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TRANSMITTAL OF RESPONSES TO OEPA COMMENTS ON THE GROUNDWATER MODELING REPORT - SUMMARY OF MODEL DEVELOPMENT

09/21/93

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RESPONSES

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SEP 21 1993

DOE-3034-93

Mr. James A. Saric, Remedial Project Director
U.S. Environmental Protection Agency
Region V - 5HRE-8J
77 W. Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Graham E. Mitchell, Project Manager
Ohio Environmental Protection Agency
40 South Main Street
Dayton, Ohio 45402-2086

Dear Mr. Saric and Mr. Mitchell:

TRANSMITTAL OF RESPONSES TO OHIO ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE GROUNDWATER MODELING REPORT - SUMMARY OF MODEL DEVELOPMENT

Reference: Letter, G. E. Mitchell to J. R. Craig, "Comments on the Groundwater Modeling Report - Summary of Model Development," dated June 17, 1993

Enclosed for your review are the subject responses. Changes will be incorporated in the report once final resolution is achieved. A segment of the requested information, however, will be included in a report entitled, Groundwater Modeling Report - Summary of Model Improvements, which will be submitted to the United States Environmental Protection Agency and the Ohio Environmental Protection Agency in April, 1994.

If you or your staff have any questions, please contact Kathi Nickel at (513) 648-3166 or Pete Yerace at (513) 648-3161.

Sincerely,

Jack R. Craig
Fernald Remedial Action
Project Manager

FN:Nickel

Enclosure: As Stated

Recycled and Recyclable

cc w/ enc:

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RESPONSE TO OHIO EPA'S COMMENTS ON FINAL GROUNDWATER MODELING REPORT - SUMMARY OF MODEL DEVELOPMENT

Ohio EPA Comment No: 1 **Section No: 5.1.5** **Page No: 5-14**

Comment: As was previously commented on in the Draft Groundwater Report, a table of posted residuals (observed minus the simulated heads) would be very informative. This would be similar to the concentration comparisons (Table 6-3 for example). Further this would be used to prepare a chart of measured versus simulated to examine for clustering.

Response: DOE agrees that a table of posted residuals (observed minus simulated heads) would be very informative. It was not included in the report because DOE is currently updating the model. A table of posted residuals will be included in the "Groundwater Modeling Report - Summary of Model Improvements," which will be prepared once planned model improvements are completed. The groundwater model revisions which are planned are presented in the "Groundwater Modeling Evaluation Report and Improvement Plan." Figure 1-4, Overall Model Improvement Program, of this report presents the proposed sequence for improvements and the reports which will be generated prior to the OU5 RI report.

Action: A table of posted residuals (observed minus simulated heads) will be prepared once the groundwater model is revised. This table will be included in the "Groundwater Modeling Report - Summary of Model Improvements."

Ohio EPA Comment No: 2 **Section No: 5.2.3** **Page No: 5-34**

Comment: A brief discussion of the vertical head gradient is presented, but the significance is understated. In Appendix D of the 1992 Groundwater Report, hydrographs of the 1000 wells are presented, followed by grouped 2000, 3000, and 4000-series wells. While most of the 2000, 3000, and 4000 locations show little head variation, some do. For example, at the -001 site in the northwest portion of the site, there is 1 to 2 feet of downward head differential. At the -018 site in the western-central portion, there is a 10-foot upward head difference. At the -006 site in the extreme northwest, there is a 18-foot upward head differential.

Response: Vertical gradients of the aquifer system will be re-evaluated during the groundwater model revisions. Specifically, the vertical grid resolution will be increased during model calibration. Any significant vertical head gradients which remain after recalibration will be discussed in detail in the "Groundwater Modeling Report - Summary of Model Improvements." Please refer to the "Groundwater Modeling Evaluation Report and Improvement Plan" for a discussion on the proposed improvements and the sequence of reports which will be generated.

Action: DOE agrees with the comment. DOE will evaluate the water levels at locations -001, -018, and -006 to determine if the indicated gradients exist. Any significant vertical head gradients which remain after calibration will be discussed in detail in the "Groundwater Modeling Report - Summary of Model Improvements."

Ohio EPA Comment No: 3 **Section No: 5.2.4** **Page No: 5-50**

Comment: In the draft report, particle tracking results in the regional three-dimensional flow model were presented. These were very useful and informative. These results should not have been excluded. These are the baseline "no-action" scenario.

Response: The purpose of the "Groundwater Modeling Report - Summary of Model Development" was to reiterate what model development has been done to date. Previous applications were not intended to be included in this report. The

groundwater model will be revised according to the "Groundwater Modeling Evaluation Report and Improvement Plan" and the results of the improved model's demonstrative applications, including particle tracking, will be presented in the "Groundwater Modeling Report - Summary of Model Improvements."

Action: DOE will present the results of the improved groundwater model's demonstrative applications in the "Groundwater Modeling Report - Summary of Model Improvements."

Ohio EPA Comment No: 4 **Section No: 5** **Page No:**

Comment: Data sets previously reviewed in 1992 (i.e., 3DS9-63.dat, received on January 1991) were identified as having negative thickness grid blocks. This is not realistic and the computer program was never designed to address such input. Because the same computer output files are presented in the final report, it is assumed that either the data input errors were found to be insignificant, or that the model simply allowed physically unrealistic values to read into the code and forced the values to zero. In other words, there is no evidence in the final report that the model results were checked.

Response: The SWIFT solute transport data file 3DS9-63.dat is an outdated file. This file had several UTH values of -1 for the clay interbed layer which were incorrectly input during the file's creation. The error was detected and corrected in 1990. The following is a summary of the record of correction:

- The names of the files in which the negative thickness were corrected are 3dsol12-41.dat (3DSOL) and 3dflow21c.dat (3DFLOW). The new file names after the completion of the corrections were given as 3dsol12-41c.dat (3DSOL) and 3dflow21s.dat (3DFLOW), respectively.

- Date of modification: 7-05-90 for 3dsol12-41c.dat (which is the solute transport model with a retardation factor = 12).

- Date of modification: 7-30-90 for 3dflow21s.dat (which is the 3-D flow model).

- According to information given by IT Corporation, the data input errors were found to be insignificant by comparing the modeling results of 3dsol12-41.dat and 3dsol12-41c.dat.

- 3DS9-63.dat was not used in any feasibility studies or risk assessments - the negative thickness in 3DS9-63.dat (which is the solute transport model with a retardation factor = 9) was not corrected. However, results from this model input file are included in the summary report to demonstrate the impacts of different retardation factors on the predicted solute concentrations.

The revised transport model input files (i.e., 3dsol12-41c.dat and 3dflow21s.dat) were used in the South Plume Modeling Report and RI Reports for CRU1, CRU2, and CRU4. These revised model files are the starting points of the planned model improvement activities. The revised 3DSOL file (i.e., 3dsol12-41c.dat) was provided to Ohio EPA in 1992.

Action: DOE will transmit the updated SWIFT data file to Ohio EPA.

Ohio EPA Comment No: 5 **Section No: 6.2.2** **Page No: 6-14**

Comment: The new Figure 6-7 compares the regional and local simulated heads. It is not clear why the boundary heads do not match exactly. If the local model is based on interpolation of fixed heads from the regional model, then the two models should coincide along the model perimeter. There is a significant deviation between the regional and local model in the northern portion of the grid beneath Paddys Run. The difference appears to be the result of an error either in establishing the perimeter fixed heads or in the recharge flux rate used to represent Paddys Run. These differences should be explained. The model nesting procedure should not create such significant differences along the model perimeter.

Response: Figure 6-7 was made by superimposing the potentiometric surface maps from the calibrated run 2dflow92 (Figure 20-3 of draft Groundwater Report, December 1990) and the calibrated run 3dflow21c (Figure 20-19 of draft Groundwater Report, December 1990). Both of these models are regional flow models. Hence, Figure 6-7 was mislabeled and should not be used to compare regional and local model simulated heads. Differences between the two contour sets are due to changes in bedrock elevations between the 2-D and 3-D flow models, as well as the different hydraulic conductivity and recharge values used by the models. In general, the 3-D models were improved from the 2-D models, with higher resolution and updated model parameters. The 2-D flow models were not revised with the updated parameters used in the 3-D models. The 2-D models were developed as intermediate steps during the development process of the 3-D models. Currently, these 2-D models are not being used in the RI/FS.

No potentiometric surface map was made for 2DSOL during the telescoping process from the regional model to the local model. The pressure difference between the regional and local simulated heads were checked in all of the overlayed cells of both models using a post-processing program. This program verified that the flow system in the solute transport model was successfully imported from the regional flow model. The hard copies from the computer printout are saved in our QA records. The same validation process was performed for the 3-D regional and local models.

Action: An errata sheet will be issued to explain that Figure 6-7 is mis-labeled and should be disregarded along with references to it. The errata sheet will specifically delete the reference to Figure 6-7 on page 6-10 and will change the reference from Figure 6-7 on page 6-13 to Figure 6-6.

Ohio EPA Comment No: 6 **Section No: 6.3** **Page No:**

Comment: All results for retardation factor of 9 have been moved into Appendix C. The main text refers confidently to the case with a retardation of 12. The implication is that the sensitivity runs (Table 21-8 in the Groundwater Report) are less important (appearing on the last page).

Response: The retardation factor will be re-evaluated during model improvement. Additional data (e.g., groundwater concentrations and geochemical tests) are now available which will allow for a better determination of retardation factor. Additional sensitivity tests will also be performed on the improved model. The final results of the retardation factor determination and sensitivity analysis will be presented in "Groundwater Modeling Report - Summary of Model Improvements."

Action: DOE will present final results of both the retardation factor determination and sensitivity analysis in the "Groundwater Modeling Report - Summary of Model Improvements."

Ohio EPA Comment No: 7 **Section No: 6.3** **Page No:**

Comment: The 70-year predictions have been removed from the draft report. These runs can be described as the "no-action" scenario. These should not have been removed in the final report.

Response: The "Groundwater Modeling Report - Summary of Model Development" was intended to summarize previous model development and not previous applications. DOE is currently updating the groundwater model. Demonstrative applications with the improved model including new 70-year predictions will be presented in "Groundwater Modeling Report - Summary of Model Improvements."

Action: DOE will present demonstrative applications using the improved model including new 70-year predictions in the "Groundwater Modeling Report - Summary of Model Improvements."