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Department of Energy

Ohio Field Office
Fernald Closure Project
175 Tri-County Parkway
Springdale, Ohio 45246
(513) 648-3155

NOV 3 2004

DOE-0047-05

Mr. James A. Saric, Remedial Project Manager
United States Environmental Protection Agency
Region V, SR-6J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Ms. Val Orr
Ohio Environmental Protection Agency
Division of Drinking and Ground Waters – UIC Unit
P.O. Box 1049
Columbus, OH 43216-1049

Dear Mr. Saric, Mr. Schneider, and Ms. Orr:

TRANSMITTAL OF RESPONSES TO THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY AND OHIO ENVIRONMENTAL PROTECTION AGENCY COMMENTS AND THE REVISED GROUNDWATER REMEDY EVALUATION AND FIELD VERIFICATION PLAN

References:

1) Letter DOE-0314-04, W. Taylor to J. Saric/T. Schneider, "Transmittal of the Fernald Closure Project Groundwater Remedy Evaluation and Field Verification Plan," dated June 29, 2004

2) Letter J. Saric to J Reising, "Groundwater Remedy Evaluation and Field Verification Plan," dated August 24, 2004

3) Letter T. Schneider to W. Taylor, "Comments on Groundwater Remedy Evaluation Plan," dated September 1, 2004

Enclosed for your review are responses to comments received on the Groundwater Remedy and Field Verification Plan (as noted in References 2 and 3), and a revised copy of the plan that incorporates the comment responses. The enclosed documents also reflect input received during

a site visit by the United States Environmental Protection Agency (USEPA) and Ohio Environmental Protection Agency (OEPA) on Tuesday, September 28, 2004, and a phone conversation with GeoTrans on Tuesday, October 5, 2004.

If you have any questions or need further information, please contact Johnny Reising at (513) 648-3139.

Sincerely,

WJ Taylor

William J. Taylor
Director

FCP:Lojek

Enclosure: As Stated

cc w/enclosure:
D. Lojek, OH
J. Reising, OH
T. Schneider, OEPA-Dayton (three copies of enclosure)
G. Jablonowski, USEPA-V, SR-6J
M. Cullerton, Tetra Tech
F. Bell, ATSDR
M. Shupe, HSI GeoTrans
R. Vandegrift, ODH
AR Coordinator, Fluor Fernald, Inc./MS78

cc w/o enclosure:
R. Abitz, Fluor Fernald, Inc./MS64
K. Alkema, Fluor Fernald, Inc./MS01
K. Broberg, Fluor Fernald, Inc./MS52-5
J. Chiou, Fluor Fernald, Inc./MS64
E. Henry, Fluor Fernald, Inc./MS52-5
W. Hertel, Fluor Fernald, Inc./MS52-5
F. Johnston, Fluor Fernald, Inc./MS52-5
M. Kopp, Fluor Fernald, Inc./MS52-5
C. Murphy, Fluor Fernald, Inc./MS01
D. Nixon, Fluor Fernald, Inc./MS01
D. Powell, Fluor Fernald, Inc./MS64
ECDC, Fluor Fernald, Inc./MS52-7

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RESPONSES TO
U. S. AND OHIO ENVIRONMENTAL PROTECTION AGENCY
TECHNICAL REVIEW COMMENTS ON
GROUNDWATER REMEDY EVALUATION
AND FIELD VERIFICATION PLAN

FERNALD CLOSURE PROJECT
FERNALD, OHIO

OCTOBER 2004

U.S. DEPARTMENT OF ENERGY

RESPONSES TO UNITED STATES ENVIRONMENTAL PROTECTION AGENCY TECHNICAL REVIEW COMMENTS ON THE GROUNDWATER REMEDY EVALUATION AND FIELD VERIFICATION PLAN

SPECIFIC COMMENTS

1. Commenting Organization: U.S. EPA Commenter: Saric
Section #: 2.2.1 Pg #: 6 Line #: Not Applicable (NA) Code: C
Original Specific Comment #: 1
Comment: Figure 2.2.1 shows little more than the general agreement of plume geometry between the data dated December 31, 2003, and the data dated December 31, 2002 (updated with 1 year of modeling). Other than this, it is unclear what other conclusions can be drawn from the figure concerning model calibration. A map showing the residual concentrations between the two initial conditions would provide additional data to allow quantitative comparison of the two potential initial conditions. In addition, running the model for 1 year and comparing the results to the data set from December 31, 2003, provides little information on the overall transport model's calibration and ability for long-term prediction. Considering the significant amount of groundwater quality data collected over the years, a much more rigorous transport model calibration could probably be conducted

Response: Because of DOE's continuing effort to improve the site groundwater model, initial conditions in the model were updated with the most recent field data available through December 2003. These initial conditions replaced those developed from data as of December 2002 used in previous modeling runs. Figure 2.2.1 was included in the subject report to show the general agreement of plume geometry between initial conditions developed from data up to December 2002 and those developed from data up to December 2003.

Initial concentration conditions in the groundwater model were updated using data collected through the December 31, 2003. Observed versus predicted wellhead concentrations were compared using plots of concentrations versus time. Model predicted concentrations more closely matched observed concentrations when initial conditions in the model were developed using the average monitoring well concentration for 2003 rather than using the maximum well concentration. Initial conditions were previously developed with the maximum concentration from each monitoring location. These concentrations versus time plots were presented in Attachment A.1 of the 2003 Integrated Site Environmental Report (ISER).

The spatial statistics of the December 2003 data were different than those of earlier data sets in that horizontal and vertical ranges on the semi-variograms were 300 ft and 20 ft respectively compared to ranges from 500 to 700 feet horizontally and 50 to 70 feet vertically observed in earlier data. This smaller range in the December 2003 data set is due to more closely spaced data with more vertical resolution from the use of direct push samples. Figures 2.2.2 and 2.2.3 were included in the report to demonstrate the spatial statistics of the December 2003 data set.

With smaller horizontal and vertical ranges in the December 2003 data set, the Kriging radius used to develop initial conditions was set at 300 feet with a horizontal to vertical anisotropy ratio of 15 for a vertical Kriging radius of 20 feet. Consequently, the resulting initial condition plume had less vertical smearing of the plume with depth and higher concentrations around data "hot spots". For example, the maximum concentration in the initial condition file developed from December 2002 data was 481 micrograms per liter (μg/L) in model layer 12 while the maximum concentration was 591 μg/L in model layer 12 in the initial condition file developed from December 2003 data. The total dissolved and sorbed mass in the 2002 initial conditions was 762 lbs. and 5,335 lbs. respectively compared to 641 lbs. dissolved mass and 4,491 lbs. sorbed mass in the 2003 initial conditions [assuming a partition coefficient (Kd) of

3.0 liters per kilogram (L/kg)]. Total mass in the initial conditions was 6,097 lbs. in 2002 and 5,132 lbs. in 2003, a difference of 965 lbs. This value compares favorably with the 1,162 lbs. of total uranium removed by pumping during 2003.

Action: Plan will be revised to include information provided in response.

2. Commenting Organization: U.S. EPA Commenter: Saric
Section #: 2.2.1 Pg #: 6 Line #: NA Code: C
Original Specific Comment #: 2
Comment: The text states that the initial conditions based on the December 31, 2003, data show higher uranium concentrations than the initial uranium concentrations based on December 31, 2002, data. It is unclear how concentrations in the aquifer can be increasing. This statement may intend to say that the December 31, 2003, uranium concentrations are higher than the initial conditions based on the December 2002 data updated through 1 year of modeling. The statement and its significance should be clarified.

Response: Initial conditions based on the December 31, 2003 data do show higher uranium concentrations than the initial conditions based on the December 31, 2002 data. The increase is a the result of: 1) higher uranium concentrations being measured in some of the Type-8 monitoring wells, 2) a change in the spatial statistics inherent in the data, and 3) the result of a smaller Kriging radius used on the December 2003 data set.

Action: Plan will be revised to include information provided in the response.

3. Commenting Organization: U.S. EPA Commenter: Saric
Section #: 2.2.1 Pg #: 6 Line #: NA Code: C
Original Specific Comment #: 3
Comment: The text states that the wellhead concentrations predicted from the VAM3D transport runs more closely agree with observed concentrations when the most recent data are used as the initial condition data set. The phrase "most recent data" is confusing. If it refers to the December 31, 2003, data set, then it is unclear which data set the predicted wellhead concentrations are compared to after the VAM3D transport run is complete. This statement and its significance should be clarified.

Response: Initial conditions for the transport model developed from the December 2003 data set are used to predict initial wellhead concentrations as represented in the transport model at time zero based on the extraction well screen elevations and hydraulic conductivities in the model. These predicted wellhead concentrations at time zero are compared to the actual measured concentrations from the extraction wells for the same time. Predicted wellhead concentration curves from the model for future times are compared with extrapolated trend line fits to observed wellhead concentrations. Ideally, the extrapolated wellhead concentration decline curves from observed values should agree with the predicted wellhead concentration decline curves from the transport model.

Action: Text will be revised to remove the confusing usage of the term "most recent data".

4. Commenting Organization: U.S. EPA Commenter: Saric
Section #: 2.2.1 Pg #: 6 Line #: NA Code: C
Original Specific Comment #: 4
Comment: The text states that an unexpected benefit to using a new initial condition is a cleanup time reduction of 4 to 5 years if all other variables are held constant. This "new" initial condition may also affect the amount of treatment required to meet the discharge limits. Because prior agreements on discharge limits were made based on the "old" initial condition, the text should clarify the impact the new initial condition would have on the treatment required to

meet discharge limits. Depending on the significance of this evaluation, additional discussion may be required regarding which initial condition is best suited for decision-making purposes.

Response: As explained in the Test Plan, modeling results indicate that established discharge limits can be met using pumping rates defined for Modeling Approach C. Discharge limits can also be met using pumping rates defined for modeling Approach C-Improved because 1200 + gpm will be available for groundwater treatment. Treatment capacities are defined in Section 5 of the Operations and Maintenance Master Plan for the Aquifer Restoration and Wastewater Treatment (OMMP, Revision 2) for different operational time periods. These treatment capacities are used in the Test Pump spreadsheet to determine the flow weighted discharge concentration for the entire treatment process when different quantities of water are treated, including pumped groundwater. Pumping rates for Approach C and Approach C-Improved are presented in Tables 2.1.1 and 3.1.1 respectively. Using pumping rates defined in Tables 2.1.1 and 3.1.1 and the treatment capacities defined in the OMMP, no additional treatment capacity is required to meet the established discharge limits under Modeling Approach C and Approach C-Improved above and beyond what is already planned.

Action: No change to the plan required.

5. Commenting Organization: U.S. EPA Commenter: Saric
Section #: 2.2.1 Pg #: 6 Line #: NA Code: C
Original Specific Comment #: 5
Comment: The text states that when more recent "direct push" sampling data overlapped with older data at the same location, the more recent data were used. If multiple direct-push sampling data were collected from the same location in 2003, the data should be averaged to allow comparison with the groundwater monitoring well data set, which was averaged for the 2003 time period.

Response: Multiple direct-push sampling data were not collected from the same location in 2003.

Action: Plan will be revised to include the information presented in the response.

6. Commenting Organization: U.S. EPA Commenter: Saric
Section #: 2.2.1 Pg #: 6 Line #: NA Code: C
Original Specific Comment #: 6
Comment: The figure's numbers are incorrect and should be corrected throughout the document.

Response: The error is limited to figures in Section 2.

Action: Plan will be revised with correct figure numbers in Section 2.

7. Commenting Organization: U.S. EPA Commenter: Saric
Section #: 2.2.1 Pg #: 6 Line #: NA Code: C
Original Specific Comment #: 7
Comment: The text refers to two figures that show the horizontal and vertical semi-variograms from the input total uranium data but does not discuss their significance. The report should provide additional detail on the significance of these figures and their impact on developing the initial conditions.

Response: This comment is similar to US EPA Original Specific Comment #1. Please see comment response to U.S. EPA Original Specific Comment #1.

Action: Please see action to U.S. EPA Original Specific Comment #1.

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8. Commenting Organization: U.S. EPA Commenter: Saric
Section #: 2.3 Pg #: 7 Line #: NA Code: C
Original Specific Comment #: 8
Comment: The text states that the Operable Unit (OU) 5 Record of Decision (ROD) discharge limits could be met using the pumping rate defined in Approach C. The text does not contain or refer to supporting documentation for this statement. The text should be revised to contain or refer to supporting documentation for this statement.

Response: The ability to meet discharge limits was assessed using "Test Pump". Test Pump is an excel spreadsheet that calculates a flow weighted discharge concentration based on predefined treatment capabilities and pumping rates. Groundwater treatment capacity will be limited the most during the Converted Advanced Wastewater Treatment (CAWWT) Facility construction time period. If discharge limits can be met during this time period then discharge limits will be met during the subsequent pumping periods also. Table 5.1 illustrates that the discharge limits can be met during the CAWWT construction time period. The blended outfall concentration is predicted to be 26 µg/L and the mass of uranium per year to the river is predicted to be 589 pounds.

Action: Plan will be revised to include information presented in the response.

9. Commenting Organization: U.S. EPA Commenter: Saric
Section #: 3.2.2 Pg #: 10 Line #: NA Code: C
Original Specific Comment #: 9
Comment: The text states that Figure 3.2.1 illustrates how recharge is distributed in model nodes representing the storm sewer outfall ditch. The text should also state how the recharge was introduced into the model and at what layers. For example, the text should clarify if recharge was simulated by (1) a series of extraction wells open to various layers, (2) as a "stream" segment with an assumed conductance value of the stream bed, or (3) simply using a greater recharge number. The 500-gallon-per-minute recharge rate's method of introduction into the model may have significantly different impacts on groundwater flow and quality results.

Response: The 500 gallon per minute (gpm) recharge in the Storm Sewer Outfall Ditch (SSOD) was simulated in the VAM3D model by increasing the recharge by 50 gpm at each of 10 model nodes along the SSOD and at the model's top surface.

Action: Plan will be revised to include information presented in the response.

10. Commenting Organization: U.S. EPA Commenter: Saric
Section #: 4.1 Pg #: 12 Line #: NA Code: C
Original Specific Comment #: 10
Comment: The text states that the initial conditions used for Approach C and Approach C Improved differ from the initial conditions used in the comprehensive groundwater strategy report. The text should clearly states that the change in initial conditions will result in a cleanup time reduction of 4 to 5 years. The text should also evaluate the impact of this change of initial conditions on the treatment required to meet the discharge limits.

Response: This comment is similar to U.S. EPA Original Specific Original Specific Comment #4.

Action: Please see comment response to U.S. EPA Original Specific Comment #4.

11. Commenting Organization: U.S. EPA Commenter: Saric
Section #: 5.0 Pg #: 16 Line #: NA Code: C
Original Specific Comment #: 11
Comment: The text states that upon completion of the first field verification exercise, the remedy system will be calibrated. This statement is unclear. The text should specify which system elements will be calibrated and the calibration method.

Response: The objective is to adjust system operation so that capture of the uranium plume is optimized while maintaining discharge limits. This will be accomplished by adjusting pumping rates in the field.

Action: Plan will be revised to make intentions clearer.

12. Commenting Organization: U.S. EPA Commenter: Saric
Section #: 5.0 Pg #: 16 Line #: NA Code: C
Original Specific Comment #: 12
Comment: The text presents an aggressive approach for collecting a significant amount of groundwater elevation data; however, the text does not include comparison of pre- and post-injection shutdown water levels to those predicted by the groundwater model. This comparison would allow a very good opportunity to test the calibration and prediction capabilities of the groundwater flow model. The report should include a groundwater flow model calibration effort complete with pre-established calibration targets and analysis. The same should be done with the data collected from the storm sewer outfall ditch recharge capability.

Response: Disagree. The VAM3D groundwater flow model was calibrated in 2000 (Great Miami Aquifer VAM3D Flow Model Recalibration Report) to an October 1998 groundwater elevation data set. The model calibration was validated with dry and wet season groundwater elevation data sets from October 1999 and July 1998 respectively.

Groundwater elevation data collected as part of the Groundwater Remedy Evaluation and Field Verification Plan will be compared to flow model predictions of pre- and post-injection shutdown water levels and SSOD recharge capabilities. If flow model predictions are not in agreement with observations as defined by the calibration criteria defined in Section 3.7 of the Integrated Environmental Monitoring Plan, Revision 3 (January 2003), then a flow model calibration will be performed.

Action: No change to the plan required.

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RESPONSES TO OHIO ENVIRONMENTAL PROTECTION AGENCY TECHNICAL REVIEW COMMENTS ON GROUNDWATER REMEDY EVALUATION AND FIELD VERIFICATION PLAN

13. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 1.1 Pg.#: 2 Line #: 15 Code: C
Original Specific Comment #: 1
Comment: The text states that the modeling presented in the Comprehensive Groundwater Strategy Report indicates that continuing well-based re-injection will only shorten the aquifer remedy by four years. This statement requires extensive qualification. The cited modeling effort is based on a simplistic representation aquifer heterogeneity, assumes a linear distribution coefficient, and ignores the sorbed total uranium mass present in the portion of the aquifer dewatered as a result of the remediation. Recognition of these limitations requires that the predicted cleanup time be characterized as overly optimistic. A more realistic treatment of these, and perhaps other issues in the model, would show a greater value of well-based reinjection for reducing cleanup time.

Response: The simplifying assumptions in the groundwater model have been previously acknowledged and discussed in various reports. Regardless of the limitations, the groundwater model is the only tool available for predicting future outcomes of the groundwater remedy under different alternative pumping conditions. Comparison runs made with the model are more reliable than absolute dates predicted by the model for any single pumping scenario.

Action: No change to the plan required.

14. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 2.0 Pg.#: 4 Line #: 26 Code: C
Original Specific Comment #: 2
Comment: An explanation of how the "nominal" boundary conditions were derived is needed. Alternatively, a document citation should be provided.

Response: An explanation of how the "nominal" boundary conditions were derived can be found in the Great Miami Aquifer VAM3D Flow Model Recalibration Report, which was issued in 2000. Nominal corresponds to the October 1998 elevation data set.

Action: Plan will be revised to include information provided in the response.

15. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 2.2.1 Pg.#: 6 Line #: 14 Code: C
Original Specific Comment #: 3
Comment: Direct push data at the site predates the startup of remediation pumpage in many portions of the site. Mixing this data with recently measured concentrations will result in a more inaccurate estimation of initial conditions than might be obtained by considering more up-to-date direct push information only.

Response: The process of replacing older geoprobe data with newer geoprobe data has and will continue to take place. Almost all of the direct-push data that predates the active remediation have been replaced by post start-up data, and were not used to determine initial conditions. Thirty direct-push locations were probed prior to the start of remediation pumping in 1998. Only four of these locations were used to help determine initial conditions for Approach C and Approach C-Improved. These four locations are shown in Figure A.2-3A of the 2003 IEMP. Of these four locations, only one is located within the uranium plume.

Of the remaining direct-push data there are approximately 78 locations dating from 1999 to 2001, 21 locations dating from 2002, and 25 locations dating from 2003 that were used to develop initial conditions. As shown in Figure A.2-3A of the 2003 ISER, these data are located in the Waste Storage Area and South Field. Because these locations have not been re-sampled using a direct-push sampling tool, eliminating them would result in the loss of valuable control points for the Kriging process.

Action: No change to the plan required.

16. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 2.3 Pg.#: 7 Line #: 9 Code: C
Original Specific Comment #: 4
Comment: It is unclear how the model substantiates or refutes the claim that the Operable Unit 5 Record of Decision pumping rates can be met or exceeded by "Approach C". Please explain and provide justification for this statement.

Response: The OU5 ROD refers to a modeling scenario based on 28 wells, operating 27 years, at a combined maximum pumping rate of 4000 gpm. Tables 2.1.1 and 3.1.1 list pumping rates for Approach C and Approach C Improved respectively. The lowest net extraction rate for Approach C is 4275 gpm, and the lowest net extraction rate for Approach C Improved is 4565 gpm.

Action: Plan will be revised to include information provided in the response.

17. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 2.3 Pg.#: 7 Line #: 17 Code: C
Original Specific Comment #: 5
Comment: The recognition and apparent acceptance that a stagnation zone will develop once reinjection is stopped is disconcerting given that a major overhaul of the remediation system is being contemplated here. More specific actions should be proposed at this time to address it. A more proactive approach than the proposed managed natural attenuation-type passive monitoring strategy is recommended.

Response: Both the South Plume, and South Field Extraction Wells will continue to pump so the approach being taken is not "managed natural attenuation-type- passive monitoring". As discussed in Section 2.3 of the plan, pulse pumping the existing extraction wells in the area will be considered. The installation of additional extraction wells in the area has not been ruled out, but being located on private property hinders it.

Action: No change to the plan required.

18. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 3.0 Pg.#: 9 Line #: 2 Code: C
Original Specific Comment #: 6
Comment: DOE's stated objective for evaluating induced recharge through the SSOD is to determine whether or not the SSOD can provide recharge to the aquifer at a maximum rate of *up to 500 gpm*. Considering that the current design reinjection rate for the system as a whole is 1400 gpm, the selection of 500 gpm as the maximum target rate for the SSOD is too low and has not been justified. DOE should define the objective of this evaluation to be the determination of the *maximum* rate of induced recharge that can be achieved by reinjection through the SSOD. At a minimum, DOE needs to indicate a technical basis for limiting the maximum reinjection rate considered to 500 gpm.

Response: The rate of 500 gpm was selected because groundwater modeling has shown that a rate lower than 500 gpm offers no real cleanup benefit. So if infiltration through the bed of the SSOD can deliver 500 gpm to the aquifer, it would be worth pursuing. If the test is successful and plans are made to utilize this strategy in the remedy, a flow rate higher than 500 gpm will be considered, but logistics involving a source of clean water for injection and meeting established discharge limits at the Parshall Flume will need to be evaluated also. The field verification plan presented in Section 5 will be revised to reflect a more aggressive and robust assessment of inducing recharge down the SSOD. The plan will include a baseline test for 500 gpm flow into the northeastern branch of the SSOD, gauging of additional seasonal flows carried by the SSOD, and the possible use of infiltrometers at select locations along the bed of the SSOD to calculate infiltration rates. If the baseline 500 gpm test in the northeastern branch of the SSOD is successful later work will be conducted to determine the maximum flow rate that could be sustained, using the entire SSOD, not just the northeastern fork. This later work would not be conducted until after the northwestern branch of the SSOD has been remediated, so it can be included in the testing. If the baseline 500 gpm test is not successful, a later test will be conducted after the northwestern branch of the SSOD has been remediated so it can be included in the test. This early work in the northeastern branch of the SSOD may allow DOE to begin inducing recharge down the SSOD immediately after completion of the test, rather than wait until the northwestern branch of the SSOD has been remediated in late 2005.

Action: As stated in response.

19. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 3.0 Pg.#: 9 Line #: 3 Code: C
Original Specific Comment #: 7
Comment: Provide an explanation why treated groundwater, available at much greater quantity from the CAWWT, was not considered as the most likely source for reinjection water to the SSOD.

Response: During the planned testing time period the AWWT will be undergoing carve down into the CAWWT. Until storm water is removed from the treatment equation, the CAWWT will not provide enough treated groundwater for a re-injection operation. Once storm water no longer requires treatment, use of treated groundwater from the CAWWT can be considered.

Action: No change to the plan required.

20. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 3.0 Pg.#: Line #: 3 Code: C
Original Specific Comment #: 8
Comment: Pumping uncontaminated groundwater from the construction wells and reinjecting that water into a contaminated portion of the aquifer raises the question of whether or not this is an defensible use of the resource. Use of treated site groundwater for reinjection purposes avoids this issue. Contaminating otherwise useable groundwater may become a negative public perception issue, particularly during drought periods.

Response: DOE was pursuing this route based on discussions with Ohio EPA at the March 18, 2004 meeting; therefore, DOE believes that this is a defensible use of the resource. A pumping rate of 500 gpm is very small compared to the capacity of the Great Miami Aquifer, the impact to the aquifer will be negligible. If a troublesome drought period is experienced in the future, suspension of re-injection operations can be considered. Treated site groundwater could be available for re-injection after the site's storm water treatment needs end.

Action: No change to the plan required.

21. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 3.2.2 Pg #: 10 Line #: 22 Code: C
Original Specific Comment #: 9
Comment: Water will be ponded in the SSOD from the position of the weir shown on Figure 3.1 to some point upstream. Figure 3.2.1 shows the model blocks where recharge from the SSOD was applied in the model. Based on site topography in the vicinity of the SSOD, the locations of these blocks do not correspond to the location of the portion of the stream where water will pond and recharge to the aquifer will occur. Please explain this discrepancy. The model conclusions should be revalidated if the SSOD-induced recharge was misapplied.

Response: Infiltration was loaded into the groundwater model in an area that corresponds to the point in the SSOD where surface water will infiltrate into the GMA due to the absence of glacial overburden. This point was taken from Figure 3-10 of the OU5 Remedial Investigation Report (1996). Ponding of water at the Weir locations will be minimal. As shown in Table 5.2 of the plan, a 5-foot wide Weir can meter a flow of approximately 2000 gpm with only a 5-inch rise in water level.

Action: No change to the plan required.

22. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 3.3 Pg #: 11 Line #: 7 Code: C
Original Specific Comment #: 10
Comment: It is not clear how the model substantiates or refutes the claim that the Operable Unit 5 Record of Decision established discharge limits would not be met with the pumping rates defined for "Approach C-Improved". Please explain and provide justification for this statement.

Response: Table 5.3 of the plan presents Test Pump results for Approach C-Improved from April 1, 2005 to April 1, 2006. Test pump is an excel spreadsheet. Page three of the table shows that the average outfall concentration during this time period would be 30.6 µg/L and that the mass of uranium per year would be 802 pounds. The established discharge limits are a monthly uranium concentration average of 30 µg/L and 600 pounds of uranium per year.

Action: No change to the plan required.

23. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 3.3 Pg #: 11 Line #: 15 Code: C
Original Specific Comment #: 11
Comment: Clarify what is meant by stating that "Approach C-Improved" only provides for 800 gpm groundwater treatment.

Response: When Approach-C Improved was modeled it was believed that only 800 gpm of treatment capacity would be available for the treatment of groundwater. This estimate was used as input for Test Pump to predict outfall levels at the Parshall Flume. This treatment capacity estimate has changed. New treatment capacity estimates are presented in Section 5 of the OMMP, Revision 2. A higher treatment capacity (minimum of 1200 gpm) is now being targeted for groundwater. Increasing this minimum capacity is dependent upon the treatment capacity needed to treat storm water. If the capacity set aside for the treatment of storm water treatment is not utilized, more groundwater can be treated. Test Pump is used to predict outfall levels using defined treatment capacities, treatment effluent concentrations, and extraction well pumping rates. Results serve as a guide for predicting if a modeled pumping and treatment scenario will meet discharge limits. Operational data will dictate how the system is actually operated (i.e., extraction rates, routing of water to treatment) in order to meet discharge limits at the Parshall Flume.

Action: No change to the plan required.

24. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 3.3 Pg #: 11 Line #: 20 Code: C
Original Specific Comment #: 12
Comment: The text notes that it is unknown if the SSOD is capable of delivering 500 gpm recharge to the aquifer. The model is an obvious tool to use for estimating SSOD aquifer recharge capability. The SSOD should be re-defined in the model as a head dependent flux boundary and the maximum potential reinjection rate should be estimated given realistic assumptions regarding the hydraulic conductivity of SSOD bottom sediments. As an example, a three-dimensional flow model of the site was used to calculate an informal estimate of the reinjection rate that the SSOD might be able to sustain. The analysis simulated two weirs on the SSOD, one located at the culvert that runs beneath the road just south of the former Active Flyash Pile Area (the position shown on Figure 3.1) and the other located approximately 700 feet upstream from that point. If a sufficient re-injection flow is made available to allow water to pool behind both weirs, the resulting pool elevations would be approximately 545 and 550 feet, respectively. Assuming an SSOD bottom material hydraulic conductivity of 3.8 feet/day, a recharge rate of 1800 gpm was calculated. Although only a preliminary estimate based on limited site information, this analysis suggests that it can be anticipated that the SSOD may accept greater than 500 gpm flow rates.

Response: As discussed in the response to Ohio EPA Original Specific Comment #6, groundwater modeling has shown that a rate lower than 500 gpm offers no real cleanup benefit to the aquifer. So if infiltration through the bed of the SSOD can deliver 500 gpm to the aquifer, it would be worth pursuing. As also discussed in Ohio EPA Original Specific Comment #6, if plans are made to utilize this strategy in the remedy, a flow rate higher than 500 gpm will be considered, but logistics involving a source of clean water for injection and meeting established discharge limits at the Parshall Flume will need to be evaluated also.

Action: See action for Ohio EPA Original Specific Comment #6.

25. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 5 Pg #: 15 Line #: 13 Code: C
Original Specific Comment #: 13
Comment: A water level transducer and data logger should also be installed in Monitoring Well 23279 located near Re-Injection Well 33263. Data provided by this transducer will show how much the water level falls in the vicinity of this re-injection well after pumping has stopped and verify that water level stability has been attained in the northwestern portion of the South Field.

Response: Agree.

Action: A water level transducer and data logger will also be installed in Monitoring Well 23279.

26. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 5 Pg #: 15 Line #: 27 Code: C
Original Specific Comment #: 14
Comment: Consideration should be given to including in the capture and flow interpretations a *quantitative* analysis of flow direction and gradient (e.g., based on well triads).

Response: Agree.

Action: Key areas will be assessed using well triads to determine flow direction and gradient.

27. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 5 Pg #: 16 Line #: 24 Code: C
Original Specific Comment #: 15
Comment: DOE has developed an extensive sediment characterization plan for the SSOD (PSP for Predesign Characterization of Sediments in Paddys Run and Associated Drainage Features, March 15, 2004). As a result of the sampling discussed in that document, a sediment excavation design for at least portions of the SSOD will likely be developed. The excavation of extensive sediment volumes from the ditch will likely result in an increase in bottom sediment hydraulic conductivity in the affected areas. In order to enhance the infiltration capabilities of the SSOD, the excavation of bottom sediments along its entire length should certainly be considered. At a minimum, the field trial discussed in this plan should be delayed until all SSOD remediation activities have been completed.

Response: As discussed in response to Ohio EPA Original Specific Comment # 6, this test is a baseline test to determine if the SSOD is capable of accepting 500 gpm. The test will not include the northwestern branch of the SSOD where most of the soil and sediment FRL exceedances in the SSOD are located. If the test is successful and plans are made to utilize this strategy in the remedy, a flow rate higher than 500 gpm will be considered, but logistics involving a source of clean water for injection and meeting established discharge limits at the Parshall Flume would need to be evaluated also. If higher rates are evaluated at a later date, as a means of optimizing infiltration through the SSOD, then DOE agrees that this future phase of testing should be delayed until all SSOD remediation activities have been completed, and should include the northwestern branch of the SSOD also. Excavation of bottom sediments in the SSOD will be considered as part of future testing, not the initial 500 gpm test.

Action: See action for Ohio EPA Original Specific Comment # 6.

28. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 5.0 Pg #: 16 Line #: last line Code: C
Original Specific Comment #: 16
Comment: The text states that the west fork of the SSOD contains sediment contamination and will not receive discharge or be a part of this test.

This is unacceptable. A plan to effect the remediation of the west fork should be submitted for approval. The remediation of this area should precede the implementation of the assessment of induced recharge.

Response: This comment is similar to Ohio EPA Original Specific Comment #15.

Action: See comment response for Ohio EPA Original Specific Comment #15.

29. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 5 Pg #: 16 Line #: 29 Code: C
Original Specific Comment #: 17
Comment: In addition to the contamination noted in the northwestern fork, the background section of the PSP for Predesign Characterization of Sediments in Paddys Run and Associated Drainage Features (March 15, 2004) notes that contaminated runoff also enters the northeastern fork of the SSOD. The PSP calls for sediment samples to be collected along the northeastern fork. The field trial should be delayed until the results from these samples have been reviewed.

Response: Preliminary data from this study have been reviewed. The northeastern fork of the SSOD does not contain any above soil or sediment FRL contamination. Sporadic soil and sediment FRL exceedances are present in the SSOD south of the confluence of the northwestern fork and the northeastern fork, but DOE believes the risk to the environment from running clean

water down the lower section of the SSOD is minimal. Flushing this lower section of the SSOD with clean water is no different than allowing storm water to run down the ditch. The constituents with exceedances in the lower portion of the SSOD are fairly insoluble to water (thorium-232, thorium-228, radium-228, radium-226, arsenic, aroclor-1254, and one hit of beryllium). The soil samples with the FRL exceedances were collected on the banks of the SSOD (some as far up as 4 feet) so it is quite possible that water from this study would not come in contact with the spots where the samples were collected.

Action: No change to test plan required.

30. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 5 Pg #: 16 Line #: 29 Code: C
Original Specific Comment #: 18
Comment: The test setup should have the capability to accommodate an increased flow rate to the SSOD from an additional clean water source in the event that field results indicate that the SSOD will reinject at a greater-than-500 gpm flow rate.

Response: As discussed in the response to Ohio EPA Original Specific Comment #6, this is a baseline test to determine if the SSOD is capable of accepting 500 gpm. If the test is successful and plans are made to utilize this strategy in the remedy, a flow rate higher than 500 gpm will be considered, but logistics involving a source of clean water for injection and meeting established discharge limits at the Parshall Flume would need to be evaluated also.

Action: See action for Ohio EPA Original Specific Comment #6.

31. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 5 Pg #: 17 Line #: 2 Code: C
Original Specific Comment #: 19
Comment: The flow meter selected for the field trial should be capable of gaging flows at least double or triple the 500 gpm rate in event that the SSOD is capable of reinjecting at a greater flow rate.

Response: This comment is similar to Ohio EPA Original Specific Comment #18. Please see comment response to Ohio EPA Original Specific Comment #18.

Action: No change to the plan required.

32. Commenting Organization: Ohio EPA Commentor: GeoTrans, Inc.
Section #: 5 Pg #: 17 Line #: 3 Code: C
Original Specific Comment #: 20
Comment: If possible, one or more additional weir(s) should be installed along the SSOD to maximize ponding. Water ponded to the greatest achievable depths along the length of the ditch will maximize the driving head for reinjection of water into the aquifer.

Response: The objective of the Weirs in the test plan is to measure flow not to pond water.

Action: No change to the plan required.