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RESPONSE TO COMMENTS ON THE PREDESIGN INVESTIGATION AND SITE SELECTION REPORT FOR THE ON-SITE DISPOSAL FACILITY

10/10/95

DOE-0027-96
DOE-FN OEPA
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RESPONSE

Department of Energy
Fernald Environmental Management Project
P. O. Box 398705
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OCT 10 1995

DOE-0027-96

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

Dear Mr. Schneider:

RESPONSE TO COMMENTS ON THE PREDESIGN INVESTIGATION AND SITE SELECTION REPORT FOR THE ON-SITE DISPOSAL FACILITY

The Department of Energy, Fernald Area Office (DOE-FN) is pleased to submit the enclosed response to the Ohio Environmental Protection Agency (OEPA) comments on the Predesign Investigation and Site Selection Report for the On-Site Disposal Facility.

Upon receiving the OEPA approval on this response, the DOE-FN will modify and issue the final version of the referenced Predesign Investigation and Site Selection Report for both the OEPA and the U.S. Environmental Protection Agency (U.S. EPA).

If you have any questions, please contact Rod Warner at (513) 648-3156.

Sincerely,

for J.W. Reising

Johnny W. Reising
Fernald Remedial Action
Project Manager

FN:Warner

Enclosure: As Stated

Recycled and Recyclable

cc w/enc:

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RESPONSE TO OHIO EPA COMMENTS ON THE DRAFT PREDESIGN INVESTIGATION AND SITE SELECTION REPORT FOR THE ON-SITE DISPOSAL FACILITY

GENERAL COMMENTS

Comment No. 1
Commenting Organization: Ohio EPA Commentor: OFFO
Section #: N/A Page #: N/A Line #: N/A Code: G
Original General Comment: 1

Comment: The report indicates that a majority of the glacial till in the study area has hydraulic conductivities between 1×10^{-8} and 7×10^{-9} cm/sec. There are areas, however, which may have hydraulic conductivities much higher than this. There are also several small detections of higher than background detections of uranium in wells screened in the gray clay. Although these detections are not in themselves high enough to be considered a threat to the GMA, they do cast some doubt on the ability of the gray clay to be as protective as some of the input parameters in the modeling have assumed the gray clay to be. If further investigation confirms this, additional measures will have to be taken to insure that any cell is protective of human health and the environment. These measures may include altering cell shape, over excavation and recompaction, or redesigning the liner system.

Response: During Feasibility Study modeling, an overall vertical hydraulic conductivity of 1.9×10^{-6} was used for the gray till. The modeling demonstrated protectiveness for human health and the environment. The measured values of hydraulic conductivity from all soil samples within the gray till were two to three orders of magnitude lower than the value used in the model. The hydraulic conductivities of till samples ranged from 1×10^{-8} to 7×10^{-9} cm/sec except in isolated cases. The highest vertical permeability measured in the gray till was 5.7×10^{-8} cm/sec (See Appendix D). Also, there were an additional 20 vertical undisturbed hydraulic conductivity tests conducted on the gray till as part of the Geotechnical Investigation for the On-Site Disposal Facility, and the range of hydraulic conductivities was between 8.4×10^{-8} to 7.7×10^{-9} cm/sec. It is also important to remember that as an added factor of safety, the liner system for the disposal facility and the brown clay were not part of the modeling though they provide increased protectiveness.

The density of that hydraulic conductivity sampling within the disposal facility footprint (34 samples) is believed to be sufficient to preclude any concerns about the overall hydraulic conductivity of the gray till within the footprint, and implies that the disposal facility shape and location are appropriate. The footprint selected was the most protective because it is underlain by the thickest average gray till with the least amount of interbedded coarse granular material.

Given the number of vertical hydraulic conductivity samples in Phases II and III of the Predesign Investigation the variability of the higher than background uranium concentrations implies variation in the past deposition of uranium within the footprint. Equilibrated lysimeter samples have yielded similar uranium concentrations and the current results should not be considered extraordinary. Also, lysimeter results from

greater depths and with similar concentrations were used to determine an effective K_d value which was used to demonstrate protectiveness in the FS modeling. The concentration of 14.4 μg/l uranium is underlain by more than 25 feet of gray till, which provides more protection than the 12 feet used for the Feasibility Study modeling.

Action: No Action.

SPECIFIC COMMENTS

Comment No. 2
Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.3.3.2 Page #: 2-18 Line #: 10 Code: C
Original Specific Comment: 2

Comment: This paragraph states that two isolated wells, 11547 and 11548 had elevated levels of uranium and that further investigation is needed to appropriately evaluate these wells. Please include a schedule within the text for conducting this additional work.

Response: This additional work was proposed in the Path Forward of the Predesign Investigation Report, Section 6.0. A schedule for the additional work will be provided to the agency as part of an addendum rather than as a modification to the Predesign Investigation Report itself. This additional work is being addressed in an addendum to the Project Specific Plan for the Predesign Investigation.

Action: The proposed schedule for the activities to be presented in the addendum is as follows:

Activity	Date
PSP/Work Plan Submitted to EPA	10/24/95
Start Field Work & Lab Analysis - Flow meter/slug tests - Groundwater sampling - Drain tile mapping - Characterization sampling	12/4/95
Complete Field Work & Lab Analysis	3/8/96
Submit Draft Report to EPA	5/26/96

Comment No. 3
Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 2.3.3.3 Page #: 2-18 Line #: 28 Code: C
Original Specific Comment: 3

Comment: This section states that background values for tritium in the region of the FEMP, and that the loading of tritium for the FEMP has not been determined. Please explain in further detail within this section as to whether or not calculating these values would be beneficial or not, and if indeed it is determined that these values would be useful, please include a schedule for conducting these calculations.

Response: Since tritium does not exist in water greater than approximately 40 years old, it may be assumed that water containing tritium is younger than forty years. The variability of the tritium may be attributed to the variability of the atmospheric concentrations of tritium

at the time of loading, which is in turn related to the increase or decrease of atmospheric nuclear tests over time. The loading of tritium in the Cincinnati area has not been documented, and since age dating would not provide accurate results within the last 40 years, calculating the background and loading of tritium would not be of further value.

Action: No action.

Comment No. 4
Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 2.3.3.3 Page #: 2-18 Line #: Code:
Original Specific Comment: 4

Comment: Though there is no background for tritium, relative comparisons can be made to see if zones of the till are impacted by relatively modern water. The actual age of the ground water is unimportant, but the presence of modern ground water indicates relatively rapid infiltration through the till. Did the tritium results indicate that the grey layer is an effective barrier to ground water infiltration, or did it indicate that there are areas which may have higher rates of infiltration?

Response: The variability in the concentrations of tritium indicates possible local variations in both hydraulic conductivity within the gray till and atmospheric concentrations of tritium. Therefore, the tritium values should not be used to indicate if the gray clay is an effective barrier. Hydraulic conductivity measurements are a better overall indicator of the protectiveness of the gray clay, and those results are in the range of $1x10^{-8}$ to $7x10^{-9}$ cm/sec.

Action: The following text has been added to page 2-18, line 33: "... heterogeneity of the till and the variability of the hydraulic conductivity within the gray till and the variation in the atmospheric concentrations of tritium over time."

Comment No. 5
Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 2.6.3 Page #: 2-48 Line #: 27-29 Code:
Original Specific Comment: 5

Comment: Does DOE believe that the high vertical hydraulic gradients indicate that the migration rate of ground water through the till is low?

Response: High vertical gradients in the till does indicate that the vertical hydraulic conductivities are low.

Action: The following text has been added to page 2-48, line 30: "...vertical hydraulic gradient exists and that the vertical hydraulic conductivity is low."

Comment No. 6
Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 2.7 Page #: 2-53 Line #: Code:
Original Specific Comment: 6

Comment: A discussion of the impact of Tc^{99} on ground water within the 1000 year design life of the cell is warranted in this report. The report only discuses the uranium component of ground water impact.

Response: Additional groundwater sampling will be conducted and the samples will be analyzed for Tc^{99}. The results for this additional activity will be addressed in a subsequent report as

an addendum to the Predesign Investigation and Site Selection Report.

Action: Groundwater samples will be analyzed for Tc^{99} during the additional sampling activity.

Comment No. 7
Commenting Organization: Ohio EPA Commentor: ODH
Section #: 2.8.2 Page #: 2-55 Line #: Code: C
Original Specific Comment: 7

Comment: The text states that wells 11547 and 11548 have elevated concentrations of Total Uranium, were resampled and analyzed on the on-site radiological laboratory. Results from this second analysis indicated Total Uranium concentrations has dropped significantly. There is no explanation as to why this variation occurs, or if samples from the same wells were to be resubmitted to the original laboratory as a quality control check. If it is determined these locales are contributing to groundwater contamination as it appears, more characterization work in these areas is essential.

Response: Agreed. There will be additional characterization work conducted for these two wells to determine the source of the uranium (see Comment No. 2). The possible sources being considered include ground water contamination from the production area, groundwater contamination from the waste water treatment facility, soil contamination within the proximity of the wells, and surface soil contamination migrating downward due to poor well construction.

Action: An addendum to the Project Specific Plan is being written to include the additional characterization and will be submitted to the EPA and OEPA.

Comment No. 8
Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 2.8.2 Page #: 2-56 Line #: 1-2 Code:
Original Specific Comment: 8

Comment: Does this not indicate that areas with higher tritium concentrations also have a higher hydraulic conductivity than those with lower tritium concentrations?

Response: See Comment 3.

Action: See Comment 3.

Comment No. 9
Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 4.3.1.1 Page #: 4-10 Line #: 32 Code:
Original Specific Comment: 9

Comment: The dilution factor is relevant to the OU5 FS, but not to this document. This investigation focuses on the hydrogeology of the proposed landfill footprint and whether or not the till can provide a barrier which is protective of human health and the environment. The importance of the presence of the uranium in the study area is not its impact on the GMA but its impact on the characterization of the local hydrogeology of the till.

Response: Since uranium is present in the area of the footprint, it becomes important to determine whether the existing concentrations have an impact on GMA within the modeling for the Feasibility Study. The discussion of the dilution factor demonstrates that the contamination found in the perched groundwater collected for the wells installed during the Predesign Investigation does not result in impacts to the GMA which alter the conclusions of the modeling.

Action: No action.

Comment No. 10
Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 4.3.1.2 Page #: 4-16 Line #: 1-4 Code:
Original Specific Comment: 10
Comment: Though the samples may not be representative of *in situ* conditions, what is the source of the uranium?
Response: The source of the uranium may either be natural or from prior production activities, or a combination of both.
Action: The following text has been added to Page 4-16.
"...the equilibrated concentrations. The concentrations of uranium prior to, and after equilibration, may be due to natural conditions or from prior production activities, or a combination of both."

Comment No. 11
Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 4.3.3.1 Page #: 4-21 Line #: 5 Code:
Original Specific Comment: 11
Comment: Is the Kd measured in L/kg or ml/kg? The entire report needs to be checked for consistency; the units vacillate between L/kg and ml/kg.
Response: Agreed.
Action: A global search for mL/g has been conducted, and it has been changed to L/kg.

Comment No. 12
Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 4.3.3.2 Page #: 4-23 Line #: 8 Code:
Original Specific Comment: 12
Comment: The Kd of 3.41 is not in very close agreement with the Kd of 10.8 calculated in batch testing. Further discussion of this is warranted.
Response: Agreed.
Action: The following text was added to page 4-23, line 8: "...was obtained. This value of 3.41 L/kg is different from that of the 10.8 L/kg, because the 3.41 value is calculated from the results of the stabilized lysimeters. This represents an effective K_d value between two different points within the till and unsaturated GMA. The 10.8 value was calculated from measured laboratory results from the K_d extraction and sampling process. Both values demonstrate more protectiveness of human health and the environment than the 3.1 L/kg used in the FS modeling."

Comment No. 13
Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: 6.1 Page #: 6-2 Line #: 19-29 Code:
Original Specific Comment: 13
Comment: How will DOE assess the impact of these tiles on the till system if they are found? What actions will be taken if drainage tiles are not found.
Response: In the past, the tile system may have influenced lateral flow in the upper 2 to 4 feet of

the till. Since the excavation for the liner system will average approximately five feet, the tile system will not influence conditions following construction of the disposal facility. The purpose for identifying the drain tile network is to plan for its removal prior to excavating the top five feet of till for borrow. Removal of the drain tile is necessary since the upper five feet of till is intended for recompaction and use in construction of the disposal facility. Location of the tiles prior to excavation will speed the recompaction effort.

Action: No action.

Comment No. 14
Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: A.1.4 Page #: A-12 Line #: 28-32 Code:
Original Specific Comment: 14

Comment: Does this indicate that there is no substantial physical difference between the brown and gray tills?

Response: This may indicate there is no substantial difference between the brown and gray tills.

Action: The following text has been added to page A-12, line 32: "...brown-gray interface. This may indicate that there is no substantial granular difference between the brown and gray tills."

Comment No. 15
Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: Page #: Line #: Code:
Original Specific Comment: 15

Comment: Text is missing between A-17 and A-24. A-17 ends in the middle of the sentence and A-24 begins a new section.

Response: The remaining text is at the top of page A-20.

Action: No action.

Comment No. 16
Commenting Organization: Ohio EPA Commentor: DDAGW
Section #: I.1.6 Page #: I-50 Line #: 37 Code:
Original Specific Comment: 16

Comment: Figure I-2 does not show the locations with high permeability. This figure should be included. Furthermore, the units for areal extent are not clear. If it is truly areal extent, the units should be square feet.

Response: The reference to Figure I-2 is a typographical error. The correct reference is to Figure I-12. The references to the dimensions of the areal extent do need to be clarified.

Action: The reference on page I-50, line 37, will be changed to Figure I-12. Also, the text has been changed to:

"The results of inverse modeling indicate that beneath the area under consideration for the disposal cell there are four subareas with potentially high permeability at the brown/gray till interface. These areas vary from approximately 150 feet by 150 feet to 400 feet by 1,000 feet in areal extent (Figure I-12). (Note that smallest model grid spacing is 100 feet and only permeability at the brown/gray till interface was estimated.)

Comment No. 17
Commenting Organization: Ohio EPA Commentor: ODH
Section #: App. L, Sampling Results Page #: Line #: Code:
Original Specific Comment: 17
Comment: It would facilitate data review if a legend and description of all acronyms used in reporting the radiological analyses were included in this report.
Response: A acronyms list will be provided for Appendix L of the Predesign Investigation Report.
Action: The acronym list will be as follows:

ACRONYMS AND ABBREVIATIONS

2-sig cnt uncert	2-sigma count uncertainty
2-sig cnt TPU	2-sigma count total population uncertainty
ALK	alkalinity
ASL	analytical support level
BLK	blank
Brom	bromide
Carb	carbonate
Cnt. Unc	count uncertainty
Conc	concentration
Det. Limit	detection limit
DI Water	de-ionized water
DUP	duplicate sample
ISO U	isotopic uranium