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Department of Energy

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MAY 23 1997

DOE-0981-97

Mr. James A. Saric, Remedial Project Director
U.S. Environmental Protection Agency
Region V-SRF-5J
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

Dear Mr. Saric and Mr. Schneider:

**TRANSMITTAL OF RESPONSES TO THE U.S. ENVIRONMENTAL PROTECTION AGENCY
AND OHIO ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE DRAFT FINAL
INTEGRATED ENVIRONMENTAL MANAGEMENT PROJECT, RESPONSE TO THE OHIO
ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE DRAFT FINAL ON-SITE
DISPOSAL FACILITY GROUNDWATER/LEAK DETECTION AND LEACHATE MONITORING
PLAN**

- References:
- 1) Letter, J. Saric, U.S. EPA to J. Reising, DOE-FEMP, "Draft Final IEMP," dated April 24, 1997.
 - 2) Letter, T. Schneider, OEPA to J. Reising, DOE-FEMP, "Comments-Integrated Environmental Monitoring Plan," dated April 10, 1997.
 - 3) Letter, T. Schneider, OEPA to J. Reising, DOE-FEMP, "Comments OSDF GW Monitoring Plan," dated April 10, 1997.
 - 4) Letter, J. Saric, U.S. EPA to J. Reising, DOE-FEMP, "OSDF Leachate Monitoring Plan," dated April 24, 1997.

This letter serves to submit the subject responses for your review and approval. The comments were provided in References 1, 2, and 3. Only the responses to comments are being submitted at this time per agreement reached during the May 20, 1997, weekly

Department of Energy, Fernald Environmental Management Project (DOE-FEMP), U.S. Environmental Protection Agency (U.S. EPA), and Ohio Environmental Protection Agency (OEPA) conference call. Once your concurrence on the comment responses and associated actions is received, the documents will be submitted in final form. Note that for the OSDF Groundwater/Leak Detection and Leachate Monitoring Plan, the U.S. EPA approved the Draft Final Plan without comment (Reference 4).

With the U.S. EPA and OEPA concurrence, DOE would like to begin implementation of the IEMP in July of this year. An implementation schedule for the IEMP Air Monitoring Program will be submitted to you by June 13, 1997. The schedule will reflect the DOE's intention of having all monitors installed and operational by January 1998 so that the original modeling-based approach will be used consistently throughout 1997, and the alternate monitoring-based approach will commence January 1998.

Should you have any questions regarding this submittal, please contact Kathleen Nickel at (513) 648-3166.

Sincerely,



Johnny W. Reising
Fernald Remedial Action
Project Manager

FEMP:Nickel

Enclosure: As Stated

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**RESPONSES TO U.S. EPA AND OEPA COMMENTS
ON THE DRAFT FINAL
INTEGRATED ENVIRONMENTAL MONITORING PLAN
FOR MARCH 1997**

**FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO**

MAY 1997

**U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE**

**RESPONSES TO U.S. EPA COMMENTS
ON THE DRAFT FINAL
INTEGRATED ENVIRONMENTAL MONITORING PLAN
(MARCH 1997)**

1. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 3 Pg.#: NA Line#: NA Code: Original
General Comment #: 4 DOE Response #: 9

Comment: The text states that DOE will base its decision to recalibrate the groundwater model on whether future groundwater elevation levels are within the historical minimum and maximum groundwater elevation measurements. This approach is acceptable if the future range in groundwater elevations falls within the minimum and maximum groundwater elevation range for the specific season under study.

DOE states that throughout the aquifer restoration period it will compare predicted total uranium concentrations from selected monitoring wells to predicted total uranium concentrations. This comparison will be used to verify the groundwater model. U.S. EPA agrees with this approach. DOE should also compare the concentration of total uranium from each of the extraction wells to the total uranium concentration in each extraction well predicted by the groundwater model. In addition, DOE should compare the mass of uranium extracted from each extraction well to the predicted uranium mass for each extraction well. These two additional comparisons are as important as a point-by-point comparison because the concentration and mass from each extraction well gives better overall assessment of the aquifers response to the remediation modules. Furthermore, DOE has based many of the remediation decisions on the predicted total uranium concentration and total uranium mass extracted from each extraction well.

Response: The SWIFT groundwater model is a steady state model which predicts groundwater elevations and contaminant concentrations under future pumping/injection conditions as various modules of the groundwater remedy are brought on line. The model was calibrated to an average groundwater elevation data set before it was used in the OU5 Remedial Investigation and subsequent studies. The calibration effort and resulting model parameters were described in the SWIFT Great Miami Aquifer Model, Summary of Improvements Report (DOE, April, 1994).

Since the model is run to steady state, it does not predict seasonal variations in groundwater elevations within the aquifer which average between eight and ten feet at some locations. Nevertheless, as the commentor correctly points out, it is necessary to have a set of criteria against which to judge the future performance of the model as pumping/injection modules are brought on line and as actual field observations are compared against model predictions to track remedy performance. DOE's intent is to use historical groundwater elevation data to define an acceptable range of variance between observed groundwater elevations and predicted groundwater elevations to determine if and when the model needs to be recalibrated. Specifically, if the predicted groundwater elevations are not consistently (two or more consecutive quarters) within five feet (approximately one half the seasonal variation as determined from historical data) of the observed groundwater elevations for more than one third of the groundwater monitoring wells within the capture zone area, the need for model recalibration will be evaluated.

With respect to concentration comparisons in the extraction wells, DOE does intend to compare predicted well head concentrations with measured concentrations to track

remedy performance. Since the remedy design is based on achieving FRL concentrations in the aquifer, and since model predictions are given in concentrations instead of mass, DOE believes that reporting uranium mass extracted by well over time is redundant with the concentration data and should not be required since mass removed can readily be calculated from actual concentration and pumping data (which will be reported) by a straight forward conversion of units. However, as stated in Section 3.7.1 on pgs. 3-71 through 3-73 and in Section 3.7.2 on pgs. 3-79 through 3-80, total mass removed by remediation module will be tracked and reported as is currently done in the DMEPP for the South Plume.

Action: Change the paragraph in Section 3.5.1.6 on pg. 3-50 from lines 5 through 10 to read as follows:

"A continuous model performance evaluation process is critical to ensure that model predictions are accurate and reliable. Therefore, water table maps with capture zones, flow divides and stagnation zones will be produced from the collected field data and will be compared to annual model predictions to determine how well the groundwater model is predicting actual aquifer responses during remediation. If the model predictions of groundwater elevations consistently (two or more consecutive quarters) do not match the observed groundwater elevations to within five feet (one-half the approximate seasonal variation in groundwater elevations as defined by historical data) for at least two thirds of the monitoring wells within the capture zone of the remedial system, the need for model recalibration will be evaluated."

This is discussed in more detail in Section 3.7.

Change the paragraph in Section 3.7.1 on pg. 3-76 starting at line 18 to read as follows:

"The aquifer restoration target is concentration based, rather than mass-based. Success will be measured by achieving concentration-based FRLs in the aquifer. To verify groundwater model predictions of remedy performance, groundwater concentrations obtained from monitoring and extraction wells will be compared to groundwater concentrations which have been predicted through modeling (Figure 3-19). During 1997 and 1998, total uranium plume maps of the 20 ug/L plume will be compared against modeled predictions in the Baseline Remedial Strategy Report to begin to evaluate if the initial stages of the restoration are proceeding on track."

Change the paragraph in Section 3.7.1 on pg. 3-78 from lines 14 through 17 to read as follows:

"Modeled groundwater elevations for a given year will be compared to actual groundwater elevations measured quarterly in the monitoring well during the same year. If the difference between the actual quarterly measurement and the modeled groundwater elevation for that year is consistently (two or more consecutive quarters) greater than five feet for more than one third of the monitoring wells within the capture zone, then the need to implement model recalibration for the affected area of the model will be evaluated."

Change the paragraph in Section 3.7.1 on pg. 3-78 which begins on line 24 to read as follows:

"Total uranium data collected from monitoring and extraction wells will also be used to check the groundwater model. Predicted contaminant..."

- 2. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: NA Pg.#: NA Line#: NA Code: NA
 Original General Comment #: NA
 Comment: DOE responses to several U.S. EPA comments refer to either an item of information, planning, or action that will be incorporated in a separate document. For example, DOE refers to information that will be provided in the Sitewide Excavation Plan in response to U.S. EPA Specific Comment No. 35. Another example is DOE's response to U.S. EPA Specific Comment No. 45 that indicates the IEMP submittal for the time period of 1999 to 2000 will include an extended analytical suite for sediment. It is DOE's responsibility to properly address and incorporate responses to these comments in the separate documents. DOE should prepare a table summarizing the separate documents that will address the responses to U.S. EPA comments on the IEMP.
 Response: Agree. To address the above comment, Table 1 was prepared and includes: the comment number in the Responses to U.S. EPA and OEPA Comments on the Draft IEMP for August 1996, and for comments addressed by this document; the U.S. EPA and/or OEPA original comment number; the environmental media sampling program to which the comment refers; the commitment made in the DOE comment response; and, the document that will address the commitment. Note that the table excludes project-specific monitoring-related items slated for other project-related documents, as crosswalks for these items were already included in the Draft Final IEMP. Additionally, any comments pertaining to the OSDF groundwater monitoring program have been addressed in the Draft Final OSDF Groundwater/Leak Detection and Leachate Monitoring Plan.
 Action: No revision to the IEMP required.

- 3. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: 3.5.1.4 Pg.#: 3-45 Line#: 1 Code: NA
 Original Specific Comment #: 16 DOE Response #: 22
 Comment: DOE's response is acceptable; however, the text of the IEMP was not changed to reflect the response. DOE should modify the IEMP text to reflect these changes.
 Response: All of the changes noted in the action were made in the text, but the wrong figure number was referenced in the comment response. Changes were made to Figure 3-11 not 3-13.
 Action: No revision to the IEMP required.

- 4. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: 3.5.1.4 Pg.#: 3-45 Line#: 3 Code: NA
 Original Specific Comment #: 17 DOE Response #: 23
 Comment: DOE's response is acceptable; however, the text of the IEMP was not changed to reflect the response. DOE should modify the IEMP text to reflect these changes.
 Response: All of the changes noted in the action were made in the text, but the wrong figure number was referenced in the comment response. Changes were made to Figure 3-11 not 3-13.
 Action: No revision to the IEMP required.

5. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: 3.5.1.6 Pg.#: 3-19 Line#: 7 Code: NA
 Original Specific Comment #: 19 DOE Response #: 25

Comment: The text states that DOE will not collect groundwater elevation data from Type 3 wells. DOE bases this decision on historical groundwater elevation data, which demonstrates that the groundwater elevation for Type 2 and Type 3 wells are very similar and do not indicate vertical gradients. DOE should collect groundwater elevation data from both Type 2 and 3 wells because historical data reflects the aquifer's response to minor stress as compared to the proposed groundwater remediation modules. DOE proposes aggressively remediating the aquifer with both pumping and injection wells. Groundwater elevation data from both Type 2 and 3 wells is needed to monitor aquifer restoration and system operations. DOE should revise the IEMP to include collecting groundwater elevation data from both Type 2 and 3 wells on at least a quarterly basis.

Response: DOE acknowledges the comment. Although Type 2 and Type 3 groundwater elevation data have shown no significant differences in historical data collected since 1993 around the South Plume pumping system, DOE will collect both Type 2 and Type 3 elevation data to evaluate the effects of additional pumping or injection modules as they are brought on line. The Type 2 and Type 3 elevation data will be evaluated for significant differences, and if none are found, DOE may make a future recommendation to discontinue collecting elevation data from the Type 3 wells.

Action: Change the paragraph in Section 3.5.1.6 on pg. 3-48 which begins on line 10 to read as follows:

"The Great Miami Aquifer is an unconfined aquifer and responds rapidly to recharge events. Data collected at the FEMP and reported in the Operable Unit 5 RI Report documents that no strong vertical gradients exist in the area of the FEMP. However, with the implementation of the remedy and the stresses placed on the aquifer by the additional pumping, water level monitoring during the remediation will use both Type 2 wells which are screened at the water table surface as well as Type 3 wells which are screened deeper within the aquifer."

Change the list of groundwater elevation monitoring wells on pg. 3-48 to include the following wells:

3009	3011	3014	3015	3017	3020
3027	3032	3034	3043	3044	3045
3046	3049	3054	3065	3066	3067
3068	3069	3070	3091	3092	3093
3095	3096	3097	3098	3106	31217
3125	3126	3128	31565	3385	3387
3390	3396	3398	3402	3417	3421
3423	3424	3426	3429	3431	3432
3550	3551	3552	3624	3636	3648
3679	3733	3821	3880	3881	3897
3898	3899	3900			

Add above well locations to Figure 3-13.

6. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: 4.4.2.1 Pg. #: 4-10 Line#: 36 Code: NA
 Original Specific Comment #: NA
 Comment: The text throughout Section 4 incorrectly refers to Appendix C for further information on surface water locations that exceed final remediation levels (FRL) and benchmark toxicity values (BTV). Surface water locations are shown in Appendix B. The text should be revised to refer to Appendix B for surface water locations showing exceedances of FRLs and BTVs.
 Response: Agree. Any references to Appendix C in Section 4.0 will be replaced with Appendix B.
 Action: Replace references to "Appendix C" with "Appendix B," in Section 4.0.
7. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: 4.4.2.3 Pg. #: 4-17 Line#: 13-15 Code: NA
 Original Specific Comment # NA
 Comment: The text refers to a table providing the number of FRL and BTV exceedances in Appendix C. Neither Appendix C, nor Appendix B, contain any table that lists such exceedances. The text should be revised to address this issue.
 Response: Agree. Table 4-2 provides the total number of FRL and/or BTV exceedances by constituent. The subject text will be revised as noted in the Action below.
 Action: Delete the sentence that begins on line 13 and ends on line 15 of pg. 4-17. Replace with:

 "Maps detailing surface water locations with historical FRL or BTV exceedances are provided in Appendix B. Table 4-2 provides the total number of FRL and/or BTV exceedances by constituent."
8. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: 4.4.2.8 Pg. #: 4-27 Line#: 17 Code: NA
 Original Specific Comment #: NA
 Comment: The text refers to a sampling agreement implemented on May 1, 1996. FEMP should cite a reference that discusses the sampling.
 Response: Agree. The sampling agreement will be referenced in the text and in the list of references.
 Action: Add the following to the Reference list, pg. R-2, before the reference beginning on line 4:

 "U.S. Department of Energy, 1996a, "Phase VII Removal Actions and Reporting Requirements Under the Fernald Environmental Management Project Legal Agreements," letter DOE-0395-96 from Johnny Reising, U.S. DOE to James A. Saric, U.S. EPA, and Tom Schneider, Ohio EPA, dated January 16, 1996."

 Change "1996a" on line 4 to "1996b," and change "1996b" on line 7 to "1996c."

 Globally replace "DOE 1996a" in the text of the document to "DOE 1996b ," and "DOE 1996b" to DOE 1996c."

 Add "(DOE 1996a)." after "in early 1996" on line 32, pg. 4-3.

 Add "(DOE 1996a)" after "implemented May 1, 1996" on line 17, pg. 4-27.

9. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: 4.4.3 Pg.#: 4-28 Line#: 31 Code: NA
 Original Specific Comment #: NA
 Comment: The text specifies analytical support level (ASL) B for all data collected in the IEMP surface water and treated effluent program. An explanation of ASL B should be provided to clarify the program design.
 Response: Agree. A brief description of ASL B will be included in the text in Section 4.4.3. Additionally, brief descriptions of the ASLs to be used will be provided for the other media sections as well.
 Action: Add the following sentence after "will be level B." on line 31, pg. 4-28: "ASL B provides qualitative, semi-qualitative, and quantitative data with some QA/QC checks."
 Add the following sentence after "monitoring purposes." on line 6, pg. 3-64: "ASL B provides qualitative, semi-qualitative, and quantitative data with some QA/QC checks."
 Add the following to line 12, pg. 5-13: "An ASL of B was selected because the results will provide surveillance monitoring data. ASL B provides qualitative, semi-qualitative, and quantitative data with some QA/QC checks."
 Add the following sentence after "at ASL B." on line 16, pg. 6-25: "ASL B provides qualitative, semi-qualitative, and quantitative data with some QA/QC checks."
 Add the following sentence after "contributors to dose" on line 18, pg. 6-25: "ASL D provides quantitative data with fully defined QA/QC and complete data packages, including raw data."
 Add the following sentence after "measured at ASL B." on line 30, pg. 6-28: "ASL B provides qualitative, semi-qualitative, and quantitative data with some QA/QC checks."
 Add the following sentence after "analyzed to ASL B." on line 10, pg. 6-31: "ASL B provides qualitative, semi-qualitative, and quantitative data with some QA/QC checks."
 Add the following sentence after "at ASL B." on line 34, pg. 7-10: "ASL B provides qualitative, semi-qualitative, and quantitative data with some QA/QC checks."
10. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: 4.4.3 Pg.#: 4-30 and 4-32 Line#: NA Code: NA
 Original Specific Comment #: NA
 Comment: Table 4-3 incorrectly references Table 4-1 for parameters to be analyzed at locations SWP-01 and SWR-01. Table 4-3 should be revised to reference Table 4-2.
 Response: Agree. Table 4-3 will be revised to reference Table 4-2.
 Action: Revise "Table 4-1" to read "Table 4-2" for SWP-01 in Table 4-3, pg. 4-30, and for SWR-01 on pg. 4-32.

11. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: 4.5.2 Pg. #: 4-39 and 4-54 Line#: NA Code: NA
 Original Specific Comment #: NA
 Comment: Tables 4-4 through 4-15 identify multiple analytical methods for several analytes, including total metals, fluoride, cyanide, ammonia, nitrate/nitrite, and total suspended solids. These tables should be revised to list the specific analytical method for each of these analytes. In addition, the tables should be revised to list the authors and year of publication for the references provided.
 Response: Disagree. The specific analytical method for each analyte was not listed because DOE cannot commit to one method without knowing where the samples will be sent for analysis. The samples may be sent to the on-site laboratory, or to one of the several off-site laboratories. Samples will be sent to the FEMP on-site laboratory if capacity is available and if the analysis can be performed. Analyses that cannot be performed on-site will be sent to an "acceptable" off-site laboratory. (For more explanation, see the response to Original Specific Comment 23, Comment 29 in the Responses to Comments on the Draft IEMP for August 1996). Regardless, the method used by the laboratory must meet the QA/QC requirements for the specified analytical support level (ASL), and must attain detection limits low enough to allow comparisons with FRLs and historical data.
 Action: No action required.
12. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: 5.4.3 Pg. #: 5-8 Line#: 28-31 Code: NA
 Original Specific Comment #: NA
 Comment: The text provides limited detail regarding the development and justification for the analytical parameters selected as part of the sediment program design. It is not clear why some parameters will not be analyzed. For example, DOE proposes not monitoring radium-226 and isotopic thorium concentrations in sediment from Paddy's Run south of the storm sewer outfall ditch and in the Great Miami River because these analytes have not been consistently detected at levels above FRLs. The text does not clearly indicate if radium-226 and isotopic thorium have been detected at levels above background at these locations. Because radium-226 and isotopic thorium are primary contaminants at FEMP, detection of these analytes at levels above background would indicate that pathways exist for sediment contamination to exceed the FRLs. Also, the remedial activities to be conducted at FEMP may significantly increase the quantity and variety of contaminated sediment. The text should be revised to address the issue of monitoring radium-226 and isotopic thorium in sediments from Paddy's Run south of the storm sewer and in the Great Miami River. In addition, DOE should more clearly define its technical justification for the proposed analytical parameters.
 Response: This comment raises the following issues which require further discussion:
 1) Provide additional justification for the analytical parameters selected for the sediment program; and 2) Provide additional clarification of why certain parameters (Ra-226, Th-228, Th-230, and Th-232) are analyzed only in the SSOD and in Paddys Run upstream of the SSOD. The issues are discussed below.
- 1) As discussed during the December 1996 meetings the justification for the selected parameters is that these parameters (Uranium, Radium-226, Thorium-228, -230, and -232) represent the site's primary soil COCs which comprise approximately 90% of the human health risk. Also discussed during the December meetings was the DOE commitment to do additional sediment

sampling in Paddys Run, downstream from the SSOD, for primary soil COCs at three year intervals beginning in 1999. This commitment was formalized in the Response and Action for Comment # 45 on the Draft IEMP.

2) The reasons for limiting the location of the Ra-226 and isotopic thorium sampling to the SSOD and to Paddys Run north of the SSOD are: the paucity of sediment FRL exceedances for these primary soil COCs in historic data set, and the proximity of the historic sampling locations to source areas. The historic data indicates that only rarely have concentrations of Ra-226 and the thorium isotopes exceeded FRLs at these locations, near the potential sources. Given this lack of FRL exceedances near the potential sources, it can be reasonably assumed that the contaminant concentrations at downstream locations in Paddys Run and in the Great Miami River would also be below the FRLs. In reviewing data from 1991 through 1996 contained within the annual Site Environmental Reports (SERs) the following observations are noted:

- For Ra-226, out of the 117 samples collected in the SSOD and in Paddys Run north of the SSOD, there were no observed occurrences above the Ra-226 sediment FRL of 2.9 pCi/g. Out of the 117 samples, a maximum concentration of 2.3 pCi/g was observed in 1992. The annual averages of the Ra-226 samples collected from 1991 through 1996 ranged from 0.17 pCi/g to 0.97 pCi/g.
- For Th-228, out of the 112 samples collected in the SSOD and in Paddys Run north of the SSOD, there were no observed occurrences above the Th-228 sediment FRL of 3.2 pCi/g. Out of the 112 samples, a maximum concentration of 1.9 pCi/g was observed in 1996. The annual averages of the Th-228 samples collected from 1991 through 1996 ranged from 0.35 pCi/g to 1.26 pCi/g.
- For Th-230, out of the 112 samples collected in the SSOD and in Paddys Run north of the SSOD, there were no observed occurrences above the Th-230 sediment FRL of 18,000 pCi/g. Out of the 112 samples, a maximum concentration of 4.0 pCi/g was observed in 1996. The annual averages of all the Th-230 samples collected from 1991 through 1996 ranged from 0.45 pCi/g to 2.44 pCi/g.
- For Th-232, out of the 112 samples collected in the SSOD and in Paddys Run north of the SSOD, there was only one observed occurrence above the Th-232 sediment FRL of 1.6 pCi/g. Out of the 112 samples, a maximum concentration of 1.8 pCi/g was observed in the SSOD in 1996. The annual averages of all the Th-232 samples collected from 1991 through 1996 ranged from 0.33 pCi/g to 1.13 pCi/g.

Given the above data summary, in conjunction with the sediment data evaluation protocol established in Section 5.6, DOE believes the sediment sampling program currently outlined in the IEMP is adequate. The data evaluation protocol in Section 5.6 clearly establish DOE responsibility to conduct confirmatory sampling should an FRL exceedance occur. As noted on Figure 5-2 (IEMP Sediment Data Evaluation and Associated Actions)

should a sediment FRL exceedance occur, sampling would be conducted to determine the extent of the exceedance. This sampling would include if necessary, sampling of the sediments within Paddys Run and the Great Miami River, downstream from the confirmed exceedance.

DOE agrees that additional justification for not monitoring for Ra-226, Th-228, Th-230, and Th-232 in the GMR and in Paddys Run downstream from the SSOD could be provided. DOE will provide the additional justification in Section 5.4.2, Sediment Program Design Considerations as indicated in the action below.

Action: On pg. 5-8 after the bullet ending on line 7 add the following text: "In reviewing the sediment data for Ra-226, Th-228, Th-230, and Th-232, from 1991 through 1996 that is contained within the annual Site Environmental Reports (SERs), the following observations are noted:

- For Ra-226, out of the 117 samples collected in the SSOD and in Paddys Run north of the SSOD, there were no observed occurrences above the Ra-226 sediment FRL of 2.9 pCi/g. Out of the 117 samples, a maximum concentration of 2.3 pCi/g was observed in 1992. The annual averages of the Ra-226 samples collected from 1991 through 1996 ranged from 0.17 pCi/g to 0.97 pCi/g.
- For Th-228, out of the 112 samples collected in the SSOD and in Paddys Run north of the SSOD, there were no observed occurrences above the Th-228 sediment FRL of 3.2 pCi/g. Out of the 112 samples, a maximum concentration of 1.9 pCi/g was observed in 1996. The annual averages of the Th-228 samples collected from 1991 through 1996 ranged from 0.35 pCi/g to 1.26 pCi/g.
- For Th-230, out of the 112 samples collected in the SSOD and in Paddys Run north of the SSOD, there were no observed occurrences above the Th-230 sediment FRL of 18,000 pCi/g. Out of the 112 samples, a maximum concentration of 4.0 pCi/g was observed in 1996. The annual averages of all the Th-230 samples collected from 1991 through 1996 ranged from 0.45 pCi/g to 2.44 pCi/g.
- For Th-232, out of the 112 samples collected in the SSOD and in Paddys Run north of the SSOD, there was only one observed occurrence above the Th-232 sediment FRL of 1.6 pCi/g. Out of the 112 samples, a maximum concentration of 1.8 pCi/g was observed in the SSOD in 1996. The annual averages of all the Th-232 samples collected from 1991 through 1996 ranged from 0.33 pCi/g to 1.13 pCi/g."

13. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: 6.4.2.2 Pg.#: 6-20 Line#: 10-21

Code: NA

Original Specific Comment #: NA

Comment: The text states that data from 8 of the 20 alpha scintillation radon detectors will be compiled into 24-hour averages and reported to EPA on quarterly basis. This section and Figure 6-3 should be revised to identify the eight detectors that will be included in the quarterly reporting. The text should also briefly describe how the eight detectors

were selected and whether the selection criteria are still be applicable for the full range of planned remediation activities at FEMP.

Response: The text will be revised to reflect that data from all alpha scintillation detectors will be provided in the IEMP quarterly reports.

Action: Delete second sentence of paragraph starting on line 11 pg. 6-20 and replace with:

"Currently twenty (20) alpha scintillation radon detectors are located on FEMP property and at off-property locations."

Delete paragraph beginning on line 17 pg. 6-20 and replace with:

"These continuous monitors provide hourly readings which are used to establish compliance with the 100 pCi/l radon limit defined in DOE Order 5400.5 and to observe short-term data trends. The data are also used to aid in the quantification of radon releases from the silos. Hourly data collected from all environmental alpha scintillation detectors will be summarized on a monthly basis to provide the following information: daily average, monthly average, minimum daily average, and maximum daily average for the month. This data will submitted to the EPA quarterly in IEMP quarterly reports."

14. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 6.5.2 Pg.#: 6-25 Line#: 17 Code: NA
Original Specific Comment #: NA
Comment: The text states that a quarterly composite sample of high-volume filter media will be analyzed for radionuclides at ASL D. However, Table 6-2 on Page 6-18 specifies ASL B for these samples. This discrepancy should be corrected by listing the appropriate ASL in both locations.
Response: Agree.
Action: Table 6-2 will be changed to show that quarterly composite samples will be analyzed at ASL D.
15. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 6.5.2.2 Pg.#: 6-27 Line#: 11-24
Code: NA
Original Specific Comment #: NA
Comment: This section describes quality assurance (QA) requirements for air particulate samples. However, the section does not adequately describe QA requirements for the quarterly composite samples that will be analyzed for target radionuclides. For example, the section does not indicate whether blank or spiked filter samples will be submitted with the quarterly samples as is being done for the bi-weekly samples that are analyzed for uranium. The section should be revised to identify and describe all QA requirements for quarterly radionuclide samples.
Response: Agree.
Action: Revise section 6.5.2.2 as follows:

Pg. 6-27, line 13 will be revised to:

"• One blank sample will be submitted for analysis with each batch of bi-weekly filters and with each set of quarterly composite samples."

Pg. 6-27, lines 22 to 25 will be revised to:

- The laboratory is also required to perform analyses on method blanks, matrix spikes and laboratory control samples as required by the SCQ for the corresponding ASL and analytical method. For the quarterly composite samples, analyzed under ASL-D, a method blank, duplicate, matrix spike and laboratory control sample will be analyzed for each batch of samples."

16. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: 6.5.3.2 Pg.#: 6-30 Line#: NA
 Code: NA

Original Specific Comment #: NA

Comment: Section 6.4.2.2 states that two or three detectors will be used at each alpha track-etch monitoring location, and that the results of these multiple samples will be used to assess the precision of the monitoring data and to identify any spurious results. Section 6.5.3.2 should be expanded to further describe the QA requirements associated with these multiple samples. For example, Section 6.5.3.2 should list control limits (in terms of relative percent difference or relative standard deviation) that will be used to identify spurious results. Section 6.5.3.2 should also be expanded to describe QA requirements for radon measurements made with the alpha scintillation monitors.

Response: This comment represents two separate issues 1) QA protocol for evaluating replicate data and 2) QA associated with alpha scintillation monitors. The text will be revised to define the QA requirements associated with each issue in the appropriate section.

Action: Add the following after line 21 on pg. 6-30:

"The following process will be used to evaluate replicate data usability by identifying outliers and suspect data points.

1) IF $\frac{|\text{Maximum Value} - \text{Average Value}|}{\text{Average Value}} \leq \text{Standard Deviation of Spikes}$

AND

IF $\frac{|\text{Minimum value} - \text{Average Value}|}{\text{Average Value}} \leq \text{Standard Deviation of Spikes}$

THEN average all data from location

2) IF $\frac{|\text{Maximum Value} - \text{Average Value}|}{\text{Average Value}} \leq \text{Standard Deviation of Spikes}$

AND

IF $\frac{|\text{Minimum Value} - \text{Average Value}|}{\text{Average Value}} \geq \text{Standard Deviation of Spikes}$

THEN average data from two higher data points

3) IF $\frac{|\text{Maximum Value} - \text{Average Value}|}{\text{Average Value}} \geq \text{Standard Deviation of Spikes}$

AND

IF $\frac{|\text{Minimum Value} - \text{Average Value}|}{\text{Average Value}} \leq \text{Standard Deviation of Spikes}$

THEN average data from two lower data points

- 4) IF $\frac{|\text{Maximum Value} - \text{Average Value}|}{\text{Average Value}} \geq \text{Standard Deviation of Spikes}$
AND
IF $\frac{|\text{Minimum Value} - \text{Average Value}|}{\text{Average Value}} \geq \text{Standard Deviation of Spikes}$

THEN record highest value if within historical range and/or reasonable based on process knowledge."

Add the following text after line 16 pg. 6-30:

"In addition, routine source checks (i.e. monthly) are performed on continuous radon detectors. Data will be recorded on process control charts and only instruments demonstrating acceptable performance will be used to collect data in the field. Source check data that falls within +/- two standard deviations of the mean identifies an instrument as acceptable for use. If the source check data from an instrument lies outside of +/- two standard deviations from the mean, that instrument will not be used until it is examined and repaired, and recalibrated if necessary."

17. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 6.5.4 Pg.#: 6-31 Line#: 8-9 Code: NA
Original Specific Comment #: NA
Comment: The text states that the direct radiation monitoring network will include 30 thermoluminescent dosimeter (TLD) locations, while Section 6.4.2.3 and Figure 6-4 indicate that the network will include 36 TLD locations. Section 6.5.4 should be revised to indicate the correct number of locations. In addition, the text stating that three TLDs are deployed quarterly should be revised to state that three TLDs are deployed quarterly at each location.
Response: Agree.
Action: Pg. 6-31, lines 8 and 9 will be revised to:

"The monitoring design incorporates a network of 36 TLD locations. Three TLDs are deployed quarterly at each location and submitted to the on-site laboratory for analysis."

18. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 6.5.4.2 Pg.#: 6-32 Line#: NA Code: Na
Original Specific Comment #: NA
Comment: Section 6.4.2.3 states that three TLDs will be used at each direct radiation monitoring location, and that the results of these multiple samples will be used to assess the precision of the monitoring data and identify any spurious results. Section 6.5.4.2 should be expanded to further describe the QA requirements associated with these multiple samples. For example, Section 6.5.4.2 should list control limits (in terms of relative standard deviation) that will be used to identify spurious results. In addition, Section 6.5.4.2 mentions intralaboratory comparisons for TLDS but does not provide any details of how these comparisons will be made. The text should be revised to more clearly describe the intralaboratory comparisons of TLD results.

Response: Agree that additional information on TLD QA practices is needed. Note that the comment mentions *intralaboratory* comparisons, while the IEMP mentions, and additional information will be provided on, *interlaboratory* comparisons.

Action: Section 6.4.2, pg. 6-32, lines 11 through 21 will be revised as follows:

"6.5.4.2 QA Sampling Requirements

Quality control samples will be taken according to the frequency recommended in the SCQ. These samples will be collected and analyzed in order to evaluate the possibility that some controllable practice, such as decontamination, sampling or analytical practice, may be responsible for introducing bias in the project's analytical results. Quarterly data from the three TLDs at each location will agree within $\pm 20\%$ or will be considered suspect and invalid data. A TLD which repeatedly differs by more than $\pm 15\%$ from the other two co-located TLDs will be removed from service. The following quality assurance practices will be conducted under this sampling program:

- TLD reader is calibrated semi-annually and quality control checks are performed prior to reading each batch of TLDs.
- Spiked dosimeters with a known amount of gamma radiation will be submitted for analysis (must agree within 10 percent of known dose).
- Interlaboratory comparisons will be conducted with the DOE Environmental Measurements Laboratory. The comparison studies require the FEMP to submit a set of TLDs which are then exposed (along with TLDs from other study participants) to a known amount of environmental radiation. The TLDs are then returned to the FEMP for processing. The results from all participants are then compared to known value of radiation and the $\pm 30\%$ performance specification from ANSI-N545."

19. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: 6.6 Pg.#: 6-37 Line#: 7-8 Code: NA
 Original Specific Comment #: 45

Comment: The text in DOE's response indicates that monthly reporting of radon data from the K-65 silos will be added to Figure 6-5 (now Figure 6-8). The figure contains a footnote reference to quarterly data reporting. In addition, Figure 8-1 indicates monthly radon reporting that will transition to quarterly reporting during the active period of the IEMP. DOE should clarify its intent on reporting radon data to U.S. EPA and make that intent clear in the IEMP.

Response: Hourly data from all environmental alpha scintillation detectors will be summarized on a monthly basis and will provide the following information: daily average, monthly average, minimum daily average, and maximum daily average for the month. This data will be submitted to the EPA quarterly in IEMP quarterly reports (reference response and action associated with comment 13).

Action: Footnote d for figure 6-8 will be revised to the following:

"d = includes radon data formatted monthly from the preceding quarter"

20. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 6.6.2 Pg.#: 6-38 Line#: 12-13 Code: NA
Original Specific Comment #: NA
Comment: The text states that basic statistics for alpha scintillation monitors will be generated on a monthly basis. This statement apparently contradicts Section 6.4.2.2 (see lines 19 and 20 on Page 6-20), which states that data from these monitors will be compiled into 24-hour averages. The text should be revised to consistently describe data summary procedures for alpha scintillation monitoring results.
Response: The text will be revised for consistency.
Action: Delete paragraph beginning on line 17 pg. 6-20 and replace with:

"These continuous monitors provide hourly readings which are used to establish compliance with the 100 pCi/l radon limit defined in DOE Order 5400.5 and to observe short-term data trends. The data are also used to aid in the quantification of radon releases from the silos. Hourly data collected from all environmental alpha scintillation detectors will be summarized on a monthly basis to provide the following information: daily average, monthly average, minimum daily average, and maximum daily average for the month. This data will submitted to the EPA quarterly in IEMP quarterly reports."

21. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 6.6.3 Pg.#: 6-42 Line#: 11 Code: NA
Original Specific Comment #: NA
Comment: The text refers to IEMP air monitoring program expectations identified in Section 4.4.1. This reference should be corrected to Section 6.4.1.
Response: Agree.
Action: Revise lines 11 and 12, pg. 6-42, to:

"Data evaluation to address any remaining expectations identified in Section 6.4.1 is encompassed in the data evaluation techniques described above."

22. Commenting Organization: U.S. EPA Commentor: Saric
Section#: 6.6.4 Pg.#: 6-42 Line#: 5-10 Code: NA
Original Specific Comment #: NA
Comment: The text does not clearly describe quarterly reporting requirements for the IEMP air monitoring program; it also does not reflect DOE's commitment in Response #1 to provide quarterly summaries of all air monitoring data to the agencies. Specifically, the text does not clearly state that the quarterly reports will include (1) target radionuclide results from analyses of quarterly composite filter samples and (2) quarterly TLD results from the direct radiation monitoring component of the program. Furthermore, the quarterly reports shown on Figure 6-8 appear to include only radon data (based on footnote *d* to the figure). The text and figure should be revised to clarify that quarterly reports will include data from all three components of the IEMP air monitoring program (that is, radiological particulate air monitoring, radon monitoring, and direct radiation monitoring).
Response: DOE will report the TLD, radon and bi-weekly air particulate results on a quarterly basis, however, as noted in the draft IEMP (page 6-44, lines 5-10), quarterly composite data may lag behind other data due to the amount time necessary for sample analysis, data review, and evaluation. However every effort will be made to include this data in the corresponding quarterly report. If the data is not available it will be rolled into the following quarterly report.

Action: Revise pg. 6-42 lines 30 - 34 as follows:

- "• Air monitoring data for calendar year 1996 will be reported in the 1996 SER to be published in June 1997. Air monitoring, TLD and radon data for calendar year 1997 will be published in June 1998 in a transitional environmental monitoring report. Data collected in calendar year 1998, will be reported under the quarterly IEMP reports, as well as the new IEMP annual comprehensive report to be published in June 1999."

Revise pg. 6-44 lines 9-13 as follows:

"Data and information pertaining to the air program will be presented in the quarterly meetings and reports and will consist of the following:

- Graphical presentation of data trends for air particulate, radon, and TLD results at each sample location for the most recent quarter and target radionuclide results from analyses of quarterly composite filter samples from the previous quarter"

23. Commenting Organization: U.S. EPA Commentor: Saric
 Section#: C.2.3.1 Pg.#: C-15 Line#: 24-26 Code: NA
 Original Specific Comment #: NA

Comment: The text proposes using historical background concentrations to correct measured radionuclide air concentrations when measured background results are below detection limits. Background radionuclide concentrations are likely to vary and will exceed the average historical level in some years and will be below the average historical level in other years. The proposal to use average historical level in place of low (nondetected) measured background levels--but not in place of high measured background levels--is arbitrary, and radionuclide concentrations corrected by this method will be biased low. The IEMP should be revised to state that measured radionuclide concentrations will be corrected only by background concentrations measured during the same sampling period.

Response: DOE accepts the method for correcting measured concentrations with background concentrations measured during the same sampling period.

Action: Revise pg. C-15, lines 20 to 22 as follows:

"Detectable contaminant concentrations will be corrected to net detectable concentrations using the average background concentration measured during the same sampling period. Average background concentrations will be determined using the average detected concentrations at the two background air monitors. Background air monitoring results which are MDCs will not be averaged, only measured concentrations will be used."

Delete lines 24 through 26, pg. C-15.

24. Commenting Organization: U.S. EPA Commentor: Saric
Section#: C.2.3.1 Pg.#: C-16 Line#: 13 Code: NA
Original Specific Comment #: NA
Comment: The section number for "All Pathway Dose Calculations" should be renumbered as
 C.2.3.2.
Response: Agree.
Action: Revise line 13, pg. C-16 to:

 "C.2.3.2 All Pathway Dose Calculations"

**RESPONSES TO OEPA COMMENTS
ON THE DRAFT FINAL INTEGRATED ENVIRONMENTAL MONITORING PLAN
(MARCH 1997)**

25. Commenting Organization: OEPA Commentor: HSI GeoTrans
Section#: 3.0 Pg. #: Line #: Code: C
Original Comment #: 1
Comment: The use of geoprobe technology does not seem to have been considered in the development of the IEMP strategy. A discussion regarding the merits of this technology should be included. It is recommended that flexibility be incorporated into the monitoring program to allow for rapid deployment of geoprobe, specifically when erratic or unexplainable monitoring data results arise in the future.
Responses: The routine groundwater monitoring program defined in the IEMP for 1997 and 1998 does not involve the use of the Geoprobe™ sampling tool, but it does provide for its rapid deployment should the need arise.

Text in Section 3.7.1 (Lines 7 through 10, on pg. 3-71) states that if additional characterization data is needed a modification to the IEMP would be implemented, or a new sampling plan would be prepared depending upon the anticipated size of the activity.
Action: The following sentence will be added to pg. 3-71 following line 11. "Additional sampling activities may utilize other sampling techniques, such as a Geoprobe™ sampling tool, which has been used successfully at the FEMP to obtain groundwater samples without the use of a permanent monitoring well."
26. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 3.2.2. Pg #: 3-4 Line #: 7 Code:
Original Editorial Comment #: 32
Comment: The word groundwater is hanging at the end of this sentence.
Responses: Comment Acknowledged.
Action: The word "groundwater" will be removed from the text.
27. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 3.5.1.3 Pg #: 3-41 Line #: 33-35 Code:
Original Editorial Comment #: 33
Comment: The beginning sentences of this section are repeated on the next pg. 3-42. Delete one of them.
Responses: Agree.
Action: Duplicate text will be removed.
28. Commenting Organization: OEPA Commentor: HSI GeoTrans
Section#: 3.4.1 Pg. #:3-10 Line #: 25-26 Code: C
Original Comment #: 2
Comment: An implicit expectation of model verification is, if significant discrepancies are encountered between observed data and model predictions, the adjusted model may be used to modify the remediation system and the accompanying monitoring program (as indicated in Section 3.7.1). This should be reflected in Design Considerations (Section #: 4.2) Further discussion on this topic should be referenced to other documents (possibly the Baseline Remedial Strategy Report) or included here.
Responses: As written now, the IEMP identifies model verification as a program expectation. It is stated on pg 3-10 that an expectation of the monitoring program is to "Provide groundwater data that is sufficient to verify groundwater model predictions of the remedy

performance." As stated below in the action to this comment, text will be added to Section 3.4.2.2 (Well Selection Criteria) so that the plan also emphasizes model verification as a design consideration.

Action: A reference will be added to pg. 3-10 of Section 3.4.1 (Program Expectations) that will direct the reader to the model verification discussion found in Section 3.7.1.

A bullet will be added to pg. 3-19 of Section 3.4.2.2 (Well Selection Criteria) that states the following: "Select monitoring well locations that will provide data needed to verify groundwater model predictions."

29. Commenting Organization: OEPA Commentor: HSI GeoTrans
Section#: 3.4.2.1 Pg. #:3-14 Line #: 5-8 Code: C
Original Comment #: 3
Comment: Not all modules are independent and the statement that they will be "independently withdrawn from service" may not be entirely true. In particular, the operation of the South Plume Module and the Injection Demonstration Module are linked together, and the performance of the latter may significantly affect the efficiency of the former. This interdependence is clearly indicated on (Section#: 3.4.2.1; Pg. #: 3-15, Line #: 5-11) and should be applied to the design of IEMP groundwater monitoring plan (Section#: 3.5; Pg. #: 3-28, Line #: 25-27).
Responses: Agree, the intent of the sentence in question is to state that modules will be turned off as remediation objectives are achieved.
Action: The word "independently" will be removed from pg. 3-14, line 6.
30. Commenting Organization: OEPA Commentor: HSI GeoTrans
Section#: 3.4.2.1 Pg. #:3-17 Figure #: 3-5 Code: C
Original Comment #: 4
Comment: The basis for selecting locations of injection wells is not provided. Although the groundwater flow field is generally converging towards the extraction well, the possibility of some constituents of concern escaping the capture zone of extraction wells should not be neglected. This is particularly important since mixing of off-property uranium plume and PRRS plume has been listed as a high priority (Section#: 3.5.1.1; pg. #:3-29; Line #: 21-23). It should be specified how this contingency is accounted for in the design consideration.
Response: The basis for the selection of injection well locations is provided in Section 4 of the Baseline Remedial Strategy Report. Providing data to assess the capture and restoration of FRL constituents is a noted design consideration listed on pg. 3-10, lines 16 through 19. Mixing of the off-property uranium plume with the PRRS plume is addressed in Section 3.5.1.1, pg. 3-30, lines 8 through 10 and lines 17 through 18.
Action: No revision to the IEMP required.
31. Commenting Organization: OEPA Commentor: HSI GeoTrans
Section#: 3.4.2.2 Pg. #:3-20 Line #: 27-28 Code: C
Original Comment #: 5
Comment: The details of "step-wise" verification of completion of the remedy for each module should be provided.
Responses: The current version of the IEMP only addresses years 1997 and 1998. It is not anticipated that any modules will be turned off during this time period. The strategy for verification sampling will be addressed in later versions of the IEMP. This is stated in Section 3.4.2.3 on pg. 3-20, lines 30 through 32.
Action: No revision to the IEMP required.

32. Commenting Organization: OEPA Commentor: HSI GeoTrans
 Section #: 3.5.1.2 Page #: 3-40 Line #: 11-12 Code: C
 Original Comment #: 6
 Comment: In locating the new monitoring wells after excavation and other remedial activities have been completed, the locations and construction techniques of the old monitoring wells should be considered. It may be useful to "reconstruct" some of the old monitoring wells such that the historical analytical records from the old wells can be matched to the new wells. Historical records can be very useful in tracking groundwater restoration efforts.
 Responses: DOE agrees that historical records can be very useful in tracking groundwater restoration efforts. DOE will consider the locations and construction techniques of old monitoring wells when selecting locations for new monitoring wells.
 Action: No revision to the IEMP required.

33. Commenting Organization: Ohio EPA Commentor: OFFO
 Section #: 3.5.1.2 Pg #: 3-40 Line #: 14 Code: c
 Original Comment #:
 Original Comment #: 7
 Comment: The Ohio EPA agrees that it is preferable to have operational experience prior to determining the locations and numbers of South Field monitoring wells. This section does not commit to any time-frame for making this determination. Please tie the timing of this determination to an OU2 deliverable (the excavation close-out report, for instance) so that the this doesn't "fall thru the cracks".
 Responses: The start date for the South Field System Phase II, as currently defined in the Draft Final RA Work Plan, pg. 23, is October 1, 2003. DOE is anticipating that a start up plan for the system will be prepared. The time frame for determining the need for and location of additional monitoring wells will be established in this start up plan. The need to summarize and track the separate documents that will address responses to U.S. EPA comments on the IEMP is also the topic of Comment #2. Please see the response to Comment #2.
 Action: No revision to the IEMP required. Please see the Action to Comment #2.

34. Commenting Organization: Ohio EPA Commentor: DDAGW
 Section #: 3.5.1.4 Pg #: 3-44 Line #: Fig 3-13 Code: c
 Original Comment #: 93
 Original Comment #: 8
 Comment: The proposed monitoring well frequency should be adequate to monitor the relatively long term effects of the OU1 waste pit clean-up activities. As stated in the response to comments, this will detect releases from the waste storage area before they can travel outside the capture zone of the Waste Storage Area Recovery System. However, DOE needs to consider the impact that this possible source loading could have on the overall ground water clean-up scheduling. Once this slug of contaminants has entered the aquifer matrix, the time required to "flush it out" may be substantial. The DOE should investigate the impacts that this may have as part of the work plan for the OU1 remediation.
 Responses: DOE is considering the possibility that leakage as a result of OU1 excavation activities could impact the aquifer. The impact of such a leakage on the aquifer restoration would depend upon the rate and duration. Good interproject communication during the excavation and close monitoring of both surface and subsurface conditions should detect such an occurrence. It is currently envisioned that the determination regarding impacts to the aquifer as a result of OU1 excavation activities will be investigated as part of the aquifer restoration project and not as part of a work plan for OU1. Preliminary monitoring in support of the detailed design of the Waste Storage Area Module Recovery

Well System will likely include a focussed Geoprobe sampling effort to verify aquifer conditions.

Action: No revision to the IEMP required.

35. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 3.5.2.2 Pg #: 3-53 Line #: 5 Code: c
Original Comment #: 9
Comment: The replacement of the Project-Specific Plan for the Routine Groundwater Monitoring Program Along the Downgradient Boundary of the FEMP, Revision 1 by the IEMP will require that the Director's Findings and Orders (DF&Os) be modified to remain consistent with the changes in the parameter list, monitoring frequency, and reporting schedule
Responses: DOE agrees and is currently negotiating with the OEPA to modify the DF&O to reflect the IEMP.
Action: No revision to the IEMP required.
36. Commenting Organization: OEPA Commentor: HSI GeoTrans
Section #: 3.5.2.2 Pg. #:3-55 Line #: 1-3 Code: C
Original Comment #: 10
Comment: The justification for quarterly sampling of the nine constituents categorized as >MP for RCRA property boundary monitoring is not obvious. The monitoring wells associated with the IEMP modules are located within the perimeter wells for RCRA monitoring, and are sampled quarterly. Based on absence of constituents of concern at the IEMP module monitoring wells, arguments can be made for a semi-annual or annual monitoring at the RCRA property boundary.
Response: The justification for quarterly sampling for the >MP constituents is presented on pg. 3-26 (lines 21-23). The >MP constituents are sampled for quarterly because they have been detected in the Great Miami Aquifer above their established FRL and are considered mobile and persistent.
Action: No revision to the IEMP required.
37. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 3.7 Pg #: 3-78 Line #: 4 Code: c
Original Comment #: 11
Comment: Please quote an acceptable range of variation between modeled and measured groundwater levels.
Response: This comment is similar to Comment 1. Please see response to Comment 1.
Action: This comment is similar to Comment 1. Please see action to Comment 1.
38. Commenting Organization: ODH Commentor: ODH
Section #: 4.2.2 Pg #: 4-3 Line #: Code:
Original Comment #: 12
Comment: ODH does not receive the quarterly FFCA sampling program result reports on radiological constituents and elsewhere in the text. ODH requests inclusion on the copy list.
Response: Agree. ODH will be added to the current quarterly FFCA sampling result report distribution.
Action: As indicated in the response above.

39. Commenting Organization: Ohio EPA Commentor: DSW
 Section #: 4.4.2.1 Pg #: 4-14 Line #: 4 Code: E
 Original Editorial Comment #: 34
 Comment: The text states that FRL and BTV exceedences are in Appendix C whereas, they are found in Appendix B.
 Response: Agree. The text will be revised to reference Appendix B (see response to Comment 6).
 Action: As noted in the Action for Comment 6.
40. Commenting Organization: Ohio EPA Commentor: DSW
 Section #: 4.4.2.3 Pg #: 4-17 Line #: 15 Code: E
 Original Editorial Comment #: 35
 Comment: The text states that FRL and BTV exceedences are in Appendix C whereas, they are found in Appendix B.
 Response: Agree. The text will be revised to reference Appendix B (see response to Comment 6).
 Action: As noted in the Action for Comment 6.
41. Commenting Organization: ODH Commentor: ODH
 Section #: 4.5.2.1 Pg #: 4-40 Line #: Code:
 Original Comment #: 13
 Comment: Footnoted at the bottom of page 4-40 states radionuclides do not have standard methods of analysis. While no consensus yet exists, ASTM, U.S. EPA, and the Standard Methods Series contain methods which are considered as standards.
 Response: Agree, however, because no consensus exists, the DOE cannot commit to one of the published methods. Instead, the performance specifications in the SCQ for radionuclide analyses are provided to laboratories during the bidding process. The selected laboratory must then provide an analysis that meets the performance specifications.
 Action: No action required.
42. Commenting Organization: Ohio EPA Commentor: DSW
 Section #: 4.6.1 Pg #: 4-59 Line #: 7 Code: C
 Original Comment #: 14
 Comment: Due to the scope of the remedial activities at the site and the inherent limitations of the controls used, it is anticipated that some adverse effects to the quality of the surface waters will occur. It is therefore suggested that the question be modified to more accurately reflect this by asking "Has the uncontrolled runoff and implementation of site remedial activities caused an undue adverse impact to the surface water".
 Response: Agree.
 Action: Modify the question on line 7, pg. 4-59, by adding "undue" between "activities caused an" and "adverse impact to."
43. Commenting Organization: Ohio EPA Commentor: OFFO
 Section #: 5.5.4. Pg #: 5-15 Line #: 22 Code:
 Original Editorial Comment #: 36
 Comment: Change FERMCO to Fluor Daniel Fernald.
 Response: Agree. FERMCO will be changed to Fluor Daniel Fernald.
 Action: As indicated in the response.

44. Commenting Organization: ODH Commentor: ODH
 Section #: 6.0 General Comment Pg #: Line #: Code:
 Original Comment #: 15
 Comment: As the IEMP is revised every two years, it may be advantageous to depict project-specific air monitors (if used) along with the regular particulate monitor network as the air pathway is the principal one for dose to the public. This would provide a better total view of the air monitoring effort and would show "integration".
 Response: Project specific monitors are typically in operation for less than two years. Including these short term monitoring locations into the IEMP would require more frequent revisions to the IEMP. DOE will integrate maps and data from project-specific air monitors (if used) in the IEMP quarterly and annual reports as necessary to support site-wide data interpretations.
 Action: No revision to the IEMP required.
45. Commenting Organization: ODH Commentor: ODH
 Section #: 6.0 General Comment Pg #: Line #: Code:
 Original Comment #: 16
 Comment: To continually demonstrate NESHAPS compliance, what are the contingencies if property owners revoke siting of Hi-Vols on their properties? Are the former locations near the fencelines maintained as an option for use?
 Response: If property owners do not permit the siting of air monitors on their property, further discussions between EPA, OEPA, and DOE will be necessary to determine an alternate approach or locations for determining compliance. Since the point of compliance under NESHAP Subpart H is the receptor, DOE will not accept the compliance standard applied at the fenceline in areas where the nearest receptors are located at some distance from the facility boundary. As a contingency, fenceline monitoring in these areas could be considered in conjunction with a mechanism for projecting measured concentrations at fenceline to estimated concentrations at the receptors as a means of demonstrating compliance.
 Action: No revision to the IEMP required.
46. Commenting Organization: Ohio EPA Commentor: DAPC
 Section #: 6.0 General Comment Pg #: n/a Line #: n/a Code: C
 Original Comment #: 17
 Comment: All monitors, new and existing, should meet US EPA ambient monitoring site guidelines for Hi-vols.
 Response: Agree. DOE has considered USEPA air monitoring siting guidelines for particulate monitors (40 CFR 58, Appendix E) in selecting and maintaining locations for high-volume air monitors.
 Action: No revision to the IEMP required.
47. Commenting Organization: Ohio EPA Commentor: DAPC
 Section #: 6.0 General Comment Pg #: n/a Line #: n/a Code: C
 Original Comment #: 18
 Comment: There is only one radon monitor in the 60-120 degree sector and one in the 135-195 degree sector (centered on the vitrification plant). OEPA recommends increasing the radon monitoring in these areas.
 Response: Since the Vitrification Pilot Plant (VPP) is not scheduled for operation in the next two years additional monitoring will not be necessary near the VPP at this time. Adequate data currently exists to demonstrate that non K65 exclusion fenceline radon detectors are not significantly different with respect to each other, and data collected can be considered

to be baseline or background data. This issue will be reassessed during future revisions of the IEMP as start-up and operation of the VPP approaches.

Action: No revision to the IEMP required.

48. Commenting Organization: Ohio EPA Commentor: OFFO
 Section #: 6.1 Pg #: 6-1 Line #: 13-20 Code: C
 Original Comment #: 19
 Comment: Two additional regulatory drivers should be considered while developing the air monitoring program; namely, DOE Order 5400.5 Chapter II 2: The ALARA Process and 10 CFR 834 (Proposed) 834.102. The air monitoring program should be designed to fulfill the regulatory requirements for all applicable drivers.
 Response: The ALARA Process is embedded in the design, planning, and execution of individual remediation projects which will be collectively monitored under the IEMP. The determination of whether ALARA principals are being met must be made at the project level through the evaluation of project specific administrative and engineered controls against procedural requirements, design specifications and regulatory standards.
- DOE is aware that 10 CFR 834, when promulgated, may require changes to the IEMP. However, until such time as the final rule is promulgated and any associated implementing guidance is made available, changes to the existing program would be premature and potentially not aligned with the final rule.
- Action: No revision to the IEMP required.
49. Commenting Organization: Ohio EPA Commentor: OFFO
 Section #: 6.1 Pg #: 6-2 Line #: 4-7 Code: C
 Original Comment #: 20
 Comment: The sentence beginning with "Monitoring at or near...." should be reworded to indicate that monitoring at or near potential receptor locations will provide a direct measure of the radionuclide concentrations present in the air at the sampling location and NOT a measure of the "environmental conditions" present.
- This sentence should also be changed to reflect that a dose estimate will be conducted at the potential receptor location based on the direct measurement of radionuclide concentrations in air. It seems that the reliability and the accuracy of this dose assessment methodology remains to be seen.
- Response: Agree with recommended changes to wording.
 Action: Revise pg. 6-2, lines 4 to 7 as follows:
- "Monitoring at or near the potential receptor locations will provide a direct measure of the radionuclide concentrations present in the air from the full range of planned remedial activities at the FEMP."
50. Commenting Organization: Ohio EPA Commentor: OFFO
 Section #: 6.1 Pg #: 6-2 Line #: 12 Code: C
 Original Comment #: 21
 Comment: What are the "established thresholds"?
 Response: As used in the referenced sentence, the term "established thresholds" refers to the 40 CFR 61 Subpart H dose limit of 10 mrem/year. DOE may impose a lower administrative limit as a means to ensure the 10 mrem/year limit is not exceeded.
 Action: No revision to the IEMP required.

51. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: 6.2 Pg #: 6-2 Line #: 31-33 Code: C
Original Comment #: 22

Comment: The separation of IEMP responsibilities and project specific emissions control monitoring is inconsistent with the DOE Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance (1991). This document states that "All airborne emissions from DOE-controlled facilities should be evaluated.....The results of this evaluation...should be documented in the site Environmental Monitoring Plan."

Ohio EPA suggests that a central "entity" be established at the FEMP that will have overall responsibility for the monitoring of all airborne emissions. This "entity" will ensure that all monitoring is performed as stated in the IEMP, individual work plans, and evaluate the overall effectiveness of the air program. One entity at the FEMP should be able to answer any questions about air emissions and air monitoring.

The QA sampling requirements for the alpha track-etch cups are inadequately described in this section. Only sample spikes are indicated as a QA measure. Field blanks, blind duplicates, trip blanks, etc need to be included to assure quality radon data from alpha track-etch cups.

Response: This comment appears to have two issues associated with it: 1) responsibilities for the monitoring of all airborne emissions and 2) QA for alpha track-etch detectors. The following response is divided to address each issue.

- 1) A fundamental integration objective of the IEMP is to bring together all monitoring data (IEMP and project specific) necessary to support sitewide decision making by providing a comprehensive picture of the environmental conditions at the site. This information will be consolidated and reported through the IEMP. As such, the IEMP and the Environmental Monitoring organization responsible for it's implementation provides this single entity.
- 2) Radon field blank and trip blank data has been collected in the past and has not yielded data that is useful from a quality assurance perspective. Field blanks that are subjected to radon exposures in the field while the detectors are collected, measure exposures that are far below the minimum detectable concentration level of the analytical vendor.

All radon detectors data submitted to the vendor are randomly designated blind identifying numbers and the vendor does not know whether a replicate sample or spiked detector has been received. Hence there is no need for blind duplicates.

Trip blanks serve the purpose of measuring cross contamination. In the case of radon detectors the detectors are individually sealed and then typically sealed in two to three collection bags. Since radon daughters deposit their energy on the detector material cross contamination is not a concern. To eliminate the problem of additional exposure from storage in high radon areas the detectors are shipped from the vendor immediately before deployment and immediately returned after retrieval from the field. The elimination of storage time and the sealing of the bags eliminates the need for trip blanks. Should a storage bag be ineffectively sealed all detectors in that bag are likely to receive an anomalous high exposure which would be more likely to be observed than variable results from limited trip blanks.

Action: No revision to the IEMP required.

52. Commenting Organization: Ohio EPA Commentor: OFFO
 Section #: 6.5.3.2 Pg #: 6-30 Line #: n/a Code: C
 Original Comment #: 23
 Comment: There is no mention of periodic source checks for the continuous radon monitors. The use of control charts and source checks are necessary when utilizing this type of equipment.
 Response: The text will be revised to describe the periodic source checks.
 Action: After line 16 pg. 6-30 add the following:

 "In addition, routine source checks (i.e. monthly) are performed on continuous radon detectors. Data will be recorded on process control charts and only instruments demonstrating acceptable performance will be used to collect data in the field. Source check data that falls within +/- two standard deviations of the mean identifies an instrument as acceptable for use. If the source check data from an instrument lies outside of +/- two standard deviations from the mean, that instrument will not be used until it is examined and repaired, and recalibrated if necessary."
53. Commenting Organization: Ohio EPA Commentor: OFFO
 Section #: 6.6.1 Pg #: 6-35 Line #: 20-21 Code: C
 Original Comment #: 24
 Comment: The data should also be evaluated to determine if releases of radiological contaminants to the atmosphere are complying with ALARA standards (e.g. are airborne concentrations higher than anticipated? What measures can be employed to keep the dose ALARA). There should also be action levels which would trigger appropriate actions to ensure that the Subpart H standard is not exceeded. This action level should be substantially less than the NESHAP standard.
 Response: The fugitive emission controls implemented by the projects consistent with the requirements of the BAT determination for fugitive dust will ensure that emissions are ALARA. As such, compliance with the BAT determination serves as the sites ALARA standard and assessing sitewide compliance with the BAT determination serves as the measure of how well the site is maintaining emmissions ALARA.

 As shown in Figure 6-5, air particulate data will be continually evaluated against the 10 mrem standard to evaluate any trends in light of the anticipated schedule and mix of remediation activities throughout the year. This data evaluation will effectively support the sitewide decision making process outlined in Section 1 of the IEMP and will ensure that appropriate actions are taken to avoid any exceedence of the 10 mrem standard.
 Action: No revision to the IEMP required.
54. Commenting Organization: Ohio EPA Commentor: OFFO
 Section #: 8.2.1. (8.2.3) Pg #: 8-5 Line #: 3 Code:
 Original Editorial Comment #: 37
 Comment: Delete wording. The AIP does not say that Ohio EPA has "limited" independent sampling abilities. It simply states that Ohio EPA *may also take additional samples*.
 Response: Agree. The word "limited" will be removed from the text.
 Action: Delete "limited" from line 3, pg. 8-5.
55. Commenting Organization: Ohio EPA Commentor: OFFO
 Section #: C.2.3.1 Pg #: C14 Line #: 10-20 Code: C
 Original Comment #: 25
 Comment: The Thorium Series (e.g. Th-232 and daughters) is not discussed in this section. Provide explanation on how these isotopes will be incorporated into NESHAP reporting.

Response: As indicated in Table C-2 of the IEMP, Th-232 and Th-228 are part of the quarterly composite analytical regime. Ra-228 and Ac-228, the immediate daughters of Th-232, will be considered to be in equilibrium with the Th-232 concentration measured in the quarterly composite. Ra-224, a daughter of Th-228, will be considered to be in equilibrium with the Th-228 measured in the quarterly composite. The basis for the quarterly analysis of Th-232 and Th-228 and the explanation of how Th-232 and Th-228 and their daughters will be incorporated into the NESHAP compliance demonstration is provided in pgs. C-10 through C-16 of the IEMP.

Action: No revision to the IEMP required.

56. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Appendix D General Comment Pg #: Line #: Code: C
Original Comment #: 26

Comment: Obviously it is difficult to develop as well as review this natural resource monitoring plan prior to completing the Impact Assessment and the Restoration Plan documents. Ohio EPA believes it is appropriate to revisit this portion of the IEMP following completion of those documents.

Response: Agree.

Action: Finalize the NRIMP with available information and update in conjunction with the regular revision schedule of the IEMP. Changes resulting from finalization of the Natural Resource Impact Assessment and/or the Natural Resource Restoration Plan may be incorporated into the NRIMP as part of an annual IEMP update or biannual IEMP revision.

57. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: Appendix D General Comment Pg #: Line #: Code: C
Original Comment #: 27

Comment: I'm not sure if this document was provided to the other Natural Resource Trustees for review. If not, it is necessary for them to review the document prior to finalization.

Response: The draft NRIMP was submitted to all Natural Resource Trustees for review. All comments received were incorporated.

Action: The final NRIMP will be submitted to all Natural Resource Trustees in conjunction with agency submittal.

58. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: D.4.1.1.1 Pg #: 8 Line #: 19-21 Code: C
Original Comment #: 28

Comment: Due to the problems associated with the Area 1 Phase 1 work plan and the lack of approval for that document, Ohio EPA recommends extraction of the Sloan's Crayfish Monitoring Plan from that document with incorporation into the IEMP. This is appropriate in that the need to monitor Sloan's Crayfish population is not just due to A1P activities.

Response: Agree.

Action: The Sloan's Crayfish Management Plan will be incorporated into the NRIMP as an attachment.

59. Commenting Organization: Ohio EPA Commentor: OFFO
Section #: D.4.1.3 Pg #: 9 Line #: 27-33 Code: C
Original Comment #: 29

Comment: Include a map of areas of concern for Running Buffalo Clover as well as a list of work plans which would include surveys in such areas.

Response: Agree in part.

Action: A map of areas of concern for running buffalo clover will be included within the NRIMP. The areas of concern for the running buffalo clover are west of Paddys Run and currently outside the scope of any defined excavation work plan. Pending certification, natural resource restoration activities are the only actions anticipated west of Paddys Run.

60. Commenting Organization: Ohio EPA Commentor: OFFO
 Section #: D.4.4 Pg #: 11 Line #: 13-24 Code: C
 Original Comment #: 30
 Comment: Either this document or the NRRP must more clearly define how "ground truthing" of the Impact Assessment will be conducted. This is an essential step in ensuring natural resource damages are appropriately restored.
 Response: Agree.
 Action: Section 4.4 of the NRIMP will be revised to read as follows:

"Visual observations of designated habitat areas (as defined in the NRIA) will be implemented on a quarterly basis for the entire Fernald Site. The extent of each impacted habitat area will be surveyed using a Global Positioning System (GPS). This mapping system consists of a Trimble Pathfinder ProXL and an Omnistar 6300A. The Trimble Pathfinder ProXL system is a mapping grade receiver with powerful GIS capabilities when used with Trimble's Asset Software. The Omnistar 6300A receiver is used to provide differential correction to the Trimble Pathfinder ProXL. The interfacing of the two units provides real-time differential correction, thus increasing position accuracy. A map will be scaled to depict the extent of impacts in each specific habitat type (see Figure D-3).

In addition, changes to habitats will be tracked using an electronic database with specific fields to indicate the scope of the activity being conducted, the impacts to the habitat based on field observations and any other relevant information pertaining to the impact. If necessary, photographs will also be taken. The GPS map and electronic database will be presented on a quarterly basis. Results of monitoring will be compared with results of the NRIA to determine unanticipated impacts during remediation. The determination of unanticipated impacts will allow the NRTs to collectively determine if adjustment to the levels of natural resource restoration is needed."

61. Commenting Organization: Ohio EPA Commentor: OFFO
 Section #: Figure D-2 Pg #: Line #: Code: C
 Original Comment #: 31
 Comment: Revise legend to define outlined areas.
 Response: Agree.
 Action: Figure D-2 will be revised to define outlined areas.

**TABLE 1
IEMP RESPONSE TO COMMENTS
COMMITMENTS IMPACTING OTHER DOCUMENTS**

DOE Comment No.	USEPA/OEPA Original Comment No.	Media Affected	Information Commitment	Document Addressing Commitment
Draft IEMP of August 1996:				
4, 79, 81, 84	USEPA Original Specific No. 1, OEPA Original No. 16, 18, and 21	Groundwater	Provide the certification process for completion of aquifer restoration, including specific concentrations, statistical methods, and confirmation sampling used for certification.	Future versions of the IEMP, for the two-year periods that include completion of aquifer restoration modules
19	USEPA Original Specific No. 13	Groundwater	After completion of OU2 excavations, provide the number, location, and installation timeframe of additional monitoring wells, and technical justification for their installation.	A future project-specific work plan (PSP), which will be submitted to EPA/OEPA for approval prior to well installation
21	USEPA Original Specific No. 15	Groundwater	If additional monitoring wells are needed after the Injection Demonstration Module is operational, provide the number, location, and installation timeframes of the additional monitoring wells and technical justification for their installation.	A future PSP, which will be submitted to the EPA/OEPA for approval prior to well installation
28	USEPA Original Specific No. 22	Groundwater	While the current IEMP uses primarily ASL B for most analyses, ASL C or D may be warranted for confirmation of completion of aquifer restoration. The appropriate ASL for certification sampling should be provided with justification.	Future version of the IEMP covering the first two-year period that includes aquifer restoration certification
34	USEPA Original General No. 8	Surface water	Assure that the surface water sampling occurs under a range of flow conditions by providing documentation of flow conditions during sample collection at each location.	Revised version of the liquids procedure which will include site surface water sampling (SMPL-02)
40	USEPA Original Specific No. 31	Surface water and sediment	Provide methods for certification sampling for uranium (and other constituents) in surface water and sediment within the drainage area encompassing the northeast drainage ditch and surface water sampling point SWD-01, following completion of soil remediation in the northeast area.	Annual update of the CY 1997-1998 IEMP or in a future two-year version of the IEMP, whichever is appropriate after completion of soil remediation in the northeast area

TABLE 1 - IEMP RESPONSE TO COMMENTS COMMITMENT CROSSWALK (Cont'd)

DOE Comment No.	USEPA/OEPA Original Comment No.	Media Affected	Information Commitment	Document Addressing Commitment
44	USEPA Original Specific No. 35	Sediment	Specify which drainage ditches will undergo project-specific sediment investigations to refine remediation needs in other drainage ditches and the storm sewer outfall ditch.	Sitewide Excavation Plan and/or associated documents
45	USEPA Original Specific No. 36	Sediment	Sediment samples, at a location near where Paddys Run flows off the FEMP property, should be analyzed for an expanded analytical suite every third year.	The IEMP for CY1999-2000 and future IEMPs
46	USEPA Original Specific No. 37	Air	When proposed rule 10 CFR 834 is promulgated as a final rule, DOE will evaluate the requirements in the final rule to determine its appropriate application within the context of the IEMP.	Future version of the IEMP for the two-year period after promulgation of the final rule
98	OEPA Original No. 35	Groundwater	Submit change pages to the IEMP to update two water level maps in the IEMP, if the final version of the Baseline Remedial Strategy Report (BRSR) indicates the need to update these figures.	Final BRSR and change pages to the IEMP for CY 1997-1998, if necessary
Draft Final IEMP of March 1997:				
33	OEPA Original No. 7	Groundwater	Provide the time frame for determining the need for and location of additional monitoring wells for the South Field Extraction System Module.	The start up plan for the South Field Extraction System Module, Phase II
47	OEPA Original No. 18	Air	Evaluate need for additional radon monitors in the area of the Vitrification Pilot Plant (VPP), when operational.	Future version of the IEMP for the two-year period in which the VPP becomes operational

32