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SUPPLEMENT TO PROJECT SPECIFIC PLAN SNAPSHOT MONITORING WELL SAMPLING AND SURFACE WATER AND SEDIMENT SAMPLING FINAL U.S. EPA AND OHIO EPA COMMENT RESOLUTION DECEMBER 1993

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RESPONSES
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SUPPLEMENT TO

PROJECT SPECIFIC PLAN

SNAPSHOT MONITORING WELL SAMPLING AND SURFACE WATER AND SEDIMENT SAMPLING

FINAL U.S. EPA AND OHIO EPA COMMENT RESOLUTION

December 1993

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY

U.S. DEPARTMENT OF ENERGY
FERNALD FIELD OFFICE

INTRODUCTION

This Supplement to Project Specific Plan for Snapshot Monitoring Well Sampling and Surface Water and Sediment Sampling documents the resolution of issues and comments offered by U.S. EPA and Ohio EPA and incorporates amendments to the subject Plan, dated May 1993. All issues cited in the following document are resolved:

- Letter, J. R. Craig to J. A. Saric and G. E. Mitchell, "Transmittal of Responses to U.S. EPA and Ohio EPA Comments on the Project Specific Plan for Snapshot Monitoring Well and Surface Water and Sediment Sampling," dated August 31, 1993

This Supplement presents each comment followed by the final resolution of the comment as agreed to by U.S. EPA, Ohio EPA and DOE. Where a resolution requires a revision of a table, figure or text, the resolution is attached as an amendment.

Two appendices are attached to this Supplement: Appendix A contains the above-cited correspondence, while Appendix B contains amendments to the Project Specific Plan. Each amendment is identified by a code that refers to the Comment Number in the Supplement. For example, the code for an amendment recommended by U.S. EPA Original Comment No. 1 is USOC-1, one by Ohio EPA Original General Comment No. 1 is OOGC-1 or one by Ohio EPA Original Specific Comment No. 2 is OOSC-2, etc.

RESOLUTION OF U.S. EPA AND OHIO EPA COMMENTS ON THE PROJECT SPECIFIC PLAN FOR SNAPSHOT MONITORING WELL SAMPLING AND SURFACE WATER AND SEDIMENT SAMPLING

Commenting Organization: U.S. EPA Commentor:
Section #: 3.1 Pg. #: 3 Line #: Code:
Original Comment # 1

Comment: The text states that wells proposed for Snapshot sampling were selected to provide comprehensive coverage of the Site and surrounding areas. However, the text does not specifically state the criteria for well selection. The text should include a discussion of well selection criteria.

Resolution: The well selection was based on review of data from past groundwater sampling. The primary considerations were the importance of the well with respect to definition of the vertical and horizontal extent of contamination (i.e., the location of the well); and organic and radiological contaminant concentrations previously detected (with attention to comparison to health-based standards, such as MCLs). The major objectives were to define the horizontal and vertical limits of the contaminant plumes and to compare current conditions to past concentrations detected in the groundwater. Amendment USOC-1 presents revised Tables A-1, A-2, A-3 and A-4 which identify the monitoring wells sampled for Snapshot under all the sampling programs. Three maps depicting the locations of the Snapshot monitoring wells are included in this amendment.

Commenting Organization: U.S. EPA Commentor:
Section #: 3.1.3 Pg. #: 3 Line #: Code:
Original Comment # 2

Comment: The method used to determine the number of equipment rinsate samples is unclear. The number of equipment rinsate samples is usually one rinsate sample for every 20 samples collected, and equipment is decontaminated between each sample. The text states that equipment rinsates will be collected at frequency of 1 per 20 decontamination operations of sampling equipment. As written, equipment may not be decontaminated between each sample, and equipment rinsate samples may not be collected as frequently as necessary. The text must be modified to clarify this statement.

Resolution: The procedure for equipment rinsate blanks is that a rinsate sample will be collected for every batch of 20 instruments that have been decontaminated. The intent is that each sample instrument will be decontaminated before it is used to collect the sample and, after 20 individual instrument decontaminations have been performed, a new rinsate blank sample will be collected to verify competence of the decontamination process. Due to the use of dedicated sampling equipment, decontamination is not necessary for each sample generated.

all wells other than 1031 and 2649 is disposed of in the general sump for treatment by the on-site waste water treatment system. This procedure is consistent with previous RI/FS groundwater sampling programs. Since 1988, this procedure has been approved by the U.S. EPA for groundwater sampling.

The DOE is currently negotiating an Investigation Derived Waste (IDW) policy with the Ohio EPA. The policy will ensure that IDW is managed in a protective yet efficient manner. Once finalized all purge water will be managed in accordance with the policy. Until the policy is finalized, purge water suspected to contain RCRA waste will be containerized pending characterization.

Commenting Organization: Ohio EPA Commentor:
Section #: Pg. #: Line #: Code:
Original General Comment # 1

Comment: DOE has failed to provide justification for the analytical suites chosen for groundwater, surface water and sediment sampling. It is unclear why contaminants detected during previous sampling events were not included in the Snapshot (e.g., Sr-90, etc.). A basic reason for conducting this sampling event is that a number of locations have not been sampled for the full suite of contaminants. This presents a problem when a contaminant is detected at one location but not sampled for at locations immediately surrounding it.

Resolution: There are three basic reasons for the groundwater and surface water Snapshot sampling event:

- The Snapshot provides a comprehensive and current round of HSL inorganic and VOC data for the RI to compensate for the fact that HSL data were collected only from some of the monitoring wells installed under the RI/FS sampling programs.

- Groundwater data have been collected from monitoring wells across the site at different times and for different purposes over the past five years. The list of wells sampled during sampling event "A" may not be the same list sampled during sampling event "B" six months later. Nevertheless, complete radiological analyses, which include strontium-90 and technetium-99, were performed on over 800 groundwater samples at the FEMP. The Snapshot provides a current site-wide picture of the groundwater contamination at the FEMP which provides a comprehensive basis for the analysis of contaminant fate and transport.

- Most of the groundwater samples collected prior to Snapshot were filtered in the field. The Snapshot provides unfiltered data needed for risk assessment purposes.

Analytes were selected based on an understanding of the operating history of the FEMP and the predominant radionuclides processed at the FEMP, and a review of existing groundwater data. Several thousand groundwater samples have been collected under the RI since May 1987. The analytical results from these samples repeatedly show that if radiological contamination is present, the dominant contaminant is uranium. Therefore, the analyte list for the Snapshot does not include some analytes, such as strontium, which have been detected but are not significant in terms of risk or remediation options. The remedial actions taken to control or remove uranium will deal with the strontium as well,

all wells other than 1031 and 2649 is disposed of in the general sump for treatment by the on-site waste water treatment system. This procedure is consistent with previous RI/FS groundwater sampling programs. Since 1988, this procedure has been approved by the U.S. EPA for groundwater sampling.

The DOE is currently negotiating an Investigation Derrived Waste (IDW) policy with the Ohio EPA. The policy will ensure that IDW is managed in a protective yet efficient manner. Once finalized all purge water will be managed in accordance with the policy. Until the policy is finalized, purge water suspected to contain RCRA waste will be containerized pending characterization.

Commenting Organization: Ohio EPA Commentor:
Section #: Pg. #: Line #: Code:
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Resolution: There are three basic reasons for the groundwater and surface water Snapshot sampling event:

- The Snapshot provides a comprehensive and current round of HSL inorganic and VOC data for the RI to compensate for the fact that HSL data were collected only from some of the monitoring wells installed under the RI/FS sampling programs.

- Groundwater data have been collected from monitoring wells across the site at different times and for different purposes over the past five years. The list of wells sampled during sampling event "A" may not be the same list sampled during sampling event "B" six months later. Nevertheless, complete radiological analyses, which include strontium-90 and technetium-99, were performed on over 800 groundwater samples at the FEMP. The Snapshot provides a current site-wide picture of the groundwater contamination at the FEMP which provides a comprehensive basis for the analysis of contaminant fate and transport.

- Most of the groundwater samples collected prior to Snapshot were filtered in the field. The Snapshot provides unfiltered data needed for risk assessment purposes.

Analytes were selected based on an understanding of the operating history of the FEMP and the predominant radionuclides processed at the FEMP, and a review of existing groundwater data. Several thousand groundwater samples have been collected under the RI since May 1987. The analytical results from these samples repeatedly show that if radiological contamination is present, the dominant contaminant is uranium. Therefore, the analyte list for the Snapshot does not include some analytes, such as strontium, which have been detected but are not significant in terms of risk or remediation options. The remedial actions taken to control or remove uranium will deal with the strontium as well.

since it is always found with the uranium. If this were the beginning of the investigation, it would be important to sample for all possible analytes. However, this is the end of the remedial investigation and the inventory of contaminants is complete. Therefore, not every trace contaminant needs to be analyzed for in every sampling.

In terms of occurrence and distribution, the predominant radiological contaminants at the FEMP are uranium, thorium and radium. In terms of the history of the site, the predominant radionuclides processed were uranium, thorium and radium. A check of draft risk assessment documents available for a number of the operable units also indicated that these radiological parameters are predominant contaminants of concern. Thus, uranium, thorium and radium were selected for the Snapshot analyte lists.

In terms of occurrence and distribution, the predominant HSL contaminants of groundwater are volatile organics and metals. Thus, these analytes were selected for the groundwater Snapshot.

The exclusion of a chemical or radiological parameter from the Snapshot sampling event does not indicate that a parameter, such as Sr-90, will not be seriously considered in the RI risk assessment. However, it should be noted that Sr-90 was detected much less frequently in environmental media sampled at the FEMP than the target analytes for the Snapshot: therefore, it makes a very small contribution to the overall risk posed by the targeted analytes.

Commenting Organization: Ohio EPA Commentor:
Section #: Pg. #: Line #: Code:
Original General Comment # 2

Comment: The work plan must include a figure(s)/plate detailing the locations of existing monitoring wells and highlighting those wells being incorporated into the Snapshot sampling. Without such a figure, it is difficult if not impossible, to evaluate DOE's selection of monitoring wells for inclusion. The necessity for such a map is further supported by the lack of text within the work plan describing the process of selection DOE used. A discussion of the selection process should be incorporated into the text.

Resolution: Amendment USOC-1 presents maps that indicate the locations of the wells. The well selection was based on review of data from past groundwater sampling. The primary considerations were the importance of the well with respect to the definition of the vertical and horizontal extent of contamination (i.e., the location of the well); and organic and radiological contaminant concentrations previously detected (with attention to comparison to health-based standards, such as MCLs). The major objectives were to define the horizontal and vertical limits of the contaminant plumes and to compare current conditions to past concentrations detected in the groundwater.

Commenting Organization: Ohio EPA Commentor:
Section #: Pg. #: Line #: Code:
Original General Comment # 3

Comment: The Snapshot monitoring program does not include any kind of colloid investigation of site groundwater. The nature of colloidal transport in the groundwater is critical to the goals of the RI in that it may dramatically affect the determination of the nature, rate, and extent of the migration of contaminants in the groundwater.

The Snapshot monitoring program should be modified so that colloidal transport is adequately characterized. The work plan should be modified to include this study and submitted to Ohio EPA for approval.

Resolution: Revision of the Project Specific Plan is not required. As was discussed in the conference call on June 21, 1993 with Ohio EPA and GeoTrans, DOE does not agree that an RI need exists for a study of colloidal transport for the following reasons:

- The nature and extent of uranium in both the perched zones and the Great Miami Aquifer are well-defined by groundwater monitoring data. Colloidal transport data will not improve the understanding of the nature and extent of groundwater contamination by uranium. Existing data and data collected during the Snapshot sampling program will be sufficient to define the nature and extent of groundwater contamination for the RI.

- There is no well-developed and verified approach to modeling the rate of transport of colloidal particles. The presence or absence of colloidal transport, which might or might not be faster than the transport of soluble species, is one of numerous parameters with a degree of uncertainty that must be factored into any transport model. Others include hydraulic parameters, such as transmissivity, hydraulic conductivity and hydraulic gradient, as well as physical/chemical parameters, such as Kd, TOC, pH, and oxidation potential. The transport model can accommodate these uncertainties by conservatively estimating input parameters.

- Ohio EPA does not indicate how data concerning colloidal transport would be used in the RI/FS. It can be assumed, however, that the use would be in contaminant transport modeling. Since there is no well-developed and verified approach for modeling colloid transport, the practical usefulness of the colloidal data to contaminant transport modeling is questionable. An alternative approach is to use Kd, as a bulk property, to calibrate the model. This approach is already planned and is independent of specific colloidal transport data.

DOE does acknowledge that there may be colloidal transport at the site. Therefore, DOE is prepared to discuss with Ohio EPA a separate post-RI sampling program to investigate this phenomenon.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.2 Pg. #: 5 Line #: Code:
Original Specific Comment # 1

Comment: It is unclear the selection process DOE used for choosing sampling locations. DOE should include W1, ASI-11, and ASI-12 in the sampling or provide sufficient justification for their exclusion. Ohio EPA assumes that DOE is planning to use Great Miami River background concentrations to compare results. This should be stated in the work plan.

Resolution: Sampling points W1 and W5, which are background locations for the Great Miami River and Paddys Run, are covered under a separate PSP titled "Pilot Plant Drainage Ditch Seepage and Surface Water Background Investigation." Sample locations ASI-11 and ASI-12 were not included in the plan because of the very small drainage area they represent. However, DOE recognizes the merit of the directive to include samples of this drainage area. The samples will be collected at the first observation of water in this area. Because of the closeness of these sample locations to each other, an assessment of the drainage condition will determine whether one or both of these samples are to be collected.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.2.1 Pg. #: 5 Line #: Code:
Original Specific Comment # 2

Comment: DOE should provide a justification for excluding the Great Miami River from sediment sampling.

Resolution: The Great Miami River was not excluded from sediment sampling. Both paragraphs in Section 3.2 state that the Great Miami River will be sampled for sediments. Section 3.2.1 text is modified as follows: "A total of four surface water and sediment sampling locations have been selected along the Great Miami River to provide water and sediment quality data; sample locations are described in Table 3-4."

Commenting Organization: Ohio EPA Commentor:
Section #: 3.3.1 Pg. #: 9 Line #: Code:
Original Specific Comment # 3

Comment: DOE should sample 2000- and 3000- series wells in the vicinity of the Sewage Treatment Plant, waste pits, and K-65 Silos for Tc-99 since Tc-99 has been detected in the perched groundwater, waste pits, and decant sump respectively. DOE should discuss the grounds for not including all contaminants previously detected within the analytical suite.

Resolution: As discussed in response to General Comment No. 1, radiological analytical parameters for the Snapshot were selected to monitor for predominant site process radionuclides, which are uranium, thorium and radium. In addition, technetium was selected for analysis at all 1000-series well locations and at 2000- and 3000-series well locations where it had previously been detected. The following 2000- and 3000-series wells in the vicinity of the waste pits and K-65 silos were designated for technetium analysis: 2028, 2033, 3009, 3034, 2643 and 2648.

Review of analytical data from 2000- and 3000-series wells did not determine the presence of technetium beneath the perched groundwater in the vicinity of the Sewage Treatment Plant; therefore, technetium analysis was not selected for those wells. Monitoring Wells 2429 and 3429, installed directly downgradient of the Sewage Treatment Plant, are complete and have been sampled for RCRA compliance monitoring. Analysis of these wells included technetium for use in RI assessments.

Chemical analytical parameters were selected to monitor predominant organic and inorganic constituents. Volatile organics compounds and metals were the predominant analytes. Although scattered detections of semivolatiles, pesticides, PCBs and BNAs

have occurred, their distribution does not justify site-wide monitoring defined for the Snapshot sampling program.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.3.2 Pg. #: 9 Line #: Code:
Original Specific Comment # 4

Comment: DOE should sample surface water locations for Tc-99. Previous sampling has detected Tc-99 in multiple surface water locations. DOE should discuss the basis for not including all contaminants previously detected within the analytical suite.

Resolution: Revision of the Project Specific Plan is not required. As discussed in the Response to General Comment No. 1, a review of the results from five years of environmental monitoring determined uranium, radium and thorium to be the predominant radiological contaminants at the FEMP. Review of RI surface water data shows that technetium was detected once, at 50 pCi/L, in 85 samples collected from 16 locations on Paddys Run and the Great Miami River (GMR). In addition, a review of 14 samples from the Zone of Influence Study showed technetium to be detected at values ranging from 31.4 to 57.2 pCi/L in 14 samples collected within 3/4 mile downstream of the effluent discharge to the GMR. Two six-month composite samples collected in 1992 from a location upstream of the effluent discharge showed technetium present at 21.7 and 33.4 pCi/L. As presented in the Site-Wide Characterization Report (DOE 1993), the calculated PRG for technetium is 3,750 pCi/L, based on an MCL dose of 4 mRem per year.

Concentrations of technetium varied throughout the above-mentioned range and showed no discernible trends with respect to proximity to the effluent discharge. The 14 detections did not appear to be significantly above the background levels shown in the 1992 monitoring. Therefore, the concentrations of technetium in surface water samples does not present a strong basis for an effort to analyze for it.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.3.3 Pg. #: 9 Line #: Code:
Original Specific Comment # 5

Comment: DOE should describe the reasoning for not analyzing sediment samples for Pesticides and PCBs.

Resolution: The selected radiological, inorganic, volatile and semivolatile organic analytical parameters focus on constituents that are attributable to site sources. Although there have been occurrences of pesticides and PCBs on the site, there are no data to indicate that the FEMP ever generated or used these materials in quantities that would affect the streams or sediments in the area. The FEMP is surrounded by agricultural land where pesticides may be used regularly. Analysis for pesticides would be inconclusive in characterizing the extent of pesticide contamination attributable to the FEMP.

PCB-containing wastes are stored, along with solvents, in maintained drums. A substation of functioning electrical transformers and capacitors is located on site and PCBs have been detected at low concentrations in surface soils at a few scattered locations. Given the containment integrity and on-going maintenance of the storage and substation areas, the potential for release of PCBs from these sources to Paddys Run is not considered significant enough to warrant analysis. While PCBs were detected in surface soils, analysis for PCBs in surface water and sediments is not warranted because of the relatively low concentrations detected in soil samples, the distances from these areas to Paddys Run and the Great Miami River, and the runoff control measures in place at the FEMP. Analyses of surface water and sediments at locations immediately downstream of the FEMP Storm Sewer Outfall Ditch did not detect PCBs.

Commenting Organization: Ohio EPA Commentor:
Section #: Table 7-1 Pg. #: 18 Line #: Code:
Original Specific Comment # 6

Comment: Appendix K of the SCQ should be added as a reference document for decontamination for both groundwater and surface water sampling. Section 6.8 of SCQ simply refers the reader to Appendix K for details on decontamination.

Resolution: Amendment OOSC-6 presents Table 7-1 revised to cite SCQ Section 6.8, Appendix K, Subsection K.11 as a reference for the decontamination procedures.

Commenting Organization: Ohio EPA Commentor:
Section #: Table 7-3 Pg. #: 17 Line #: Code:
Original Specific Comment # 7

Comment: A subsection providing the "proposed disposition methodology" for unused soil cores is not included as suggested by the last sentence on the page.

Resolution: Soil cores were not generated by work performed for this plan: reference to "unused soil cores" is deleted.

Commenting Organization: Ohio EPA Commentor:
Section #: 7.3.1 Pg. #: 18 Line #: Code:
Original Specific Comment # 8

Comment: The fact that DOE has not predetermined which wells generate potential RCRA waste purge water is disconcerting. If DOE has conducted a sufficient review of historical data for selecting wells for sampling, such a review should also define which wells will likely generate RCRA waste. DOE must make this determination prior to sampling wells.

Resolution: A reason for including HSL inorganics and volatile organics in the target analyte list for this PSP is to develop a database of analyses to determine if any of these constituents

may be present over a very broad area. This is to determine the nature and extent of contamination and to perform a baseline risk assessment.

Under the ongoing RCRA sampling, which was included in the Snapshot PSP, 47 wells have been formally evaluated to determine if RCRA wastes would be generated during the sampling process. Of these wells, only two are identified to potentially generate RCRA wastes. These are Wells 1031 and 2649 which are located near the Clearwell, a specific waste source: purged water from these wells is handled as RCRA waste. It is unlikely that wells outside the RCRA-monitored area will contain RCRA constituents. Purge water from all wells other than 1031 and 2649 is disposed of in the general sump for treatment by the on-site waste water treatment system. This procedure is consistent with previous RI/FS groundwater sampling programs. Since 1988, this procedure has been approved by the U.S. EPA for groundwater sampling.

The DOE is currently negotiating an Investigation Derived Waste (IDW) policy with the Ohio EPA. The policy will ensure that IDW is managed in a protective yet efficient manner. Once finalized all purge water will be managed in accordance with the policy. Until the policy is finalized, purge water suspected to contain RCRA waste will be containerized pending characterization.

Commenting Organization: Ohio EPA Commentor:
Section #: 7.3.2 Pg. #: 18 Line #: Code:
Original Specific Comment # 9

Comment: Appendix K of the SCQ does not specifically address contact waste. DOE should provide a more detailed discussion of contact waste handling and disposition or provide a more specific reference to the SCQ.

Resolution: Investigation-derived wastes are disposed of in accordance with DOE procedures and federal regulations. Contact waste, such as PPE, wipes, rags, etc., are handled in either of two ways. If work is performed in a radiological control area, contact wastes are placed in a bag labelled "contaminated waste" and secured for future off-site disposal as contaminated waste. If work is performed outside the radiological control areas, contact wastes are placed in a bag labelled "clean" and disposed of as clean trash.

Commenting Organization: Ohio EPA Commentor:
Section #: Table A-1 Pg. #: A-2 Line #: Code:
Original Specific Comment # 10

Comment: The table should be footnoted to describe which removal actions and OU 5 work plan addendum are being used for the Snapshot sampling.

Resolution: Amendment USOC-1 presents revised PSP Tables A-1, A-2 and A-3 with footnotes that identify appropriate Removal Actions and OU5 Addenda.

Commenting Organization: Ohio EPA Commentor:
Section #: Table A-1 Pg. #: A-7 Line #: Code:

Original Specific Comment # 11

Comment: DOE should sample monitoring Wells 1442 and 1448. Significant perched groundwater contamination exists in the area of the STP justifying sampling of these wells.

Resolution: Wells 1442 and 1448 have been included and sampled as part of the Snapshot.

Commenting Organization: Ohio EPA Commentor:
Section #: Table A-1 Pg. #: A-10 Line #: Code:
Original Specific Comment # 12

Comment: DOE should sample monitoring Well 2094. The well's placement is within the South Plume and within the Paddys Run Road site plume.

Resolution: Monitoring Well 2094 has been sampled.

APPENDIX A

E-5066

Department of Energy
Fernald Environmental Management Project
P.O. Box 398705
Cincinnati, Ohio 45239-8705
(513) 738-6357

AUG 31 1993.

DOE-2867-93

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

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

Dear Mr. Saric and Mr. Mitchell:

TRANSMITTAL OF RESPONSES TO UNITED STATE ENVIRONMENTAL PROTECTION AGENCY AND OHIO ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE PROJECT SPECIFIC PLAN FOR SNAPSHOT MONITORING WELL SAMPLING AND SURFACE WATER AND SEDIMENT SAMPLING, MAY 1993

References: 1) Letter, J. A. Saric to J. R. Craig, "Approval of OU #5 Snapshot Sampling Work Plan Addendum - FEMP," dated July 15, 1993

2) Letter, G. E. Mitchell to J. R. Craig, "Comments on the Operable Unit 5 PSP," dated June 17, 1993

Enclosed for your review are the subject responses. The work plan will be revised once final resolution of these comments is achieved.

If you have questions regarding the responses, please contact Pete Yerace at (513) 648-3161.

Sincerely,

Jack R. Craig
Fernald Remedial Action
Project Manager

FN:Yerace

Enclosure: As Stated

RESPONSES TO U.S. EPA COMMENTS ON THE PROJECT SPECIFIC PLAN FOR SNAPSHOT SAMPLING

Commenting Organization: U.S. EPA | Commentor:
Section #: 3.1 | Pg. #: 3 | Line #: | Code:
Original Comment # 1

Comment: The text states that wells proposed for Snapshot sampling were selected to provide comprehensive coverage of the Site and surrounding areas. However, the text does not specifically state the criteria for well selection. The text should include a discussion of well selection criteria.

Response: The well selection was based on review of data from past groundwater sampling. The primary considerations were the importance of the well with respect to definition of the vertical and horizontal extent of contamination (i.e., the location of the well); and organic and radiological contaminant concentrations previously detected (with attention to comparison to health-based standards, such as MCLs). The major objectives were to define the horizontal and vertical limits of the contaminant plumes and to compare current conditions to past concentrations detected in the groundwater.

Action: Add figures to the PSP to show the locations of the wells identified in Appendix A of the PSP. Add a discussion of how the well locations were chosen.

Commenting Organization: U.S. EPA | Commentor:
Section #: 3.1.3 | Pg. #: 3 | Line #: | Code:
Original Comment # 2

Comment: The method used to determine the number of equipment rinsate samples is unclear. The number of equipment rinsate samples is usually one rinsate sample for every 20 samples collected, and equipment is decontaminated between each sample. The text states that equipment rinsates will be collected at frequency of 1 per 20 decontamination operations of sampling equipment. As written, equipment may not be decontaminated between each sample, and equipment rinsate samples may not be collected as frequently as necessary. The text must be modified to clarify this statement.

Response: The procedure for equipment rinsate blanks is that a rinsate sample will be collected for every batch of 20 instruments that have been decontaminated. The intent is that each sample instrument will be decontaminated before it is used to collect the sample and, after 20 individual instrument decontaminations have been performed, a new rinsate blank sample will be collected to verify competence of the decontamination process. Due to the use of dedicated sampling equipment, decontamination is not necessary for each sample generated.

Action: The text of the PSP will be modified to incorporate the above response.

cc w/enc:

K. A. Chaney, EM-424, TREV
D. R. Kozlowski, EM-424 TREV
G. Jablonowski, USEPA-V, AT-18J
J. Kwasniewski, OEPA-Columbus
P. Harris, OEPA-Dayton
M. Proffitt, OEPA-Dayton
T. Schneider, OEPA-Dayton
J. Michaels, PRC
L. August, GeoTrans
F. Bell, ATSDR
K. L. Alkema, FERMCO
B. S. Biehle, FERMCO/52-5
P. F. Clay, FERMCO/19
AR Coordinator, FERMCO

cc w/o enc:

R. L. Glenn, Parsons
J. W. Thiesing, FERMCO/2

Commenting Organization: U.S. EPA | Commentor:
Section #: Tables 3-1 through 3-3 | Pp. #: 4.5 | Line #: | Code:
Original Comment # 3

Comment: These tables provide a list of existing wells to be sampled under the Work Plan Addendum. However, it is difficult to determine the adequacy of the wells chosen for snapshot sampling without a figure showing all the well locations and those sampled in the spring of 1993 and those proposed for the snapshot sampling. To allow U.S. EPA to better assess the adequacy of the wells chosen for sampling, a figure should be included showing all well locations and those proposed for snapshot sampling.

Response: Maps that indicate the locations of the wells will be provided.

Action: Add maps to the PSP depicting wells to be sampled for the Snapshot program.

Commenting Organization: U.S. EPA | Commentor:
Section #: 3.2.1 | Pg. #: 5 | Line #: | Code:
Original Comment # 4

Comment: It is unclear why no surface water samples are planned in the Great Miami River, upstream of the Site effluent line. A Great Miami River surface water sample should be collected upstream of the Site effluent line or U.S. DOE should provide justification for omitting the upstream sample.

Response: Sampling points W1 and W5, which are upstream background locations for the Great Miami River and Paddys Run, respectively, are covered under a separate PSP titled "Pilot Plant Drainage Ditch Seepage and Surface Water Background Investigations."

Action: No change to the PSP is required.

Commenting Organization: U.S. EPA | Commentor:
Section #: 7.3.1 | Pg. #: 18 | Line #: | Code:
Original Comment # 5

Comment: U.S. DOE must assure that steps are taken to adequately determine if purge water generated during sampling is a RCRA waste.

Response: A reason for including HSL inorganics and volatile organics in the target analyte list for this PSP is to develop a data base of analyses to determine if any of these constituents may be present over a very broad area. This is to determine the nature and extent of contamination and to perform a baseline risk assessment.

Under the ongoing RCRA sampling, which was included in the Snapshot PSP, 47 wells have been formally evaluated to determine if RCRA wastes would be generated during the sampling process. Of these wells, only two are identified to potentially generate RCRA wastes. These are Wells 1031 and 2649 which are located near the Clearwell, a

specific waste source: purged water from these wells is handled as RCRA waste. It is unlikely that wells outside the RCRA-monitored area will contain RCRA constituents. Purge water from all wells other than 1031 and 2649 is disposed of in the general sump for treatment by the on-site waste water treatment system. This procedure is consistent with previous RI/FS groundwater sampling programs. Since 1988, this procedure has been approved by the US EPA for groundwater sampling.

Action: No change to the PSP is required.

RESPONSES TO OHIO EPA COMMENTS ON THE PROJECT SPECIFIC PLAN FOR SNAPSHOT SAMPLING

Commenting Organization: Ohio EPA Commentor:
Section #: Pg. #: Line #: Code:
Original General Comment # 1

Comment: DOE has failed to provide justification for the analytical suites chosen for groundwater, surface water and sediment sampling. It is unclear why contaminants detected during previous sampling events were not included in the Snapshot (e.g., Sr-90, etc.). A basic reason for conducting this sampling event is that a number of locations have not been sampled for the full suite of contaminants. This presents a problem when a contaminant is detected at one location but not sampled for at locations immediately surrounding it.

Response: There are three basic reasons for the groundwater and surface water Snapshot sampling event:

- The Snapshot will provide a comprehensive and current round of HSL inorganic and VOC data for the RI to compensate for the fact that HSL data were collected only from some of the monitoring wells installed under the RI/FS sampling programs.

- Groundwater data have been collected from monitoring wells across the site at different times and for different purposes over the past five years. The list of wells sampled during sampling event "A" may not be the same list sampled during sampling event "B" six months later. Nevertheless, complete radiological analyses, which include strontium-90 and technetium-99, were performed on over 800 well samples at the FEMP. The Snapshot provides a current site-wide picture of the groundwater contamination at the FEMP which provides a comprehensive basis for the analysis of contaminant fate and transport.

- Most of the groundwater samples collected to date were filtered in the field. The Snapshot will provide unfiltered data needed for risk assessment purposes.

Analytes were selected based on an understanding of the operating history of the FEMP and the predominant radionuclides processed at the FEMP, and a review of existing groundwater data. Several thousand groundwater samples have been collected under the RI since May 1987. The analytical results from these samples repeatedly show that if radiological contamination is present, the dominant contaminant is uranium. Therefore, the analyte list for the Snapshot does not include some analytes, such as strontium, which have been detected but are not significant in terms of risk or remediation options. The remedial actions taken to control or remove uranium will deal with the strontium as well, since it is always found with the uranium. If this were the beginning of the investigation, it would be important to sample for all possible analytes. However, this is the end of the remedial investigation and the inventory of contaminants is complete. Therefore, not every trace contaminant needs to be analyzed for in every sampling.

In terms of occurrence and distribution, the predominant radiological contaminants at the FEMP are uranium, thorium and radium. In terms of the history of the site, the predominant radionuclides processed were uranium, thorium and radium. A check of draft risk assessment documents available for a number of the operable units also indicated that these radiological parameters are predominant contaminants of concern.

Thus, uranium, thorium and radium were selected for the Snapshot analyte lists.

In terms of occurrence and distribution, the predominant HSL contaminants of groundwater are volatile organics and metals. Thus, these analytes were selected for the groundwater Snapshot.

The exclusion of a chemical or radiological parameter from the Snapshot sampling event does not indicate that a parameter, such as SR-90, will not be seriously considered in the RI risk assessment. However, it should be noted that Sr-90 was detected much less frequently in environmental media sampled at the FEMP than the target analytes for the Snapshot; therefore, it has a very small contribution to the overall risk posed by the targeted analytes.

Action: The explanation provided in the Response will be added to the PSP text.

Commenting Organization: Ohio EPA Commentor:
Section #: Pg. #: Line #: Code:
Original General Comment # 2

Comment: The work plan must include a figure(s)/plate detailing the locations of existing monitoring wells and highlighting those wells being incorporated into the Snapshot sampling. Without such a figure, it is difficult if not impossible, to evaluate DOE's selection of monitoring wells for inclusion. The necessity for such a map is further supported by the lack of text within the work plan describing the process of selection DOE used. A discussion of the selection process should be incorporated into the text.

Response: Maps will be provided that indicate the locations of the wells. The well selection was based on review of data from past groundwater sampling. The primary considerations were the importance of the well with respect to the definition of the vertical and horizontal extent of contamination (i.e., the location of the well); and organic and radiological contaminant concentrations previously detected (with attention to comparison to health-based standards, such as MCLs). The major objectives were to define the horizontal and vertical limits of the contaminant plumes and to compare current conditions to past concentrations detected in the groundwater.

Action: Add figures to the PSP to show the locations of the wells identified in Appendix A of the PSP. Add a discussion of how the well locations were chosen.

Commenting Organization: Ohio EPA Commentor:
Section #: Pg. #: Line #: Code:
Original General Comment # 3

Comment: The Snapshot monitoring program does not include any kind of colloid investigation of site groundwater. The nature of colloidal transport in the groundwater is critical to the goals of the RI in that it may dramatically affect the determination of the nature, rate, and extent of the migration of contaminants in the groundwater.

The Snapshot monitoring program should be modified so that colloidal transport is adequately characterized. The work plan should be modified to include this study and submitted to Ohio EPA for approval.

Response: As was discussed in the conference call on June 21, 1993 with Ohio EPA and GeoTrans, DOE does not agree that an RI need exists for a study of colloidal transport for the following reasons:

- The nature and extent of uranium in both the perched zones and the Great Miami Aquifer are well-defined by groundwater monitoring data. Colloidal transport data will not improve the understanding of the nature and extent of groundwater contamination by uranium. Existing data and data collected during the Snapshot sampling program will be sufficient to define the nature and extent of groundwater contamination for the RI.

- There is no well-developed and verified approach to modeling the rate of transport of colloidal particles. The presence or absence of colloidal transport, which might or might not be faster than the transport of soluble species, is one of numerous parameters with a degree of uncertainty that must be factored into any transport model. Others include hydraulic parameters, such as transmissivity, hydraulic conductivity and hydraulic gradient, as well as physical/chemical parameters, such as Kd, TOC, pH, and oxidation potential. The transport model can accommodate these uncertainties by conservatively estimating input parameters.

- Ohio EPA does not indicate how data concerning colloidal transport would be used in the RI/FS. It can be assumed, however, that the use would be in contaminant transport modeling. Since there is no well-developed and verified approach for modeling colloid transport, the practical usefulness of the colloidal data to contaminant transport modeling is questionable. An alternative approach is to use Kd, as a bulk property, to calibrate the model. This approach is already planned and is independent of specific colloidal transport data.

DOE does acknowledge that there may be colloidal transport at the site. Therefore, DOE is prepared to discuss with Ohio EPA a separate post-RI sampling program to investigate this phenomenon.

Action: No change to the Snapshot PSP required. DOE will contact Ohio EPA to discuss the development of a separate sampling program to investigate colloidal transport.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.2 Pg. #: 5 Line #: Code:
Original Specific Comment # 1

Comment: It is unclear the selection process DOE used for choosing sampling locations. DOE should include W1, ASI-11, and ASI-12 in the sampling or provide sufficient justification for their exclusion. Ohio EPA assumes that DOE is planning to use Great Miami River background concentrations to compare results. This should be stated in the work plan.

Response: Sampling points W1 and W5, which are background locations for the Great Miami River and Paddys Run, are covered under a separate PSP titled "Pilot Plant Drainage Ditch Seepage and Surface Water Background Investigation." Sample locations ASI-11 and ASI-12 were not included in the plan because of the very small drainage area they represent. By the time the Ohio EPA comments were received, the drainage was dry.

Action: No change to the PSP is required.

021

Commenting Organization: Ohio EPA Commentor:
Section #: 3.2.1 Pg. #: 5 Line #: Code:
Original Specific Comment # 2

Comment: DOE should provide a justification for excluding the Great Miami River from sediment sampling.

Response: The Great Miami River was not excluded from sediment sampling. Both paragraphs in Section 3.2 state that the Great Miami River will be sampled for sediments. Section 3.2.1 will be modified so that it is in agreement with Section 3.2.

Action: Add the words "surface water and sediment" to the sentence under Section 3.2.1.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.3.1 Pg. #: 9 Line #: Code:
Original Specific Comment # 3

Comment: DOE should sample 2000- and 3000- series wells in the vicinity of the Sewage Treatment Plant, waste pits, and K-65 Silos for Tc-99 since Tc-99 has been detected in the perched groundwater, waste pits, and decant sump respectively. DOE should discuss the grounds for not including all contaminants previously detected within the analytical suite.

Response: As discussed in response to General Comment No. 1, radiological analytical parameters for the Snapshot were selected to monitor for predominant site process radionuclides, which are uranium, thorium and radium. In addition, analysis for technetium was selected at all 1000-series well locations and at 2000- and 3000-series well locations where it had previously been detected. The following 2000- and 3000-series wells in the vicinity of the waste pits and K-65 silos were designated for technetium analysis: 2028, 2033, 3009, 3034, 2643 and 2648.

Review of analytical data from 2000- and 3000-series wells did not determine the presence of technetium beneath the perched groundwater in the vicinity of the Sewage Treatment Plant; therefore, technetium analysis was not selected for those wells. Monitoring Wells 2429 and 3429 being installed directly downgradient of the Sewage Treatment Plant are near completion and scheduled for RCRA compliance sampling. Analysis of these wells will include technetium for use in RI assessments.

Chemical analytical parameters were selected to monitor predominant organic and inorganic constituents. Volatile organics compounds and metals were the predominant analytes. Although scattered detections of semivolatiles, pesticides, PCBs and BNAs have occurred, their distribution does not justify site-wide monitoring defined for the Snapshot sampling program.

Action: A discussion clarifying the analyte selection will be added to Section 3.3.1.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.3.2 Pg. #: 9 Line #: Code:
Original Specific Comment # 4

Comment: DOE should sample surface water locations for Tc-99. Previous sampling has detected Tc-99 in multiple surface water locations. DOE should discuss the basis for not including all contaminants previously detected within the analytical suite.

Response: As discussed in the Response to General Comment No. 1, a review of the results from five years of environmental monitoring determined uranium, radium and thorium to be the predominant radiological contaminants at the FEMP. Review of RI surface water data shows that technetium was detected once, at 50 pCi/L, in 85 samples collected from 16 locations on Paddys Run and the Great Miami River (GMR). In addition, a review of 14 samples from the Zone of Influence Study showed technetium to be detected at values ranging from 31.4 to 57.2 pCi/L in 14 samples collected within 3/4 mile downstream of the effluent discharge to the GMR. Two six-month composite samples collected in 1992 from a location upstream of the effluent discharge, showed technetium present at 21.7 and 33.4 pCi/L. The calculated PRG, as presented in the Site-Wide Characterization Report (DOE 1993), for technetium is 3,750 pCi/L, based on an MCL dose of 4mRem per year.

Concentrations of technetium varied throughout the above-mentioned range and showed no discernible trends with respect to proximity to the effluent discharge. The 14 technetium detections did not appear to be significantly above the background levels shown in the 1992 monitoring. Therefore, the concentrations of technetium in surface water samples does not present a strong basis for an effort to analyze for it.

Action: No change to the PSP is required.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.3.3 Pg. #: 9 Line #: Code:
Original Specific Comment # 5

Comment: DOE should describe the reasoning for not analyzing sediment samples for Pesticides and PCBs.

Response: The selected radiological, inorganic and volatile and semivolatile organic analytical parameters were focused on analyzing for constituents that are attributable to site sources.

Although there have been occurrences of pesticides and PCBs on the site, there are no data to indicate that the FEMP ever generated or used these materials in quantities that would affect the streams or sediments in the area. The FEMP is surrounded by agricultural land where pesticides may be used regularly. Analysis for pesticides would be inconclusive to characterize the extent of pesticide contamination attributable to the FEMP.

PCB-containing wastes are stored, along with solvents, in maintained drums. A substation of functioning electrical transformers and capacitors is located on site; and PCBs have been detected at low concentrations in surface soils at a few scattered

locations. Given the containment integrity and on-going maintenance of the storage and substation areas, the potential for release of PCBs from these sources to Paddys Run is not considered significant enough to warrant analysis. While PCBs were detected in surface soils, analysis for PCBs in surface water and sediments is not warranted because of: the relatively low concentrations detected in soil samples; the distances from these areas to Paddys Run and the Great Miami River; and the runoff control measures in place at the FEMP. Analyses of surface water and sediments at locations immediately downstream of the FEMP Storm Sewer Outfall Ditch did not detect PCBs.

Action: A discussion of the reasoning for not analyzing sediments samples for pesticides and PCBs will be added to the PSP.

Commenting Organization: Ohio EPA Commentor:
Section #: Table 7-1 Pg. #: 18 Line #: Code:
Original Specific Comment # 6

Comment: Appendix K of the SCQ should be added as a reference document for decontamination for both groundwater and surface water sampling. Section 6.8 of SCQ simply refers the reader to Appendix K for details on decontamination.

Response: DOE agrees. The text will be modified to include the references to Appendix K.

Action: Add reference to Appendix K, Subsection K.11, as appropriate to Table 7-1.

Commenting Organization: Ohio EPA Commentor:
Section #: Table 7-3 Pg. #: 17 Line #: Code:
Original Specific Comment # 7

Comment: A subsection providing the "proposed disposition methodology" for unused soil cores is not included as suggested by the last sentence on the page.

Response: Since soil cores are not a part of this plan, they should not have been mentioned.

Action: The text will be corrected to remove reference to soil cores.

Commenting Organization: Ohio EPA Commentor:
Section #: 7.3.1 Pg. #: 18 Line #: Code:
Original Specific Comment # 8

Comment: The fact that DOE has not predetermined which wells generate potential RCRA waste purge water is disconcerting. If DOE has conducted a sufficient review of historical data for selecting wells for sampling, such a review should also define which wells will likely generate RCRA waste. DOE must make this determination prior to sampling wells.

Response: A reason for including HSL inorganics and volatile organics in the target analyte list for this PSP is to develop a data base of analyses to determine if any of these constituents may be present over a very broad area. This is to determine the nature and extent of

contamination and to perform a baseline risk assessment.

Under the ongoing RCRA sampling, which was included in the Snapshot PSP, 47 wells have been formally evaluated to determine if RCRA wastes would be generated during the sampling process. Of these wells, only two are identified to potentially generate RCRA wastes. These are Wells 1031 and 2649 which are located near the Clearwell, a specific waste source: purged water from these wells is handled as RCRA waste. It is unlikely that wells outside the RCRA-monitored area will contain RCRA constituents. Purge water from all wells other than 1031 and 2649 is disposed of in the general sump for treatment by the on-site waste water treatment system. This procedure is consistent with previous RI/FS groundwater sampling programs. Since 1988, this procedure has been approved by the US EPA for groundwater sampling.

Action: No change to the PSP is required.

Commenting Organization: Ohio EPA Commentor:
Section #: 7.3.2 Pg. #: 18 Line #: Code:
Original Specific Comment # 9

Comment: Appendix K of the SCQ does not specifically address contact waste. DOE should provide a more detailed discussion of contact waste handling and disposition or provide a more specific reference to the SCQ.

Response: DOE agrees that there is not a section in the SCQ directly pertaining to investigation derived wastes, although some sampling procedures in Appendix K do mention waste handling. The reference was made in error. Investigation-derived wastes are disposed of in accordance with DOE procedures and federal regulations. Contact waste, such as PPE, wipes, rags, etc., will be handled in either of two ways. If work is performed in a radiological control area, contact wastes will be placed in a bag labelled "contaminated waste" and secured for future off-site disposal as contaminated waste. If work is performed outside the radiological control areas, contact wastes will be placed in a bag labelled "clean" and disposed of as clean trash.

Action: No change to the PSP is required.

Commenting Organization: Ohio EPA Commentor:
Section #: Table A-1 Pg. #: A-2 Line #: Code:
Original Specific Comment # 10

Comment: The table should be footnoted to describe which removal actions and OU 5 work plan addendum are being used for the Snapshot sampling.

Response: DOE agrees.

Action: The suggested footnotes will be added to the table.

025

Commenting Organization: Ohio EPA Commentor:
Section #: Table A-1 Pg. #: A-7 Line #: Code:
Original Specific Comment # 11

Comment: DOE should sample monitoring Wells 1442 and 1448. Significant perched groundwater contamination exists in the area of the STP justifying sampling of these wells.

Response: DOE agrees. The wells will be sampled.

Action: Add Wells 1442 and 1448 to Table 3-1 and Table A-1.

Commenting Organization: Ohio EPA Commentor:
Section #: Table A-1 Pg. #: A-10 Line #: Code:
Original Specific Comment # 12

Comment: DOE should sample monitoring Well 2094. The well's placement is within the South Plume and within the Paddys Run Road site plume.

Response: DOE agrees. The well will be sampled.

Action: Add Well 2094 to Table 3-2 and Table A-2.

APPENDIX B

USOC-1

APPENDIX B

TABLE A-1
GLACIAL OVERBURDEN (TYPE 1) WELLS SAMPLING SUMMARY

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addenda[a]
	1008		X		
X	1009				
X	1010				
X	1011				
X	1020				
	1024		X		
	1025		X		
	1027		X		
	1028		X		
X	1029				
	1030		X		
	1031		X		
X	1032				
X	1033				
X	1034				
	1035			X	
	1038		X	X	
	1039		X	X	
	1041			X	
	1042			X	
	1045			X	

Note: All Type 1 wells to be analyzed for Technetium-99

[a] Operable Unit 5 (OU5) RI/FS Work Plan Addenda, September 1992

Identification codes for Removal Actions and OU5 Addenda cited in Tables A-1 through A-4:

RA3 - Removal Action 3
K65 - K65 Slurry Line
AA - Administrative Area
RA7 - Removal Action 7
SEQ - Southeast Quadrant of Production Area
P1P - Plant 1 Pad
FTA - Fire Training Area

029

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addenda[a]
	1046			X	
	1047			X	
	1048			X	
	1052		X		
X	1054				
	1055	RA7			
	1064		X		
	1065			X	
	1072		X		
X	1073				
	1074		X		
	1079		X		
	1080		X		
	1081		X		
	1082		X		
	1083		X		
X	1084				
	1085		X		
X	1110				
X	1111				
X	1112				
X	1113				
X	1117				

Note: All Type 1 wells to be analyzed for Technetium-99

[a] Operable Unit 5 (OU5) RI/FS Work Plan Addenda, September 1992

Identification codes for Removal Actions and OU5 Addenda cited in Tables A-1 through A-4:

RA3 - Removal Action 3
K65 - K65 Slurry Line
AA - Administrative Area
RA7 - Removal Action 7
SEQ - Southeast Quadrant of Production Area
P1P - Plant 1 Pad
FTA - Fire Training Area

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addenda[a]
X	1130				
X	1131				
	1134			X	
X	1135				
X	1145				
	1150				K65
X	1151				
X	1152				
	1154				K65
X	1155				
X	1157				
	1160		X		
	1167				K65
X	1171				
	1173				SEQ
	1176			X	
X	1177				
X	1179				
X	1182				
X	1186				
X	1189				
X	1195				
X	1201				

Note: All Type 1 wells to be analyzed for Technetium-99

[a] Operable Unit 5 (OU5) RI/FS Work Plan Addenda, September 1992

Identification codes for Removal Actions and OU5 Addenda cited in Tables A-1 through A-4:

RA3 - Removal Action 3
RA7 - Removal Action 7
PIP - Plant 1 Pad
K65 - K65 Slurry Line
SEQ - Southeast Quadrant of Production Area
FTA - Fire Training Area
AA - Administrative Area

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addenda[a]
	1206				K65
	1207				K65
	1208				K65
	1210			X	
	1212				K65
	1213				K65
X	1214				
	1215				K-65
X	1216				
X	1218				
	1226				K65
X	1230				
X	1234				
X	1236				
	1237				K65
X	1239				
X	1240				
X	1241				
X	1242				
X	1246				
X	1255				
	1260		X		
X	1267				

Note: All Type 1 wells to be analyzed for Technetium-99

[a] Operable Unit 5 (OU5) RI/FS Work Plan Addenda. September 1992

Identification codes for Removal Actions and OU5 Addenda cited in Tables A-1 through A-4:

RA3 - Removal Action 3
K65 - K65 Slurry Line
AA - Administrative Area
RA7 - Removal Action 7
SEQ - Southeast Quadrant of Production Area
P1P - Plant 1 Pad
FTA - Fire Training Area

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addenda[a]
X	1269				
X	1270				
X	1273				
	1276		X		
X	1278				
X	1279				
X	1281				
X	1283				
X	1287				
X	1291				
X	1299				
X	1301				
X	1317				
X	1324				
	1332		X		
	1336	RA7			
	1338				P1P
	1339				P1P
	1340	RA7			
	1342	RA7			
	1343	RA7			P1P
	1344	RA7			K65
	1345	RA7			

Note: All Type 1 wells to be analyzed for Technetium-99

[a] Operable Unit 5 (OU5) RI/FS Work Plan Addenda, September 1992

Identification codes for Removal Actions and OU5 Addenda cited in Tables A-1 through A-4:

RA3 - Removal Action 3
K65 - K65 Slurry Line
AA - Administrative Area
RA7 - Removal Action 7
SEQ - Southeast Quadrant of Production Area
P1P - Plant 1 Pad
FTA - Fire Training Area

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addenda[a]
	1348	RA7			P1P
X	1351				
	1352	RA7			
X	1353				
X	1354				
X	1356				
	1357	RA7			
	1359	RA7			
X	1360				
	1361	RA7			
X	1363				
X	1403				
X	1418				
X	1423				
	1433			X	
X	1441				
X	1442				
X	1443				
X	1444				
X	1447				
X	1448				
X	1509				
X	1511				

Note: All Type 1 wells to be analyzed for Technetium-99

[a] Operable Unit 5 (OU5) RI/FS Work Plan Addenda, September 1992

Identification codes for Removal Actions and OU5 Addenda cited in Tables A-1 through A-4:

RA3 - Removal Action 3
RA7 - Removal Action 7
P1P - Plant 1 Pad
K65 - K65 Slurry Line
SEQ - Southeast Quadrant of Production Area
FTA - Fire Training Area
AA - Administrative Area

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addenda[a]
X	1513				
X	1515				
	1516			X	
	1517			X	
	1518			X	
	1523		X		
	1643		X		
	1644		X		
	1645		X		
	1646		X		
	1675	RA3			
	1676	RA3			
X	1685				
	1711			X	
	1719			X	
X	1728				
X	1733				
	1836				K65
	1837				K65
	1838				K65
	1839				K65
	1840				K65
	1842				K65

Note: All Type 1 wells to be analyzed for Technetium-99

[a] Operable Unit 5 (OU5) RI/FS Work Plan Addenda, September 1992

Identification codes for Removal Actions and OU5 Addenda cited in Tables A-1 through A-4:

RA3 - Removal Action 3
RA7 - Removal Action 7
PIP - Plant 1 Pad
K65 - K65 Slurry Line
SEQ - Southeast Quadrant of Production Area
FTA - Fire Training Area
AA - Administrative Area

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addenda[a]
	1843				K65
	1844				K65
	1866				AA
	1868				AA
	1869				AA
	1887				FTA
	1890				FTA

Note: All Type 1 wells to be analyzed for Technetium-99

[a] Operable Unit 5 (OU5) RI/FS Work Plan Addenda, September 1992

Identification codes for Removal Actions and OU5 Addenda cited in Tables A-1 through A-4:

RA3 - Removal Action 3
K65 - K65 Slurry Line
AA - Administrative Area
RA7 - Removal Action 7
SEQ - Southeast Quadrant of Production Area
P1P - Plant 1 Pad
FTA - Fire Training Area

5066

TABLE A-2
GREAT MIAMI AQUIFER (TYPE 2) WELL SAMPLING SUMMARY

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addenda[a]
	2002	RA3			
X	2004				
X	2006				
X	2007				
	2008		X		
X	2009				
	2010	RA7	X		
X	2011				
X	2013				
	2014	RA3		X	
	2015	RA3			
	2016			X	
	2017	RA3			
X	2020				
	2024		X		
	2027		X	X	
X	2028				
X	2032				
X	2033[a]				
X	2034				
	2037		X	X	

Note: All Type 1 wells to be analyzed for Technetium-99

[a] Operable Unit 5 (OU5) RI/FS Work Plan Addenda. September 1992

Identification codes for Removal Actions and OU5 Addenda cited in Tables A-1 through A-4:

RA3 - Removal Action 3
K65 - K65 Slurry Line
AA - Administrative Area
RA7 - Removal Action 7
SEQ - Southeast Quadrant of Production Area
P1P - Plant 1 Pad
FTA - Fire Training Area

037

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addenda[a]
	2042			X	
	2043		X		
	2044	RA3			
	2045	RA3		X	
	2046	RA3			
	2047			X	
	2048	RA3			
	2049			X	
	2050	RA3			
	2051		X		
	2052		X	X	
X	2054				
	2055		X		
	2064		X		
	2065	RA3			
	2066		X		
	2067		X		
X	2068				
	2070		X		
	2084		X		
	2091	RA3			

Note: All Type 1 wells to be analyzed for Technetium-99

[a] Operable Unit 5 (OU5) RI/FS Work Plan Addenda, September 1992

Identification codes for Removal Actions and OU5 Addenda cited in Tables A-1 through A-4:

RA3 - Removal Action 3
RA7 - Removal Action 7
P1P - Plant 1 Pad
K65 - K65 Slurry Line
SEQ - Southeast Quadrant of Production Area
FTA - Fire Training Area
AA - Administrative Area

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addenda[a]
	2092	RA3			
	2093	RA3			
X	2094				
	2095	RA3			
	2096	RA3			
	2097	RA3			
	2098	RA3			
	2104	RA3			
	2106		X		
X	2107				
X	2108				
X	2109[a]				
X	2118				
X	2119				
	2120		X		
	2125	RA3			
X	2126[a]				
	2128[a]	RA3			
X	2171				
	2383	RA3			
	2384	RA3			

Note: All Type 1 wells to be analyzed for Technetium-99

[a] Operable Unit 5 (OU5) RI/FS Work Plan Addenda, September 1992

Identification codes for Removal Actions and OU5 Addenda cited in Tables A-1 through A-4:

RA3 - Removal Action 3
RA7 - Removal Action 7
P1P - Plant 1 Pad
K65 - K65 Slurry Line
SEQ - Southeast Quadrant of Production Area
FTA - Fire Training Area
AA - Administrative Area

E - 5006

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addenda[a]
	2385	RA3		X	
	2386	RA3			
	2387	RA3			
X	2388				
X	2389[a]				
X	2390				
	2391	RA3			
	2392[a]	RA3			
	2393	RA3			
	2394	RA3			
	2396	RA3			
	2397[a]	RA3			
	2398	RA3			
	2399	RA3			
X	2400				
	2401			X	
	2402			X	
X	2417				
X	2420				
	2421		X		
X	2423				

Note: All Type 1 wells to be analyzed for Technetium-99

[a] Operable Unit 5 (OU5) RI/FS Work Plan Addenda, September 1992

Identification codes for Removal Actions and OU5 Addenda cited in Tables A-1 through A-4:

RA3 - Removal Action 3
K65 - K65 Slurry Line
AA - Administrative Area
RA7 - Removal Action 7
SEQ - Southeast Quadrant of Production Area
P1P - Plant 1 Pad
FTA - Fire Training Area

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OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addenda[a]
X	2429[a]				
	2430		X		
	2434		X		
	2545	RA3			
	2548	RA3			
	2549	RA3			
	2550	RA3			
	2551	RA3			
	2552	RA3			
	2554	X			
	2558	RA3			
	2559	RA3			
	2560	RA3			
	2624	RA3			
	2625	RA3			
	2636	RA3			
	2643[a]		X		
	2648		X		
	2649		X		
	2679	RA3			
	2728	RA3			

Note: All Type 1 wells to be analyzed for Technetium-99

[a] Operable Unit 5 (OU5) RI/FS Work Plan Addenda, September 1992

Identification codes for Removal Actions and OU5 Addenda cited in Tables A-1 through A-4:

RA3 - Removal Action 3
RA7 - Removal Action 7
P1P - Plant 1 Pad
K65 - K65 Slurry Line
SEQ - Southeast Quadrant of Production Area
FTA - Fire Training Area
AA - Administrative Area

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OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addenda[a]
	2821		X		
	2822		X		
X	2880				
X	2881				
X	2897				
X	2898				
X	2899				
X	2900		X		

Note: All Type 1 wells to be analyzed for Technetium-99

[a] Operable Unit 5 (OU5) RI/FS Work Plan Addenda, September 1992

Identification codes for Removal Actions and OU5 Addenda cited in Tables A-1 through A-4:

RA3 - Removal Action 3
K65 - K65 Slurry Line
AA - Administrative Area
RA7 - Removal Action 7
SEQ - Southeast Quadrant of Production Area
P1P - Plant 1 Pad
FTA - Fire Training Area

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TABLE A-3
GREAT MIAMI AQUIFER (TYPE 3) WELL SAMPLING SUMMARY

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addenda[a]
	3001		X		
X	3003				
X	3004				
	3008		X		
X	3009[a]				
	3010	RA7	X		
	3011		X		
	3014	RA3			
	3015	RA3			
	3016	RA3			
X	3017				
X	3020				
X	3032				
X	3034[a]				
	3037		X		
	3043		X		
	3044	RA3			
	3045	RA3			
	3046	RA3			
X	3049				
X	3054				
	3055	RA7	X		

Note: All Type 1 wells to be analyzed for Technetium-99

[a] Operable Unit 5 (OU5) RI/FS Work Plan Addenda. September 1992

Identification codes for Removal Actions and OU5 Addenda cited in Tables A-1 through A-4:

RA3 - Removal Action 3
K65 - K65 Slurry Line
AA - Administrative Area
RA7 - Removal Action 7
SEQ - Southeast Quadrant of Production Area
P1P - Plant 1 Pad
FTA - Fire Training Area

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OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addenda[a]
	3064		X		
	3065	RA3			
	3066		X		
	3067		X		
X	3068				
	3069		X		
	3070		X		
	3091	RA3			
	3092	RA3			
	3093	RA3			
	3095	RA3			
	3096	RA3			
	3097	RA3			
	3098	RA3			
	3106		X		
X	3107				
X	3108				
	3120		X		
	3125	RA3			
	3128	RA3			
	3385	RA3			
	3387	RA3			
X	3390[a]				

Note: All Type 1 wells to be analyzed for Technetium-99

[a] Operable Unit 5 (OU5) RI/FS Work Plan Addenda, September 1992

Identification codes for Removal Actions and OU5 Addenda cited in Tables A-1 through A-4:

RA3 - Removal Action 3
K65 - K65 Slurry Line
AA - Administrative Area
RA7 - Removal Action 7
SEQ - Southeast Quadrant of Production Area
PIP - Plant 1 Pad
FTA - Fire Training Area

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addenda[a]
	3391	RA3			
	3396[a]	RA3			
	3397	RA3			
	3398		X		
X	3402				
	3417		X		
	3421		X		
X	3423				
X	3429[a]				
	3550	RA3			
	3551	RA3			
	3552	RA3			
	3624	RA3			
	3636	RA3			
	3679	RA3			
	3689	RA3			
	3733		X		
	3821		X		
X	3880				
X	3881				
X	3897				
X	3898				
X	3899				
X	3900		X		

Note: All Type 1 wells to be analyzed for Technetium-99

[a] Operable Unit 5 (OU5) RI/FS Work Plan Addenda, September 1992

Identification codes for Removal Actions and OU5 Addenda cited in Tables A-1 through A-4:

RA3 - Removal Action 3
K65 - K65 Slurry Line
AA - Administrative Area
RA7 - Removal Action 7
SEQ - Southeast Quadrant of Production Area
P1P - Plant 1 Pad
FTA - Fire Training Area

TABLE A-4
GREAT MIAMI AQUIFER (TYPE 4) WELL SAMPLING SUMMARY

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addenda[a]
	4001		X		
	4008		X		
	4010		X		
	4011		X		
	4013		X		
	4014	RA3			
	4015	RA3			
	4016	RA3			
	4064		X		
	4067		X		
	4091	RA3			
	4096	RA3			
	4097	RA3			
	4101	RA3			
	4102	RA3			
	4103	RA3			
	4125	RA3			
	4398		X		
	4424		X		

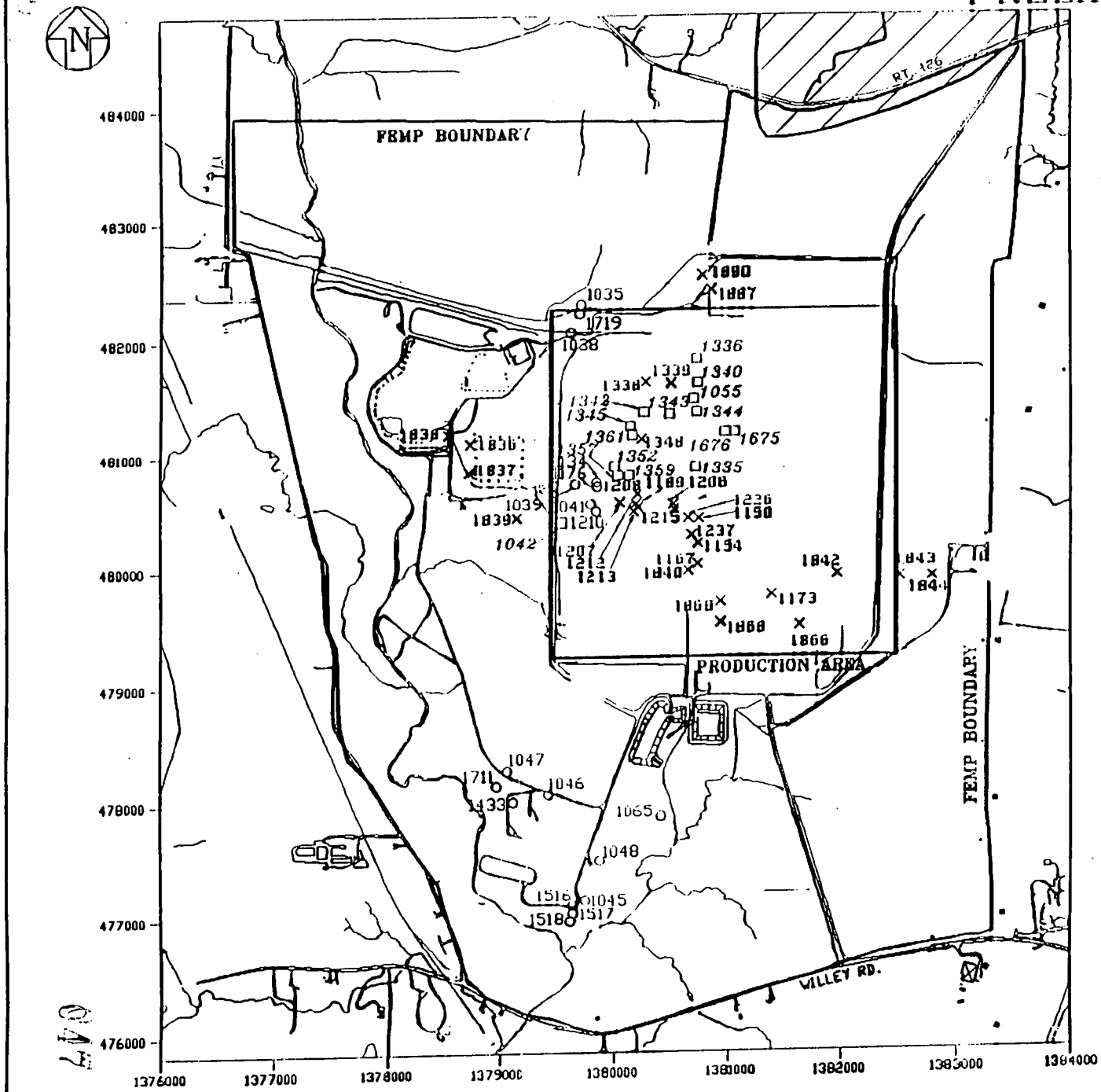
Note: All Type 1 wells to be analyzed for Technetium-99

[a] Operable Unit 5 (OU5) RI/FS Work Plan Addenda, September 1992

Identification codes for Removal Actions and OU5 Addenda cited in Tables A-1 through A-4:

RA3 - Removal Action 3
RA7 - Removal Action 7
P1P - Plant 1 Pad
K65 - K65 Slurry Line
SEQ - Southeast Quadrant of Production Area
FTA - Fire Training Area
AA - Administrative Area

PRELIMINARY



LEGEND

TYPE 1 WELL LOCATIONS FOR SNAPSHOT SAMPLING PLAN

× 1047 Wells sampled for OU5 Addendum

□ 1047 Wells sampled for various removal actions

O 1047 Wells sampled for OU2

FIGURE 2 of 2

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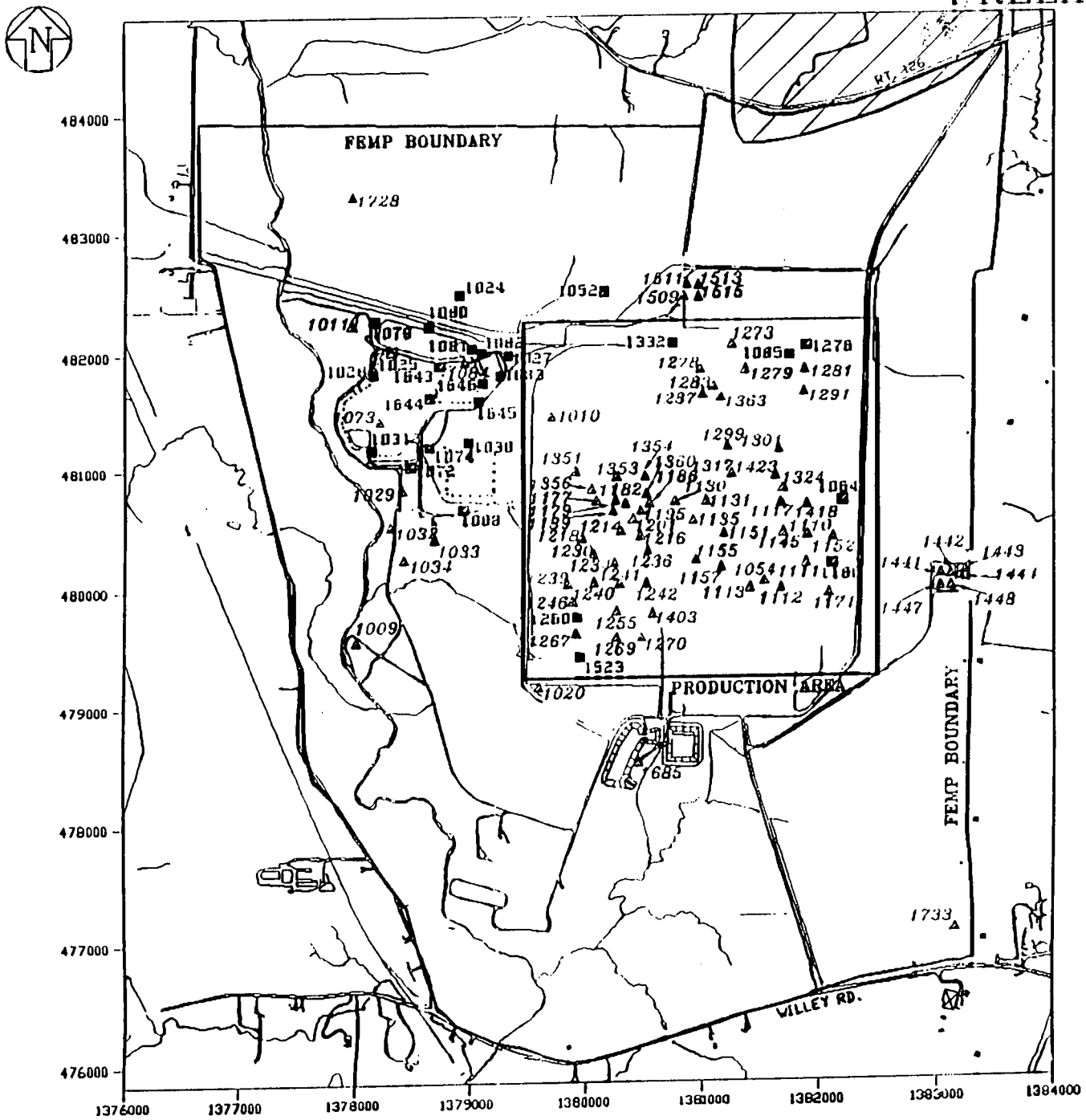
FERNALD, OHIO
FERNALD ENVIRONMENTAL PROJECT

PRELIMINARY



LEGEND

TYPE 1 WELL LOCATIONS FOR SNAPSHOT SAMPLING PLAN

▲ 1033 Wells sampled for OU5 Snapshot Work Plan

■ 1033 RCRA Wells

FIGURE 1 of 2

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FERNALD, OHIO
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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APPENDIX B

USOC-3

TABLE 3-1
GLACIAL OVERBURDEN PIEZOMETERS AND WELLS

1009	1151	1241	1353
1010	1152	1242	1354
1011	1155	1246	1356
1020	1157	1250	1360
1029	1171	1255	1363
1032	1177	1267	1403
1033	1179	1269	1412
1034	1182	1270	1418
1054	1186	1273	1423
1073	1189	1278	1441
1084	1195	1279	1443
1110	1201	1281	1444
1111	1214	1283	1447
1112	1216	1287	1491
1113	1218	1291	1509
1117	1230	1299	1511
1130	1234	1301	1513
1131	1236	1317	1515
1135	1239	1324	1728
1145	1240	1351	1733

All Type 1 wells to be analyzed for technetium-99.

TABLE 3-2
GREAT MIAMI AQUIFER 2000-SERIES WELLS

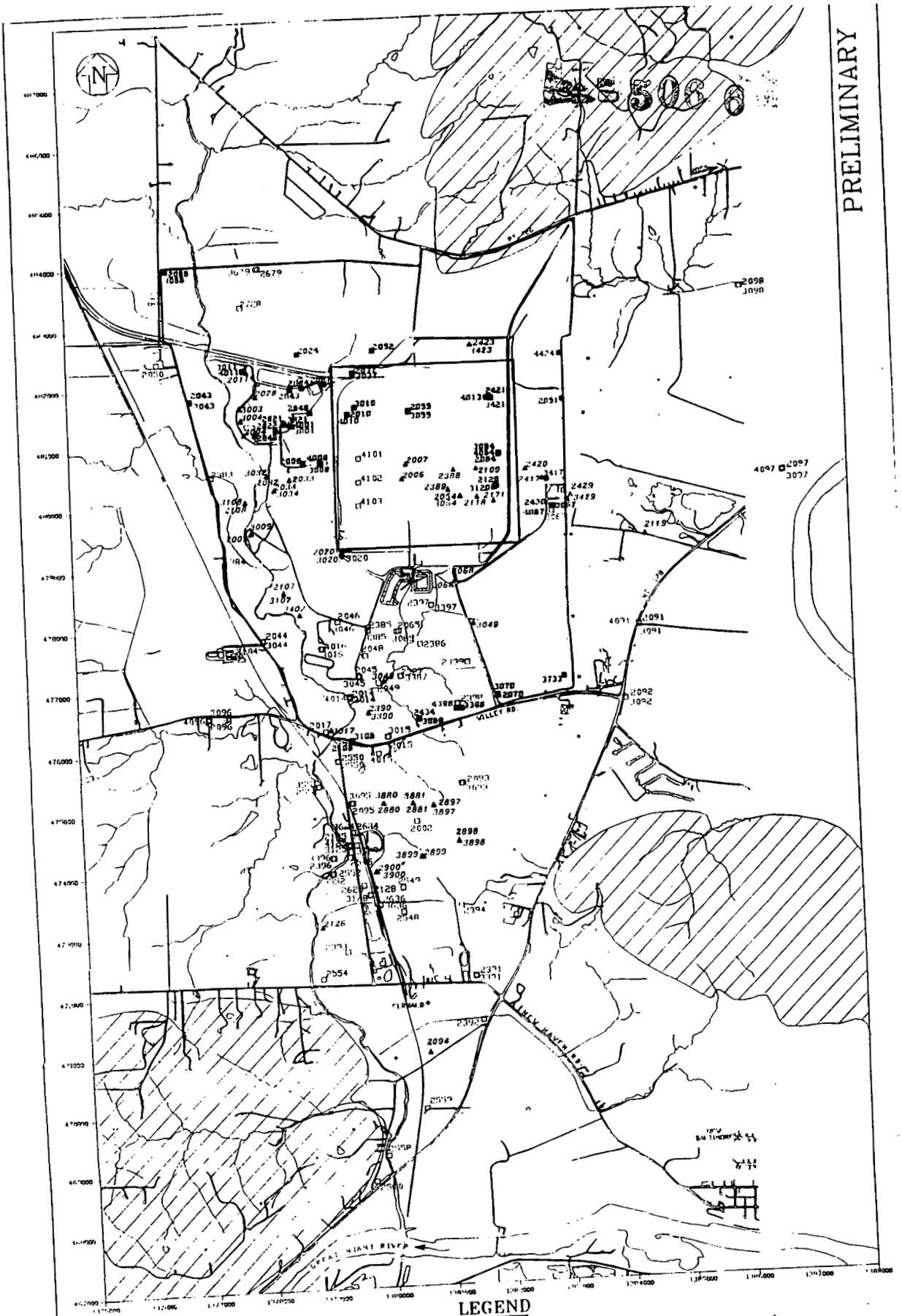
2004	2032	2118	2420
2006	2033[a]	2126[a]	2423
2007	2034	2171	2642
2009	2054	2388	2728
2011	2068	2389[a]	2733
2020	2107	2390	
2028[a]	2109[a]	2417	

[a]Analysis includes technetium-99.

TABLE 3-3
GREAT MIAMI AQUIFER 3000-SERIES WELLS

3003	3020	3054	3402
3004	3032	3068	3423
3009[a]	3034[a]	3107	
3017	3049	3390[a]	

[a]Analysis includes technetium-99.



LEGEND

TYPE II, III and IV WELL LOCATIONS
FOR SNAPSHOT SAMPLING PLAN

052

- ▲ 2002 Wells sampled for OU5 Snapshot Work Plan
- ■ 2002 RCRA Wells
- □ 2002 Wells sampled for various removal actions
- ○ 2002 Wells sampled for OU2
- × 2002 Wells sampled for the OU5 Addendum

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APPENDIX B

OOSC-6

TABLE 7-1 GROUNDWATER SAMPLING PROCEDURES	
Administrative Procedures	**Reference Document**
Field Procedures	SCQ Section 6.2, Appendix K
Sample Handling Shipment Procedures	SCQ Section 6.7
Decontamination	SCQ Section 6.8, Appendix K, Subsection K.11
SURFACE WATER & SEDIMENT SAMPLING	
Field Procedures	SCQ Section 6.3, Appendix K
Sample Handling Shipment Procedures	SCQ Section 6.7
Decontamination	SCQ Section 6.8, Appendix K, Subsection K.11