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SUPPLEMENT TO PROJECT SPECIFIC PLAN SURFACE AND SUBSURFACE SOILS SAMPLING INVESTIGATION FINAL U.S. EPA AND OHIO EPA COMMENT RESOLUTION DECEMBER 1993

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DOE-FN/EPA
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RESPONSES
OU5

5048

SUPPLEMENT TO

PROJECT SPECIFIC PLAN

SURFACE AND SUBSURFACE SOILS SAMPLING INVESTIGATION

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 the Project Specific Plan for Surface and Subsurface Soils Sampling Investigation 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 documents have been 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 Surface and Subsurface Soils Sampling Investigation," dated August 31, 1993.

- Letter, G. E. Mitchell to J. R. Craig, October 21, 1993.

The 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 or for one by Ohio EPA Comment No. 2 is OC-2, etc.

RESOLUTION OF U.S. EPA AND OHIO EPA COMMENTS ON THE PROJECT SPECIFIC PLAN FOR SURFACE AND SUBSURFACE SOILS SAMPLING INVESTIGATION

Commenting Organization: U.S. EPA Commentor:
Section #: 3.1.2 Pg. #: 6 Line #: Code:
Original Comment # 1

Comment: Many survey readings shown in Figure 3-3 indicate relatively high levels of uranium contamination along the fence line and railroad spur east of the solid waste landfill. DOE should investigate this area to characterize the soil contamination.

Resolution: The area with elevated walk-over survey readings in Figure 3-3 was sampled during the CIS investigation as a follow up to that survey. The areas of high readings are all included in removal actions or other operable units. The area between the railroad spur and the east fence of the Waste Storage Area is covered by Removal Action 17 (dealing with soil piles) that is being conducted by OU3. North of the OU3 area is the Solid Waste Landfill which is part of OU 2. The area west of the railroad tracks is part of OU 1. The only OU 5 area that still required investigation to follow up the CIS data is the scar area included in this PSP.

Commenting Organization: U.S. EPA Commentor:
Section #: 3.1.2 Pg. #: 11 Line #: Code:
Original Comment # 2

Comment: Soil borings 11091 through 11095 are supposed to define soil contamination around Plant 8. However, borings 11091 through 11094 are all located north of Plant 8; boring 11095 is the only boring located south of Plant 8. Additional borings should be located east, south, and west of Plant 8 to determine the extent of contamination in the Plant 8 vicinity.

Resolution: Revision of the PSP is not required. The text says the borings "will be sampled to investigate possible contamination in and around Plant 8" because, as is also stated in the text, there have been very few inorganic and organic soil analyses in the area. Possible sources of chemical contamination associated with Plant 8 are above-ground storage tanks and sumps, most of which are located to the north. The significant contamination in the Plant 8 area is radiological, as determined in the Production and Additional Suspect Area Sampling Program. The sampling in this PSP will indicate if there are organic or inorganic components that must be dealt with along with the known radiological contamination. If necessary, additional borings will be installed and sampled during the FS or Remedial Design/Remedial Action (RD/RA) activities to further refine contaminant area and volume.

Commenting Organization: U.S. EPA Commentor:
Section #: 3.1.3 Pp. #: 11-13 Line #: Code:
Original Comment # 3

Comment: The text states that Figure 3-6 shows previous investigation borings containing organic contamination. The text does not reference the previous investigations, and the data presented in Figure 3-6 does not correlate with the data presented in Appendix B (page B-5). These omissions and discrepancies should be addressed.

Resolution: The previous investigations are the Production and Additional Suspect Area (PASA) Work Plan, DCR 33 to the RI/FS Work Plan (October 1989) and DCR 63 (March 1991) which included additional investigations based on the results from the sampling done under the PASA Work Plan. These documents are cited in Section 2.0 "Previous Investigations" in the PSP. Data from eight borings depicted in Figure 3-6 are presented in Appendix B, page B-5 in the section that presents the Plant 6 Area. Two of the borings, 1148 and 1612, are not labelled correctly in Figure 3-6 and should be designated as "organic contamination in soil exists (> 1.5 feet)." Amendment USOC-3 presents the revised Figure 3-6 which correctly labels Borings 1148 and 1612.

Commenting Organization: U.S. EPA Commentor:
Section #: 3.1.3 Pg. #: 13 Line #: Code:
Original Comment # 4

Comment: The text states that boring 11109 will be sampled to investigate the lateral extent of contamination downgradient of the garage area. In terms of soil contamination, the use of the term "downgradient" is unclear. This statement should be clarified.

Resolution: The last sentence of Section 3.1.3 is revised to state, "Deep boring 11109 will be sampled south of the Health and Safety Building to investigate the lateral extent of contamination downgradient of the garage area in reference to the perched water table gradient."

Commenting Organization: U.S. EPA Commentor:
Section #: 3.1.4 Pg. #: 13 Line #: Code:
Original Comment # 5

Comment: The text states that the graphite furnace and oil burner area are identified in Figure 3-8. The graphite furnace and oil burner area are not identified in Figure 3-8. This discrepancy should be resolved.

Resolution: Amendment USOC-5 presents revised Figure 3-8 which includes a depiction of the graphite furnace and oil burner area.

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Commenting Organization: U.S. EPA Commentor:
Section #: 3.1.4 Pg. #: 20 Line #: Code:
Original Comment # 6

Comment: The text indicates that boring 11090 will be located in the same area as boring 1566. However, Figures 3-8 and 3-9 indicate that boring 11090 will be in approximately the same location as boring 1565. This discrepancy should be resolved.

Resolution: The text is correct; the numbers assigned to the borings in Figure 3-8 are reversed. Amendment USOC-5 presents revised Figure 3-8 which depicts the correct location of Borings 1565 and 1566.

Commenting Organization: U.S. EPA Commentor:
Section #: 3.1.5 Pg. #: 20 Line #: Code:
Original Comment # 7

Comment: The text indicates that if split spoon recovery is poor, the boring location will be moved but will remain within a 2-foot radius of the original boring. It is unclear why the boring location would be moved, especially if the original boring has reached a depth greater than 9 feet. Because at depths greater than 3 feet, 6-inch samples are collected every 3 feet, the additional recovery needed for a sample could be obtained from the next 6 inches instead of redrilling the boring. DOE should consider this alternative approach.

Resolution: Revision of the PSP is not required. The sampling program is based on samples of soil at six-inch-depth increments. The glacial overburden is more homogeneous laterally than vertically within the local area of the borehole; therefore, it is important to design the sampling program to minimize the impact of changes in grain size on the sampling results. The analytical program requires a large volume of sample material, and it is important to compare six-inch intervals to six-inch intervals rather than six-inch intervals to 12- or 18-inch intervals.

At the time the plan was being written, the DOE was considering the use of large diameter split spoons that could collect sufficient material for the analysis in one boring. If this approach did not prove to be practical, there had to be an alternative sampling approach in the PSP so the field work could proceed. The text says that if additional material is required to obtain enough material for analysis, it should be gathered from additional borings within a two-foot circle.

Commenting Organization: U.S. EPA Commentor:
Section #: 3.1.5 Pg. #: 20 Line #: Code:
Original Comment # 8

Comment: The text states that borings will be advanced until they reach groundwater or a total depth of 20 feet. It is unclear why 20 feet was selected as the termination point of these borings. DOE should provide justification for terminating borings at 20 feet.

Resolution: The 20-foot limit has been a standard procedure since the writing of the Production and Additional Suspect Area Work Plan. The 20-foot limit is placed on the drilling of auger holes to minimize the risk of drilling through the bottom of the glacial overburden and creating an immediate pathway between the perched groundwater and the Great Miami Aquifer. Augers do not provide any protection against the downward migration of contamination. Additionally, it has been shown by hundreds of borings that the perched water table is within 20 feet of the surface in the glacial overburden, even though the sediments may not yield water fast enough to indicate the water table has been encountered during drilling.

Commenting Organization: U.S. EPA Commentor:
Section #: 3.2 Pg. #: 22 Line #: Code:
Original Comment # 9

Comment: The text states that radiological data are available for the areas bordering the former production area. However, the text does not state the source of this data, whether the data has been validated, and whether the data is of an analytical level that can be used to support the risk assessment. This information should be included in the text to allow assessment of whether the data is of sufficient quality to support the risk assessment.

Resolution: The referenced radiological data were generated from the March 1988 RI Surface Soil Sampling Plan. The data are of appropriate data quality (ASL E) to support RI/FS assessments. Surface soil samples were collected at 0 to 2-inch and 0 to 6-inch intervals during Task 3.4.2 of the RI/FS Surface Soil Sampling Plan. This data has been validated and will be used in the baseline risk assessment of OU 5.

Commenting Organization: U.S. EPA Commentor:
Section #: 3.6 Pg. #: 30 Line #: Code:
Original Comment # 10

Comment: The text states that the boring interval with the highest radiological activity or organics field screening results will be sampled. The text does not address the case where the highest radiological activity and highest organics screening results are not common to the same interval. The text should identify the boring interval to be sampled when the highest radiological activity and highest organics screening results are not common to the same interval.

Resolution: Revision of the PSP is not required. The PSP text does not require that the highest screening value for radiological activity be the same as the highest sample for organics. If the highs occur at different depths, two samples were to be collected; the full radiological and organic analytical program would apply to both samples.

Commenting Organization: E.S. EPA Commentor:
Section #: 6.1 Pg. #: 34 Line #: Code:
Original Comment # 11

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 to be decontaminated between samples. The text states that

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equipment rinsate samples will be collected at a rate of one for each 20 washings. The text as it is currently written indicates that equipment may not be decontaminated between samples and that equipment rinsate samples may not be collected as frequently as necessary. The text should be modified to clarify these issues.

Resolution: Sampling equipment is decontaminated after every use. There is no suggestion in the PSP that the equipment is not to be cleaned between uses. The text emphasizes that each time a sampling instrument is cleaned, this cleaning will be included in the count of 20 washings. This is to ensure that the rinsate sampling truly evaluates the cleaning process under all sampling programs. If five instruments are washed in one batch, this would be counted as five equipment washings toward the 20. The count of 20 washings is not tied to the numbered samples sent to the laboratory versus the number of lithologic samples collected but not sent to a laboratory. This approach ensures that the washing procedure is monitored accurately and continuously.

Commenting Organization: U.S. EPA Commentor:
Section #: 6.1 Pg. #: 34 Line #: Code:
Original Comment # 12

Comment: The text states that two types of quality control (QC) samples will be collected: equipment rinsate samples and trip blanks. The text should be modified to state that three types of QC samples will be collected, and duplicate samples should be added to the list. Also, the duplicate sample collection method described does not correspond with the standard definition of a duplicate sample. Duplicate samples should be aliquots of the same sample, not samples collected from the same depth in adjacent borings. This discrepancy should be addressed.

Resolution: Revision of the PSP is not required. DOE recognizes that these are not "standard" duplicates. However, it is also clear that in order to collect a standard duplicate, a very large mixing container is required given the volume of soil required for the extensive analytical program. The large volume coupled with the difficulty of mixing and blending the clay-rich soil found at the FEMP, unless they are dried and crushed, made the collection of standard duplicates appear to be unreliable. As a compromise, it was decided to collect adjacent samples for comparison. While not standard duplicates, they were from the same horizon and were not extensively agitated and blended which could cause the loss of volatile organics.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.0 Pg. #: 2 Line #: Code:
Comment # 1

Comment: It is standard practice to not collect VOC samples from soils <0.5 feet, since such compounds quickly volatilize from these soils. DOE should reconsider its sampling plan with regard to collecting VOC samples from below the 0.5 feet mark at shallow soil sampling locations. Shallow borings and deep borings should only be sampled for VOCs at intervals below the 0.0 to 0.5 interval.

Resolution: Revision of the PSP is not required. Soil sampling programs conducted under the RI at the FEMP, beginning with the Production and Additional Suspect Area Sampling Program in 1989, have included surface soil sampling for VOC constituents. The SCQ, which is approved by the EPA, states that VOC samples can be collected at a depth of three inches (Appendix K.5.1).

Sampling will determine whether surface contamination exists. Soil collected over a vertical distance of six inches, even in dry summer conditions, contains some moisture in which VOC constituents will be dissolved if they are present. DOE acknowledges that it is possible to lose some VOC constituents from this depth to the atmosphere; however, the purpose of the majority of the samples is for assessment of risk to humans by exposures to surface soil through direct contact and inhalation of particulates or vapors. It appears equally valid that if the surface soil is not sampled for VOCs, the result could present a false negative because the contamination may not penetrate to the sample depth collected. Without definitive data showing that volatiles are not present in surface soil, DOE feels that VOC analyses of soil 0.0 to 0.5-foot depths are necessary.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.1.1 Pg. #: 3 Line #: Code:
Comment # 2 and A

Comment: The section does not address the numerous piles of soil and debris which exist within the northwest quadrant between the production area and the waste pits. DOE should incorporate a sampling program to evaluate the nature and extent of contamination within these soil piles. It is probable a significant portion of the soil piles may have been deposited after the 1987 CIS survey.

Resolution: These materials are construction wastes placed in the area following screening by the Waste Management Program. They were deposited after the CIS was completed. The soil piles are included in the area of OU3 and are included in Removal Action 17. OU3 is preparing a sampling plan to characterize the piles referred to by the Ohio EPA and several other soil piles in the Waste Storage Area. It will sample for constituents specified in Removal Action 17 and will be conducted in December or January. Once characterized, the soil piles may be consolidated with other material under Removal Action 17; therefore, it is appropriate that OU3 rather than OU5 characterizes this material.

Commenting Organization: Ohio EPA Commentor:
Section #: Figure 3-2 Pg. #: 5 Line #: Code:
Comment # 3

Comment: The figure is illegible and should be revised to be useful to the reader.

Resolution: Revision of the PSP is not required. DOE agrees that the figure is difficult to read. It is a copy of the figure from the CIS report which was originally in color. The purpose of the figure is to show the extent of the area surveyed by the CIS rather than any data on the survey results. Data are presented in Figure 3-3.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.1.1 Pg. #: 6 Line #: ¶ 2 Code:
Comment # 4

Comment: This section fails to include a justification for the proposed sampling locations and depths, which do not lie within the ground scar area (i.e., SD-01, SS-04, SS-06, SS-03). DOE should provide justification for these locations. Additionally, DOE should consider the use of field screening methods for the location of these samples.

Resolution: In overview, the soil sample locations proposed in the PSP were suggested to provide data to supplement existing RI/FS radiological data and to assure that adequate HSL data are available for baseline risk assessment. Relatively high uranium concentrations were noted in the vicinity of shallow boring location PA-SD-01. Samples PP-SS-03, 04 and 06 were planned and collected to represent biased locations at the western border of the former production area. Samples collected to a depth of five feet will confirm existing information (some of the existing data is WEMCO data), provide a depth profile in an area previously found to be contaminated, and provide HSL data for an area marginally characterized as to HSL contamination. These locations are at the western border of the former production area. Data from these areas will help define the horizontal extent of HSL/radiological contamination.

Commenting Organization: Ohio EPA Commentor: M. Proffitt
Section #: 3.1.2 Pg. #: 6 Line #: ¶ 3 Code:
Comment # 5

Comment: If these borings would yield information beneficial to the Till/Vadose zone investigation, then they should be continued past the water table. This data should then be incorporated in the Till/Vadose zone report.

Resolution: Revision of the PSP is not required. The only information that would be gained from the suggested approach are lithologic data. Given the tight schedule and need to get the laboratory results for chemical analyses back for the RI report, it was not considered worth the delay to get the additional lithologic data in the field. This is especially true for the former production area where there already is a very high density of borings. Lithologic logs generated by this soil sampling will be used to increase understanding of the geology of the glacial overburden.

Commenting Organization: Ohio EPA Commentor:
Section #: Table 3-2 Pg. #: 9 Line #: Code:
Comment # 6

Comment: The units for PCBs should be reviewed. The concentration at location 1183 is highly elevated. Additionally, other tables in the document report PCBs in μg/kg.

Resolution: The correct units for PCBs in Table 3-2 are μg/kg. Amendment OC-6 presents revised Table 3-2.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.1 Pg. #: 11 Line # Code:
Comment # 7

Comment: DOE fails to provide a justification for only Hydropunch sampling for VOCs. DOE should consider sampling for additional constituents while conducting the sampling. This will allow for the most efficient collection of samples and answer questions concerning groundwater contamination that may be raised by soil data.

Resolution: Revision of the PSP is not required. The primary focus of the PSP for surface and subsurface soils is collection of data for characterization and risk assessment purposes. Groundwater contamination has been investigated as described in the "Snapshot Monitoring Well Sampling and Surface Water and Sediment Sampling" PSP which has been provided to Ohio EPA. The proposal to Hydropunch in select areas is an adjunct to these programs and was designed to maximize data collection efforts without compromising the RI time schedule.

Analytes for the Hydropunch samples were chosen based on contaminants previously detected in the groundwater, contaminant mobility and practical consideration of sample volume and collection time requirements. VOCs were selected as the analytes for the Hydropunch samples because solvents were used at several on-site buildings/facilities, VOCs are known site contaminants, and they are relatively mobile chemicals. Additionally, because of the small sample volume requirements, VOC samples are easily and quickly collected. Thus, VOC samples can be collected using Hydropunch techniques without causing serious delays to the overall sampling program.

Commenting Organization: Ohio EPA Commentor: M. Proffitt
Section #: 3.1.2 Pg. #: 11 Line #: ¶ 1 Code:
Comment # 8

Comment: Section 3.1.2, page 6, ¶ 2 indicates that groundwater in this vicinity is contaminated with inorganic and organic constituents. As a result, the hydropunch samples should be analyzed for these contaminants, not just VOC's.

Resolution: Revision of the PSP is not required. DOE did consider sampling for other constituents; however, they are covered in the Snapshot PSP which has been provided to the Ohio EPA. Hydropunch sampling was specified for this area only because the thickness of the sandy silt under the area would allow the Hydropunch to be driven sufficiently deep to have a high probability that a sample could be collected. Again, the first consideration for this plan is to collect the necessary soil data in time for inclusion in the RI. Samples collected in the groundwater sampling specified in the Snapshot PSP are designed to characterize groundwater contamination.

Commenting Organization: Ohio EPA Commentor: M. Proffitt
Section #: 3.1.2 Pg. #: 11 Line #: ¶ 3 Code:
Comment # 9

Comment: In ¶ 2 of this section, it is stated that there is no existing inorganic or organic data for this area. Ohio EPA, therefore, recommends sampling the groundwater for the full HSL list, not just VOC's.

Resolution: Revision of the PSP is not required. DOE did consider sampling for other constituents; however, they are covered in the Snapshot PSP that was sent to the Ohio EPA on June 9, 1993. Hydropunch sampling was specified for this area only because the thickness of the sandy silt under the area would allow the Hydropunch to be driven deep enough to have a high probability that a sample could be collected. Again, the first consideration for this PSP was to collect the necessary soil data in time for inclusion in the RI.

Commenting Organization: Ohio EPA Commentor: M. Proffitt
Section #: General Pg. #: Line #: Code:
Comment # 10

Comment: How will the stratigraphy for the hydropunched zones be characterized? If sole characterization stops at the water table, then the groundwater samples (via hydropunch) will be obtained from unknown strata.

Resolution: Revision of the PSP is not required. There will be no attempt to characterize the zone where the Hydropunch is used other than to identify the lithology where the water table is reached. Blow count data will be available to indicate if there is a major change in the resistance to penetration that could indicate that the bottom of the water-bearing zone was encountered. Again, the primary objective is to collect analytical data from soil samples. Stratigraphic characterization of this area by previous boring programs is considered sufficient for RI/FS purposes.

Commenting Organization: Ohio EPA Commentor: M. Proffitt
Section #: 3.1.3 Pg. #: 13 Line #: ¶ 3 Code:
Comment # 11

Comment: This paragraph states that perched groundwater has been significantly contaminated with Uranium in this area. If additional characterization of groundwater contamination is necessary, Ohio EPA recommends coupling hydropunch sampling with the boring program.

Resolution: Revision of the PSP is not required. Sampling for groundwater characterization has been covered under the Snapshot PSP. Also, since a significant amount of data exists on the nature of uranium contamination at the FEMP, it was not necessary from the point of view of the RI to collect additional water samples beyond those specified.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.1.3 Pg. #: 13 Line #: ¶ 3 Code:
Comment # 12

Comment: The OU5 Work Plan Addendum for the production area additional sampling proposed the installation of monitoring wells and sampling near the garage. Has this data been encompassed into this sampling plan. DOE should consider the use of hydropunch sampling in this area. Previous data reported in the OU5 WPA suggest significant groundwater contamination other than uranium in this area.

Resolution: Revision of the PSP is not required. All pertinent data available were reviewed in preparation for the writing of this PSP. The groundwater characterization in the Snapshot PSP in conjunction with historic data will be sufficient for purposes of the RI/FS. Sampling with the Hydropunch was considered but not selected, based on previous experience in the area. Drilling indicates that the subsurface is predominantly glacial till composed of silt and clay. Sampling of perched groundwater in this area in conventional piezometers has proved to be difficult due to slow recharge.

Commenting Organization: Ohio EPA Commentor: M. Proffitt
Section #: 3.1.4 Pg. #: 13 Line #: ¶ 2 Code:
Comment # 13

Comment: What additional groundwater investigation is planned if soil contamination is confirmed at depth?

Resolution: Revision of the PSP is not required. No additional RI/FS groundwater investigation is planned. The Snapshot PSP and the Additional Wells PSP are designed to provide data to fill the remaining RI/FS data needs for groundwater characterization. Additional groundwater sampling may be warranted in the future as part of the remedial design/remedial action for the area.

Commenting Organization: Ohio EPA Commentor:
Section #: Figure 3-9 Pg. #: 19 Line #: Code:
Comment # 14

Comment: Why has DOE not proposed collecting hydropunch samples at deep borings in this quadrant? DOE should consider the use of hydropunch sampling in this area. DOE's proposal to collect Hydropunch in other areas is a good example of obtaining the most information possible from a given sampling event.

Resolution: Revision of the PSP is not required. The northeast quadrant has the highest percentage of "dry" borings of any quadrant in the former production area. Sampling with the Hydropunch was considered but not selected, based on previous experience in the area. Drilling in the area indicates that the subsurface is predominantly glacial till composed of silt and clay. Sampling of perched groundwater in this area in conventional piezometers has proved to be difficult due to slow recharge.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.1.5 Pg. #: 20 Line #: ¶ 4 Code:
Comment # 15

Comment: If additional borings are need to obtain sufficient sample volume, the soil should be homogenized prior to collecting specific analyte volumes. The exception to this is VOCs of course.

Resolution: Revision of the PSP is not required. DOE agrees and this is defined in the sampling procedure in SCQ Appendix K.5.1.

Commenting Organization: Ohio EPA Commentor:
Section #: 7.1.2 Pg. #: 36 Line #: Code:
Comment # 16

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: 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. Reference to SCQ, Appendix K for handling and disposal of contact waste, is deleted from Section 7.1.2.

Commenting Organization: Ohio EPA Commentor:
Section #: Appendix B Pg. #: B-2 Line #: Code:
Comment # 17

Comment: Revise table to show cyanide as 1/8 for number above background. If this is not a correct revision, then cyanide should be removed from the table.

Resolution: The reviewer is correct. Amendment OC-17 presents revised PSP Appendix Table, Page B-2, "Preliminary Summary of Metal Concentrations in Soil Significantly Exceeding Background and Corresponding Action Levels."

Commenting Organization: Ohio EPA Commentor:
Section #: Pg. #: Line #: Code:
Comment # B

Comment: DOE should address soil piles visible on aerial photos approximately 200 yards east of the northeast corner of the production area. Ohio EPA's concern with these piles has been previously voiced at meetings with DOE.

Resolution: DOE has added a boring in the soil pile described above. This is approximately 20 feet east of Boring 1739. Amendment OC-B presents the approximate location of the new boring with respect to Boring 1739 and the laboratory analysis of the only soil sample from Boring 1739 that was submitted for chemical analysis. The log for boring 1739 does not indicate any unusual material in the pile.

The new boring was added to the Additional Monitoring Well task under WBS 50.03.22 as that program was not completed at the time of OEPA's request. Under this program soil samples were collected continuously with a split spoon sampler. Samples were collected at 0 to 0.5, 2.0 to 2.5, 5.0 to 5.5 and at 5-foot intervals to the bottom of the 40-foot boring for total uranium and total thorium analysis (TAL 50.03.22B). In addition, if any sample in the boring exhibited an organic chemical screening reading of 5 ppm or more above background for 10 seconds or more, the sample was to be analyzed for TAL 50.03.18A in accordance with this Soil Sampling PSP. If a field radiological screening showed levels 15 percent above background, the sample was to be analyzed for TAL 50.03.18A.

During the sampling there were no above-background readings of either organics or radiological parameters. No unusual materials were encountered in the boring.

Commenting Organization: Ohio EPA Commentor:
Section #: Appendix B Pg. #: B-4 Line #: Code:
Comment # 18

Comment: DOE should provide the reasoning behind the use of the 50% exceedance criteria described in footnote (2).

Resolution: Concentrations exceeding site-specific background levels by approximately 50 percent or more are specified in footnote (1). Inorganic constituents occur naturally in soil. Concentrations can vary greatly and can be closely related to varying soil types. The 50 percent measure of significance was selected to provide a conservative preliminary assessment of the available soil data.

APPENDIX A

5048

Department of Energy
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AUG 31 1993

DOE-2863-93

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
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Dear Mr. Saric and Mr. Mitchell:

TRANSMITTAL OF RESPONSES TO UNITED STATES ENVIRONMENTAL PROTECTION AGENCY AND OHIO ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON THE PROJECT SPECIFIC PLAN FOR SURFACE AND SUBSURFACE SOIL SAMPLING INVESTIGATION, JUNE 1993

References: 1) Letter, J. A. Saric to J. R. Craig, "Disapproval of OU 5 Additional Soil Sampling Work Plan - FEMP," dated July 22, 1993

2) Letter, G. E. Mitchell to J. R. Craig, "Comments on the Operable Unit 5 PSP," dated July 26, 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 or your staff have questions regarding the responses, please contact Pete Yerace at (513) 648-3161.

Sincerely,

Jack R. Craig
Fernald Remedial Action
Project Manager

FN:Yerace

Enclosures: As stated

Recycled and Recyclable

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J. W. Thiesing, FERMCO/2

RESPONSES TO U.S. EPA COMMENTS ON THE PROJECT SPECIFIC PLAN FOR SURFACE AND SUBSURFACE SOIL SAMPLING INVESTIGATION

Commenting Organization: U.S. EPA Commentor:
Section #: 3.1.2 Pg. #: 6 Line #: Code:
Original Comment # 1

Comment: Many survey readings shown in Figure 3-3 indicate relatively high levels of uranium contamination along the fence line and railroad spur east of the solid waste landfill. DOE should investigate this area to characterize the soil contamination.

Response: The area with elevated walk-over survey readings in Figure 3-3 was sampled during the CIS investigation as a follow up to that survey. The areas of high readings are all included in removal actions or other operable units. The area between the railroad spur and the east fence of the Waste Storage Area is covered by Removal Action 17, which deals with waste piles, that is being conducted by CRU3. North of the CRU3 area is the Sanitary Landfill which is part of OU 2. The area west of the railroad tracks is part of OU 1. The only OU 5 area that still required investigation to follow up the CIS data is the scar area included in this PSP.

Action: Expand the text to reference the coverage by the other operable units.

Commenting Organization: U.S. EPA Commentor:
Section #: 3.1.2 Pg. #: 11 Line #: Code:
Original Comment # 2

Comment: Soil borings 11091 through 11095 are supposed to define soil contamination around Plant 8. However, borings 11091 through 11094 are all located north of Plant 8; boring 11095 is the only boring located south of Plant 8. Additional borings should be located east, south, and west of Plant 8 to determine the extent of contamination in the Plant 8 vicinity.

Response: The text says the borings "will be sampled to investigate possible contamination in and around Plant 8" because, as is also stated in the text, there are very few inorganic and organic samples from the area. Possible sources of chemical contamination associated with Plant 8 are above-ground storage tanks and sumps, most of which are located to the north. The significant contamination in the Plant 8 area is radiological, as determined in the Production and Additional Suspect Area Sampling Program. The sampling in this PSP will indicate if there are organic or inorganic components that must be dealt with along with the known radiological contamination. If necessary, additional borings will be installed and sampled during the FS to further refine contaminant area and volume.

Action: No change to the PSP is required.

Commenting Organization: U.S. EPA Commentor:
Section #: 3.1.3 Pp. #: 11-13 Line #: Code:
Original Comment # 3

Comment: The text states that Figure 3-6 shows previous investigation borings containing organic contamination. The text does not reference the previous investigations, and the data presented in Figure 3-6 does not correlate with the data presented in Appendix B (page B-5). These omissions and discrepancies should be addressed.

Response: The previous investigations are the Production and Additional Suspect Area (PASA) Work Plan, DCR 33 to the RI/FS Work Plan (October 1989) and DCR 63 (March 1991) which included additional investigations based on the results from the sampling done under the PASA Work Plan. These documents are cited in Section 2.0 "Previous Investigations" in the PSP. Data from eight borings depicted in Figure 3-6 are presented in Appendix B, Page B-5 in the section that presents Plant 6 Area. Two of the borings, 1148 and 1612, are not labelled correctly in Figure 3-6 and should be designated as "organic contamination in soils exists (> 1.5 feet)"

Action: Clarify the text to indicate that the graphite furnace and oil burner area were sampled under the PASA Work Plan and subsequent additions to that plan. Revise Figure 3-6 to properly identify borings 1148 and 1612 as specified above.

Commenting Organization: U.S. EPA Commentor:
Section #: 3.1.3 Pg. #: 13 Line #: Code:
Original Comment # 4

Comment: The text states that boring 11109 will be sampled to investigate the lateral extent of contamination downgradient of the garage area. In terms of soil contamination, the use of the term "downgradient" is unclear. This statement should be clarified.

Response: The term downgradient here refers to the perched water table gradient.

Action: The text will be clarified.

Commenting Organization: U.S. EPA Commentor:
Section #: 3.1.4 Pg. #: 13 Line #: Code:
Original Comment # 5

Comment: The text states that the graphite furnace and oil burner area are identified in Figure 3-8. The graphite furnace and oil burner area are not identified in Figure 3-8. This discrepancy should be resolved.

Response: DOE agrees.

Action: The figure will be corrected to show the location of the graphite furnace and oil burner.

Commenting Organization: U.S. EPA Commentor:
Section #: 3.1.4 Pg. #: 20 Line #: Code:
Original Comment # 6

Comment: The text indicates that boring 11090 will be located in the same area as boring 1566. However, Figures 3-8 and 3-9 indicate that boring 11090 will be in approximately the same location as boring 1565. This discrepancy should be resolved.

Response: The text is correct: the numbers assigned to the wells in Figure 3-8 are reversed.

Action: The labels on Wells 1566 and 1565 will be changed to show the correct location of the wells.

Commenting Organization: U.S. EPA Commentor:
Section #: 3.1.5 Pg. #: 20 Line #: Code:
Original Comment # 7

Comment: The text indicates that if split spoon recovery is poor, the boring location will be moved but will remain within a 2-foot radius of the original boring. It is unclear why the boring location would be moved, especially if the original boring has reached a depth greater than 9 feet. Because at depths greater than 3 feet, 6-inch samples are collected every 3 feet, the additional recovery needed for a sample could be obtained from the next 6 inches instead of redrilling the boring. DOE should consider this alternative approach.

Response: The sampling program is based on samples of soils at six-inch depth increments. The Glacial Overburden is more homogeneous laterally than vertically within the local area of the borehole; therefore, it is important to design the sampling program to minimize the impact of changes in grain size on the sampling results. The analytical program requires a large volume of sample material, and it is important to compare six-inch intervals to six-inch intervals rather than six-inch intervals to 12- or 18-inch intervals.

At the time the plan was being written, the DOE was considering the use of large diameter split spoons that could collect sufficient material for the analysis in one boring. If this approach did not prove to be practical, there had to be an alternative sampling approach in the PSP so the field work could proceed. The text says that if additional material is required to obtain enough material for analysis, it should be gathered from additional borings within a two-foot circle.

Action: No change to the PSP is required.

Commenting Organization: U.S. EPA Commentor:
Section #: 3.1.5 Pg. #: 20 Line #: Code:
Original Comment # 8

Comment: The text states that borings will be advanced until they reach groundwater or a total depth of 20 feet. It is unclear why 20 feet was selected as the termination point of these borings. DOE should provide justification for terminating borings at 20 feet.

Response: The 20-foot limit has been a standard procedure since the writing of the Production and Additional Suspect Area Work Plan. The 20-foot limit is placed on the drilling of auger holes to minimize the risk of drilling through the bottom of the glacial overburden and creating an immediate pathway between the perched groundwater and the Great Miami Aquifer. Augers do not provide any protection against the downward migration of contamination. Additionally, it has been shown by hundreds of borings that the perched water table is within 20 feet of the surface in the glacial overburden, even though the sediments may not yield water fast enough to indicate the water table has been encountered during drilling.

Action: The PSP will be revised to reflect the above response.

Commenting Organization: U.S. EPA Commentor:
Section #: 3.2 Pg. #: 22 Line #: Code:
Original Comment # 9

Comment: The text states that radiological data are available for the areas bordering the former production area. However, the text does not state the source of this data, whether the data has been validated, and whether the data is of an analytical level that can be used to support the risk assessment. This information should be included in the text to allow assessment of whether the data is of sufficient quality to support the risk assessment.

Response: The referenced radiological data were generated from the March 1988 RI Surface Soil Sampling Plan. The data are of appropriate data quality (ASL E) to support RI/FS assessments. Surface soil samples were collected at 0 to 2-inch and 0 to 6-inch intervals during RI/FS task 3.4.2 (RI/FS Surface Soils Sampling Plan). This data has been validated and will be used in the baseline risk assessment of OU 5.

Action: The text will be modified to state the source of the data and that it is RI/FS quality data (ASL E) that is validated, and will be used for the baseline risk assessment.

Commenting Organization: U.S. EPA Commentor:
Section #: 3.6 Pg. #: 30 Line #: Code:
Original Comment # 10

Comment: The text states that the boring interval with the highest radiological activity or organics field screening results will be sampled. The text does not address the case where the highest radiological activity and highest organics screening results are not common to the same interval. The text should identify the boring interval to be sampled when the highest radiological activity and highest organics screening results are not common to the same interval.

Response: The PSP text does not require that the highest screening value for radiological be the same as the highest sample for organics. If the highs occur at different depths, two samples will be collected; the full radiological and organics analytical program would apply to both samples.

Action: No change to the PSP is required.

Commenting Organization: E.S. EPA Commentor:
Section #: 6.1 Pg. #: 34 Line #: Code:
Original Comment # 11

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 to be decontaminated between samples. The text states that equipment rinsate samples will be collected at a rate of one for each 20 washings. The text as it is currently written indicates that equipment may not be decontaminated between samples and that equipment rinsate samples may not be collected as frequently as necessary. The text should be modified to clarify these issues.

Response: Sampling equipment is decontaminated after every use. There is no suggestion in the PSP that the equipment is not to be cleaned between uses. The text emphasizes that each time a sampling instrument is cleaned, this cleaning will be included in the count of 20 washings. This is to assure that the rinsate sampling truly evaluates the cleaning process under all sampling programs. If five instruments are washed in one batch, this would be counted as five equipment washings toward the 20. The count of 20 washings is not tied to the number samples sent to the laboratory versus the number of lithologic samples collected but not sent to a laboratory. This approach assures that the washing procedure is monitored accurately and continuously.

Action: Clarify the text to show that sampling equipment is decontaminated between each use, and that rinsate samples are collected at a frequency of 1 in 20 samples collected (and equipment washings) regardless of the use of the sample.

Commenting Organization: U.S. EPA Commentor:
Section #: 6.1 Pg. #: 34 Line #: Code:
Original Comment # 12

Comment: The text states that two types of quality control (QC) samples will be collected: equipment rinsate samples and trip blanks. The text should be modified to state that three types of QC samples will be collected, and duplicate samples should be added to the list. Also, the duplicate sample collection method described does not correspond with the standard definition of a duplicate sample. Duplicate samples should be aliquots of the same sample, not samples collected from the same depth in adjacent borings. This discrepancy should be addressed.

Response: DOE recognizes that these are not "standard" duplicates. However, it is also clear that in order to collect a standard duplicate, a very large mixing container is required given the volume of the soils required for the extensive analytical program. The large volume coupled with the difficulty of mixing and blending the clay-rich soils found at the FEMP, unless they are dried and crushed, made the collection of standard duplicates appear to be unreliable. As a compromise, it was decided to collect adjacent samples for comparison. While not standard duplicates, they will be from the same horizon and will not have been extensively agitated and blended which could cause the loss volatile organics.

Action: No change to the PSP is required.

RESPONSES TO OHIO EPA COMMENTS ON THE PROJECT SPECIFIC PLAN FOR SURFACE AND SUBSURFACE SOIL SAMPLING INVESTIGATION

Commenting Organization: Ohio EPA Commentor:
Section #: 3.0 Pg. #: 2 Line #: Code:
Comment # 1

Comment: It is standard practice to not collect VOC samples from soils <0.5 feet, since such compounds quickly volatilize from these soils. DOE should reconsider its sampling plan with regard to collecting VOC samples from below the 0.5 feet mark at shallow soil sampling locations. Shallow borings and deep borings should only be sampled for VOCs at intervals below the 0.0 to 0.5 interval.

Response: Soil sampling programs conducted under the RI at the FEMP, beginning with the Production and Additional Suspect Area Sampling Program in 1989, have included surface soil sampling for VOC constituents. The SCQ, which is approved by the EPA, states that VOC samples can be collected at a depth of three inches (Appendix K.5.1).

Sampling will determine whether surface contamination exists. Soils collected over a vertical distance of six inches, even in dry summer conditions, contain some moisture in which VOC constituents will be dissolved if they are present. DOE acknowledges that it is possible to lose some VOC constituents from this depth to the atmosphere; however, the purpose of the majority of the samples is for assessment of risk to humans by exposures to surface soils through direct contact and inhalation of particulates or vapors. It appears equally valid that if the surface soil is not sampled for VOCs, the result could present a false negative because the contamination may not penetrate to the sample depth collected. Without definitive data showing that volatiles are not present in surface soils, DOE feels that VOC analyses of soils 0.0 to 0.5-foot depths are necessary.

Action: No change to the PSP is required.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.1.1 Pg. #: 3 Line #: Code.
Comment # 2

Comment: The section does not address the numerous piles of soil and debris which exist within the northwest quadrant between the production area and the waste pits. DOE should incorporate a sampling program to evaluate the nature and extent of contamination within these soil piles. It is probable a significant portion of the soil piles may have been deposited after the 1987 CIS survey.

Response: These materials are construction wastes placed in the area following screening by the Waste Management Program. They were deposited after the CIS was completed. The soil piles are included in the area of CRU3 and are included in Removal Action 17.

Action: No change to the PSP is required.

Commenting Organization: Ohio EPA Commentor:
Section #: Figure 3-2 Pg. #: 5 Line #: Code:
Comment # 3

Comment: The figure is illegible and should be revised to be useful to the reader.

Response: DOE agrees that the figure is difficult to read. It is a copy of the figure from the CIS report which was originally in color. The purpose of the figure is to show the extent of the area surveyed by the CIS rather than any data on the survey results. Data are presented in Figure 3-3.

Action: No change to the PSP is required.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.1.1 Pg. #: 6 Line #: ¶ 2 Code:
Comment # 4

Comment: This section fails to include a justification for the proposed sampling locations and depths, which do not lie within the ground scar area (i.e., SD-01, SS-04, SS-06, SS-03). DOE should provide justification for these locations. Additionally, DOE should consider the use of field screening methods for the location of these samples.

Response: In overview, the soils sample locations proposed in the PSP were suggested to provide data to supplement existing RI/FS radiological data and to assure that adequate HSL data are available for baseline risk assessment. Relatively high uranium concentrations were noted in the vicinity of shallow boring location PA-SD-01. Samples collected to a depth of five feet will confirm existing information (some of the existing data is WEMCO data), provide a depth profile in an area previously found to be contaminated, and provide HSL data for an area marginally characterized as to HSL contamination. These locations are at the western border of the Production Area. Data from these areas will help define the horizontal extent of HSL/radiological contamination.

Action: The text will be revised to include more justification for the proposed sampling locations.

Commenting Organization: Ohio EPA Commentor: M. Proffitt
Section #: 3.1.2 Pg. #: 6 Line #: ¶ 3 Code:
Comment # 5

Comment: If these borings would yield information beneficial to the Till/Vadose zone investigation, then they should be continued past the water table. This data should then be incorporated in the Till/Vadose zone report.

Response: The only information that would be gained from the suggested approach are lithologic data. Given the tight schedule and need to get the laboratory results for chemical analyses back for the RI report, it is not considered worth the delay to get the additional lithologic data in the field. This is especially true for the former production area where there already is a very high density of borings. Lithologic logs generated by this soil sampling will be used to increase understanding of the geology of the glacial overburden.

Action: No change to the PSP is required.

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Commenting Organization: Ohio EPA Commentor:
Section #: Table 3-2 Pg. #: 9 Line #: Code:
Comment # 6

Comment: The units for PCBs should be reviewed. The concentration at location 1183 is highly elevated. Additionally, other tables in the document report PCBs in $\mu g/kg$.

Response: DOE agrees. The correct units for PCBs in Table 3-2 are $\mu g/kg$.

Action: Table 3-2 will be corrected to reflect PCB concentration units as $\mu g/kg$.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.1 Pg. #: 11 Line # Code:
Comment # 7

Comment: DOE fails to provide a justification for only Hydropunch sampling for VOCs. DOE should consider sampling for additional constituents while conducting the sampling. This will allow for the most efficient collection of samples and answer questions concerning groundwater contamination that may be raised by soil data.

Response: The primary focus of the PSP for surface and subsurface soils is collection of soils data for characterization and risk assessment purposes. Groundwater contamination has been investigated as described in the "Snapshot Monitoring Well Sampling and Surface Water and Sediment Sampling" PSP which has been provided to Ohio EPA. The proposal to Hydropunch in select areas is an adjunct to these programs and was designed to maximize data collection efforts without compromising the RI time schedule.

Analytes for the Hydropunch samples were chosen based on contaminants previously detected in the groundwater, contaminant mobility and practical consideration of sample volume and collection time requirements. VOCs were selected as the analytes for the Hydropunch samples because solvents were used at several on-site buildings/facilities. VOCs are known site contaminants, and they are relatively mobile chemicals. Additionally, because of the small sample volume requirements, VOC samples are easily and quickly collected. Thus, VOC samples can be collected using Hydropunch techniques without causing serious delays to the overall sampling program.

Action: No change to the PSP is required.

Commenting Organization: Ohio EPA Commentor: M. Proffitt
Section #: 3.1.2 Pg. #: 11 Line #: ¶ 1 Code:
Comment # 8

Comment: Section 3.1.2, page 6, ¶ 2 indicates that groundwater in this vicinity is contaminated with inorganic and organic constituents. As a result, the hydropunch samples should be analyzed for these contaminants, not just VOC's.

Response: DOE did consider sampling for other constituents; however, they are covered in the Snapshot PSP which has been provided to the Ohio EPA. Hydropunch sampling was specified for this area only because the thickness of the sandy silt under the area would allow the Hydropunch to be driven sufficiently deep to have a high probability that a sample could be collected. Again, the first consideration for this plan is to collect the necessary soil data in time for inclusion in the RI. Samples collected in the groundwater sampling specified in the Snapshot PSP are designed to characterize the groundwater contamination.

Action: No change to the PSP is required.

Commenting Organization: Ohio EPA Commentor: M. Proffitt
Section #: 3.1.2 Pg. #: 11 Line #: ¶ 3 Code:
Comment # 9

Comment: In ¶ 2 of this section, it is stated that there is no existing inorganic or organic data for this area. Ohio EPA, therefore, recommends sampling the groundwater for the full HSL list, not just VOC's.

Response: DOE did consider sampling for other constituents; however, they are covered in the Snapshot PSP which was sent to the Ohio EPA on June 9, 1993. Hydropunch sampling was specified for this area only because the thickness of the sandy silt under the area would allow the Hydropunch to be driven deep enough to have a high probability that sample could be collected. Again, the first consideration for this PSP was to collect the necessary soil data in time for inclusion in the RI.

Action: No change to the PSP is required.

Commenting Organization: Ohio EPA Commentor: M. Proffitt
Section #: General Pg. #: Line #: Code:
Comment # 10

Comment: How will the stratigraphy for the hydropunched zones be characterized? If sole characterization stops at the water table, then the groundwater samples (via hydropunch) will be obtained from unknown strata.

Response: The commentor is correct. There will be no attempt to characterize the zone where the Hydropunch is used, other than to identify the lithology where the water table is reached. Blow count data will be available to indicate if there is a major change in the resistance to penetration which could indicate that the bottom of the water bearing zone was encountered. Again, the primary objective is to collect analytical data from soil samples. Stratigraphic characterization of this area by previous boring programs is considered sufficient for RI/FS purposes.

Action: No change to the PSP is required.

Commenting Organization: Ohio EPA Commentor: M. Proffitt
Section #: 3.1.3 Pg. #: 13 Line #: ¶ 3 Code:
Comment # 11

Comment: This paragraph states that perched groundwater has been significantly contaminated with Uranium in this area. If additional characterization of groundwater contamination is necessary, Ohio EPA recommends coupling hydropunch sampling with the boring program.

Response: Sampling for groundwater characterization has been covered under the Snapshot PSP. Also, since a significant amount of data exists on the nature of uranium contamination at the FEMP, it was not necessary from the point of view of the RI to collect additional water samples beyond those specified.

Action: No change to the PSP is required.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.1.3 Pg. #: 13 Line #: ¶ 3 Code:
Comment # 12

Comment: The OU5 Work Plan Addendum for the production area additional sampling proposed the installation of monitoring wells and sampling near the garage. Has this data been encompassed into this sampling plan. DOE should consider the use of hydropunch sampling in this area. Previous data reported in the OU5 WPA suggest significant groundwater contamination other than uranium in this area.

Response: All pertinent data available were reviewed in preparation for the writing of this PSP. The groundwater characterization in the Snapshot PSP in conjunction with historic data will be sufficient for purposes of the RI/FS. Sampling with the Hydropunch was considered, but not selected for this area based on previous experience in the area. Drilling in the area indicates that the subsurface is predominantly glacial till composed of silt and clay. Sampling of perched groundwater in this area has proved to be difficult in conventional piezometers due to slow recharge.

Action: No change to the PSP is required.

Commenting Organization: Ohio EPA Commentor: M. Proffitt
Section #: 3.1.4 Pg. #: 13 Line #: ¶ 2 Code:
Comment # 13

Comment: What additional groundwater investigation is planned if soil contamination is confirmed at depth?

Response: No additional RI/FS groundwater investigation is planned. The Snapshot PSP and the Additional Wells PSP are designed to provide data to fill the remaining RI/FS data needs for groundwater characterization. Additional groundwater sampling may be warranted in the future as part of the remedial design/remedial action for the area.

Action: No change to the PSP is required.

Commenting Organization: Ohio EPA Commentor:
Section #: Figure 3-9 Pg. #: 19 Line #: Code:
Comment # 14

Comment: Why has DOE not proposed collecting hydropunch samples at deep borings in this quadrant? DOE should consider the use of hydropunch sampling in this area. DOE's proposal to collect Hydropunch in other areas is a good example of obtaining the most information possible from a given sampling event.

Response: The northeast quadrant has the highest percentage of "dry" borings of any quadrant in the former Production Area. Sampling with the Hydropunch was considered, but not selected for this area based on previous experience in the area. Drilling in the area indicates that the subsurface is predominantly glacial till composed of silt and clay. Sampling of perched groundwater in this area has proved to be difficult in conventional piezometers due to slow recharge.

Action: No change to the PSP is required.

Commenting Organization: Ohio EPA Commentor:
Section #: 3.1.5 Pg. #: 20 Line #: ¶ 4 Code:
Comment # 15

Comment: If additional borings are need to obtain sufficient sample volume, the soil should be homogenized prior to collecting specific analyte volumes. The exception to this is VOCs of course.

Response: DOE agrees; and this is part of the sampling procedure in SCQ Appendix K.5.1.

Action: No change to the PSP is required.

Commenting Organization: Ohio EPA Commentor:
Section #: 7.1.2 Pg. #: 36 Line #: Code:
Comment # 16

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: Remove the last sentence from Section 7.1.3 of the PSP referencing the SCQ. Modify the PSP to address how contact wastes are to be handled.

Commenting Organization: Ohio EPA Commentor:
Section #: Appendix B Pg. #: B-2 Line #: Code:
Comment # 17

Comment: Revise table to show cyanide as 1/8 for number above background. If this is not a correct revision, then cyanide should be removed from the table.

Response: The reviewer is correct.

Action: The table will be corrected.

Commenting Organization: Ohio EPA Commentor:
Section #: Appendix B Pg. #: B-4 Line #: Code:
Comment # 18

Comment: DOE should provide the reasoning behind the use of the 50% exceedance criteria described in footnote (2).

Response: Concentrations exceeding site-specific background levels by approximately 50% or more are specified in footnote (1). Inorganic constituents occur naturally in soils. Concentrations can vary greatly and can be closely related to varying soil types. The 50% measure of significance was selected to provide a conservative preliminary assessment of the available soils data.

Action: No change to the PSP is required.

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Ohio EPA
State of Ohio Environmental Protection Agency

Southwest District Office
40 South Main Street
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(513) 285-6357
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George V. Voinovich
Governor

October 21, 1993

Mr. Jack R. Craig
Project Manager
U.S. DOE FEMP
P. O. Box 398705
Cincinnati, Ohio 45239-8705

Dear Mr. Craig:

The purpose of this letter is to provide approval or conditional approval to the revised O.U. 5 PSP's. Where comments are provided these will serve as conditions for approval. DOE should provide responses to these comments.

1. PSP for Trap Range - approved

2. PSP for Pilot Plant Drainage Ditch Seepage and Surface Water Background Investigation - approved

3. PSP for Snapshot Monitoring Well Sampling and Surface Water and Sediment Sampling - approved

4. PSP for Surface and Subsurface Soil Sampling
   A. Response to OEPA Comment #2: The response states the referenced soil piles are in the area of CRU3 and have been placed there by the Waste Management Program. Regardless of where the soils are located, the characterization of these soils is the responsibility of OU5. These soils must be addressed within the OU5 RI. The fact that the Waste Management Program placed these soils is of little consequence unless substantial characterization was conducted at the time of placement. It is probable that some materials were placed into this area prior to RA17 being approved and thus the screening levels used and contaminant concentrations are uncertain. DOE must address the characterization of these soils within OU5.

   B. DOE should address soil piles visible on aerial photos approximately 200 yards east of the northeast corner of the production area. Ohio EPA's concern with these piles has been previously voiced at meetings with DOE.

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5. PSP for Sampling Ground and Surface Water
A. Response to Ohio EPA Specific Comment #1: DOE's response to this comment is unacceptable. The response implies that the location could not be sampled due to the timeliness of Ohio EPA comments. DOE submitted the PSP on 6/10/93, Ohio EPA provided comments (6/17/93, and DOE responded on 8/24/93). If a delay is to be blamed for the missed sample, it lies with DOE for not submitting the PSP in May as scheduled. These locations should be incorporated into the sampling as soon as sufficient water is present.

B. Response to Ohio EPA Specific Comment #8: It is unclear how DOE "formally evaluated to determine if RCRA wastes would be generated". It would seem reasonable that ground water sampling from within an isolated Hazardous Waste Management Unit, where listed wastes were disposed and have been detected in ground water (e.g., Sewage Treatment Plant and Fire Training Facility), would generate a listed hazardous waste. DOE should re-evaluate its methodology for determining wells which may generate hazardous waste. Additionally, what has happened to the purge water from such areas to date?

6. PSP for Additional Monitoring Well Installation and Abandonment:
A. Response to Ohio EPA Specific Comment #8: It is unclear how DOE "formally evaluated to determine if RCRA wastes would be generated". It would seem reasonable that ground water sampling from within an isolated Hazardous Waste Management Unit, where listed wastes were disposed and have been detected in ground water (e.g., Sewage Treatment Plant), would generate a listed hazardous waste. DOE should reevaluate its methodology for determining wells which may generate hazardous waste. Additionally, what has happened to the purge water from such areas to date?

If you should have any questions please feel free to contact Tom Schneider or me at (513) 285-6357.

Sincerely,

Graham E. Mitchell
Project Manager

cc: Jenifer Kwasniewski, DERR
Tom Schneider, DERR
Kurt Kollar, DERR
Jim Saric, U.S. EPA
Ken Alkema, FERMCO
Lisa August, GeoTrans
Jean Michaels, PRC
Robert Owen, ODH

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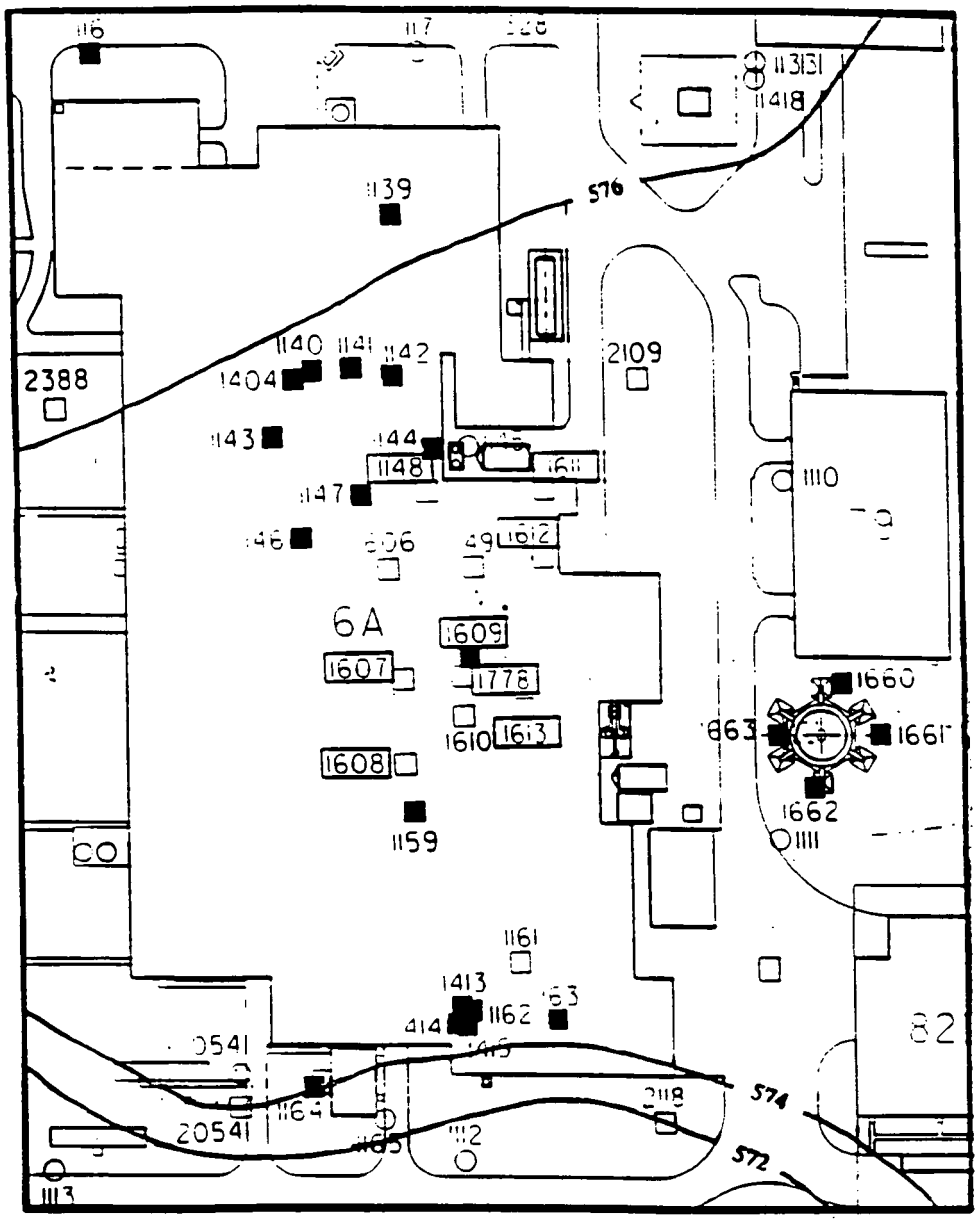
APPENDIX B

APPENDIX B

USOC-3

FIGURE 3-6
ORGANIC CONTAMINATION IN SOILS UNDER PLANT 6



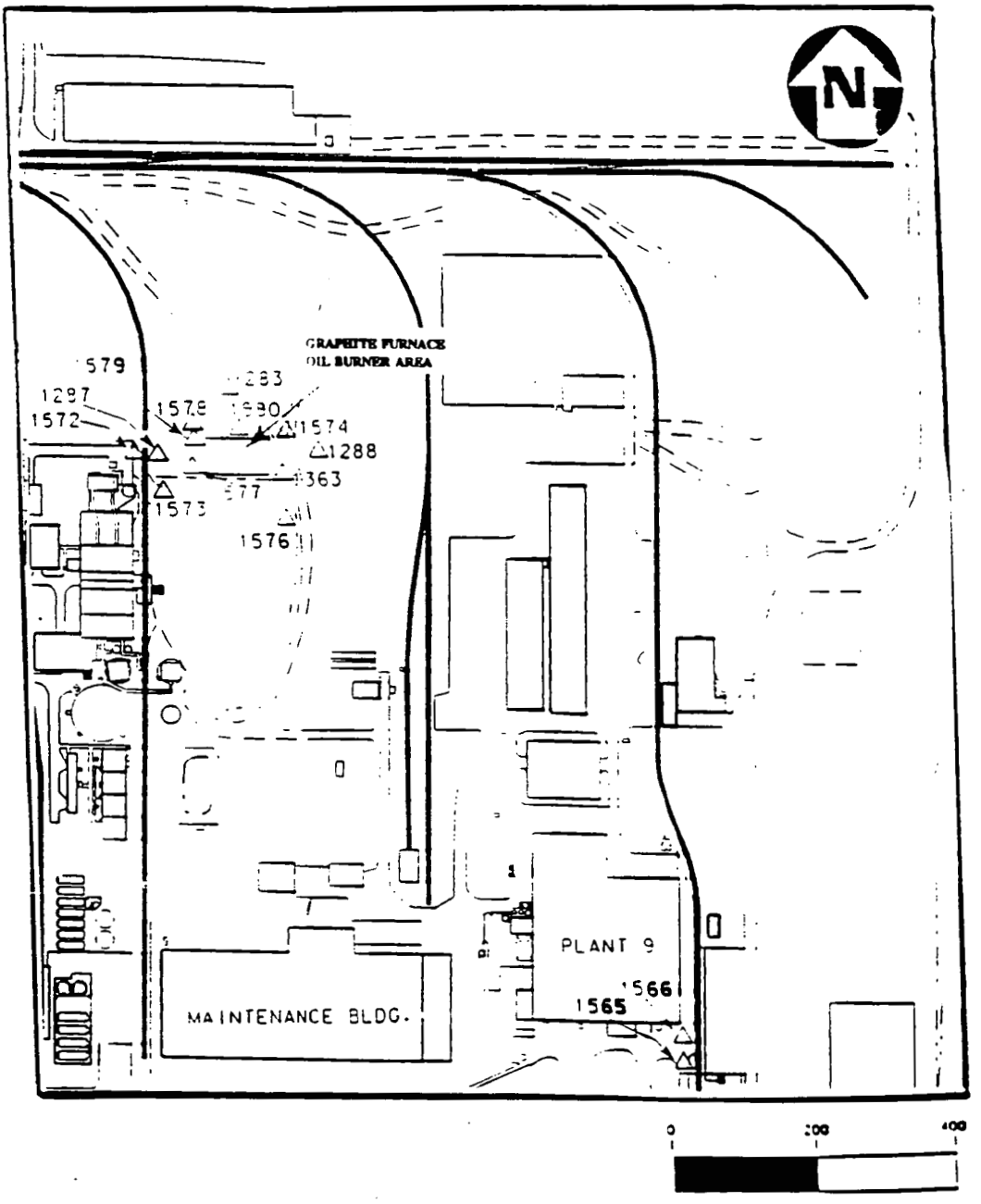
LEGEND

- ○ 2" WELL CASING
- □ 4" WELL CASING
- ■ BORING
- [1152] ORGANIC CONTAMINATION IN SOILS EXISTS (> 1.5 feet deep) AT THIS LOCATION
- ~ 574 ~ AVERAGED PERCHED GROUNDWATER ELEVATION (1988 through 1992)

APPENDIX B

USOC-5

FIGURE 3-8
BORING LOCATIONS IN THE NORTHEAST QUADRANT OF THE PRODUCTION AREA



LEGEND

△ BORING WHERE ORGANIC CONTAMINATION BELOW THE SURFACE EXISTS

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APPENDIX B

OC-6

TABLE 3-2
CHEMICAL CONCENTRATIONS IN SOILS FROM THE PLANT 2/3 AREA IN THE SOUTHWEST QUADRANT

Data presented by location, sample number and sample depth. NA indicates not available. For inorganic constituents, dashes indicate concentrations below background; for organic constituents, pesticides and PCBs, dashes indicate no detection.

Constituents	Location	1183	1183	1213	1193	1412
	Sample ID	16595	16597	17276	51954	55089
	Depth (feet)	0.0 - 0.5	0.5 - 1.0	6.0 - 7.0	6.0 - 7.5	5.5 - 6.0
Inorganic constituents (mg/kg)						
Arsenic		8.4	–	NA	NA	26.5
Beryllium		2.4	1.7	NA	NA	1
Cadmium		6.9	5.2	NA	NA	4.1
Calcium		105,000	115,000	NA	NA	48,200
Chromium		75.5	–	NA	NA	–
Cobalt		17.4	14.3	NA	NA	12.8
Copper		38.5	–	NA	NA	–
Lead		334	440	NA	NA	161
Magnesium		38,600	21,400	NA	NA	17,500
Molybdenum		2.9	–	NA	NA	–
Nickel		50	42.3	NA	NA	38
Silver		17.2	5.9	NA	NA	3.9
Zinc		247	89	NA	NA	65.5
Organic constituents (µg/kg)						
Volatiles						
1-1-Dichloroethane		–	–	–	–	14
1,1,1-Trichloroethane		–	–	–	–	6
2-Butanone		4	4	–	10	110
2-Propanone		14	5	9	29	98
Methylene chloride		8	5	17	17	78
Toluene		2	2	–	2	–
Semivolatiles						
Benzoic acid		–	88	NA	NA	–
bis(2-Ethylhexi) phthalate		180	–	NA	NA	–
Fluoranthene		–	–	NA	NA	81
N-Nitrosodipheniamine		100	130	NA	NA	630
Phenanthrene		–	–	NA	NA	88
Pesticides and PCBs (µg/kg)						
PCB-1254		360	–	NA	NA	–

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APPENDIX B

OC-17

PRELIMINARY SUMMARY OF METAL CONCENTRATIONS IN SOIL SIGNIFICANTLY EXCEEDING BACKGROUND, mg/kg (1)
AND CORRESPONDING ACTION LEVELS, mg/kg
OPERABLE UNIT #5
FERMCO
CINCINNATI, OHIO

SOURCE	PARAMETER	RANGE OF CONCENTRATIONS SIGNIFICANTLY EXCEEDING BACKGROUND (1)	LOCATION OF MAXIMUM CONCENTRATION (Depth Interval, Feet)	NUMBER OF CONCENTRATIONS SIFICANTLY EXCEEDING BACKGROUND/ TOTAL NO. SAMPLES (2)	ACTION LEVEL
Plant 6 Area	Cadmium	2.4 - 6.2	1609 (4-5)	9/10	
	Lead	31.8 - 51.8	1662 (0-1)	3/10	
South of Maintenance Building	Beryllium	1.1	1601 (0.5-1	1/17	
	Cadmium	2.9 - 7.2	1327 (0-1)	16/17	
	Lead	116	1327-(0-1)	2/17	
	Mercury	0.25 - 0.37	1327 (0-1)	3/17	
	Nickel	63.3	1327-(0-1)	2/17	
North of Maintenance Building 12	Cadmium	2.5 - 8	1308 (0-1)	6/8	
	Lead	982	1308 (0-1)	1/8	
	Mercury	0.53	1308 (0-1)	1/8	
	Nickel	67.8	1308 (0-1)	1/8	
	Cyanide	22.8	1308 (0-1)	1/8	
Coal Pile Runoff Basin	Barium	132	1584 (2-2.5)	1/18	
	Cadmium	2 - 120,000	1676 (unknown)	17/18	
	Chromium	87.7	1676 (2-2.5)	1/18	
	Copper	34.6	1676 (2-2.5)	1/18	
	Lead	26.1 - 63.4	1586 (0.5-1)	2/18	
	Nickel	41.9	1676 (2-2.5)	1/18	
	Selenium	2.6	1584 (0.5-1)	1/18	
Tank Farm North of Maintenance Building 12	Arsenic	12.6	1307 (0-0.5)	1/26	
	Beryllium	1.1 - 1.2	1589 (2-2.5) & 1590 (9.5-10)	4/26	
	Cadmium	3.3 - 6.7	1307 (0-0.5)	26/26	
	Chromium	67.5	1307 (0-0.5)	1/26	
	Copper	48.9	1307 (0-0.5)	1/26	
	Lead	32.2 - 334	1307 (0-0.5)	2/26	
	Mercury	0.46	1307 (0.5-1)	1/26	
	Nickel	36.7 - 72.2	1307 (0-0.5)	1/26	
	Thallium	0.39	1307 (0.5-1)	1/26	
Plant 4 Area	Barium	456	1302 (0.5-1)	1/9	
	Beryllium	0.67 - 0.83	1593 (0.5-1)	4/9	
	Cadmium	3.6 - 5.4	1302 (0.5-1)	9/9	
	Chromium	32.1 - 94.6	1593 (0.5-1)	2/9	
	Lead	32.2 - 49.7	1593 (0.5-1)	2/9	
	Nickel	36.7 - 102	1593 (0.5-1)	2/9	
Graphite Furnace/Oil Burner Area	Arsenic	11.5 - 81.9	1576 (0.5-1)	8/30	
	Barium	121 - 512	1288 (0.5-1)	13/30	
	Beryllium	1.2 - 1.9	1576 (0.5-1)	6/30	
	Cadmium	2.3 - 12.4	1578 (0.5-1)	26/30	
	Chromium	22.5 - 59.2	1578 (0.5-1)	8/30	
	Copper	21.8 - 43.9	1578 (2-2.5)	13/30	
	Lead	25.3 - 50.3	1283 (0.5-1)	6/30	
	Mercury	0.13 - 0.28	1288 (0.5-1)	7/30	
	Nickel	33.8 - 52.4	1577 (2-2.5)	6/30	
	Selenium	1.2 - 1.6	1578 (4-4.5)	2/30	

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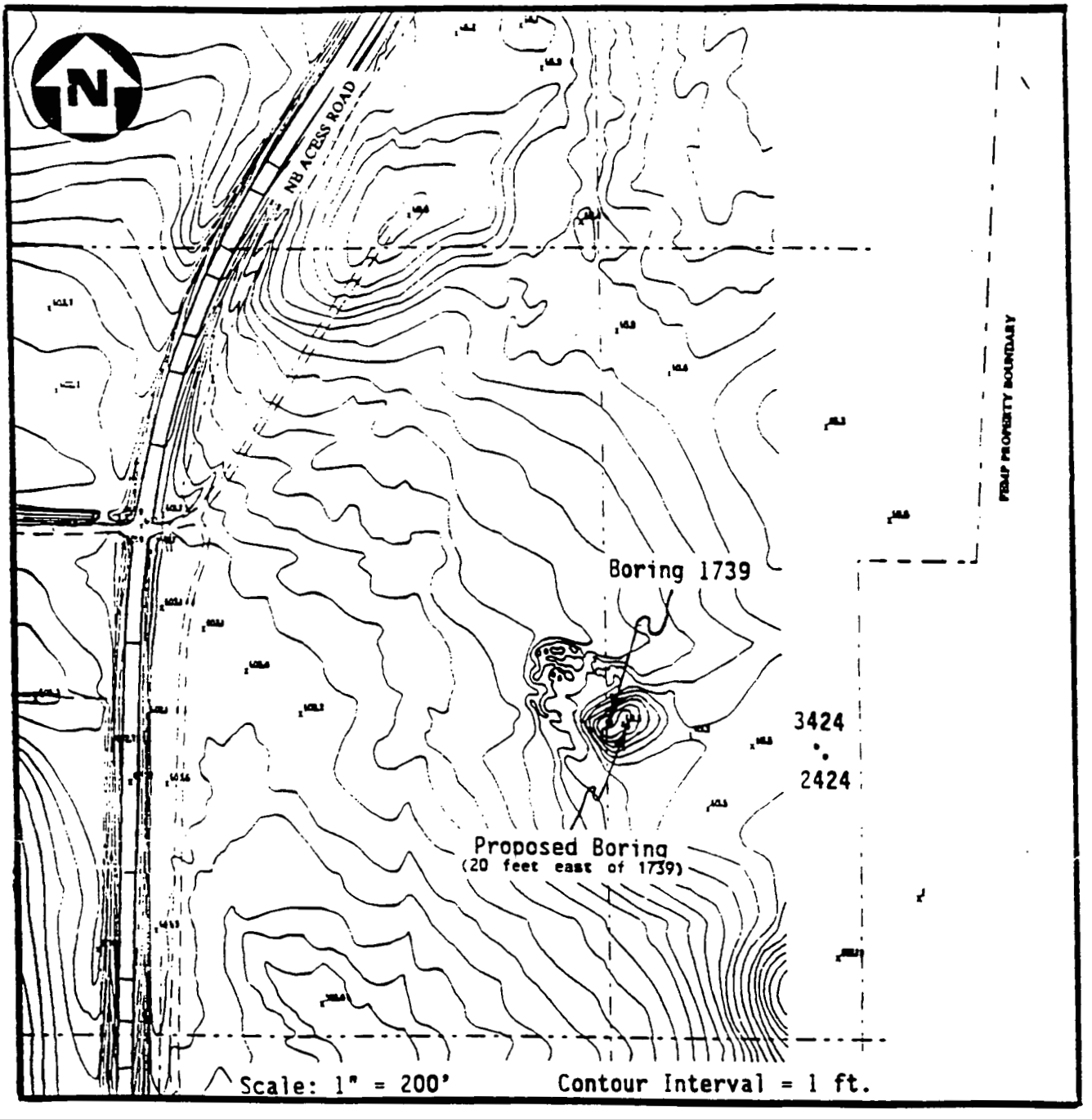
APPENDIX B

OC-B



PROPOSED RUBBLE MOUND BORING LOCATION

LAB_RESULTS
Printed: 12/13/93 13:29

Boring ID 1739 Sample ID 101334
Material type SOIL Sample Date 01/02/92
Sample depth interval 0 to 1 in feet.

Laboratory	PARAMETER	Result	VQ	Sigma	Units
IT	% Moisture	19	NV		% MOIST
IT	% Moisture	19	NV		% MOIST
IT	% Moisture	19	NV		% MOIST
IT	% Solids	81	NV		% SOLID
IT	Aluminum	7280	-		MG/KG
IT	Arsenic	6	J		MG/KG
IT	Beryllium	1	-		MG/KG
IT	Calcium	3590	-		MG/KG
IT	Cobalt	8	-		MG/KG
IT	Chromium	12	-		MG/KG
IT	Nickel	12	-		MG/KG
IT	Molybdenum	8	-		MG/KG
IT	Mercury	0	U		MG/KG
IT	Manganese	506	-		MG/KG
IT	Magnesium	1850	-		MG/KG
IT	Lead	13	-		MG/KG
IT	Iron	14100	-		MG/KG
IT	Cyanide	0	-		MG/KG
IT	Zinc	42	-		MG/KG
IT	Vanadium	21	-		MG/KG
IT	Thallium	1	J		MG/KG
IT	Sodium	25	-		MG/KG
IT	Silver	3	UJ		MG/KG
IT	Silicon	1580	J		MG/KG
IT	Selenium	1	UJ		MG/KG
IT	Potassium	817	-		MG/KG
IT	Copper	13	-		MG/KG
IT	Cadmium	0	U		MG/KG
IT	Barium	73	-		MG/KG
IT	Antimony	7	UJ		MG/KG
IT	1,1,1-Trichloroethane	6	UJ		UG/KG
IT	1,1,2,2-Tetrachloroethane	6	U		UG/KG
IT	1,1,2-Trichloroethane	6	U		UG/KG
IT	1,1-Dichloroethane	6	UJ		UG/KG
IT	1,1-Dichloroethene	6	U		UG/KG
IT	1,2,4-Trichlorobenzene	410	U		UG/KG
IT	1,2-Dichlorobenzene	410	U		UG/KG
IT	1,2-Dichloroethane	6	U		UG/KG
IT	1,2-Dichloroethene (Total)	6	U		UG/KG
IT	1,2-Dichloropropane	6	U		UG/KG
IT	1,3-Dichlorobenzene	410	U		UG/KG
IT	1,4-Dichlorobenzene	410	U		UG/KG
IT	2,4,5-Trichlorophenol	2000	U		UG/KG
IT	2,4,6-Trichlorophenol	410	U		UG/KG
IT	2,4-Dichlorophenol	410	U		UG/KG
IT	2,4-Dimethylphenol	410	U		UG/KG
IT	2,4-Dinitrophenol	2000	UJ		UG/KG
IT	2,4-Dinitrotoluene	410	U		UG/KG
IT	2,6-Dinitrotoluene	410	U		UG/KG
IT	2-Butanone	12	U		UG/KG
IT	2-Chloronaphthalene	410	U		UG/KG

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Boring ID 1739 Sample ID 101334
Material type SOIL Sample Date 01/02/92
Sample depth interval 0 to 1 in feet.

Laboratory	PARAMETER	Result	VQ	Sigma	Units
IT	2-Chlorophenol	47	J		UG/KG
IT	2-Hexanone	12	U		UG/KG
IT	2-Methylnaphthalene	410	U		UG/KG
IT	2-Methylphenol	410	U		UG/KG
IT	2-Nitroaniline	2000	U		UG/KG
IT	2-Nitrophenol	410	U		UG/KG
IT	Benzene	6	U		UG/KG
IT	Aroclor-1260	200	U		UG/KG
IT	Aroclor-1254	200	U		UG/KG
IT	Aroclor-1248	100	U		UG/KG
IT	Aroclor-1242	100	U		UG/KG
IT	Aroclor-1232	100	U		UG/KG
IT	Aroclor-1221	100	U		UG/KG
IT	Aroclor-1016	100	U		UG/KG
IT	Dimethyl phthalate	410	U		UG/KG
IT	Diethyl phthalate	410	U		UG/KG
IT	Dieldrin	20	U		UG/KG
IT	Dibromochloromethane	6	U		UG/KG
IT	Dibenzofuran	410	U		UG/KG
IT	Dibenzo(a,h)anthracene	410	U		UG/KG
IT	Di-n-octyl phthalate	410	U		UG/KG
IT	Di-n-butyl phthalate	410	U		UG/KG
IT	Tetrachloroethene	6	U		UG/KG
IT	Styrene	6	U		UG/KG
IT	Pyrene	410	U		UG/KG
IT	Phenol	55	J		UG/KG
IT	Phenanthrene	410	U		UG/KG
IT	Pentachlorophenol	2000	U		UG/KG
IT	Nitrobenzene	410	U		UG/KG
IT	Isophorone	410	U		UG/KG
IT	Indeno(1,2,3-cd)pyrene	410	U		UG/KG
IT	Hexachloroethane	410	U		UG/KG
IT	Hexachlorocyclopentadiene	410	UJ		UG/KG
IT	Hexachlorobutadiene	410	U		UG/KG
IT	Hexachlorobenzene	410	U		UG/KG
IT	Heptachlor epoxide	10	U		UG/KG
IT	Heptachlor	10	U		UG/KG
IT	trans-1,3-Dichloropropene	6	U		UG/KG
IT	p-Chloroaniline	410	UJ		UG/KG
IT	gamma-Chlordane	100	U		UG/KG
IT	gamma-BHC (Lindane)	10	U		UG/KG
IT	delta-BHC	10	U		UG/KG
IT	cis-1,3-Dichloropropene	6	U		UG/KG
IT	bis(2-Ethylhexyl)phthalate	410	U		UG/KG
IT	bis(2-Chloroisopropyl) ether	410	U		UG/KG
IT	bis(2-Chloroethyl)ether	410	U		UG/KG
IT	bis(2-Chloroethoxy)methane	410	U		UG/KG
IT	beta-BHC	10	U		UG/KG
IT	alpha-Chlordane	100	U		UG/KG
IT	alpha-BHC	10	U		UG/KG
IT	Xylenes, Total	6	U		UG/KG
IT	Vinyl chloride	12	U		UG/KG
IT	Vinyl Acetate	12	U		UG/KG

Boring ID 1739 Sample ID 101334
Material type SOIL Sample Date 01/02/92
Sample depth interval 0 to 1 in feet.

Laboratory	PARAMETER	Result	VQ	Sigma	Units
IT	Trichloroethene	6	U		UG/KG
IT	Toxaphene	200	U		UG/KG
IT	Toluene	6	U		UG/KG
IT	Naphthalene	410	U		UG/KG
IT	N-Nitrosodiphenylamine	410	U		UG/KG
IT	N-Nitroso-di-n-propylamine	410	U		UG/KG
IT	Methylene chloride	11	UJ		UG/KG
IT	Methoxychlor	100	U		UG/KG
IT	Fluorene	410	U		UG/KG
IT	Fluoranthene	410	U		UG/KG
IT	Ethylbenzene	6	U		UG/KG
IT	Endrin ketone	20	U		UG/KG
IT	Endrin	20	U		UG/KG
IT	Endosulfan-I	10	U		UG/KG
IT	Endosulfan sulfate	20	U		UG/KG
IT	Endosulfan II	20	U		UG/KG
IT	Chloroform	6	U		UG/KG
IT	Chloroethane	12	U		UG/KG
IT	Chlorobenzene	6	U		UG/KG
IT	Carbon disulfide	6	UJ		UG/KG
IT	Carbon Tetrachloride	6	UJ		UG/KG
IT	Butyl benzyl phthalate	410	U		UG/KG
IT	Bromomethane	12	UJ		UG/KG
IT	Bromoform	6	U		UG/KG
IT	Chrysene	410	U		UG/KG
IT	Chloromethane	12	U		UG/KG
IT	Bromodichloromethane	6	U		UG/KG
IT	Benzyl alcohol	410	U		UG/KG
IT	Benzoic acid	2000	U		UG/KG
IT	Benzo(k)fluoranthene	410	U		UG/KG
IT	Benzo(g,h,i)perylene	410	U		UG/KG
IT	Benzo(b)fluoranthene	410	U		UG/KG
IT	Benzo(a)pyrene	410	U		UG/KG
IT	Benzo(a)anthracene	410	U		UG/KG
IT	Anthracene	410	U		UG/KG
IT	3,3'-Dichlorobenzidine	820	U		UG/KG
IT	3-Nitroaniline	2000	R		UG/KG
IT	4,4'-DDD	20	U		UG/KG
IT	4,4'-DDE	20	U		UG/KG
IT	4,4'-DDT	20	U		UG/KG
IT	4,6-Dinitro-2-methylphenol	2000	UJ		UG/KG
IT	4-Bromophenyl phenyl ether	410	U		UG/KG
IT	4-Chloro-3-methylphenol	410	U		UG/KG
IT	4-Chlorophenylphenyl ether	410	U		UG/KG
IT	4-Methyl-2-pentanone	12	U		UG/KG
IT	4-Methylphenol	410	U		UG/KG
IT	4-Nitroaniline	2000	U		UG/KG
IT	4-Nitrophenol	2000	U		UG/KG
IT	Acenaphthene	410	U		UG/KG
IT	Acenaphthylene	410	U		UG/KG
IT	Acetone	12	U		UG/KG
IT	Aldrin	10	U		UG/KG
IT	Cesium-137	< 0	UJ		pCi/g

Boring ID 1739 Sample ID 101334
Material type SOIL Sample Date 01/02/92
Sample depth interval 0 to 1 in feet.

Laboratory	PARAMETER	Result	VQ	Sigma	Units
IT	Plutonium-239/240	< 1	U		pCi/g
IT	Radium-228	1	J	0.25	pCi/g
IT	Strontium-90	1	-	0.23	pCi/g
IT	Technetium-99	< 1	U		pCi/g
IT	Thorium-230	2	J	0.39	pCi/g
IT	Thorium-228	3	J	0.48	pCi/g
IT	Uranium-238	3	-	0.49	pCi/g
IT	Uranium-235/236	< 1	UJ		pCi/g
IT	Uranium-234	2	J	0.48	pCi/g
IT	Thorium-232	< 1	U		pCi/g
IT	Ruthenium-106	< 1	UJ		pCi/g
IT	Radium-226	1	J	0.15	pCi/g
IT	Plutonium-238	< 1	UJ		pCi/g
IT	GROSS ALPHA	14	-	6.7	pCi/g
IT	GROSS BETA	20	-	5.6	pCi/g
IT	Thorium, Total	9	-	2.22	ug/g
IT	Uranium, Total	8	J	2.77	ug/g