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*PROJECT SPECIFIC PLAN FOR THE SNAPSHOT
MONITORING WELL SAMPLING & SURFACE WATER
AND SEDIMENT SAMPLING MAY 1993
DRAFT ADDENDUM TO THE RI/FS/ WORK PLAN*

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ADDENDUM

PROJECT SPECIFIC PLAN
for the
SNAPSHOT MONITORING WELL SAMPLING
and
SURFACE WATER AND SEDIMENT SAMPLING

WBS No. 50.03.23

**Draft Addendum to the
Remedial Investigation/Feasibility Study
Work Plan**

Prepared by

Fernald Environmental Restoration Management Corporation

Prepared for

**U.S. Department of Energy
Fernald Field Office**

Under Contract DE-AC05-92OR21972

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1.0 INTRODUCTION

CERCLA/RCRA Unit 5 (CRU5) has developed this Project Specific Plan (PSP) as a means to assess current contaminant concentrations in groundwater, surface water, and sediments at locations on and off FEMP property during the Spring of 1993. The data acquired from this snapshot program will supplement existing data and will be used in the site characterization, groundwater modeling, and risk assessments for the Remedial Investigation Report (RI) for Operable Unit (OU) 5. This PSP has been developed under the specifications of the Fernald Environmental Management Project (FEMP) Sitewide CERCLA Quality Assurance Project Plan (SCQ), and all field operations and data handling procedures will be consistent with the specifications in the FEMP SCQ.

In order to meet the schedule requirements for the OU 5 RI report, all data must be available for validation by August 1, 1993. The sampling has been organized into two programs: groundwater and surface water/sediments. To expedite data collection, the groundwater snapshot program has been designed so that new wells will not be required; all sampling will be from existing wells. Indeed, nearly all the FEMP monitoring wells will be sampled during the Spring of 1993. Many of these wells are already scheduled for sampling during this period as part of existing sampling programs (RCRA-Compliance monitoring, Operable Unit 2 RI, Operable Unit 5 Addendum, or to support removal actions). Since the analytical protocols for the existing programs do not normally require the breadth of analyses required for the OU 5 RI, their lists of analytes have been expanded for this one-time snapshot program.

This PSP has been prepared exclusively for sampling wells which are not included in the four existing sampling programs previously scheduled for sampling during the Spring of 1993.

The surface water/sediment sampling program is based on previous or existing sampling programs, with necessary modifications to ensure that all data meet OU 5 RI Data Quality Objectives. The specific sampling programs in this PSP are discussed in Section 3 following a description in Section 2 of previous RI/FS sampling of these media.

2.0 PREVIOUS INVESTIGATIONS

Historically, groundwater samples have been collected under RCRA, CERCLA, and Environmental

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Monitoring programs at the FEMP. The last sitewide snapshot sampling to determine the nature and extent of groundwater contamination was conducted in the Spring of 1989 for the OU 5 RI. Since 1989, RCRA and Environmental Monitoring sampling programs have used subsets of the available wells, while the RI program collected two groundwater samples from wells installed for the RI program: one sample at the time the well was installed and the second sample two months after the installation.

Surface water and sediment samples were collected in 1988 and 1989 for the RI from both on- and off-FEMP locations to characterize Paddys Run for the RI. Since then, the FEMP Stormwater Retention Basin has been expanded and additional stormwater runoff from the waste storage area is being collected. These actions have reduced the amount of potentially contaminated runoff reaching Paddys Run. Consequently, the character of surface water and sediment, especially in Paddys Run, may no longer be adequately characterized.

3.0 SAMPLING PROGRAMS

This PSP is for sampling wells not previously scheduled for sampling during the Spring of 1993, and for the surface water/sediment sampling program which will be carried out in conjunction with the snapshot groundwater program. Appendix A lists all the wells included in the snapshot program. The wells are further identified according to sampling program: the snapshot, RCRA compliance, OU 2 RI, OU 5 Addendum, or removal actions. The surface water sampling must be conducted as soon as possible since Paddys Run has been known to be dry in early to mid-May.

The analytical results from the sampling programs will be used to:

- Supplement existing data by providing an assessment of current contaminant concentrations at various locations on and off the FEMP;
- Provide data for risk assessment purposes;
- Support feasibility study activities for groundwater; and
- Provide an accurate spacial distribution of contaminants to calibrate the groundwater model.

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3.1 WELL SELECTION

The wells which will be sampled for this snapshot were selected to provide comprehensive coverage of the FEMP and surrounding areas. Emphasis was placed on selecting wells in areas of known historic impacts. However, background locations and wells where groundwater contamination has not previously been detected were also selected to provide an accurate assessment of current conditions. At cluster well locations, all wells within the cluster are included in the overall sampling list to provide a vertical profile of the water quality. All 4000-Series wells are being sampled in the other programs.

3.1.1 Glacial Overburden Groundwater Sampling

This PSP consists of sampling 80 existing monitoring wells and piezometers which are screened within the glacial overburden and were not previously scheduled for sampling during the Spring of 1993. These wells are listed in Table 3-1.

3.1.2 Great Miami Aquifer Sampling

This snapshot sampling program consists of 40 Great Miami Aquifer monitoring wells. The wells are located on and off FEMP property and were not previously scheduled for sampling during the Spring of 1993. Table 3-2 lists the 2000-Series wells, and Table 3-3 lists the 3000-Series wells.

3.1.3 Sampling Methodology

Samples should be collected over as short a period as possible, preferably no longer than a few weeks. All sampling will be conducted in accordance with SCQ procedures as specified in Section 6.2, "Collection of Aqueous Samples" and Appendix K, "Sampling Methods" of the SCQ.

Quality Assurance/Quality Control (QA/QC) samples will be collected in accordance with SCQ Appendix K criteria. The QA/QC samples will include field blanks, trip blanks, field duplicates and rinsate samples. Field duplicates will be collected at a frequency of 1 per 10 samples, while a trip blank will accompany each sample shipment to the laboratory. Rinsate samples and will be collected at a frequency of 1 per 20 decontamination operations of sampling equipment. Field blanks will be used at a rate of 1 in 20 samples.

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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	

^aAnalysis includes technetium-99.

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**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	

^aAnalysis includes technetium-99.

3.2 SURFACE WATER AND SEDIMENT SAMPLING

The second sampling program in this PSP is for surface water and sediments. Samples for both media will be obtained from 24 locations on and off the FEMP. The sampling locations are divided into four general groups based on location:

- Great Miami River
- Paddys Run
- Production Area
- Other areas

Figure 3-1 shows the location of the surface water and sediment sampling locations with respect to the FEMP, Great Miami River, and Paddys Run. All 24 surface water and sediment sampling points to be used in this PSP are shown in Figure 3-1.

3.2.1 Great Miami River Samples

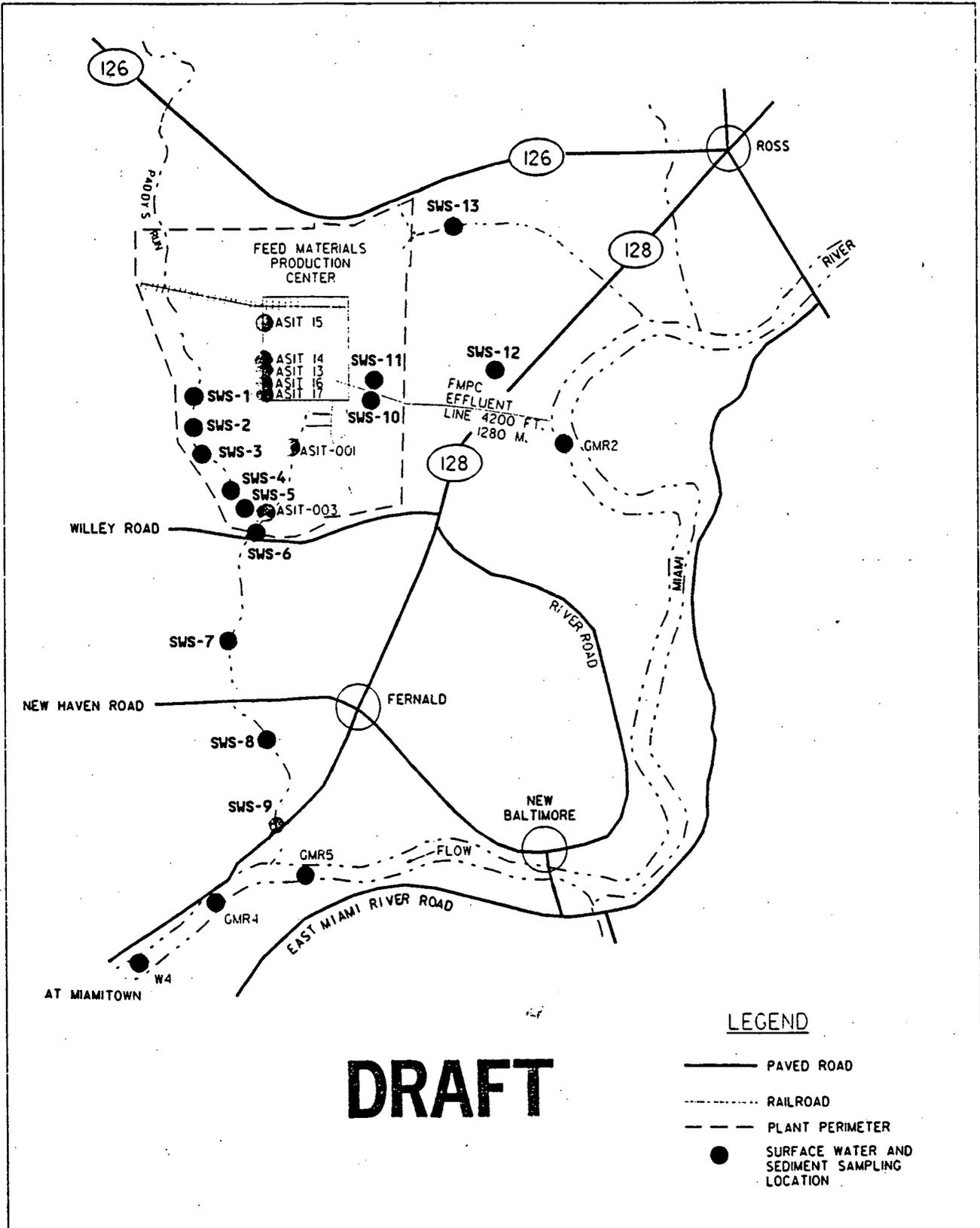
A total of four sampling locations have been selected along the Great Miami River to provide water quality data; sample locations are described in Table 3-4.

3.2.2 Paddys Run Samples

A total of 9 surface water and 9 sediment samples are planned for Paddys Run at the locations shown in Figure 3-1 and described in Table 3-5. These samples will provide water quality data and assess contaminant concentrations in the sediment.



FIGURE 3-1
SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS



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- PAVED ROAD
- - - RAILROAD
- - - PLANT PERIMETER
- SURFACE WATER AND SEDIMENT SAMPLING LOCATION

FIGURE 3-1 SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS

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**TABLE 3-4
 GREAT MIAMI RIVER SAMPLING LOCATIONS**

Location	Sample Will Provide Water Quality Data:
GMR 2	Downstream of the effluent line from the FEMP.
GMR 5	Upstream of Paddys Run.
GMR 4	Downstream of discharge from Paddys Run.
W4	At Miamitown.

**TABLE 3-5
 PADDYS RUN SAMPLING LOCATIONS**

Location	Sample Will Provide Water Quality Data:
SWS-1	Immediately downstream of the Waste Storage Area.
SWS-2	Downstream of the confluence with an unnamed ditch that drains the area west of the Pilot Plant.
SWS-3	Midway between sampling location SWS-2 and the Flyash Pile/South Field area.
SWS-4	Downgradient of the Flyash Pile.
SWS-5	Downgradient of the South Field area.
SWS-6	Downstream of the confluence with the Storm Sewer Outfall Ditch.
SWS-7	Upstream of the Paddys Run Road RI/FS site.
SWS-8	Downstream of the Paddys Run Road RI/FS site.
SWS-9	Upstream of the confluence of Paddys Run and the Great Miami River.

3.2.3 Production Area Samples

Several locations within the former production area require surface water and sediment sampling to update existing RI data. A number of modifications which have been made to the facilities within the former production area may have reduced the levels of contamination in surface drainage from the former

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production area. Therefore, the locations sampled under the original work plan of 1988 and 1989 will be resampled in order to determine current conditions.

Table 3-6 lists the surface water and sediment sampling locations and the approximate sample area they will represent.

TABLE 3-6 FORMER PRODUCTION AREA SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS	
ASIT 13	Drainage west of Plant 2/3 on the south side of the entrance to the Waste Storage Area
ASIT 14	Drainage west of Plant 1 on the north side of the entrance to the Waste Storage area
ASIT 15	Drainage along the north side of the Plant 1 Pad
ASIT 16	Drainage area south and west of the Pilot Plant
ASIT 17	Drainage south of the railroad south of the Pilot Plant

3.2.4 Other Area Samples

Additional surface water and sediment sampling locations include several minor drainage areas located east and south of the former production area as shown in Figure 3-1. These samples will be collected from:

- Locations SWS-10 and SWS-11, located near the intersection of westwardly draining ditches from the Sewage Treatment Plant Area and the south flowing ditch along the north access road;
- The Storm Sewer Outfall Ditch immediately downstream of the Stormwater Retention Basins (ASIT 1), and from immediately upstream of the confluence of the Storm Sewer Outfall Ditch and Paddys Run (ASIT 3);
- Location SWS-12 in the gravel pit located east of the FEMP; and
- Location SWS-13 in the stream that drains the northeast corner of the FEMP.

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3.3 ANALYTICAL PARAMETERS

The target analyte lists (TAL) are different for groundwater, surface water, and sediments. The analyte lists for each sample media are provided in Appendix B. Table 3-7 lists the number of samples from the Great Miami Aquifer, the glacial overburden, and the surface streams and references the appropriate TAL.

3.3.1 Groundwater

All wells will be sampled for HSL inorganic and volatile organic parameters, total and isotopic uranium and thorium, isotopic radium, and general water chemistry. TAL 50.03.23A in Appendix B is a complete list of these analytes. In addition, samples from all of the Type 1 wells and monitoring wells; 2028, 2033, 2109, 2126, 2389, 3009, 3034, and 3390 will be sampled for technetium-99 (TAL 30.03.23B in Appendix B). Both filtered and non-filtered samples will be collected for analysis of HSL inorganic and radiological parameters.

3.3.2 Surface Water

Surface water samples will be analyzed for HSL inorganic, volatile and semivolatile organic parameters, total and isotopic uranium and thorium, isotopic radium, and general water chemistry (TAL 50.03.23C in Appendix B). Both filtered and non-filtered samples will be collected for analysis of HSL inorganic and radiological parameters.

3.3.3 Sediment Samples

Sediment samples will be analyzed for HSL inorganic, volatile and semivolatile organic parameters, total and isotopic uranium and thorium, and isotopic radium (TAL 50.03.23D in Appendix B).

3.4 SAMPLING PROCEDURES

The wells and piezometers will be purged and sampled for selected radiological, HSL metals, cyanide and VOC, and general water quality parameters using sampling procedures specified in SCQ Section 6.2. Surface water and sediment samples will be collected at the designated locations using procedures specified in the SCQ, Section 6. Both filtered and unfiltered portions of the groundwater and surface water samples will be collected for the radiological and inorganic analyses. All analyses will be

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conducted by a contracted laboratory using procedures which meet the standards for these analytical packages as established in the SCQ. All analyses will be ASL C and one groundwater, one surface water, and one sediment sample in ten will be designated for ASL D reporting.

3.5 PLAN OBJECTIVES SUMMARY

The data collected for these groundwater, surface water, and sediment sampling programs will be used to assess current contaminant concentrations in the glacial overburden, the Great Miami Aquifer, the Great Miami River and Paddys Run, including some small tributaries. These data will be used for site characterization, groundwater modeling, and the risk assessment in the RI Report for OU 5. Table 3-9 summarizes the specific activities and objectives of these sampling programs.

4.0 ORGANIZATION AND RESPONSIBILITIES

This PSP has been developed by the CRU5 RI/FS Project Manager to fulfill data needs for the FEMP Site Characterization to be reported in the OU 5 RI. The CRU5 RI/FS project manager has full responsibility and authority for the content and specifications in this PSP. Any changes to the activities specified in this PSP must have the approval of the CRU5 RI/FS project manager prior to implementation. It is the CRU5 RI/FS project manager's responsibility to secure any off-property access permits required for the completion of this PSP.

4.1 FIELD ACTIVITIES

Field activities are to be conducted by the FEMP Site Characterization Group using SCQ approved work procedures. Field activities include sample handling, preservation, shipment, and notification of the laboratories. Groundwater sampling will be conducted using the procedures covered in Section 6 and Appendix K of the SCQ. The Site Characterization Group has full responsibility for the development of the field activity guidelines and field sampling plans in Sections 6 and 7 of this PSP. In addition, the Site Characterization Group will assign unique sample numbers for all samples collected.

At the completion of field activities associated with this PSP, a task completion report will prepared and submitted to the CRU5 RI/FS project manager. The report will include copies of all field forms, data

TABLE 3-7
 SUMMARY LIST OF SAMPLES BY SAMPLING AREA AND ANALYTE LIST

Sample Type	Great Miami Aquifer ^a	Glacial Overburden ^b	Great Miami River	Paddys Run	Former Production Area	Misc.	Total
Groundwater	Filtered	88					120
	UnFiltered	88					120
Surface Water ^c	Filtered		4	9	5	6	24
	UnFiltered		4	9	5	6	24
Duplicate Water	Filtered	9	1	1	1	1	17
	UnFiltered	9	1	1	1	1	17
Sediment ^d			4	9	5	6	24
Field Blanks	2	4	1	1	1	1	11
Rinsate	2	4	1	1	1	1	11
Trip Blanks	13	21	2	2	1	2	41
Total	89	223	18	33	20	24	409

Note: Duplicate samples will be collected at a rate of 1 in 10. Field blanks and rinsate samples are collected at a rate of 1 in 20 samples. Filtered and unfiltered samples represent duplicate analyses; however, they are one sample when counting for QA/QC.

^a TAL 50.03.23A in Appendix B

^b TAL 50.03.23B in Appendix B includes wells 2028, 2033, 2109, 2126, 2389, 3009, 3034, and 3390.

^c TAL 50.30.23D in Appendix B

^d TAL 50.03.23C in Appendix B

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**TABLE 3-8
 SUMMARY OBJECTIVES FOR SNAPSHOT SAMPLING PROGRAM**

Activities	Collect groundwater quality samples. Collect surface water samples. Collect sediment samples.
Objectives	Provide a sitewide sampling snapshot to assess current contaminant concentrations in the groundwater found within the glacial overburden and Great Miami Aquifer. Provide a comprehensive surface water and sediment sampling snapshot.
Prioritized Data Uses	Determine the level of contamination in the glacial overburden, Great Miami Aquifer, the Great Miami River and Paddys Run. Data will be used in the risk assessment, selection of remedial alternatives and the groundwater model calibration.
Appropriate Analytical Levels	PID field screening: ASL A; radiological field screening: ASL A; radiological: ASL C; HSL metals, cyanide & VOC: ASL C; general chemistry parameters: ASL C. Field blanks and rinsate samples are required at a frequency of one in 20 for all ASL C analyses. Ten percent of the ASL C analyses will be designated for ASL D. Duplicate samples will be collected at a rate of one in ten groundwater, surface water or sediment samples.
Constituents of Concern	Total & isotopic uranium, total & isotopic thorium, radium-226 and 228, HSL inorganics and VOC in all media; plus SVOC in surface water and sediment; and general chemistry in all water samples. In addition all 1000-series wells (Table 3-1), and monitoring wells 2028, 2033, 2109, 2126, 2389, 3009, 3034, and 3390 will include technetium-99.
Level of Concern	Drinking water standards, MCL levels, and preliminary remediation goals for radionuclides.
Required Detection Limits	Detection levels are specified in the SCQ, Section 9. Both filtered and unfiltered samples will be collected for radiological and HSL inorganic parameters.
Critical Samples	Groundwater quality analyses will be used to determine plume boundaries, interpret migration rates, calibrate models, and risk assessment. Surface water and sediment analyses will be used to determine the extent of contamination and in the risk assessment. It is essential that 90 percent of the samples specified in the snapshot be collected and validated. All samples from background locations must be successfully collected and validated.

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sheets, and activity logs, as well as a written summary of the field activities noting any variances from either the work plan or SCQ procedures.

4.2 HEALTH AND SAFETY

The FERMCO Health and Safety Department will be responsible for the development, implementation, and monitoring of a site-specific health and safety plan for each of the field work sites. This plan will include specific programs for radiological and nonradiological monitoring and controls as specified by the SCQ and presented in Section 3 of this PSP.

4.3 QUALITY ASSURANCE (QA) AND QUALITY CONTROL (QC)

The FERMCO QA department will assure the contents of this PSP conform to the requirements of the SCQ. The FERMCO QC department will monitor field activities to assure that all work conducted in the execution of this PSP conforms to the appropriate standards specified in the SCQ.

5.0 HEALTH AND SAFETY CONSIDERATIONS

Effective health and safety programs for any activity are based on an effective training program. All involved personnel will receive adequate training prior to implementation of the field work for this PSP. This training will make employees aware of all physical, radiological, and chemical hazards which may be encountered during this project.

All FEMP employee and subcontractor personnel who will be performing field work during this project are required to have completed all Occupational Safety and Health Administration (OSHA)-mandated 1910.120 Hazardous Waste Site Worker training. In addition, personnel must complete all applicable annual refresher training.

The Department of Energy (DOE) regulations at the FEMP require a series of site-specific training courses related to the site. These courses are designed to augment OSHA-required training and provide additional training specific to the hazards which exist at the FEMP. Field personnel participating in the performance of this project will be trained to the SCQ.

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In summary, employee awareness and clearly delineated lines of authority and responsibility have been designed to provide for effective health and safety related knowledge specific to each activity.

5.1 TASK SPECIFIC PLANS

All aspects of this PSP will be performed in accordance with all existing applicable DOE, United States Environmental Protection Agency (U.S. EPA), OSHA, and the State of Ohio Health and Safety Regulations. Additionally, all practices will be managed in accordance with commonly accepted practices used in the hazardous waste industry.

Each field activity has a separate task-specific health and safety plan, which has been prepared in accordance with the FEMP Site Health and Safety Plan. For each project task and sub-task, a health and safety technician will monitor the field crew's activities.

Project-specific health and safety plans address the hazards typically encountered by personnel when performing the specified field work. The plans specify proper equipment for health and safety monitoring and personnel protection, and detail the criteria for selecting monitoring equipment and protective clothing. Each member of a field crew is required to participate in a health and safety training session specific to each field project before beginning the field work.

In addition to the task-specific health and safety plans, formal approval of the field activities specified in this PSP will be obtained prior to the implementation of field work.

5.2 RADIOLOGICAL MONITORING AND CONTROLS

Radiological monitoring for this work plan will be achieved using existing institutional controls commonly utilized at the FEMP. For those areas of the FEMP which are under existing institutional radiological controls, any employee who will be entering such areas is required to possess and wear a thermal luminescent detector (TLD) to monitor for exposure to radiological contamination. In addition, each employee is required to participate in a regularly-scheduled urine analysis program which is designed to monitor for radiological exposure.

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For areas which are subject to more restrictive radiological controls when the potential for exposure is greater, Radiation Worker Permits are necessary and will be obtained prior to the field work being performed in those areas. A radiological technician will be assigned to each field crew performing any activities in an area which could be expected or result in site workers being exposed to levels of radiological contamination exceeding DOE requirements.

Ingress and egress of personnel, equipment and vehicles to and from radiologically-controlled areas will be monitored with "real time" radiation detection instruments. Monitoring results which exceed FEMP-determined exposure guidelines will be further evaluated as to the possible source(s). Measures necessary to remediate radiological contamination sources will be implemented. Such measures may include, but are not limited to, personnel training, decontamination, employee exposure monitoring, increased personnel monitoring, personnel protective equipment, and sampling of suspect materials encountered.

If the responsible radiological technician assigned to the field activities being performed identifies a real or potential condition which could or will result in an unsafe condition, then that person has the responsibility to cease field operations until the unsafe condition has been corrected.

5.3 NONRADIOLOGICAL MONITORING AND CONTROLS

Monitoring of potential health and safety problems associated with nonradiological hazards are evaluated with a health and safety technician. Also, all field crews are responsible for hazard awareness and recognition. Task specific training is designed to enhance the performance of all field work using good and safe work practices.

Evaluating the potential for personnel exposure to organic contaminants will be achieved mainly through the use of an HNu P-101 Photoionization Detector. Other equipment which could potentially be used include Drager Tubes, oxygen meters, and combustible gas indicators.

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6.0 QUALITY ASSURANCE AND QUALITY CONTROL

The primary objectives of the quality assurance and quality control sections of this plan relate to the collection of field information and data which are sufficient to accurately assess current contaminant concentrations in groundwater, surface water and sediments. To ensure that the information gathered meets data quality objectives, quality control measures will be used to determine conformance with overall OU 5 RI/FS program objectives.

The fundamental quality control mechanisms that will be used include prevention, assessment, and correction. These components are further described as:

- Prevention of defects in the data quality through planning and design, documented instructions and procedures, and careful selection and training of skilled, qualified personnel;
- Quality assessment through a program of regular audits and surveillances to supplement continual informal review; and
- Permanent correction of conditions adverse to quality objectives through a close-looped corrective action system.

6.1 FIELD AND LABORATORY QUALITY CONTROL SAMPLES

Field quality control (QC) samples will be taken to evaluate the possibility that some controllable practice, such as decontamination or sampling technique, may be responsible for introducing bias in the project's analytical results. The following types of QC samples will be collected: sampling equipment rinsates, trip blanks, and duplicate samples as outlined in Section 6 and Appendix K of the SCQ.

6.2 TRAINING, RECORDS ADMINISTRATION, AND DOCUMENT CONTROL

All FEMP employees and subcontractors assigned to this project will be required to participate in a series of regularly-scheduled training sessions; these sessions enhance the employee's awareness of his or her responsibilities and duties. Field staff will receive comprehensive project and task specific training. Daily project "Tailgate Safety Meetings" will be conducted before the beginning of field work each day to augment health and safety training.

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7.0 FIELD ACTIVITY GUIDELINES

This section presents a general description of the field activities to be used to provide the additional contaminant nature and extent information necessary for RI/FS purposes. Field activities will consist of groundwater, surface water, and sediment sampling. The goal of these field activities is to collect samples representative of these environmental media. The information derived from the field investigation should suffice to produce a snapshot of the extent of contamination of groundwater found in the Great Miami Aquifer and the glacial overburden sequence, and of surface water and sediments found in various on and off-FEMP water courses.

7.1 FIELD ACTIVITIES

Procedures to be used during the performance of the field activities are derived from several FEMP program plans, procedures, and U.S. EPA sources. The FEMP program plans include the SCQ, the FEMP Site Characterization/Data Management Department (SC/DM), and the Environmental Monitoring Section Standard Operating Procedures. The U.S. EPA procedure reference sources include "Compendium of Superfund Field Operations Methods" and "Hazardous Waste Site Disposal Operations." All procedures for monitoring well development, sample collection and shipment will be performed in accordance with directives established in the SCQ, September 1992.

7.2 FIELD ACTIVITY PROCEDURES

Field activity procedures are listed in Table 7-1. The appropriate field data validation forms from Appendix B of the SCQ must also be completed to assure that the documentation of field activities has been completed correctly.

7.3 WASTE DISPOSITION

The following wastes will be generated during characterization activities:

- Unused soil cores
- Contact wastes
- Equipment decontamination solutions

The following subsections provide the proposed disposition methodology for each type of waste generated.

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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
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

7.3.1 Purge Water

Groundwater purged from the wells will be contained and transported to the FEMP General Sump for proper disposal. If historic data for a well indicate the purge water is potentially a RCRA waste, the purge water will be drummed at the well and sampled to determine the proper method of disposal.

7.3.2 Contact Wastes

Contact wastes, such as personal protective equipment (PPE) and rags or wipes (paper towels, Chemwipes, etc.), will be placed in plastic bags or 55-gallon drums and transported to the FEMP for appropriate disposition. Contact waste handling and disposition is discussed in the SCQ, Appendix K.

7.3.3 Decontamination Solutions

Equipment decontamination solutions will be transferred to U.S. Department of Transportation (DOT)-approved, bung-type, 55-gallon drums, labeled as "Decontamination Solutions." The drums will be placed on wooden pallets, underlaid by diked Herculite sheeting to prevent contaminant migration resulting from spills or leaks. Upon completion of field activities for each characterization phase, the drummed decontamination solutions will be transported to the FEMP for storage and appropriate disposal.

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8.0 FIELD SAMPLING PLAN

Sampling for this project will be performed by the SC/DM of the FERMCO Environmental Management Division.

8.1 SAMPLE TEAM ORGANIZATION

Due to the nature, objectives, and programmatic requirements of this project, actual sampling locations and analysis parameter selection are designated by FERMCO personnel of CRU5.

8.1.1 Organizational Structure

Field sampling crews will be directly supervised by the Site Characterization/Data Management (SD/DM) Field Operations Manager. Each field crew will consist of two sampling technicians. Additional sampling custodial staff will interact with the sampling crews and the FEMP or contract laboratory performing the sampling analysis.

8.1.2 Responsibilities of Team Members

The Field Operations Manager is responsible for the coordination and effective use of all personnel on site and for proper maintenance of the record of all field activities. In addition, the field coordinator is responsible for field quality control including issuance and tracking of measurement and test equipment.

Field sampling personnel are responsible for the collection of the samples in accordance with the approved PSP. All activities associated with the execution of sampling are to be documented on the appropriate Field Activity Daily Logs (FADLs) which are to be completed by the sampling technicians for each location. These technicians are also responsible for ensuring that the proper sampling equipment is available and in serviceable condition. Also, proper decontamination of equipment between each sampling point is the responsibility of these staff.

Additional sampling custodial staff who interact with the FEMP or contract laboratory are responsible for ensuring that proper sampling containers, preservatives and sampling coolers are available and in serviceable condition. The sampling custodians are also responsible for sample labeling, handling,

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storage, and sample-required paperwork, such as a Chain of Custody/Request for Analysis (CC/RFA) Form. These must be completed before the samples are submitted to the appropriate FEMP or contractor laboratory for analysis. Finally, sampling custodians are responsible for logging in all collected samples, delivering the samples to the FEMP laboratory, or sending the samples with accompanying paperwork, to the contract laboratory.

8.1.3 Sampling Schedule

Surface water and sediment sampling must be conducted as soon as possible in order to assure that there will be water in Paddys Run and its tributaries. Groundwater sampling must be conducted as soon as possible in order to provide data in the same sampling period as the surface water/sediment sampling program. Data from all field work must be available by August 1, 1993, in order to meet the deadlines for the OU 5 RI Report.

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APPENDIX A

SNAPSHOT SAMPLING PROGRAM WELL LISTS

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

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addendum
	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	
	1046			X	
	1047			X	
	1048			X	

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

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

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addendum
	1052		X		
X	1054				
	1055	X			
	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				
X	1130				
X	1131				
	1134			X	
X	1135				

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

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

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addendum
X	1145				
	1150				X
X	1151				
X	1152				
X	1155				
X	1157				
	1160		X		
	1167				X
X	1171				
	1173				X
	1176			X	
X	1177				
X	1179				
X	1182				
X	1186				
X	1189				
X	1195				
	1198				X
X	1201				
	1206				X
	1207				X
	1208				X
	1210			X	
	1213				X

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

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

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addendum
X	1214				
	1215				X
X	1216				
X	1218				
	1226				X
	1227				X
X	1230				
X	1234				
X	1236				
	1237				X
X	1239				
X	1240				
X	1241				
X	1242				
X	1246				
X	1250				
X	1255				
	1260		X		
X	1267				
X	1269				
X	1270				
X	1273				
	1276		X		
X	1278				

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

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

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addendum
X	1279				
X	1281				
X	1283				
X	1287				
X	1291				
X	1299				
X	1301				
X	1317				
X	1324				
	1332		X		
	1334				X
	1336	X			
	1340	X			
	1342	X			
	1343	X			
	1344	X			
	1345	X			
	1347				X
	1348	X			X
X	1351				
	1352	X			
X	1353				
X	1354				
	1355	X			

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

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

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addendum
X	1356				
	1357	X			
	1359	X			
X	1360				
	1361	X			
X	1363				
X	1403				
X	1412				
X	1418				
X	1423				
	1433			X	
X	1441				
X	1443				
X	1444				
X	1447				
X	1491				
X	1509				
X	1511				
X	1513				
X	1515				
	1516			X	
	1517			X	
	1518			X	
	1523		X		

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

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

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addendum
	1643		X		
	1644		X		
	1645		X		
	1646		X		
	1675	X			
	1676	X			
	1711			X	
	1719			X	
X	1728				
X	1733				
	1836				X
	1838				X
	1839				X
	1840				X
	1841				X
	1842				X
	1843				X
	1844				X

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

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

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addendum
	2002	X			
X	2004				
X	2006				
X	2007				
	2008		X		
X	2009				
	2010	X	X		
X	2011				
X	2013				
	2014	X		X	
	2015	X			
	2016			X	
	2017	X			
X	2019				
X	2020				
X	2021				
	2024		X		
	2027		X	X	
X	2028				
X	2032				
X	2033 ^a				
X	2034				
	2037		X	X	

^aWells to be analyzed for Technetium-99

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

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addendum
	2042			X	
	2043		X		
	2044	X			
	2045	X		X	
	2046	X			
	2047			X	
	2048	X			
	2049	X		X	
	2050	X			
	2051		X		
	2052		X	X	
X	2054				
	2055	X	X		
	2064		X		
	2065	X			
	2066		X		
	2067	X			
X	2068				
	2070		X		
	2084		X		
	2091	X			
	2092	X			
	2093	X			
	2095	X			

*Wells to be analyzed for Technetium-99

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

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addendum
	2096	X			
	2097	X			
	2098	X			
	2104	X			
	2106		X		
X	2107				
X	2108				
X	2109 ^a				
X	2118				
	2120		X		
	2125	X			
X	2126 ^a				
	2128 ^a	X			
X	2171				
	2383	X			
	2384	X			
	2385	X		X	
	2386	X			
	2387	X			
X	2388				
X	2389 ^a				
X	2390				
	2391	X			
	2392 ^a	X			

^aWells to be analyzed for Technetium-99

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

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addendum
	2393	X			
	2394	X			
	2396	X			
	2397 ^a	X			
	2398	X			
	2399	X			
	2401			X	
	2402			X	
X	2417				
X	2420				
	2421		X		
X	2423				
	2430		X		
	2434		X		
	2545	X			
	2548	X			
	2549	X			
	2550	X			
	2551	X			
	2552	X			
	2554	X			
	2558	X			
	2559	X			
	2560	X			

^aWells to be analyzed for Technetium-99

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

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addendum
	2624	X			
	2625	X			
	2636	X			
	2639	X			
X	2642				
	2643*		X		
	2648		X		
	2649		X		
	2679	X			
	2728	X			
X	2733				
	2754	X			
	2821		X		
	2822		X		

*Wells to be analyzed for Technetium-99

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

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addendum
	3001		X		
X	3003				
X	3004				
	3008		X		
X	3009*				
	3010	X	X		
	3011		X		
	3014	X			
	3015	X			
	3016	X			
X	3017				
X	3020				X
X	3032				
X	3034*				
	3037		X		
	3043		X		
	3044	X			
	3045	X			
	3046	X			
X	3049				
X	3053				
X	3054				
	3055	X	X		
	3064		X		
	3065	X			

*Wells to be analyzed for Technetium-99

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

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addendum
	3066		X		
	3067		X		
X	3068				
	3069		X		
	3070		X		
	3091	X			
	3092	X			
	3093	X			
	3095	X			
	3096	X			
	3097	X			
	3098	X			
	3106		X		
X	3107				
X	3108				
	3120		X		
	3125	X			
	3128	X			
	3385	X			
	3387	X			
X	3390*				
	3391	X			
	3396*	X			
	3397	X			
	3398		X		

*Wells to be analyzed for Technetium-99

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

OU 5 Snapshot	Well Number	Removal Action	RCRA	OU 2	OU 5 Addendum
X	3402				
	3417		X		
	3421		X		
X	3423				
	3550	X			
	3551	X			
	3552	X			
	3624	X			
	3636	X			
	3679	X			
	3689	X			
	3733		X		
	3821		X		

*Wells to be analyzed for Technetium-99

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

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

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APPENDIX B

TARGET ANALYTE LISTS

SNAPSHOT MONITORING WELL, SURFACE WATER AND SEDIMENT SAMPLING

SELECTED TYPE 2 AND TYPE 3 WELLS **

TAL 50.03.23 A

FEMP RI/FS - HSL - ANALYTICAL PARAMETERS

FEMP RI/FS - GENERAL GROUNDWATER QUALITY - ANALYTICAL PARAMETERS

INORGANICS *

Pay Item

1	Aluminum
2	Antimony
3	Arsenic
4	Barium
5	Beryllium
6	Cadmium
7	Calcium
8	Chromium (Total)
9	Cobalt
10	Copper
11	Cyanide
12	Iron
13	Lead
14	Magnesium
15	Manganese
16	Mercury
17	Molybdenum
18	Nickel
19	Potassium
20	Selenium
21	Silicon
22	Silver
23	Sodium
24	Thallium
25	Vanadium
26	Zinc

GENERAL CHEMISTRY

Pay Item

1	Ammonia
2	Chloride
3	Fluoride
4	Nitrate
5	Phenols
6	Phosphorus (total)
7	Sulfate
8	Sulfide
9	Total Organic Carbon (TOC)
10	Total Organic Halogens (TOX)
11	Total Organic Nitrogen (TON)

MISC. GENERAL CHEMISTRY

1	Alkalinity
---	------------

FEMP RI/FS - LIMITED RADIOLOGICAL - ANALYTICAL PARAMETERS

RADIOLOGICAL

1	Radium 226
2	Radium 228
3	Thorium 228
4	Thorium 230
5	Thorium 232
6	Total Thorium
7	Total Uranium
8	Uranium 234
9	Uranium 235/238
10	Uranium 238

VOLATILE ORGANICS

1	1,1-Dichloroethane
2	1,1-Dichloroethene
3	1,1,1-Trichloroethane
4	1,1,2-Trichloroethane
5	1,1,2,2-Tetrachloroethane
6	1,2-Dichloroethane
7	1,2-Dichloroethene (total)
8	1,2-Dichloroethylene
9	1,2-Dichloropropane
10	2-Butanone
11	2-Hexanone
12	4-Methyl-2-pentanone
13	Acetone
14	Benzene
15	Bromodichloromethane
16	Bromoform
17	Bromomethane
18	Carbon disulfide
19	Carbon tetrachloride
20	Chlorobenzene
21	Chloroethane
22	Chloroform
23	Chloromethane
24	cis-1,3-Dichloropropene
25	Dibromochloromethane
26	Ethylbenzene
27	Methylene chloride
28	Styrene
29	Tetrachloroethene
30	Toluene
31	Total xylenes
32	trans-1,3-Dichloropropene
33	Trichloroethene
34	Vinyl acetate
35	Vinyl chloride

* The HSL Inorganics and Radiological analysis to be performed on both filtered and non-filtered samples.
 ** Refer to Sampling and Analysis Plan for specific wells (without asterisks).

SNAPSHOT MONITORING WELL, SURFACE WATER AND SEDIMENT SAMPLING

TYPE 1 AND SELECTED TYPE 2 AND TYPE 3 WELLS **

TAL 50.03.23 B

FEMP RI/FS - HSL - ANALYTICAL PARAMETERS

FEMP RI/FS - GENERAL GROUNDWATER QUALITY - ANALYTICAL PARAMETERS

INORGANICS *		Pay Item
1	Aluminum	
2	Antimony	
3	Arsenic	
4	Barium	
5	Beryllium	
6	Cadmium	
7	Calcium	
8	Chromium (Total)	
9	Cobalt	
10	Copper	
11	Cyanide	
12	Iron	
13	Lead	
14	Magnesium	
15	Manganese	
16	Mercury	
17	Molybdenum	
18	Nickel	
19	Potassium	
20	Selenium	
21	Silicon	
22	Silver	
23	Sodium	
24	Thallium	
25	Vanadium	
26	Zinc	

VOLATILE ORGANICS		Pay Item
1	1,1-Dichloroethane	
2	1,1-Dichloroethene	
3	1,1,1-Trichloroethane	
4	1,1,2-Trichloroethane	
5	1,1,2,2-Tetrachloroethane	
6	1,2-Dichloroethane	
7	1,2-Dichloroethene (total)	
8	1,2-Dichloroethylene	
9	1,2-Dichloropropane	
10	2-Butanone	
11	2-Hexanone	
12	4-Methyl-2-pentanone	
13	Acetone	
14	Benzene	
15	Bromodichloromethane	
16	Bromoform	
17	Bromomethane	
18	Carbon disulfide	
19	Carbon tetrachloride	
20	Chlorobenzene	
21	Chloroethane	
22	Chloroform	
23	Chloromethane	
24	cis-1,3-Dichloropropene	
25	Dibromochloromethane	
26	Ethylbenzene	
27	Methylene chloride	
28	Styrene	
29	Tetrachloroethene	
30	Toluene	
31	Total xylenes	
32	trans-1,3-Dichloropropene	
33	Trichloroethene	
34	Vinyl acetate	
35	Vinyl chloride	

GENERAL CHEMISTRY		Pay Item
1	Ammonia	
2	Chloride	
3	Fluoride	
4	Nitrate	
5	Phenols	
6	Phosphorus (total)	
7	Sulfate	
8	Sulfide	
9	Total Organic Carbon (TOC)	
10	Total Organic Halogens (TOX)	
11	Total Organic Nitrogen (TON)	

MISC. GENERAL CHEMISTRY		Pay Item
1	Alkalinity	

FEMP RI/FS - LIMITED RADIOLOGICAL - ANALYTICAL PARAMETERS

RADIOLOGICAL		Pay Item
1	Radium 226	
2	Radium 228	
3	Technetium 99	
4	Thorium 228	
5	Thorium 230	
6	Thorium 232	
7	Total Thorium	
8	Total Uranium	
9	Uranium 234	
10	Uranium 235/238	
11	Uranium 238	

* The HSL Inorganics and Radiological analysis to be performed on both filtered and non-filtered samples.
 ** Refer to Sampling and Analysis Plan for specific wells.

SNAPSHOT MONITORING WELL, SURFACE WATER AND SEDIMENT SAMPLING

SEDIMENT SAMPLING

TAL 50.03.23 C

FEMP RI/FS - HSL - ANALYTICAL PARAMETERS

FEMP RI/FS - LIMITED RADIOLOGICAL - ANALYTICAL PARAMETERS

INORGANICS		Pay Item
1	Aluminum	
2	Antimony	
3	Arsenic	
4	Barium	
5	Beryllium	
6	Cadmium	
7	Calcium	
8	Chromium (Total)	
9	Cobalt	
10	Copper	
11	Cyanide	
12	Iron	
13	Lead	
14	Magnesium	
15	Manganese	
16	Mercury	
17	Molybdenum	
18	Nickel	
19	Potassium	
20	Selenium	
21	Silicon	
22	Silver	
23	Sodium	
24	Thallium	
25	Vanadium	
26	Zinc	

VOLATILE ORGANICS		Pay Item
1	1,1-Dichloroethane	
2	1,1-Dichloroethane	
3	1,1,1-Trichloroethane	
4	1,1,2-Trichloroethane	
5	1,1,2,2-Tetrachloroethane	
6	1,2-Dichloroethane	
7	1,2-Dichloroethane (total)	
8	1,2-Dichloroethylene	
9	1,2-Dichloropropane	
10	2-Butanone	
11	2-Hexanone	
12	4-Methyl-2-pentanone	
13	Acetone	
14	Benzene	
15	Bromodichloromethane	
16	Bromoform	
17	Bromomethane	
18	Carbon disulfide	
19	Carbon tetrachloride	
20	Chlorobenzene	
21	Chloroethane	
22	Chloroform	
23	Chloromethane	
24	cis-1,3-Dichloropropene	
25	Dibromochloromethane	
26	Ethylbenzene	
27	Methylene chloride	
28	Styrene	
29	Tetrachloroethene	
30	Toluene	
31	Total xylenes	
32	trans-1,3-Dichloropropene	
33	Trichloroethene	
34	Vinyl acetate	
35	Vinyl chloride	

SEMIVOLATILE ORGANICS		Pay Item
1	1,2-Dichlorobenzene	
2	1,2,4-Trichlorobenzene	
3	1,3-Dichlorobenzene	
4	1,4-Dichlorobenzene	
5	2-Chloronaphthalene	
6	2-Chlorophenol	
7	2-Methylnaphthalene	
8	2-Methylphenol	
9	2-Nitroaniline	
10	2-Nitrophenol	
11	2,4-Dichlorophenol	
12	2,4-Dimethylphenol	
13	2,4-Dinitrophenol	
14	2,4-Dinitrotoluene	
15	2,4,5-Trichlorophenol	
16	2,4,6-Trichlorophenol	
17	2,6-Dinitrotoluene	
18	3-Nitroaniline	
19	3,3'-Dichlorobenzidine	
20	4-Bromophenyl phenylether	
21	4-Chloro-3-methylphenol	
22	4-Chloroaniline	
23	4-Chlorophenyl-phenyl ether	
24	4-Methylphenol	
25	4-Nitroaniline	
26	4-Nitrophenol	
27	4,6-Dinitro-2-methylphenol	
28	Acenaphthene	
29	Acenaphthylene	
30	Anthracene	
31	Benzoic acid	
32	Benzo(a)anthracene	
33	Benzo(a)pyrene	
34	Benzo(b)fluoranthene	
35	Benzo(g,h,i)perylene	
36	Benzo(k)fluoranthene	
37	Benzyl alcohol	
38	bis(2-Chloroethoxy)methane	
39	bis(2-Chloroethyl)ether	
40	bis(2-Chloroisopropyl) ether	
41	bis(2-Ethylhexyl)phthalate	
42	Butyl benzyl phthalate	
43	Carbazole	
44	Chrysene	
45	Dibenzofuran	
46	Dibenzo(a,h)anthracene	
47	Diethylphthalate	
48	Dimethylphthalate	
49	Di-n-butyl phthalate	
50	Di-n-octyl phthalate	
51	Fluoranthene	
52	Fluorene	
53	Hexachlorobenzene	
54	Hexachlorobutadiene	
55	Hexachlorocyclopentadiene	
56	Hexachloroethane	
57	Indeno(1,2,3-cd)pyrene	
58	Isophorone	
59	Naphthalene	
60	Nitrobenzene	
61	N-Nitroso-di-n-propylamine	
62	N-Nitrosodiphenylamine	
63	Pentachlorophenol	
64	Phenanthrene	
65	Phenol	
66	Pyrene	

RADIOLOGICAL		Pay Item
1	Radium 226	
2	Radium 228	
3	Thorium 228	
4	Thorium 230	
5	Thorium 232	
6	Total Thorium	
7	Total Uranium	
8	Uranium 234	
9	Uranium 235/238	
10	Uranium 238	

DRAFT

RI/FS Work Plan Addendum

May 3, 1993

RI/FS Work Plan

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SNAPSHOT MONITORING WELL, SURFACE WATER AND SEDIMENT SAMPLING

SURFACE WATER SAMPLING

TAL 50.03.23 D

FEMP RI/FS - HSL - ANALYTICAL PARAMETERS

FEMP RI/FS - LIMITED RADIOLOGICAL - ANALYTICAL PARAMETERS

INORGANICS *		Pay Item
1	Aluminum	
2	Antimony	
3	Arsenic	
4	Barium	
5	Beryllium	
6	Cadmium	
7	Calcium	
8	Chromium (Total)	
9	Cobalt	
10	Copper	
11	Cyanide	
12	Iron	
13	Lead	
14	Magnesium	
15	Manganese	
16	Mercury	
17	Molybdenum	
18	Nickel	
19	Potassium	
20	Selenium	
21	Silicon	
22	Silver	
23	Sodium	
24	Thallium	
25	Vanadium	
26	Zinc	

VOLATILE ORGANICS		Pay Item
1	1,1-Dichloroethane	
2	1,1-Dichloroethene	
3	1,1,1-Trichloroethane	
4	1,1,2-Trichloroethane	
5	1,1,2,2-Tetrachloroethane	
6	1,2-Dichloroethane	
7	1,2-Dichloroethene (total)	
8	1,2-Dichloroethylene	
9	1,2-Dichloropropane	
10	2-Butanone	
11	2-Hexanone	
12	4-Methyl-2-pentanone	
13	Acetone	
14	Benzene	
15	Bromodichloromethane	
16	Bromoform	
17	Bromomethane	
18	Carbon disulfide	
19	Carbon tetrachloride	
20	Chlorobenzene	
21	Chloroethane	
22	Chloroform	
23	Chloromethane	
24	cis-1,3-Dichloropropene	
25	Dibromochloromethane	
26	Ethylbenzene	
27	Methylene chloride	
28	Styrene	
29	Tetrachloroethene	
30	Toluene	
31	Total xylenes	
32	trans-1,3-Dichloropropene	
33	Trichloroethene	
34	Vinyl acetate	
35	Vinyl chloride	

SEMIVOLATILE ORGANICS		Pay Item
1	1,2-Dichlorobenzene	
2	1,2,4-Trichlorobenzene	
3	1,3-Dichlorobenzene	
4	1,4-Dichlorobenzene	
5	2-Chloronaphthalene	
6	2-Chlorophenol	
7	2-Methylnaphthalene	
8	2-Methylphenol	
9	2-Nitroaniline	
10	2-Nitrophenol	
11	2,4-Dichlorophenol	
12	2,4-Dimethylphenol	
13	2,4-Dinitrophenol	
14	2,4-Dinitrotoluene	
15	2,4,5-Trichlorophenol	
16	2,4,6-Trichlorophenol	
17	2,6-Dinitrotoluene	
18	3-Nitroaniline	
19	3,3'-Dichlorobenzidine	
20	4-Bromophenyl phenylether	
21	4-Chloro-3-methylphenol	
22	4-Chloroaniline	
23	4-Chlorophenyl-phenyl ether	
24	4-Methylphenol	
25	4-Nitroaniline	
26	4-Nitrophenol	
27	4,6-Dinitro-2-methylphenol	
28	Acenaphthene	
29	Acenaphthylene	
30	Anthracene	
31	Benzoic acid	
32	Benzo(a)anthracene	
33	Benzo(a)pyrene	
34	Benzo(b)fluoranthene	
35	Benzo(g,h,i)perylene	
36	Benzo(k)fluoranthene	
37	Benzyl alcohol	
38	bis(2-Chloroethoxy)methane	
39	bis(2-Chloroethyl)ether	
40	bis(2-Chloroisopropyl) ether	
41	bis(2-Ethylhexyl)phthalate	
42	Butyl benzyl phthalate	
43	Carbazole	
44	Chrysene	
45	Dibenzofuran	
46	Dibenzo(a,h)anthracene	
47	Diethylphthalate	
48	Dimethylphthalate	
49	Di-n-butyl phthalate	
50	Di-n-octyl phthalate	
51	Fluoranthene	
52	Fluorene	
53	Hexachlorobenzene	
54	Hexachlorobutadiene	
55	Hexachlorocyclopentadiene	
56	Hexachloroethane	
57	Indeno(1,2,3-cd)pyrene	
58	Isophorone	
59	Naphthalene	
60	Nitrobenzene	
61	N-Nitroso-di-n-propylamine	
62	N-Nitrosodiphenylamine	
63	Pentachlorophenol	
64	Phenanthrene	
65	Phenol	
66	Pyrene	

RADIOLOGICAL		Pay Item
1	Radium 226	
2	Radium 228	
3	Thorium 228	
4	Thorium 230	
5	Thorium 232	
6	Total Thorium	
7	Total Uranium	
8	Uranium 234	
9	Uranium 235/236	
10	Uranium 238	

FEMP RI/FS - GENERAL GROUNDWATER QUALITY - ANALYTICAL PARAMETERS

GENERAL CHEMISTRY		Pay Item
1	Ammonia	
2	Chloride	
3	Fluoride	
4	Nitrate	
5	Phenols	
6	Phosphorus (total)	
7	Sulfate	
8	Sulfide	
9	Total Organic Carbon (TOC)	
10	Total Organic Halogens (TOX)	
11	Total Organic Nitrogen (TON)	

MISC. GENERAL CHEMISTRY		Pay Item
1	Alkalinity	

* The HSL Inorganics and Radiological analysis to be performed on both filtered and non-filtered samples.

** Refer to Sampling and Analysis Plan for specific wells (without asterisks).