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FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

AREA 3
LIME SLUDGE PONDS IMPLEMENTATION PLAN

APRIL 1999

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

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TABLE OF CONTENTS

2161

Executive Summary ES-1
List of Tables iv
List of Figures iv
List of Acronyms v

1.0 Introduction 1-1
1.1 Scope and General Approach of the Implementation Plan 1-2
1.2 Background 1-4
1.3 Summary of Regulatory Drivers 1-5
1.3.1 ARARs and TBCs 1-5
1.3.2 Permits 1-5
1.3.3 Natural Resource Trusteeship 1-5
1.4 Components of the Remedy 1-6
1.5 Lessons Learned 1-7

2.0 Predesign Investigations 2-1
2.1 Summary of Surface and Subsurface Conditions 2-7
2.1.1 Surface Features 2-7
2.1.2 Subsurface Materials 2-8
2.1.3 Perched Water Zone 2-8
2.2 Identification of ASCOCs for Excavation 2-1
2.3 Summary of the RI/FS and Other Investigations 2-1
2.3.1 Characterization Investigation Study (CIS) Boring Program 2-2
2.3.2 Phase I RI Sampling 2-3
2.3.3 RCRA Facility Assessment 2-3
2.3.4 Phase II RI Sampling 2-4
2.3.5 Media Summary 2-5
2.3.5.1 Soil 2-6
2.3.5.2 Lime Sludge 2-6
2.3.5.3 Perched Groundwater 2-6
2.4 Additional Sampling/Measurements 2-7
2.5 General Conclusions 2-9
2.6 Anticipated Excavation Boundaries 2-9

3.0 Remedial Action Approach 3-1
3.1 Excavation 3-1
3.1.1 Site Preparation 3-2
3.1.1.1 Establishing Site Boundaries and Controls 3-2
3.1.1.2 Surveying and Site Layout 3-2
3.1.1.3 Establishing and Identifying Support Facilities 3-2
3.1.1.4 Clearing 3-3
3.1.1.5 Tie-In of Utility Hookups 3-3

3.1.1.6 Installation of Water Management System 3-3
3.1.1.7 Construction of Loading Area 3-5
3.1.1.8 Installation of Erosion and Sediment Control Devices 3-5
3.1.2 Excavation 3-5
3.1.2.1 General Excavation Approach 3-6
3.1.2.2 Groundwater Control 3-8
3.1.2.3 Excavation Control Monitoring 3-8
3.1.2.4 Loading and Hauling of Impacted Material 3-9
3.1.2.5 Miscellaneous Excavation Requirements 3-9
3.1.2.6 Real-Time Scanning 3-10
3.2 Conversion of LSPs to Water Management Facility 3-10
3.2.1 Liner System 3-10
3.2.2 Perimeter Drain 3-11
3.2.3 WMF Outlet Works 3-11
3.2.4 Operation of Water Management Facility 3-11
3.3 Final Remediation 3-11
3.3.1 Removal of Water Management Facility 3-12
3.3.2 Precertification and Certification 3-12
3.3.3 Restoration 3-12

4.0 Project-Specific Environmental Controls and Monitoring 4-1
4.1 Natural Resource Impacts 4-1
4.2 Air Pathway 4-1
4.2.1 Noise 4-2
4.2.2 Fugitive Emissions 4-2
4.2.3 Airborne Radiological Particulates 4-3
4.2.4 Radon 4-3
4.2.5 Direct Radiation 4-4
4.3 Surface Water Pathway 4-4
4.4 Groundwater Pathway 4-5

5.0 Project-Specific Health and Safety 5-1

6.0 Remedial Action Management Strategy 6-1
6.1 Organizational Structure 6-1
6.2 Configuration Management 6-2
6.3 Remedial Action Approach 6-2
6.4 Remedial Action Management 6-3
6.5 Contingency Management 6-3
6.6 Integrating Remediation of the LSPs with other FEMP Activities 6-5
6.7 Schedule 6-6

References R-1

LIST OF TABLES

2-1 Summary of Contaminants Pertinent to LSP Excavation
2-2 Perched Groundwater Detections Above Background
2-3 Analytical Results for Soil Compared to FRLs/WAC

6-1 Impacted Material Waste Streams from LSPs
6-2 LSP Implementation Schedule

LIST OF FIGURES

1-1 LSP Location Map

2-1 CIS Sampling Locations
2-2 RI/FS Phase I Sampling Locations
2-3 RCRA Facility Assessment Sampling Locations
2-4 RI/FS Phase II Sampling Locations

ACRONYMS AND ABBREVIATIONS

A/E	Architect/Engineer
ACA	Amended Consent Agreement
ACGIH	American Conference of Governmental Industrial Hygienists
ALARA	as low as reasonably achievable
APM	Area Project Manager
ARARs	applicable or relevant and appropriate requirements
ARASA	alternative remedial action subcontractor approach
ARWWP	Aquifer Restoration Waste Water Project
ASL	analytical support level
ASCOC	area-specific contaminants of concern
AWAC	above waste acceptance criteria
AWWT	Advanced Wastewater Treatment (Facility)
BAT	best available technology
BWAC	below waste acceptance criteria
CAM	cost account manager
CDL	Certification Design Letter
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CIS	Characterization Investigation Study
CM	Construction Manager
COC	constituent of concern
CU	certification unit
DCN	design change notice
DOE	U.S. Department of Energy
DOE-FEMP	U.S. Department of Energy - Fernald Area Office
DOT	Department of Transportation
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
ESpec	Excavation Construction Specification
FAR	federal acquisition requirement
FDF	Fluor Daniel Fernald, Inc.
FEMP	Fernald Environmental Management Project
FPA	Former Production Area
FRLs	final remediation levels
FS	Feasibility Study
FTL	field tracking log
GIS	Geographic Information System
HPGe	high purity germanium detector
HSL	Hazardous Substances List
HWMU	Hazardous Waste Management Unit
IEMP	Integrated Environmental Monitoring Program
IFB	Invitation for Bid

ACRONYMS AND ABBREVIATIONS
(continued)

IIMS	Integrated Information Management System
IMPTSAP	Impacted Materials Prototype Sampling and Analysis Plan
IMPP	Impacted Materials Placement Plan
IP	Implementation Plan
IRDP	Integrated Remedial Design Package
LSP	Lime Sludge Pond
MTL	material tracking location
NPDES	National Pollutant Discharge Elimination System
NRRP	Natural Resource Restoration Plan
NTS	Nevada Test Site
OEPA	Ohio Environmental Protection Agency
OSDF	On-Site Disposal Facility
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PCB	polychlorinated biphenyl
PCDF	permitted commercial disposal facility
PEP	Project Execution Plan
PID	photoionization detector
PPE	personal protective equipment
PSHSRM	Project-Specific Health and Safety Requirements Matrix
PSP	Project-Specific Plan
PWID	Project Waste Identification and Disposition
QA	quality assurance
QAPP	SEP Quality Assurance Project Plan
QC	quality control
RA	remedial action
RCI	Request for Clarification of Information
RCRA	Resource Conservation and Recovery Act
RCT	radiological control technician
RD	remedial design
RFP	request for proposal
RI	remedial investigation
ROD	Record of Decision
RSS	Radiological Scanning System
RTRAK	Real Time Radiation Tracking System
RWP	radiological work permit
S&H	Safety and Health
SCEP	Soil Characterization and Excavation Project
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan

ACRONYMS AND ABBREVIATIONS
(continued)

SP	Soil Pile
SWIFTS	Sitewide Waste Information Forecasting and Tracking System
SWPPP	Stormwater Pollution Prevention Plan
SWRB	Stormwater Retention Basin
SWUs	Southern Waste Units
TAL	Target Analyte List
TBC	To Be Considered Criteria
Tc-99	technetium-99
TCA	1,1,1-trichloroethane
TCLP	Toxicity Characteristic Leaching Procedure
VOC	volatile organic compound
WAC	waste acceptance criteria
WAO	Waste Acceptance Operations
WMF	water management facility
WMP	Water Management Plan
WPRAP	Waste Pits Remedial Action Project
XRF	X-ray fluorescence
yd^3	cubic yards

EXECUTIVE SUMMARY

The Lime Sludge Ponds (LSPs) are part of Remediation Area 3 at the Fernald Environmental Management Project (FEMP). The LSPs, located on the west side of the FEMP just outside of the Former Production Area (FPA), consist of two unlined ponds (north and south) that received spent lime sludge from FEMP water treatment operations, neutralization of Boiler Plant blowdown, and coal pile storm water runoff. The south pond has been inactive since the 1960s and the north pond has been inactive since the early 1990s. The LSPs contain approximately 20,000 cubic yards of lime sludge and approximately 10,000 cubic yards of soil material. The Integrated Remedial Design Package (IRDP) for LSP remediation consists of this Implementation Plan and supporting documents. LSP remediation will be performed in two major phases: 1) excavation of impacted material, and 2) conversion to a Water Management Facility (WMF).

During the excavation phase, all impacted materials will be removed from the LSPs, including lime sludge, material contaminated with lime sludge, fill material, material with contaminant concentrations above final remediation levels (FRLs), piping and all other manmade material. Approximately 30,000 cubic yards of impacted material will be removed during LSP excavation. There is no known material in the LSPs that exceed the Waste Acceptance Criteria (WAC) for the On-Site Disposal Facility (OSDF); therefore, unless above-WAC or special material is encountered during excavation, all of the impacted material from the LSPs will be disposed in the OSDF.

After excavation, the LSPs will be converted into a WMF, lined with a geosynthetic liner, to store water encountered during excavation of the FPA. This WMF will receive surface water and groundwater pumped from the active FPA. The groundwater may be contaminated with volatile organic compounds (VOCs) and/or radionuclides. The WMF will have an outlet system that will be capable of transferring the water to the Advanced Wastewater Treatment Facility (AWWT), via the BioSurge Lagoon (BSL) or the Storm Water Retention Basin (SWRB).

Excavation of the LSPs are scheduled for FY 2000. The WMF will then operate during remediation of the FPA until remediation of the WMF is performed in FY 2005.

1.0 INTRODUCTION

This Implementation Plan (IP) describes the U.S. Department of Energy (DOE)'s intended remediation of the Lime Sludge Ponds (LSPs), located in Area 3 at the Fernald Environmental Management Project (FEMP). It discusses how the general remediation strategies set forth in the Sitewide Excavation Plan [SEP (DOE 1998a)] will be applied to remediation of the LSPs.

The FEMP site has been divided into areas for remediation of soil and at- and below-grade structures and debris. As shown on Figure 1-1, Remediation Area 3 consists of the northern part of the Former Production Area (FPA) and the LSPs. Excavation of the LSPs and conversion of the excavation in to a water management facility (WMF) will support surface water management activities during remediation of the FPA.

The LSPs were investigated as part of the Operable Unit 2 Remedial Investigation/Feasibility Study (RI/FS). Therefore, the remedial action described in this IP is based on the selected remedy in the Operable Unit 2 Record of Decision [ROD (DOE 1995a)].

All LSP remedial action activities will be performed in accordance with the LSP Integrated Remedial Design Package (IRDP). The IRDP consists of the following area- and project-specific documents:

- Implementation Plan (this document)
- Design Criteria Package
- Water Management Plan
- Construction Drawings and Technical Specifications.

The remedial action requirements described in the construction drawings and technical specifications were developed in accordance with the concepts described in this IP, as guided by the SEP. As the integrating document for the IRDP, the IP provides a comprehensive description of planned remediation activities to facilitate regulatory agency review and define the scope of work necessary for implementation of remedial action.

Remediation involves strategic planning, preparation of design packages (construction drawings and technical specifications), and detailed remedial action planning. As presented in the Amended Consent Agreement [ACA (EPA 1991)], this remediation process includes preparation of remedial action work

plans to cover construction activities and the establishment of an enforceable remedial action schedule. The goals of remedial design and remedial action, and the intent of the ACA are, and will be, addressed in the SEP, IRDPs, the On-Site Disposal Facility (OSDF) Impacted Materials Placement Plan [IMPP (DOE 1996a)] and the Waste Acceptance Criteria (WAC) Attainment Plan (DOE 1997a), as well as coordination with other FEMP activities and remediation/construction activities. This Implementation Plan, as part of the LSPs IRDP, and in conjunction with the SEP and these documents, fulfills the ACA requirements.

1.1 SCOPE AND GENERAL APPROACH OF THE IMPLEMENTATION PLAN

In accordance with the SEP, the area-specific remedial design/remedial action (RD/RA) process includes the following major steps:

- Predesign investigations
- Remedial design
- Remedial action
- Precertification
- Post remediation activities
- Certification.

This IP addresses all of the above steps. However, as described in this IP, there will be an extended time period between the conclusion of the excavation phase and precertification/certification activities when the excavated LSPs will be converted to, and operated as, a WMF . Also, post remediation activities (including final restoration) will be addressed in more detail in future documents.

A radiological scan will be performed when impacted material is excavated and removed from the LSPs. Upon completion of this scan and approval of the excavation by the Construction Manager, the LSP excavation will be converted to a WMF . This conversion to a WMF will consist of installing a geosynthetic liner and other components to provide water management capacity. The WMF will support remediation of the former production area for a period of approximately five years. During operation, the WMF will provide storage capacity for excavation water generated during remediation of the FPA and pumping capability to convey water from the WMF to the BSL and the FEMP storm drain system (i.e., SWRB). After the WMF is no longer needed, the liner and other components will be removed, managed as impacted material, and dispositioned in the OSDF. The LSP area will then be certified.

Following completion of certification activities and regulatory approval, final restoration will be initiated. Final restoration and follow-on post remediation activities will be guided on a sitewide basis by the final version of the Natural Resource Restoration Plan [NRRP (DOE 1998b)].

This IP provides the overall framework and strategy for performing the remediation activities included within its scope. These remedial action activities are described in more detail in the construction drawings and technical specifications. The specific methods, means, and procedures to accomplish the work will be proposed by the selected construction contractor and presented in a Safe Work Plan.

This IP consists of the following sections:

- Section 1.0 - Introduction, which summarizes the purpose and scope of this IP and describes programmatic strategies and requirements for implementation of this remedial action project.
- Section 2.0 - Predesign Investigations, which describe the area-specific contaminants of concern (ASCOCs) for the LSPs, the surface and subsurface conditions, the nature and extent of contamination, and the anticipated excavation boundaries.
- Section 3.0 - Remedial Action Approach, which summarizes the approach that will be used to implement the remedial action, including both excavation and conversion to a WMF.
- Section 4.0 - Project-Specific Environmental Controls and Monitoring, which discusses environmental controls and the associated monitoring that will be initiated as part of the remediation of the LSPs.
- Section 5.0 - Project-Specific Health and Safety, which summarizes project-specific health and safety requirements and procedures.
- Section 6.0 - Remedial Action Management Strategy, which discusses the strategy for managing remediation activities in the LSPs.

1.2 BACKGROUND

The LSPs are located just west of the FPA. They are bounded by the K-65 trench to the south, a railroad line and the Southern Waste Unit (SWU) Haul Road to the west , 2nd Street to the north, and a paved road to the east that is adjacent to the FPA.

The LSPs consist of individual north and south basins. Design drawings of the LSPs indicate that the original basin dimensions were identical. Each pond was designed to be 100 feet by 200 feet at the bottom, have slopes of 2 horizontal to 1 vertical side, and a depth of 8.5 feet. A central earthen berm separates the two LSPs. The basins were excavated into existing soil and are unlined. Current mapping of the area and field observations indicate that the height of the berm around the south LSP, including the perimeter and central berms, was raised to increase capacity of the south LSP after the initial construction of the basins.

The LSPs received spent lime sludge from FEMP water treatment operations, neutralization of Boiler Plant blowdown, and coal pile storm water runoff. The sludge and runoff were pumped into these ponds and allowed to settle. Because of the increased berm height, the capacity in the south LSP is larger and was filled above original design capacity. The south pond was taken out of service in 1964, and the north pond has been inactive since 1995.

Field investigations of the LSPs indicate that the sludge is homogeneous. While radionuclides are present in the sludge, sampling in the berm soil and glacial till beneath the ponds has determined that the soil medium generally has higher contaminant concentrations relative to the sludge.

Thirteen contaminants of concern (COCs) have been identified for the LSPs, but only three COCs exceed their FRLs. The extent of COCs in the LSPs is limited mostly to the berm soil surrounding the ponds, and the nature of contamination is such that only three samples exceed FRLs in the LSP area being considered for remediation. COCs were also detected in the perched groundwater downgradient of the subunit, but this contamination is tied to Plant 2/3 activities to the east. Due to the low solubility of metals in lime sludge, no impact from the LSPs is expected on the perched water or the Great Miami Aquifer.

000012

1.3 SUMMARY OF REGULATORY DRIVERS

Several regulatory criteria and legal obligations provide the basis for LSP remediation activities. These include:

- Applicable or Relevant and Appropriate Requirements (ARARs) or To Be Considered Criteria (TBCs)
- Permits
- Natural Resources Trusteeship.

The pertinence of each of these to LSP remediation is discussed in the following paragraphs.

1.3.1 ARARs and TBCs

The ARARs and TBCs for the LSPs remediation project are presented in the Design Criteria Package.

1.3.2 Permits

Storm water discharges from the LSPs during remediation are covered under the existing National Pollution Discharge Elimination System (NPDES) permit (OEPA Permit Number 1I000004*ED) through the implementation of the permit-required sitewide Storm Water Pollution Prevention Plan (RM-0039). Thus, no modifications to the permit are required as a result of the LSP remedial action.

1.3.3 Natural Resource Trusteeship

Two mechanisms drive protection of natural resources during remediation, the natural resource trusteeship process and the pertinent federal and state regulations. Both of these mechanisms have been incorporated into the LSP remedial design.

Regulatory drivers for the management of natural resources and associated monitoring are grouped into three areas: threatened and endangered species protection, wetlands/floodplain protection, and cultural resource management.

Threatened and Endangered Species

Based upon the 1993-1994 updated threatened and endangered species surveys at the FEMP, DOE does not expect to encounter any federal- or state-listed threatened or endangered species or critical habitat

in the LSPs. Therefore, no additional threatened/endangered species surveys have been conducted or planned.

Wetlands/Floodplains

A jurisdictional wetland within the LSPs was delineated during the 1993 FEMP wetland delineation and will be compensated through an on-site wetland mitigation strategy as outlined in the NRRP, to be submitted separately. This wetland area consists of 0.225 acre located in the northwest corner of the north LSP.

Cultural Resource Management

The LSPs have been designated as a disturbed area (DOE 1997b), which means that a Phase I archeological survey is not required since it is unlikely that any cultural resources are present. All areas surrounding the LSPs have been surveyed, and no historic properties have been identified. In the event that cultural resources are discovered, project personnel will follow the procedures outlined in Appendix F.4.2 of the SEP, and FEMP procedure EP-0003, "Unexpected Discovery of Cultural Resources."

1.4 COMPONENTS OF THE REMEDY

As described in the Operable Unit 2 (OU2) ROD, the remedy selected to provide protection of human health and the environment involves the excavation of all impacted materials, material processing (if necessary) to meet sizing and moisture criteria for the OSDF, disposal in the OSDF of that material which meets the OSDF WAC, and off-site disposal of excavated material exceeding the OSDF WAC. The components of the selected remedy, as presented in the OU2 ROD and as applicable to the LSPs, and the commitment to ensure these elements are met include:

- Construction of the OSDF. Construction of the on-site disposal facility is underway and it will be ready to receive excavated material from the LSPs.

- Excavation. At a minimum, the LSPs will be excavated to the depth established by the OU2 RI/FS; this minimum consists of all lime sludge. Excavation will be performed to keep exposure to humans as low as reasonably achievable (ALARA). Excavation of the LSP includes removal of vegetation, soil and debris with contaminant levels above FRLs (see Section 3.0 for additional details).

000014

- Transportation and on-site disposal. Excavated material that meets the OSDF WAC will be transported to the OSDF for disposal. A discussion of transportation and disposition is presented in Section 3.0.

- Collection and treatment of construction water. The approach that will be used to manage water generated during excavation is presented in Section 3.0 of this IP and the separate Water Management Plan.

- Verification, Precertification and Certification. Monitoring will be performed during excavation to ensure that excavation is completed to the design depths. A real-time verification scan will be performed after excavation and before conversion to a WMF. Precertification and certification will be performed after removal of the WMF.

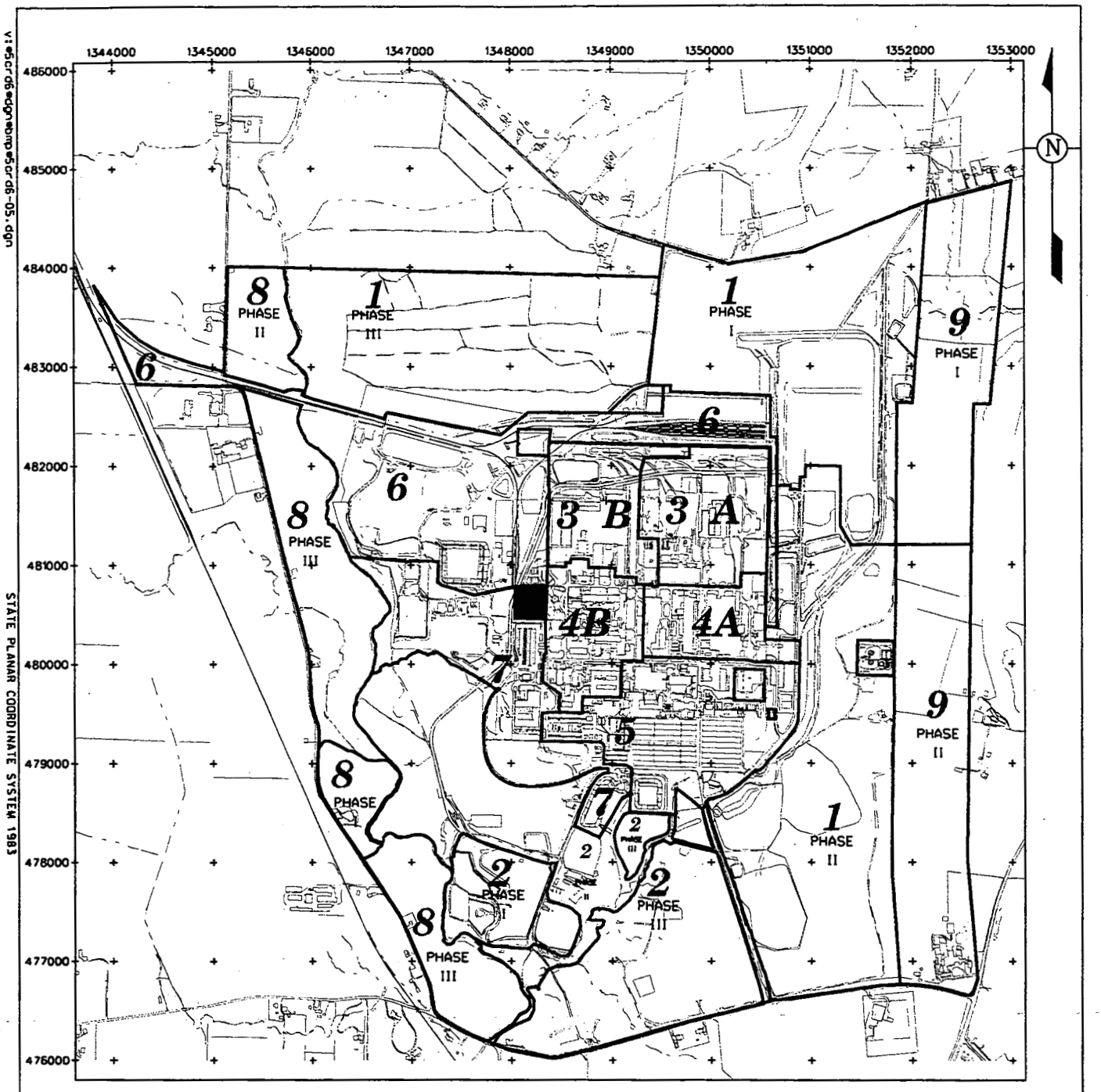
- Restoration. Final restoration of the LSPs will occur after removal of the liner and WMF components and completion of certification activities. Restoration of the LSPs will include final seeding (as needed) and revegetation. The extent of final restoration will depend on the end use of the area and the appropriate habitat. The final land use will be included in the final version of the NRRP.

- Institutional controls. Institutional controls consist of actions such as access restrictions and groundwater monitoring. During remediation and operation as a WMF, access to the area will be restricted through the use of barriers and warning/caution signs. Groundwater monitoring will be implemented using wells designated for long-term groundwater monitoring. These wells, as well as long-term sampling and monitoring strategies, are identified in the Integrated Environmental Monitoring Plan [IEMP (DOE 1997c)]. Long-term institutional controls necessary to implement restoration goals under the site's selected remedy are presented in the NRRP.

- Maintenance. Long-term maintenance of the LSPs will be conducted in accordance with the habitat and final land use of the area following remediation of the FPA.

1.5 LESSONS LEARNED

A lessons learned program has been implemented to apply knowledge accumulated during successive remedial efforts conducted under the SEP. This IP and associated IRDP documents have been prepared based on lessons learned from previous IRDPs. Based on lessons learned, major changes to this IRDP include a smaller and more focused IP and design documents (construction drawings and technical specifications) which provide more flexibility for implementation in the field.



LEGEND:

LIME SLUDGE PONDS

SCALE

1500 750 0 1500 FEET

FIGURE 1-1. LSP LOCATION MAP

STATE PLANAR COORDINATE SYSTEM 1983

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2.0 PREDESIGN INVESTIGATIONS

Previous investigations in the LSPs have provided analytical data on the nature and extent of contamination in the area. Existing data from these investigations were used to develop design plans for removal and disposition of the sludge and soil and for converting the excavation into a WMF.

Boring log data indicate that the extent of impacted material is consistent with the 1952 design drawings for the ponds. Analytical data collected from all studies show that the levels of contamination in the LSPs are very low for volatile organic compounds (VOCs), radionuclides, and metals that are identified as COCs. The only region of concern in the vicinity of the LSPs is the soil south of the K-65 trench, which trends east/west just south of the south berm (Figure 2-1). South of the K-65 trench, technetium-99 activity is present at levels above the OSDF WAC, and total uranium concentration is above the 50 parts per million (ppm) ALARA level, based on data collected during the Characterization Investigation Study (CIS).

2.1 SUMMARY OF SURFACE AND SUBSURFACE CONDITIONS

This section summarizes surface conditions from a recent topographic field survey and subsurface conditions as observed by borings placed during the CIS, RCRA Facility Assessment, and RI/FS Phase I and Phase II Investigations. A coarse grain unit (CGU) identified during the boring programs holds perched water that lies 8 to 18 feet below the current topographic surface in the vicinity of the LSP. Several wells are completed in the perched water to monitor for environmental levels of contaminants introduced by past FEMP operations.

2.1.1 Surface Features

Topography in the vicinity of the LSP was field surveyed on February 8, 1999. The LSPs were originally constructed as two identical basins that are elongated in an east-west direction. By the time the south LSP was closed in 1964, a berm had been built up around it to increase its storage capacity. This berm averages 4 feet in height above the original design grade. The berm around the north basin does not appear to be different from the original design drawings.

An east-west trending ditch with a depth of 3 to 5 feet lies directly north of the northern basin. On the west side, the LSPs are separated from a rail line by a ditch 1 to 3 feet deep. The south side of the southern basin is flanked by a trench that holds the K-65 slurry line and other utility lines. A road lies along the eastern margin of the LSPs.

The topographic surface of the lime sludge within the basins is several feet lower on the western side of the basins. The western half of the northern basin contains standing water, marsh flora, and a jurisdictional wetland. There is no standing water in the southern basin. Drainage on the outside of the berm crest will run into the west and north ditches, the K-65 slurry trench, or onto the road that parallels the east side of the LSP.

2.1.2 Subsurface Materials

Native glacial overburden deposits in the LSPs area consist of a 30 to 40 feet thick glacial till/clay layer above the sand and gravel of the GMA. The clay layer contains a coarse grained unit (CGU) that is located within the clay layer in an intermittent fashion. The CGU contains sand and gravel of various mixtures and depths. Some silt layers are also located within the overlying till. The design drawings for the LSPs show the basins to be cut into the glacial overburden to a depth of approximately 9 feet below the design surface of 577 feet above mean sea level. As shown on the construction drawings, the LSP excavation is expected to intercept the CGU.

Materials encountered in borings drilled in the LSPs indicate that some lime sludge is mixed with sediment that washed into basins. Borings through the berms indicate 8 to 18 feet of clay underlain by silt or sand. Additional clay material was added to the berms surrounding the southern basin, and this material is believed to have been derived from areas directly west of the LSPs; however, the origin of the material is unknown.

2.1.3 Perched Water Zone

The perched water zone below the LSP consists of a CGU that is 5 to 15 feet thick. Water level measurements indicate the hydraulic head increases to the northeast, implying the flow in the perched water zone is to the southwest. Hydraulic conductivity measurements in the silt and sand lenses located approximately 500 feet east of the LSP indicate horizontal water flow rates on the order of 4 feet per day.

Analytical results for perched water samples collected from monitoring wells placed around the LSP show levels of uranium that are slightly above the estimated background uranium concentration of 1.4 mg/L (Section 2.3.5.3). The lime sludge is not believed to be a source of leachable uranium because uranium levels in the sludge are less than 10 μg/g and the high pH of the lime sludge stabilizes uranium and other metals in the solid phase. As the perched water below the LSP is downgradient from the FPA, values above background may indicate migration of contamination from perched water zones below facilities within the FPA.

2.2 IDENTIFICATION OF ASCOCS FOR EXCAVATION

The COCs for the LSPs represent a combination of constituents for which FRLs and WAC have been established, as identified in the OU2 ROD, Operable Unit 5 (OU5) ROD, and WAC Attainment Plan (Table 2-1). Technetium-99 and uranium are the only COCs in the LSPs and surrounding area for which the WAC and FRLs are exceeded, respectively. The lime sludge contains no contamination that exceeds established FRL and WAC, as shown by the data summary tables in Appendix D of the Remedial Investigation (RI) Report for OU2.

2.3 SUMMARY OF THE RI/FS AND OTHER INVESTIGATIONS

Sampling investigations of the contamination in the LSPs include the CIS boring program, remedial investigation/feasibility study (RI/FS), and a Resource Conservation and Recovery Act (RCRA) Facility Assessment. Although none of these investigations were performed specifically to support remedial design, they provide relevant analytical data to evaluate the remedial design of the LSPs with respect to FRLs, WAC, and RCRA compliance.

The existing studies and data for lime sludge, soil, and surface water in the ponds, berms, and surrounding area are summarized as follows. More detailed information is provided in Sections 2.0 and 4.0 of the OU2 RI, as well as the data summary tables in Appendix D of that document.

Results for soil and sludge samples were evaluated against FRLs identified in the OU2 and OU5 RODs, applicable WAC, or background levels. Where FRLs for a constituent differed between the OU2 and OU5 RODs, the lower level was used. For example, since the WAC value for technetium-99 (29.1 pCi/g) is lower than its FRL (30 pCi/g), the WAC value will govern the remediation of technetium-99.

Perched groundwater results were compared to background levels for radionuclides and metals, as reported in the OU5 "Characterization of Background Water Quality for Streams and Groundwater" report (DOE 1994).

Sediment was not sampled during previous investigations because the ponds are self-contained and sediment generated within the LSPs stays within the LSPs. However, some sediment has collected in the bottom of the concrete-lined K-65 trench. Since this trench will not be removed during the excavation of the LSPs, no plans exist to sample the sediment in the K-65 trench during this project.

All impacted material above FRLs is expected to be removed during the excavation phase of the project. However, the LSPs will not be precertified or certified until the WMF is no longer needed, probably as part of Remediation Area 6 (Waste Pits) or Area 7 (Silos). Since the area will be certified at a later date and sufficient data exist to characterize material in the LSPs for WAC attainment, no additional sampling and analysis is planned for this project.

2.3.1 Characterization Investigation Study (CIS) Boring Program

The CIS boring program was initiated in 1989 to investigate the nature and extent of contamination associated with inactive waste storage facilities. Three borings were drilled in each pond, and ten surface samples were taken in the soil surrounding the LSPs (Figure 2-1).

Analytical results for the CIS samples show no above-FRL contamination, with the exception of two surface soil samples collected south of the K-65 trench (23-013 and 46-526 on Figure 2-1). These samples revealed technetium-99 levels of 91 pCi/g (Table D-4 of the OU2 RI) and 37 pCi/g, respectively. Both values exceed the OSDF WAC for technetium-99 of 29.1 pCi/g.

Figure 2-7 in the OU2 RI incorrectly locates CIS samples 23-012 and 23-013; these samples lie on either side of the K-65 trench, as shown correctly on Figure 2-1. The correct location of these samples is critical to the interpretation of contamination within the LSP area, as it shows that the technetium-99 contamination is restricted to soil south of the K-65 trench and eliminates the requirement for sampling and analysis to confirm the presence of technetium-99 on the LSP berms. Because the technetium-99

results from the CIS program were disputed when the data were reported, these values are in question, but they will not affect the design or excavation since they lie south of the K-65 trench.

Chlordane was detected at 1.2 μg/g in Sample 47-013, from Boring 47-03 in the North LSP. This value is above the OU5 FRL of 0.19 μg/g, but below the WAC of 2.89 μg/g. This was the only sample in any of the LSP investigations in which chlordane was detected. Data collected during the RCRA Facility Assessment and RI/FS sampling show TCLP results for chlordane that are below detection, and these results supersede the CIS data.

2.3.2 Phase I RI Sampling

Phase I RI sampling of the LSPs took place in 1991. Two borings were drilled (one in each pond) and seven monitoring wells were installed to collect lime sludge, soil, and perched groundwater samples. Figure 2-2 shows the location of the borings and three monitoring wells within the LSP area, the remaining four wells lie just east of the area depicted on the figure. Analytical results on the Phase I RI/FS samples revealed no above-WAC or above-FRL contamination. In-place density was measured at four geotechnical sample locations, two in each pond. Geotechnical information from these and other geotechnical sampling events is summarized in the OU2 RI.

2.3.3 RCRA Facility Assessment

The LSPs were identified as RCRA Subtitle C Hazardous Waste Management Units (HWMUs) in the FEMP RCRA permit application of June 1991. This classification was based on the belief that 1,1,1-trichloroethane (TCA) was released to the north LSP in the early 1980s, and an elevated chlordane level in one CIS sample (47-013). A RCRA Facility Assessment of the north LSP was performed in March 1992 to determine if the LSPs could be downgraded to Solid Waste Management Units. Samples were collected from various depths in the lime sludge and analyzed for Total Analyte List (TAL) constituents per the TCLP protocol (Figure 2-3). Analytical results indicated all RCRA constituents were below hazardous levels and the north LSP was downgraded from a HWMU to a solid waste management unit. Chlordane and TCA were not detected in the north LSP during the RCRA Facility Assessment. Therefore, RCRA contamination is not an issue in the LSP area.

2.3.4 Phase II RI Sampling

Phase II RI sampling, the most comprehensive investigation of the LSPs, was performed in 1993. Samples were collected to evaluate contamination in surface soil/sludge, subsurface soil/sludge, surface water, and perched groundwater. Geotechnical samples were also collected to evaluate the physical properties of the sludge and soil. Figure 2-4 summarizes the sample locations for Phase II RI sampling.

Surface samples were collected and analyzed for all constituents on the Hazardous Substances List (HSL), radiological COCs, PCBs, and total uranium. Six near-surface samples were analyzed for total uranium only. Subsurface soil/sludge samples were collected from the boring locations noted on Figure 2-4, and these samples were analyzed for all constituents on the HSL and radiological COCs. Four soil samples were collected from a trench dug on the south side of the K-65 trench to evaluate the impact of the K-65 slurry line on contamination in the area. At the two trench sampling locations (Figure 2-4), samples were collected and analyzed for all constituents on the HSL, radiological COCs, and total uranium.

Surface-water samples were collected and analyzed for all constituents on the HSL, radiological COCs, total uranium, and general chemistry parameters. Perched groundwater samples were collected from wells installed during Phase II (Figure 2-4) and Phase I. However, several wells installed during the Phase I investigation were dry and were not sampled.

Twenty-seven geotechnical samples were taken from four sample locations, monitoring wells, and soil borings. Data collected on the geotechnical samples included specific gravity, water content, liquid limit, plastic limit, sieve analysis, hydrometer analysis, consolidated isotropic undrained triaxial, direct shear, and dry unit weight. Appendix D-17B in the OU2 RI summarizes the geotechnical information.

Analytical results for this sampling effort show levels of contamination below FRLs for most COCs, with the exception of six samples (plus one sample which exceeded the ALARA level of 50 μg/kg total uranium). Sample LSP-SS-01, collected from trench location LSP-TR-01 (Figure 2-4), contained a total uranium concentration of 51.6 μg/g. Surface samples LSP-SS-13 and LSP-SS-14 were collected along the road lying north of the LSPs, and results show total uranium concentrations of 175 μg/g and

244 μg/g, respectively. Four samples, LSP-SS-07, LSP-SS-12, LSP-SS-13, and LSP-SS-14, have beryllium concentrations that exceed its FRL of 1.5 μg/g. The highest beryllium level detected was 2 μg/g in LSP-SS-14. LSP-SS-13 also exceeds the FRL for Aroclor 1254.

All samples exceeding FRLs are surface samples. With the exception of sample locations LSP-TR-01, LSP-SS-13, and LSP-SS-14, all surface material at the indicated locations will be removed and placed into the OSDF during LSP excavation. Sample location LSP-TR-01 lies south of the K-65 trench, and this area will be remediated as part of Area 7 at a later date. Surface samples LSP-SS-13 and LSP-SS-14 were collected along the road north of the LSP, and this area is also scheduled for remediation at a later date. Therefore, all FRL contamination within the LSP area of interest will be excavated and placed in the OSDF, and no further sampling is planned for this project. The excavation surface of the LSPs and surrounding areas will be certified at a later time, after remediation of adjacent areas.

Surface water runoff from the K-65 trench is not a concern to the LSP excavation, as the runoff is contained in the concrete trench and directed to a sump at the west termination point of the trench. The runoff from the road and area north of the LSPs is physically separated from the LSPs by a drainage ditch. Therefore, water-borne contaminants originating from the K-65 trench or road north of the LSPs have no pathway into the LSPs.

2.3.5 Media Summary

Each investigation examined different media within and around the LSPs, but all environmental media (i.e., soil, lime sludge, groundwater, and surface water) were sampled at some point. The following sections present the general conclusions for the media sampled. Table 2-2 presents the COC concentrations detected above background in the perched groundwater below the LSPs. Table 2-3 presents the FRL and WAC exceedances detected in the LSP area.

2.3.5.1 Soil

Analysis of soil samples taken from the LSPs area shows that several results are above background in this area, but only a few are above FRLs. The samples that exceed FRLs for total uranium, beryllium, and Aroclor 1254 do not exceed the OSDF WAC. Therefore, no further sampling and analysis will be done to delineate the excavation volume for remediation of the LSPs.

Based on technetium-99 results reported in the CIS, above-WAC soil may exist south of the K-65 trench. However, the extent of above-WAC soil will not be delineated at this time, as the area south of the K-65 trench will be remediated at a later date. All excavation associated with the LSP remediation will be north of the K-65 trench.

2.3.5.2 Lime Sludge

The LSPs received sludge from three different water treatment streams. Coal pile runoff (after settling), boiler plant blowdown, and water softening. All water went to Tanks 6 and 7 of the General Sump, where it was treated with lime and the sludge was partially dewatered and thickened with polymers. Therefore, most of the solids in the LSPs are lime sludge, which is predominantly calcium and magnesium hydroxides. None of the data from the sludge or the wells surrounding the ponds indicate above-FRL or above-WAC levels of VOCs, metals, or radionuclides. Results from the RCRA Facility Assessment showed that no RCRA constituents are present in the lime sludge.

2.3.5.3 Perched Groundwater

Perched groundwater wells were sampled during Phase I and II RI/FS sampling. Metals (specifically lead and chromium) and radionuclides (total uranium, radium-226, total thorium) were detected above background in some samples (Table 2-2).

Potential contaminant migration through perched groundwater below the Plant 2/3 area into perched water below the LSPs was evaluated, but perched groundwater data indicate that radionuclide levels are not far above background (Table 2-2). Conductivity measurements in the perched groundwater lenses beneath Plant 2/3 indicate it would require approximately three to five years for water to migrate under

the LSPs from Plant 2/3. Since significant contamination is not present under the LSP, contaminated perched water below Plant 2/3 is either migrating south of the LSPs or COCs in the water are attenuated by the glacial overburden.

2.4 ADDITIONAL SAMPLING/MEASUREMENTS

During excavation of the LSPs, real-time scanning with a High Purity Germanium (HPGe) detector will be performed after each excavation lift of soil material (i.e., berms). The material appears to be homogeneous, so no real-time scanning will be performed on the lime sludge unless warranteed by visual observations. Real-time data will be collected to confirm that excavated soil meets the WAC for uranium.

2.5 GENERAL CONCLUSIONS

In general, for all media and locations, the level of contamination in the LSP area is low. Though samples are above background for several constituents in the soil and groundwater, only the samples identified in Table 2-3 were above established FRLs or WAC for the LSP area.

The hydraulic conditions in perched water below this area indicate that migration of constituents in perched groundwater might occur, but only low levels of contamination have been detected so far. This indicates that COC migration from the Plant 2/3 area is further south or COCs are attenuated by glacial overburden. For these reasons, migration of COCs into the LSP excavation will not be a concern during remediation.

2.6 ANTICIPATED EXCAVATION BOUNDARIES

The excavation boundaries for the LSPs are based on 1952 design drawings. Complete excavation will involve removing the lime sludge, the berms built around the LSPs, and the center berm between the ponds so that one basin can be constructed to manage runoff from the FPA during activities in Remediation Areas 3A, 3B, 4A, and 4B. The depth of the lime sludge has been confirmed by CIS and RI/FS borings, but the extent of excavation may be modified based on actual field conditions.

TABLE 2-1
SUMMARY OF CONSTITUENTS PERTINENT TO LSP EXCAVATION

Constituent	Waste Acceptance Criteria for Soil and Sediment in the On-Site Disposal Facility [a]	FRLs Selected for use in LSPs[c]
Radionuclides		
Radium-226	---	1.70E+00 pCi/g
Radium-228	---	1.80E+00 pCi/g
Technetium-99	29.1 pCi/g	---
Thorium-228	---	1.70E+00 pCi/g
Thorium-230	---	2.80E+02 pCi/g
Thorium-232	---	1.50E+00 pCi/g
Uranium, total	1030 μg/g	82 μg/g
Organics		
Aroclor 1254	---	.13 μg/g

Notes: [a] From Waste Acceptance Criteria Attainment Plan for the On-Site Disposal Facility (DOE 1998_)
[b] From Operable Unit 2 and Operable Unit 5 RODs (DOE 1995a)
[c] From the Sitewide Excavation Plan (DOE 1998_)
ND = Not Detected

TABLE 2-2
PERCHED GROUNDWATER DETECTIONS ABOVE BACKGROUND

Well ID	Constituent	Result	Background - 95% Quantile
1039	Cadmium	10 μg/L (2/5/89)	6 μg/L
	Chromium	35 μg/L (2/5/89)	34 μg/L
	Mercury	0.4 μg/L (2/5/89)	0.3 μg/L
	Uranium, total	1.8 μg/L (11/20/88)	1.4 μg/L
1041	Chromium	162 μg/L (3/4/91)	39 μg/L
	Lead	46 μg/L (3/4/91)	9 μg/L
	Lead	11 μg/L (12/28/93)	9 μg/L
	Radium-226	3.8 pCi/L (6/28/90)	0.9 pCi/L
	Radium-226	1.4 pCi/L (12/28/93)	0.9 pCi/L
	Radium-228	2.4 pCi/L (3/4/91)	2.2 pCi/L
	Radium-228	4.2 pCi/L (12/28/93)	2.2 pCi/L
	Thorium, total	6.8 μg/L (5/5/93)	3.1 μg/L
	Uranium, total	1.7 - 34 μg/L	1.4 μg/L
1042	Radium-226	2.3 pCi/L (6/26/90)	0.9 pCi/L
	Radium-228	3.4 pCi/L (8/9/88)	2.2 pCi/L
	Uranium, total	6 - 40 μg/L	1.4 μg/L
1134	Uranium, total	21 - 36 μg/L	1.4 μg/L
1210	Uranium, total	7 - 55 μg/L	1.4 μg/L
1934	Barium	807 μg/L (12/29/93)	451 μg/L
	Chromium	64 μg/L (5/13/93)	34 μg/L
	Chromium	155 μg/L (12/29/93)	34 μg/L
	Lead	51 μg/L (5/13/93)	9 μg/L
	Lead	43 μg/L (12/29/93)	9 μg/L
	Radium-226	1.4 pCi/L (5/13/93)	0.9 pCi/L
	Radium-228	19 pCi/L (12/29/93)	2.2 pCi/L
1934	Thorium, total	24 μg/L (5/13/93)	3.1 μg/L
	Uranium, total	5 - 18 μg/L	1.4 μg/L

TABLE 2-2
(continued)

Well ID	Constituent	Result	Background - 95% Quantile
1937	Lead	15 μg/L (6/1/93)	9 μg/L
	Thorium, total	17.4 μg/L (6/1/93)	3.1 μg/L
	Uranium, total	5.2-6.5 μg/L	1.4 μg/L
1940	Lead	17 μg/L (6/11/93)	9 μg/L
	Radium-226	1.2 pCi/L (6/11/93)	0.9 pCi/L
	Radium-228	3.6 pCi/L (6/11/93)	2.2 pCi/L
	Thorium, total	6.9 μg/L (6/11/93)	3.1 μg/L
	Uranium, total	6.3-7.6 μg/L	1.4 μg/L

TABLE 2-3
ANALYTICAL RESULTS FOR SOIL COMPARED TO FRLS/WAC

Sample Location	Constituent	Result	FRL	WAC
Radionuclides				
23-013	Technetium-99	91 pCi/g	—	29.1 pCi/g
46-526	Technetium-99	37 pCi/g	—	29.1 pCi/g
LSP-SS-13	Uranium, total	175 μg/g	82 μg/g	1030 μg/g
LSP-SS-14	Uranium, total	244 μg/g	82 μg/g	1030 μg/g
PCBs/Pesticides				
47-013 (Boring 47-03)	Chlordane	1.2 μg/g	.19 μg/g	2.89 μg/g
LSP-SS-13	Aroclor 1254	0.59 μg/g	0.13 μg/g	---
Metals				
LSP-SS-07	Beryllium	1.6 μg/g	1.5 μg/g	---
LSP-SS-12	Beryllium	1.7 μg/g	1.5 μg/g	---
LSP-SS-13	Beryllium	1.8 μg/g	1.5 μg/g	---

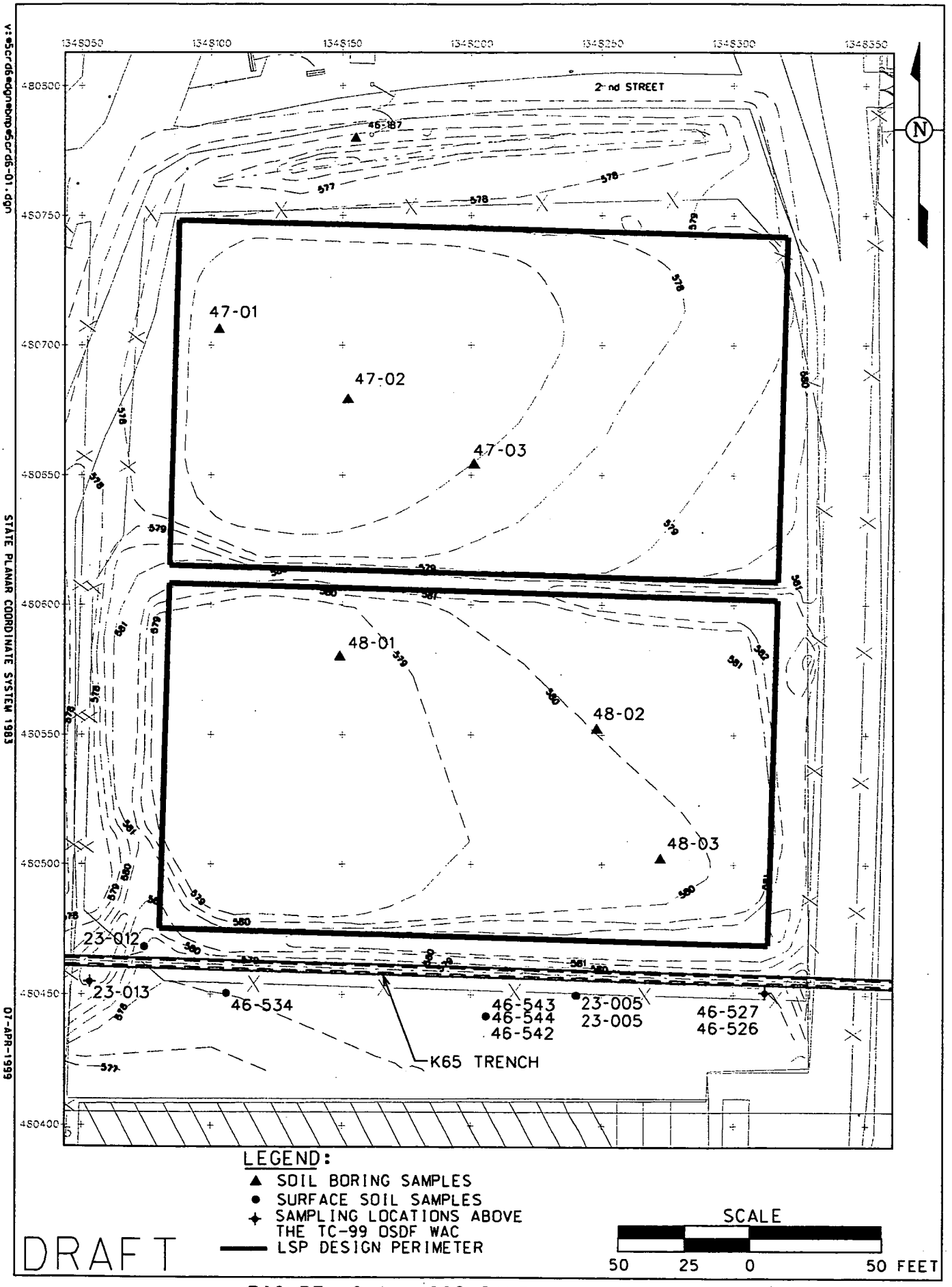

FIGURE 2-1. CIS SAMPLING LOCATIONS

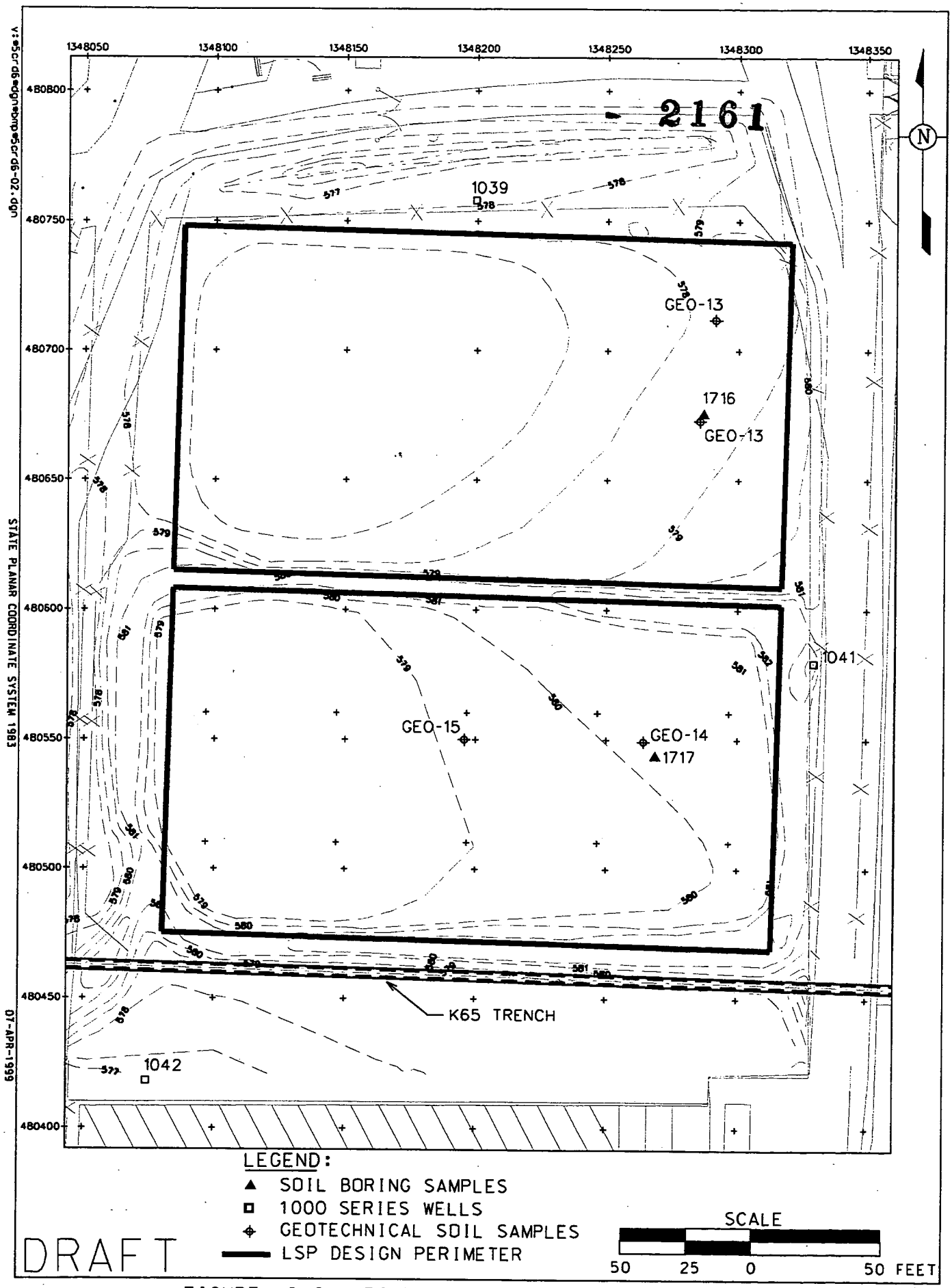

FIGURE 2-2. RI/FS PHASE I SAMPLING LOCATIONS

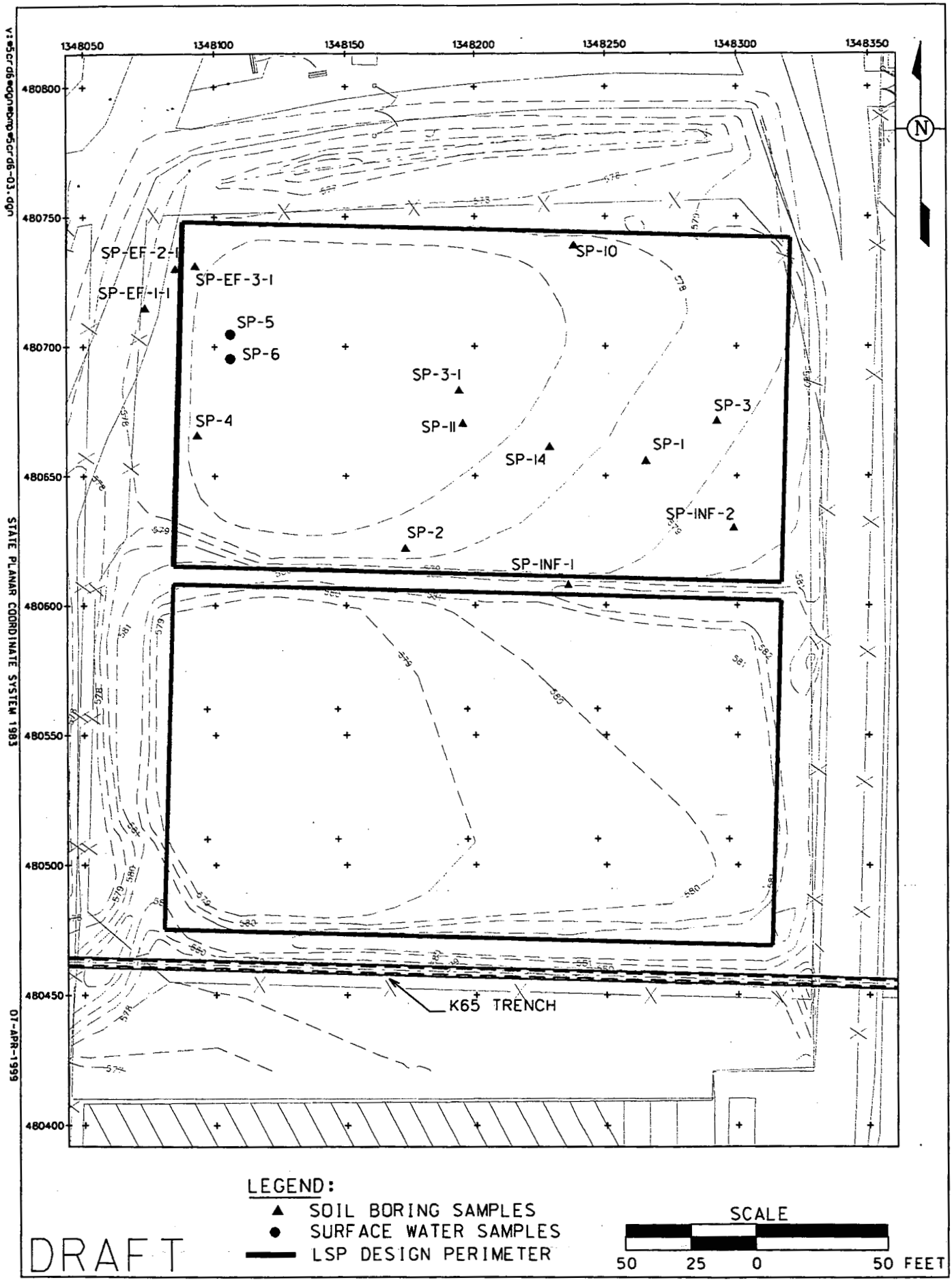

FIGURE 2-3. RCRA FACILITY ASSESSMENT SAMPLING LOCATIONS

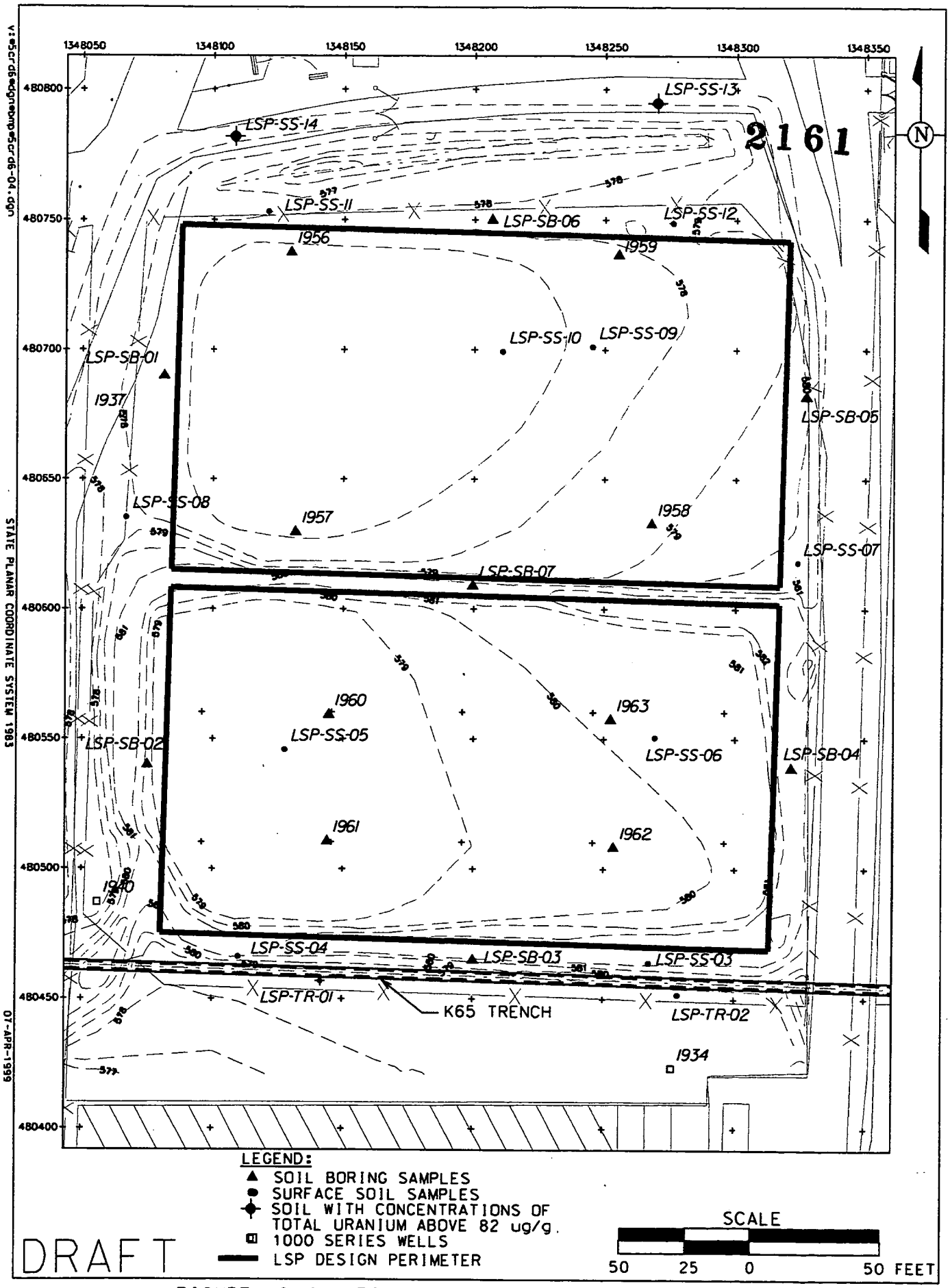

FIGURE 2-4. RI/FS PHASE II SAMPLING LOCATIONS

3.0 REMEDIAL ACTION APPROACH

This section presents the approach that will be used for remedial action (RA) activities at the LSPs. Major phases of RA activities will consist of 1) excavation, and 2) conversion to a WMF. The general excavation approach is in accordance with "Excavation Approach B - Excavation in Waste Storage/Management Areas Outside the Former Production Area," described in Section 4.2 of the SEP (DOE 1998a). Performance requirements for implementing this approach are presented on the construction drawings and technical specifications included as part of the IRDP. The construction drawings and technical specifications will become part of the contract documents, which will govern remediation activities performed by the construction contractor. Specific methods and procedures to perform the work will be detailed by the contractor in a Safe Work Plan. The Safe Work Plan will address the details to implement all aspects of the RA. The Safe Work Plan will be reviewed and approved by FDF before applicable RA activities are implemented.

As described in Section 6.0 of this IP, most of the RA work will be performed by a construction contractor. However, some advance work will be performed by the FEMP labor contractor (Wise). This advance work will involve installing some components of the water management system and excavating a trench to help dewater the lime sludge.

3.1 EXCAVATION

The RA excavation phase includes all activities associated with removing impacted material from the LSPs. This will include site preparation, excavation, loading, hauling, water management, and all other activities necessary to complete excavation prior to conversion of the LSPs to a WMF. All work will be performed in accordance with the construction drawings and technical specifications. Prior to contractor work in the LSPs and surrounding area, FDF will abandon all monitoring wells within the excavation boundaries. General guidelines for abandoning wells are included in the SEP; general details regarding abandoning these wells are provided in the Sitewide CERCLA Quality Assurance Project Plan (SCQ) (DOE 1998c).

3.1.1 Site Preparation

Site preparation activities consist of those tasks necessary to prepare the site for excavation. These activities will be performed by the FEMP labor contractor (Wise) and a construction contractor in accordance with the contract documents.

Site preparation includes:

- Establishing site boundaries and controls
- Surveying and site layout
- Establishing and identifying support facilities
- Clearing
- Tie-in of utility hookups
- Installation of water management system
- Construction of loading area
- Installation of erosion and sediment controls.

3.1.1.1 Establishing Site Boundaries and Controls

Initial preparation of the LSPs will include establishing the defined construction area in the field, using construction fencing and appropriate signs at the boundaries. A loading area will also be defined in the field.

3.1.1.2 Surveying and Site Layout

Project site survey control points (including baselines and temporary benchmarks) will be established in the field based on the coordinate system shown on the construction drawings. Excavation and cut limits will be staked in the field. In addition, support area, ditches, utility lines, loading area, and other surface features will be located and staked.

3.1.1.3 Establishing and Identifying Support Facilities

Facilities are needed to support excavation of the LSPs. The facilities include a radiological control point facility, field office, parking, clean laydown area, a controlled equipment parking area, a changeout area (if needed), and other contractor facilities. The existing radiological control point facility, located just north of the LSPs, will be used for this project. This facility consists of a trailer with a radiological personnel contamination monitor (PCM). During the excavation phase of the project, all personnel will enter and exit the work area through this facility. A portable storage and change area for PPE for chemical and radiological control will be provided as necessary. The field

office facility will consist of a trailer with office space for contractor personnel. The location of the clean laydown area, field office facility, and controlled equipment parking area are shown on the construction drawings.

3.1.1.4 Clearing

All areas to be disturbed during excavation of the LSPs will be cleared prior to excavation. Clearing will consist of cutting the trees and brush in the area, scanning the stumps and trees, and then chipping the material and hauling to a non-impacted wood chip stockpile. If segregation is not possible, the chips will be mixed with the lime sludge and other impacted material for transport and disposal in the OSDF. Any stumps will be ground in place or size reduced and excavated with the lime sludge and other impacted material for transport and disposal in the OSDF.

3.1.1.5 Tie-In of Utility Hookups

Existing electric and phone service will be extended to the support facilities associated with remediation of the LSPs. This power will be extended from the surrounding area using existing power poles and overhead lines. The electrical service will provide power to the construction trailer and lift stations. Phone service will be provided to the new construction trailer.

3.1.1.6 Installation of Water Management System

A water-management system will be installed to control erosion and sedimentation and remove stormwater and groundwater accumulation in the excavation area. However, in order to assist in dewatering the lime sludge, some components (such as connection to the FEMP storm drain system) will be installed by the FEMP labor contractor (Wise) as advance work up to one year prior to beginning excavation. Other components of the system will be constructed during site preparation and maintained throughout the excavation phase. The water management system components are detailed in the separate Water Management Plan (WMP).

Overall Approach

The objectives of the water-management system include the following:

- Prevent runoff from surrounding areas
- Control groundwater entering the excavation area
- Collect and control runoff from active excavation areas

The water-management system will consist of the following:

- Diversion ditches
- Existing FEMP facilities
- Excavation sumps
- Perimeter drain
- Lift stations and conveyance systems
- Other erosion and sediment control devices.

Diversion Ditches

Runoff from areas upgradient and adjacent to the LSPs (generally located north of the LSPs) will be collected and diverted around the LSPs. During remediation, this diversion will reduce the quantity of water requiring treatment. Following remediation, the diversion system will remain in place to prevent potential recontamination of the LSPs.

Existing FEMP Facilities

Integral components of the water management system for the LSPs include the SWRB and the AWWT facility, as well as the BioSurge Lagoon. During excavation, all runoff from the excavation area will be collected and conveyed to the SWRB via the existing FEMP storm drain system. Once the WMF is in operation, all water collected will be pumped to either the BioSurge Lagoon or the SWRB for treatment at the AWWT facility. An existing 6" diameter steel pipe in the K-65 trench will be used to transfer water from the converted LSPs to the BSL.

Excavation Sumps

As excavation is performed, active areas will be graded to drain to temporary collection sumps constructed by the contractor within the excavation. The contractor will install temporary excavation sumps in these collection points to convey the water to the FEMP storm water system.

Perimeter Drain

A perimeter drain will be installed to collect and manage perched groundwater when the converted LSPs are operated as a WMF. Some components of this perimeter drain may be installed during excavation.

Lift Stations and Conveyance Systems

Two lift stations will be installed in the WMF. Each lift station will consist of a manhole and pump. The primary lift station will pump water from the WMF to the BSL or the FEMP storm drain. A perimeter drain lift station will pump water from the perimeter drain to the existing FEMP storm drain system. Certain components of the WMF lift stations and conveyance systems may be installed during site preparation to control groundwater.

Other Erosion and Sediment Control Devices

Silt fencing will be installed at appropriate locations. Accumulated sediment from the silt fence, ditches and erosion control measures will be sampled and analyzed, as necessary, for attainment of OSDF radiological WAC prior to removal and dispositioned accordingly.

3.1.1.7 Construction of Loading Area

A loading area will be constructed on the west side of the LSPs to provide a loading area for the LSPs. It will connect the excavation to the SWU Haul Road.

3.1.1.8 Installation of Erosion and Sediment Control Devices

Erosion and sedimentation control is a component of the water management system described in the WMP and the previous paragraphs. These controls are further detailed in the construction drawings and technical specifications.

3.1.2 Excavation

Excavation will begin following site preparation activities and will include:

- Excavating lime sludge and other impacted materials within the LSPs
- Loading, hauling, and unloading lime sludge and impacted materials that meet WAC in the OSDF
- Loading, hauling, and unloading impacted material that does not meet the OSDF WAC to temporary staging locations (i.e., SP-7 or the Special Materials Transfer Area) prior to offsite treatment and/or disposal.

Impacted material consists of lime sludge, material contaminated with lime sludge, material used to construct the LSPs (including the berms), and material with contaminant levels above the FRLs. In

addition, sediment collected in ditches and in other erosion control devices will be considered impacted. Non-impacted material consists of natural soil exhibiting COC levels below the FRLs.

Approximately 30,000 cubic yards of impacted material will be excavated from the LSPs. The excavation design limit was developed based on the original design of the lime sludge pond facility and boring data. The LSPs were originally designed to contain approximately 8.5 feet of lime sludge. Borings in the area have determined the actual depth of sludge material is approximately 12 feet in the south pond and up to 8.5 feet in the north pond. Both basins appear to have been built to the original design depth. The south basin capacity was increased by raising the height of the perimeter berm. Therefore, the original design bottom was used to develop the excavation limits. The grading was modified slightly to ensure removal of all lime sludge and to provide an acceptable footprint for the conversion of the LSPs to the WMF. This excavation design depth is shown on the construction drawings and is the minimum excavation depth that will be achieved. Excavation control monitoring and subsequent certification sampling and analysis will determine the final excavation depth, which may exceed the design depth.

This section addresses the following aspects of excavation:

- General excavation approach
- Groundwater control
- Excavation control monitoring
- Loading and hauling of impacted material
- Miscellaneous excavation requirements
- Real-time scanning.

3.1.2.1 General Excavation Approach

Excavation in the LSPs will consist primarily of lime sludge and soil. Excavation of this material will be in accordance with the requirements contained in the project-specific technical specifications and shown on the construction drawings. As described earlier, some advance construction work will be performed to help dewater the lime sludge prior to excavation. This work will involve installing pipe and grading, which should reduce the water content in the material and make it easier to place in the OSDF. Because most of the excavated material will be placed in the OSDF, the OSDF IMPP is included as part of the contract documents. Specific construction methods and procedures to achieve these requirements will be detailed in the contractor's Safe Work Plan.

During excavation, it is possible that unexpected conditions will be encountered that are not addressed through standard excavation specifications and guidelines. The combination of specifications and contractor Safe Work Plans establish contingency plans to be implemented in such cases, including moving excavation activities to another area to allow evaluation of the unexpected condition. This approach will minimize and/or prevent work stoppages/slowdowns and keep the excavation process moving forward.

Excavation activities include the following:

- Excavation of lime sludge and impacted material: The excavation of lime sludge and impacted material will take place so that visual and radiological survey monitoring will be performed continuously. The contractor will be required to excavate in a manner that assures the face of the excavation is visible and not obstructed. The combination of visual and radiological survey monitoring will ensure that special materials and above-WAC contamination are identified, if present, by FDF and contractor personnel.

- Blending lime sludge and soil: During excavation, the contractor will blend the lime sludge with soil as necessary and practical to reduce moisture content and improve the placement aspects of the material.

- Excavation of debris: Debris, such as pipe, reinforced concrete and structural steel, is not anticipated to be encountered within the LSPs. If debris is encountered that exceeds the OSDF physical WAC, it will be excavated, processed to comply with physical sizing criteria discussed in the OSDF IMPP (DOE 1996a), and subsequently hauled to the OSDF for disposal. Processing of debris will occur with appropriate controls, and will be based on the processing method and area/material conditions. Debris that meets the OSDF physical WAC will be excavated with the surrounding lime sludge and impacted material and dispositioned to the OSDF.

- Excavation of special materials: Special materials, as defined in the SEP, are not anticipated in the LSPs. If, however, these materials are encountered, excavation will stop while the radiological levels are determined by FDF Radiological Control Technicians (RCTs) for occupational health and safety considerations. Special material that cannot be handled by the contractor due to health and safety concerns will be handled completely by FDF. Under normal circumstances, these special materials will be identified, excavated, handled, and documented in accordance with the guidelines provided in Appendix F of the SEP and the requirements of the technical specifications. The contractor will prepare procedures for special material handling and include these as part of the Safe Work Plan. Special materials will be placed in a safe configuration (i.e., container, plastic, etc.), as required, and temporarily staged in a Special Materials Transfer Area (as shown on the construction drawings) for later disposition by FDF Waste Management. FDF Waste Acceptance Operations (WAO) will provide a field representative to observe all excavation activities. This representative's primary

function will be to assist with the identification and handling of special materials, as well as documentation of the disposition of lime sludge and impacted materials.

- Excavation of above-WAC material: No above-WAC material has been detected in the LSPs during pre-design investigations. However, contingency plans will be developed and presented in the design documents for implementation if above-WAC material is encountered during excavation.

3.1.2.2 Groundwater Control

Groundwater will be managed by the contractor during excavation. This will include installing and utilizing some components of the WMF during excavation. Some sections of the perimeter drain system may be installed as excavation is completed. This system will collect groundwater from the CGU underlying the LSPs.

3.1.2.3 Excavation Control Monitoring

Excavation control monitoring will be performed throughout excavation in accordance with an excavation monitoring Project Specific Plan (PSP) that will be written and approved before excavation begins. Visual monitoring will be performed continuously. Since RI/FS data indicate there are no organic COCs in the LSPs that affect design or excavation, or that exceed the OSDF WAC, only organic monitoring associated with health and safety requirements will be performed.

A full time Health and Safety Representative and a Radiological Technician, both FDF representatives, will be in the field to monitor for occupational exposure to the workers. These professionals will monitor the excavation work area as necessary and appropriate, including photo-ionization detectors (PIDs) and radiological friskers. The information obtained by these personnel will be used to make decisions regarding personal protective equipment (PPE) and other worker related issues. Waste Management and WAO personnel will also use the information to determine if additional monitoring and/or sampling is necessary to characterize the material for disposal purposes.

All excavations will be subject to continuous visual observation by both the contractor and FDF personnel for change in media and the presence of special materials. Contractor personnel will receive field instruction and assistance in identifying special materials.

After excavation to the limits shown on the construction drawings, the excavation floor will be scanned for gamma-emitting radionuclides. Based on this scan, additional excavation may be performed to remove the additional contamination. After excavation is complete, the LSPs will be ready for conversion to a WMF.

3.1.2.4 Loading and Hauling of Impacted Material

Lime sludge and other impacted material excavated from the LSPs will be loaded in the designated loading area. Material will be hauled to the OSDF for disposition, unless visual and radiological monitoring indicate above-WAC and/or special materials (not anticipated). If above-WAC material are identified, they will be hauled to SP-7 or placed in the Special Materials Transfer Area. The majority of this movement will use the SWU Haul Road. To minimize the amount of material tracked onto the SWU Haul Road, the loading area will be considered a buffer zone. This loading area will be maintained with no dirt or debris on the surface, which will allow haul vehicles to access the SWU Haul Road without going through an equipment wash facility at the LSPs. Visual monitoring will be performed within the buffer zone while the haul vehicles are being loaded to ensure that contaminated material does not spill over onto the sides of the haul equipment. Haul vehicles will have to access an equipment wash facility after leaving the OSDF prior to reentering the SWU Haul Road. Special materials and above-WAC material will be dispositioned by FDF Waste Management.

3.1.2.5 Miscellaneous Excavation Requirements

Appropriate measures will be implemented to control the generation of dust. These measures include temporary seeding or application of a crusting agent in areas to be left idle for more than 45 days, and the use of water, dust suppressants, crusting agents, and other measures to control dust during actual excavation activities.

All interim and final movements of lime sludge and impacted materials will be documented as required by the construction drawings and technical specifications. This data will be incorporated into the Integrated Information Management System (IIMS).

3.1.2.6 Real-Time Scanning

After excavation to the design grade, a real-time scan will be performed on the bottom of the excavation. Real-time instruments (RTRAK, RSS and/or HPGe) will measure the gamma activity of

uranium, thorium, radium and their progeny in the surface soil. The equipment will be selected and used based on actual field conditions, as described in the User Guidelines, Measurement Strategies, and Operational Factors for Deployment of In Situ Gamma Spectrometry at the Fernald Site (DOE 1998d). The results will be used to identify the areas that may require additional excavation.

Based on this scanning, supplemental excavation will be performed if necessary. Supplemental excavation will be performed as directed by the construction manager. The excavation will be converted to the WMF to support excavation activities in the FPA.

3.2 CONVERSION OF LSPs TO WATER MANAGEMENT FACILITY

Following the excavation of lime sludge/other impacted material from the LSPs, they will be converted to a WMF to support future FPA excavation activities. This WMF will provide additional capacity for stormwater and perched groundwater collected within the FPA. The WMF will allow for storage of an additional four million gallons of water above the site's current capacity. Water collected in the WMF will be directed to the SWRB or the BSL, depending on the need for Phase I or Phase II treatment. The conversion and operation of the WMF is detailed in the WMP.

WMF construction will require installation of a liner system, perimeter drain, and outlet works. The final conversion phase will include completion of systems started during the excavation phase (i.e., perimeter drain).

3.2.1 Liner System

A liner system will be installed to prevent contamination of the underlying material from the water that will be pumped into the WMF. The liner will be a geomembrane material. The evaluation used to determine the type of material for the basin is discussed in the WMP.

000043

3.2.2 Perimeter Drain

Because the geomembrane liner will be installed over the CGU underlying the LSPs, a perimeter drain will be installed following LSP excavation. This will mitigate potential floating of the geomembrane liner by collecting and removing groundwater from underneath the liner. Water that is collected in this perimeter drain system will gravity flow into a sump and lift station. A pump in the lift station will then discharge water into the primary WMF lift station for handling and discharge.

3.2.3 WMF Outlet Works

The WMF basin will have a primary lift station in the southeast corner to pump water to either the SWRB or the BSL, depending on the need for Phase I or Phase II (VOC) treatment of the water. This lift station will tie into an existing segment of 6" metal pipe in the K-65 trench to convey flows to the BSL (Phase II treatment). A new pipe will convey flows from the primary lift station to the FEMP storm drain system. A perimeter drain lift station will be installed to convey flows to the existing FEMP storm drain system.

3.2.4 Operation of Water Management Facility

After the LSPs have been converted to a WMF, the basin and associated operating equipment (pumps, valves, etc.) will be turned over to FDF for operation and maintenance. FDF will be responsible for the operation of the facility throughout its use, which is expected to support the FPA excavation. The WMF will only be in operation during the construction season, not during the winter months. Operation and maintenance will include cleanout of the basin if sediments accumulate to a sufficient depth, directing flow from the basin to either the SWRB or the BSL (depending on what treatment of the water is necessary), checking and maintaining the lift station pumps, and maintaining all the equipment associated with the transfer system of the WMF. The FPA contractor will perform the cleanout of the basin when necessary. Details on the inspection, operation and maintenance requirements for the WMF are provided in the WMP.

3.3 FINAL REMEDIATION

Final remediation and certification of the LSPs will occur after the WMF is no longer needed to support remediation of the FPA.

3.3.1 Removal of Water Management Facility

Once the excavations supported by the WMF are complete (i.e., the remediation of the FPA), the liner, the perimeter drain system, and other associated structures will be dismantled and removed so that certification and final remediation of the footprint can occur. The pipes, pumps, and liner system from the basin itself as well as the perimeter drain system will be removed and dispositioned accordingly, depending on the supporting data and final condition of the material.

3.3.2 Precertification and Certification

Precertification will be performed when the components of the WMF are removed. These precertification results will be used to finalize the certification units (CUs) and prepare the CDL. Certification will be performed in accordance with the CDL as described in the SEP to verify that residual soil constituents are below FRLs. Based on certification results, supplemental excavation may be performed in areas where residual constituents fail certification criteria. Additional certification will be performed in areas where supplemental excavation is performed. Certification sampling and analysis and supplemental excavation will continue until certification results indicate that the soil surface conditions satisfy certification and hot spot criteria.

3.3.3 Restoration

Following certification, the LSPs will undergo final restoration in accordance with a separate natural resources restoration design package, which will be developed and submitted under a separate contract. This design will take into account final land use selected for the area, and may involve more than one remediation area. The overall plan and schedule depends upon federal funding and regulatory approval.

4.0 PROJECT-SPECIFIC ENVIRONMENTAL CONTROLS AND MONITORING

This section defines the project-specific environmental controls and monitoring that will be performed as part of remediation of the LSPs, how the resulting information will be used by the project organization, and how it will be integrated with sitewide monitoring and reporting requirements. Control mechanisms and monitoring/inspection requirements are provided for, and identified potential impacts to, natural resources, as well as environmental impacts through the air, surface water and groundwater pathways.

The IEMP provides a summary report and a cumulative feedback function for the project-specific monitoring conducted by the individual remediation projects. This link will assist with interpretation of project-specific results from a sitewide perspective. However, routine "process-adjustment" decisions, which will be made by the SCEP to react and respond to project-specific operating conditions and process-control objectives, will not be reported as part of the IEMP reporting cycles. Rather, these types of routine decisions will be maintained as part of the project organization's daily operations log and are considered to be a normal course of day-to-day practice to achieve project-specific operating objectives. Figure 5-1 of the SEP summarizes the FEMP sitewide and project-specific environmental monitoring and control mechanisms.

4.1 NATURAL RESOURCE IMPACTS

Impacts to natural resources include those associated with threatened and endangered species, cultural resources, and wetlands/floodplains. The only natural resource impact associated with remediation of the LSPs will be excavation of a 0.225 acre wetland on the west side of the North LSP. This jurisdictional wetland was delineated during the 1993 FEMP wetland delineation and will be compensated through an on-site wetland mitigation strategy, as outlined in the NRRP, which is to be submitted separately.

4.2 AIR PATHWAY

This subsection presents the air pathway control and monitoring requirements for noise, fugitive emissions (visible dust), airborne radiological particulates and radon, and direct radiation during remediation activities. Air pathway monitoring activities, to the maximum extent possible, will make use of both the existing FEMP occupational air monitoring program and the sitewide environmental

monitoring program (described in Section 6.0 of the IEMP). The use of existing monitoring programs will help ensure that project-specific data are of comparable quality and are beneficial in evaluating and reporting project-specific air pathway releases under the various regulatory drivers associated with these monitoring programs.

4.2.1 Noise

Noise control and abatement during the remediation of the LSPs will include noise control devices (mufflers) on equipment and machinery, proper maintenance of equipment and machinery, and may also include rescheduling time periods in which heavy equipment is used in the field. Noise monitoring will be conducted by the contractor as necessry to implement project-specific health and safety requirements. Noise measurements will be made in the field by contractor health and safety personnel, using health and safety protocols for noise monitoring, to assess the following: whether administrative action levels are exceeded; the need for hearing protection; the need for maintenance of equipment and machinery; the need for additional noise control or abatement; and, compliance with OSHA and ACGIH occupational noise limits. Verification noise dosimetry/monitoring may be performed by FDF. Field managers will be responsible for documenting noise monitoring in the field in accordance with the record keeping guidelines as well as for initiating noise abatement measures.

4.2.2 Fugitive Dust Emissions

Administrative and engineering control techniques, in accordance with the "Fugitive Dust Control Requirements" (RM-0047) developed from the FEMP fugitive dust control "best available technology" (BAT) determination, will be implemented during excavation, hauling, and placement of soil to mitigate potential emissions of fugitive dust and airborne radiological particulates.

Water, commercially available dust suppression agents, or other appropriate methods and work practices will be used proactively to minimize dust generation from soil excavation, loading, and hauling.

The number or type of dust suppression equipment in operation will not preclude stopping work if there is visible dust or excessive visible dust. Visible dust indicates a need to increase the level of dust control effort, including possible alteration, slowdown, or temporary suspension of the work activities generating the visible dust. The work activity(ies) observed to be generating the visible dust will be

temporarily suspended if the visible dust exceeds the site-specific limit or Ohio standard [see "Fugitive Dust Control Requirements" (RM-0047)]. Dust controls will be increased and/or work practices will be modified to bring the fugitive emissions to a level below the limit/standard during dust-generating activities.

The contractor's "Dust Control Plan" will be reviewed against these criteria by FDF for adequacy. FDF approval of that plan is a prerequisite to authorization of earthmoving activities.

4.2.3 Airborne Radiological Particulates

All airborne radiological particulate emissions associated with remediation activities are anticipated to be from fugitive dust emissions. Control mechanisms for fugitive dust emissions are presented in the preceding subsection. No airborne radiological particulate control mechanisms beyond those provided by fugitive emission control are anticipated to be required or proposed for environmental or public safety concerns as a result of remediation activities.

Airborne radiological particulate emissions associated with remediation activities will be monitored via the sitewide airborne radiological particulate monitoring program presented in Section 6.0 of the IEMP. The monitoring network encompasses all the current and expected diffuse and point sources at the FEMP site. The data collected under the sitewide airborne radiological particulate monitoring program will be used to assess the collective effect of concurrent remediation activities at the FEMP site under various regulatory drivers described in Section 6.0 of the IEMP.

4.2.4 Radon

Emission of radon from soil being excavated under the remediation project is not anticipated to be an environmental or public safety concern. Any potential radon emissions associated with remediation activities in the LSPs will be monitored via the sitewide radon monitoring program presented in Section 6.0 of the IEMP. Hence, no project-specific radon control mechanisms are anticipated to be required as a result of remediation activities.

4.2.5 Direct Radiation

No project-specific direct radiation control mechanisms beyond those provided by fugitive emissions control are anticipated to be required for environmental or public safety concerns as a result of remediation activities.

Because of the area topography, very little run-on will flow into the LSPs from upgradient areas.

Environmental radiation levels associated with remediation activities will be monitored via the sitewide environmental direct radiation monitoring program presented in Section 6.0 of the IEMP.

4.3 SURFACE WATER PATHWAY

All surface water generated within the remediation area will be collected and controlled. During excavation, this water will be conveyed to the FEMP storm water drain system and then into the SWRB. During operation of the WMF, water will be conveyed to either the SWRB or to the BSL. In either case, the water will discharge through a National Pollutant Discharge Elimination System (NPDES)-permitted outfall, in accordance with the FEMP Storm Water Pollution Prevention Plan (SWPPP). The SWPPP identifies potential sources of pollution associated with construction and industrial activities that may affect storm water quality at the FEMP and describes the practices that will be employed to reduce pollutants within these types of discharges.

Construction activity inspections mandated by the SWPPP will be conducted in the LSPs' construction area. Weekly inspections will be conducted within all construction areas at the site and after any rain events totaling 0.5 inch or more within a 24-hour period. Construction activity inspections are documented and maintained as part of the NPDES and SWPPP files at the facility.

Because the objectives of the FEMP's storm water monitoring program are met through other means, no project-specific storm water monitoring program will be implemented for the LSP project.

4.4 GROUNDWATER PATHWAY

The Great Miami Aquifer is an extensive aquifer located, in part, beneath the entire FEMP (including the LSPs). Information on the Great Miami Aquifer in the vicinity of the LSPs is provided in the Operable Unit 2 RI.

There is no evidence that groundwater in the Great Miami Aquifer has been impacted by the LSPs. Ongoing monitoring, described in detail in Section 3.0 of the IEMP (DOE 1997c) confirms that this is the case. Perched water zones are known or reasonably expected to exist in the vicinity of the LSPs (see Section 2.1.3). Sitewide monitoring of groundwater will continue under the IEMP during remediation activities. The perched groundwater will actually flow to the excavation area and be removed by the perimeter drain. Therefore, the LSPs are not expected to adversely impact the perched groundwater.

5.0 PROJECT-SPECIFIC HEALTH AND SAFETY

All DOE and FDF employees, visitors, vendors, and contractors are required to abide by the provisions of FDF-prepared applicable Environmental Safety & Health Safety and Training Requirements Matrix (ESH & TRM), FDF Work Permits, and the FDF-approved Safe Work Plan prepared by the contractor. Managers and supervisors are responsible for ensuring that ESH & TRM requirements are met as set forth in the Safe Work Plan and FDF work permits. All personnel have stop-work authority for imminent safety hazards resulting from noncompliance with the applicable health and safety practices.

All contractor activities conducted in support of this project are governed by the safety requirements specified in the remediation contract, which addresses environmental, occupational, industrial, and construction health and safety. In addition to the contract requirements, ESH & TRM, and permits, the contractors will comply with all federal, state, and local requirements (e.g., OSHA, ACGIH). Health and safety requirements and procedures for this Implementation Plan are governed by the LSP ESH & TRM, FDF Work Permits, Safe Work Plan, and the overall strategy discussed in Section 6.0 of the SEP.

A project-specific occupational monitoring strategy will be developed by the FDF Safety and Health (S&H) department for the LSP project. The contractor will incorporate their occupational exposure monitoring requirements into their FDF-approved Safe Work Plans. These strategies will address the COCs for the LSP project area and will comply with all federal, state, and local requirements (e.g., OSHA, ACGIH).

In accordance with "Developing Project-Specific Health and Safety Requirements," FEMP-SH-0001, a ESH & TRM will be developed for LSP excavation, loading, hauling, and other construction activities. The applicable ESH & TRM will be included in the contract procurement packages and will provide the contractors with information related to the possible hazards and the safety requirements to execute each task. The contractor can develop their specific Safe Work Plans using this information. The ESH & TRM may be revised after reviewing the contractor's Safe Work Plans, as tasks and/or associated hazards and mitigators are identified, added, or deleted. Upon specific request by the regulatory agencies, the DOE will submit the ESH & TRM for informational purposes only. The ESH & TRM,

as well as the detailed Safe Work Plans, will be maintained at the project site, with controlled copies in the project document control files. The ESH & TRM will be maintained as part of the contract and will be located in the project document control files.

FDF will provide all radiological occupational monitoring for the contractor. FDF radiological control technicians will provide the necessary support for LSP activities. The contractual radiological control requirements for the performance of LSP work will be documented in FDF job-specific radiological work permits (RWPs). Personnel performing work that requires an RWP will be briefed on the specific hazards and requirements for the task prior to commencing work. FDF radiological control personnel will evaluate the data obtained from the monitoring to determine the effectiveness of the radiological controls and relay this information to the contractor.

6.0 REMEDIAL ACTION MANAGEMENT STRATEGY

This section describes the strategy for managing the remedial action at the LSPs, specifically the organizational structure, configuration management, remedial action approach, remedial action management, contingency management, integration of project activities with other FEMP activities, and the remediation schedule.

6.1 ORGANIZATIONAL STRUCTURE

The governing document for CERCLA response actions at the FEMP is the ACA (EPA 1991) between DOE and Region V of the EPA. As such, ultimate project management responsibility lies with those two entities. The DOE is the lead agency responsible for CERCLA activities at the FEMP. The DOE Fernald Area Office (DOE-FEMP) is the ultimate authority for ensuring that the remedial action is performed in a manner that meets all project goals, standards, specifications, and requirements of the Operable Unit 2 ROD (DOE 1995a) and the IRDP. The OEPA has been granted regulatory authority over certain RCRA activities.

Within each agency, various organizations and offices have been delegated specific program responsibilities. The DOE-FEMP OU2 Team Leader will provide the overall DOE programmatic direction for remediation of the LSPs. The DOE-FEMP will conduct field oversight through technical leads responsible for construction, excavation/remediation, engineering, quality assurance and control, health and safety, and other pertinent aspects of the project.

The FDF SCEP will provide the overall project management and technical guidance to the Project Team. The Project Team will provide all of the necessary technical, regulatory, and administrative input required for the project. As the project moves through different phases, the project organization will change to perform each particular phase of the project efficiently. The basic project organization will stay the same throughout the project; however, the overall manager will change to best meet the needs of the project. During investigation, study, design, and certifications phases, the project will be managed by the Area Project Manager (APM). During construction phases, the project will be managed by the Construction Manager (CM). This organizational structure will provide clear lines of responsibility during the project and provide project leadership with the necessary experience at various phases of the project (i.e., the CM will lead the project during construction phases).

The project management roles and responsibilities are presented in the SCEP Project Execution Plan (PEP); additional details will be provided in the Area 3A/4A PEP.

6.2 CONFIGURATION MANAGEMENT

The project will be managed in accordance with FEMP Configuration Management requirements. Configuration Management is the management process by which the technical baseline for projects are identified, graded, tracked, and controlled. Configuration Management establishes consistency among the design requirements, physical configuration, and technical documentation, and will ensure this consistency is maintained throughout construction and operation. Configuration Management also ensures the systematic evaluation, coordination, disposition, documentation, implementation, and verification of all changes, and their impact on cost, schedule, and technical baselines. Site procedure CM-0001, "Configuration Management," will be used as the Configuration Management guideline throughout the project.

In accordance with FEMP Procedure ED-12-4015, "Performance Grading," and the Technical Review Board (TRB), this project was determined to have Performance Grade 5 for systems, structures, and components (SSCs), based on the importance of their function of hazard mitigation and safety. Performance Grade 5 will primarily require documentation control.

6.3 REMEDIAL ACTION APPROACH

The technical requirements for remedial action at the LSPs are presented in Section 3.0 of this IP and in the construction drawings and technical specifications. These requirements will be implemented and managed by FDF construction personnel and are expected to be performed by the FEMP on-site labor contractor (Wise) and by a construction contractor.

Some advance work will be performed by the FEMP labor contractor prior to remedial action excavation work. This advance work will consist of installing pipes, temporary pumps, and associated components to convey water from the LSPs into the FEMP storm drain system; it will also include excavation of trenches to dewater the lime sludge and other site prep activities. This work is expected to be performed the year prior to actual excavation. During the advance work, no impacted material will be moved from the area; all excavated material will remain within the LSP area.

The excavation and conversion phases of remedial action will be performed by a remedial action contractor through a fixed price/unit price contract. FDF will procure a contractor to implement remediation in a manner that provides the best value to the government. Specific details will depend on the final remediation schedule. The contractor will be procured through either an Invitation for Bid (IFB) process or through an addition to an existing FEMP contract. The FDF procurement system follows requirements of the Federal Acquisition Requirements (FARs) and is designed to ensure adequate and effective competition among prospective bidders/proposers.

6.4 REMEDIAL ACTION MANAGEMENT

FDF is responsible for implementing the remedial action project in accordance with DOE direction and will directly oversee the FEMP labor force (during the advance work) and manage the construction contractor (during the excavation and conversion phases) performing the remedial action work. The construction manager will manage the project during the construction phases with support from other FDF construction personnel (CCM, CE, etc.) and other FDF functional areas (engineering, QA, etc.). Construction management includes, but is not limited to, conducting status meetings, daily work surveillance and inspections, and daily safety tours and oversight of the project. The CM will ensure that safety concerns are brought to the attention of the FDF S&H Officer and the responsible contractor(s) who will correct these concerns.

The CM will also coordinate the LSP RA contractor with other FEMP contractors. This coordination depends on the actual contract mechanism that will be used and will be addressed in the actual contract documents.

6.5 CONTINGENCY MANAGEMENT

Conditions which are unexpected and neither through established excavation guidelines nor accommodated in the detailed remedial design will be dealt with according to contingency management protocols and plans set forth in Appendix F of the SEP. These contingencies are categorized as follows:

- Unearthing of materials that require special handling

- Encountering contamination or soil conditions which may pose a risk to human health or the environment if standard excavation practices are used, or which are significantly different than expected, or which may affect other operations.

- Discovering unexpected cultural or historic resources.

Requirements for managing special materials encountered during remediation of the LSPs will be presented in the project design documents and detailed in the contractor's Safe Work Plan.

As indicated in Table 6-1, some special materials may meet the OSDF WAC, while others will require off site shipment. SCEP/WAO will provide assistance to Construction for field decisions related to management and disposition of special materials and, if applicable, will arrange for movement of materials to the appropriate FEMP storage and handling areas for characterization, treatment evaluation, and final disposition arrangements.

Although not expected, excavation of the LSPs could progress to a point where continued work would cause the remedial action to differ from the design, such as:

- Discovering unexpected types or quantities of contamination

- Encountering soil types or excavation depths that are not within design parameters

- Discovering impacted materials beyond the design limits.

In accordance with the SEP, the FEMP design change process will be used to effect design changes in cases where conditions and design changes do not differ significantly from those already acknowledged and approved for the project. If conditions are significantly different from the approved design, construction activities will stop until an acceptable plan is developed and approved.

If cultural resources are discovered, the contingency plan described in Appendix F of the SEP will be implemented. Contractors will be trained to the plan and on how to recognize a potential cultural resource, as needed. Personnel will ensure safe handling of the resources by isolating the affected area until an on-call specialty contractor can perform any necessary data recovery.

6.6 INTEGRATING REMEDIATION OF THE LSPs WITH OTHER FEMP ACTIVITIES

The project is related to, and must be integrated with, other projects (external to the SCEP) at the FEMP. The major projects that will impact the LSPs are as follows:

- OSDF. Impacted material (soil, sludge, chipped vegetation, debris, etc.) will be excavated from the LSPs. This material is expected to meet the OSDF WAC and will be hauled to the OSDF, where it will be placed in ratios defined in the IMPP with available debris from the FPA. Excavation, loading, hauling, unloading, and subsequent placement of impacted material in the OSDF will be performed by one or more construction contractor.

- WAO. WAO, an FDF organization independent of both soil- and debris-generating projects and the receiving OSDF project, has responsibility for the OSDF WAC attainment compliance assurance program presented in the WAC Attainment Plan (20100-PL-0014). WAO representatives will provide oversight of field activities from impacted material origin to OSDF receipt.

- Waste Pits Remedial Action Project (WPRAP). Material excavated from the LSPs that is above the OSDF WAC (none expected) will be sent off site for disposal through WPRAP. If found, above-WAC material will be hauled to, and unloaded at, the SP-7 Stockpile by the excavation contractor.

- Waste Management. Special materials from the LSPs will be managed by FDF Waste Management. The excavation contractor will coordinate the transfer with Waste Management through the CM.

- SWU Haul Road. Haul equipment transporting material from the LSPs and vicinity to the OSDF and the SP-7 Stockpile will use the SWU Haul Road. Haul equipment returning from the OSDF and SP-7 stockpile to the LSPs will also use the SWU Haul Road. At certain designated crossings, WPRAP and Silos Project activities will require accessing the SWU Haul Road. During design, requirements for loading, washing, and monitoring vehicles will be developed.

- SWRB. Any runoff from the active excavation areas will be collected and controlled. During initial site preparation activities, prior to excavation, a system will be installed to collect and manage this water. This will include a system or process that collects sediment-laden water from the active excavation area, with capacity to remove some of the sediments, and then a means of conveying the water to the SWRB via existing storm drains.

- ARWWP (Aquifer Restoration Waste Water Project). During the conversion phase, a system will be installed to pump water to the AWWT, via the BSL or to the SWRB. There will be no provisions for segregating water in the WMF. Storm water that may be contaminated with VOC water will be managed as VOC contaminated water and pumped to the BSL; otherwise, it will be pumped to the SWRB via the existing FEMP storm drains. After it is constructed and accepted by FDF, the ARWWP will manage

and operate the WMF lift stations, pumps and discharge lines; they will control the discharge of water from the WMF to the BSL and the SWRB. The FPA construction contractor will pump water to the WMF and clean the WMF of sediment. The FDF CM will coordinate the work with the ARWWP.

- Site Utilities. Electrical power will be required for lighting, alarms, pumps, and controls. FDF will route all electric power for contractor tie-ins.

6.7 SCHEDULE

In accordance with the ACA, this Implementation Plan identifies the remedial action project-specific milestones subject to enforceable deadlines by the EPA. A conceptual schedule is provided on Table 6-2. This schedule is based on current funding assumptions and the overall site remediation schedule. As shown on the schedule, because the LSPs will be used as a WMF, there is an extended period between precertification and certification.

TABLE 6-1
IMPACTED MATERIAL WASTE STREAMS FROM LSPs

Waste Stream	Source Location	OSDF WAC Status	Final Disposition	Est. Vol. (Yd^3)
Lime Sludge OSDF Category 5 Impacted Material	LSP Excavation	BWAC[1]	OSDF[1]	20,000
Soil and Other Material OSDF Category 1 Impacted Material	LSP Excavation	BWAC[1]	OSDF[1]	9,500
Wood Chips OSDF Category 4	LSP Excavation	BWAC	SWU non-impacted woodchip stockpile	300
Above WAC Material	LSP Excavation	AWAC	SP-7 and subsequent offsite disposal	100 [2]
Prohibited Items	LSP Excavation	AWAC	Off-site containerized shipment to NTS or PCDF	25 [2]
Special materials	LSP Excavation	AWAC	Off-site containerized shipment to NTS or PCDF	25 [2]
Special materials (Various OSDF Categories)	LSP Excavation	BWAC	OSDF	50 [2]

Abbreviations:
BWAC = Below OSDF Waste Acceptance Criteria
OSDF = On-Site Disposal Facility
AWAC = Above OSDF Waste Acceptance Criteria
NTS = Nevada Test Site
PCDF = Permitted Commercial Disposal Facility

1 Lime sludge and soil will be blended together in the LSPs prior to loading and hauling to the OSDF.

2 Assumed value to reflect expectation of encountering such material.

TABLE 6-2
LSP IMPLEMENTATION SCHEDULE

Milestone	Schedule Date
Complete "advance" work	September 30, 1999
Select remediation contractor	February 1, 2000
Remediation contractor mobilizes	April 1, 2000
Begin excavation	April 15, 2000
Complete excavation	July 15, 2000
Complete conversion to WMF	September 30, 2000
Stop WMF operation	June 15, 2005
Remove WMF components	July 15, 2005
Submit Certification Design Letter	July 30, 2005
Complete certification	September 30, 2005

2161

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000062