IMPLEMENTATION PLAN FOR AREA 2, PHASE II

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

JUNE 2002

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

20450-PL-0001
REVISION A
DRAFT

-4328

IMPLEMENTATION PLAN FOR AREA 2, PHASE II

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

JUNE 2002

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

20450-PL-0001
REVISION A
DRAFT

000002

TABLE OF CONTENTS

List of Tables v
List of Figures v
List of Acronyms and Abbreviations vi

Executive Summary ES-1

1.0 Introduction 1-1
1.1 A2PII Inclusions and Exclusions 1-2
1.2 Remediation Area Background and Description 1-3
1.3 Scope and General Approach of the Implementation Plan 1-3
1.4 Programmatic Strategy 1-5
1.4.1 Predesign Investigation 1-5
1.4.2 Remedial Design 1-5
1.4.3 Remedial Action 1-6
1.4.4 Precertification 1-7
1.4.5 Certification 1-7
1.4.6 Postremedial Action 1-7
1.5 Summary of the Regulatory Drivers 1-7
1.5.1 ARARs and TBCs 1-8
1.5.2 Permits 1-8
1.5.3 Natural Resource Trusteeship and Related Natural and Cultural Resource Regulations 1-8
1.5.3.1 Threatened and Endangered Species 1-8
1.5.3.2 Wetlands/Floodplains 1-9
1.5.3.3 Resolution of DOE's Liability for Injuries to Natural Resources 1-9
1.5.3.4 Cultural Resource Management 1-9
1.6 Components of the Remedy 1-10
1.7 Lessons Learned 1-12

2.0 Predesign Investigations and Characterization Data 2-1
2.1 General Approach 2-1
2.1.1 Summary of Surface and Subsurface Physical Conditions 2-1
2.1.2 Summary of the RI/FS Investigation 2-1
2.1.3 Preliminary Constituents of Concern 2-2
2.1.4 OSDF Waste Acceptance Criteria 2-2
2.1.5 Final Remediation Levels for Soil 2-2
2.1.6 Hazardous Waste Management Units 2-2
2.1.7 Underground Storage Tanks 2-3
2.1.8 Identification of Potentially Characteristic Areas 2-3
2.1.9 High Leachability Zones 2-3
2.2 Summary of Predesign Investigations 2-3
2.2.1 Real-Time Scanning 2-4
2.2.2 Physical Sampling 2-5
2.2.3 Subareas in A2PII 2-5
2.2.3.1 Investigation of Subarea 1 – Arsenic Soil Contamination Area 2-5

2.2.3.1.1 Extent of Above-FRL Contamination in the Arsenic Soil Contamination Area 2-5
2.2.3.1.2 Determination of the Excavation Boundaries in the Arsenic Soil Contamination Area 2-6
2.2.3.2 Investigation of Subarea 2 – Radium Hot Spot 2-7
2.2.3.2.1 Extent of Above-FRL Contamination in the Radium Hot Spot 2-7
2.2.3.2.2 Determination of the Excavation Boundaries at the Radium Hot Spot 2-7
2.2.3.3 Investigation of Subarea 3 – Infrastructure 2-8
2.2.3.4 Investigation of Subarea 4 – Remaining A2PII Areas 2-8
2.2.3.4.1 Extent of Above-FRL Contamination in the Remaining A2PII Areas 2-8
2.3 Identification of Area-Specific Constituents of Concern 2-10

3.0 Remedial Action Approach 3-1
3.1 Site Preparation (General) 3-2
3.1.1 Site Boundaries and Controls 3-3
3.1.1.1 Subarea 1 (Arsenic Soil Contamination Area) 3-3
3.1.1.2 Subarea 2 (Radium Hot Spot Area) 3-3
3.1.1.3 Subarea 3 (Infrastructure) 3-3
3.1.2 Surveying and Site Layout 3-4
3.1.2.1 Subarea 1 (Arsenic Soil Contamination Area) 3-4
3.1.2.2 Subarea 2 (Radium Hot Spot Area) 3-4
3.1.2.3 Subarea 3 (Infrastructure) 3-4
3.1.3 Surface Water Management 3-5
3.1.3.1 Subarea 1 (Arsenic Soil Contamination Area) 3-5
3.1.3.2 Subarea 2 (Radium Hot Spot Area) 3-5
3.1.3.3 Subarea 3 (Infrastructure) 3-6
3.1.4 Trenching to Isolate Undocumented Below-Grade Utilities (General) 3-7
3.1.5 Establishing and Identifying Support Facilities 3-7
3.1.5.1 Change-Out Facility, Contractor Office Trailer, Break Trailer, and Cool-Down Trailer (General) 3-7
3.1.5.2 Contractor Laydown Area (General) 3-7
3.1.5.3 Water and Electrical Source (General) 3-7
3.1.5.4 Fuel Transfer Point (General) 3-7
3.1.5.5 Haul Routes (General) 3-8
3.1.6 Real-Time Scanning (General) 3-8
3.2 At- and Below-Grade Structure Demolition (General) 3-9
3.2.1 Utility Lines [Subarea 3 (Infrastructure)] 3-9
3.2.2 Concrete, Asphalt Roadways and Parking Lots [Subarea 3 (Infrastructure)] 3-10
3.3 Soil Excavation, Monitoring and Segregation (General) 3-11
3.3.1 Above-WAC, RCRA and Soil Treatment (General) 3-11
3.3.2 HWMUs and USTs (General) 3-12
3.3.3 General Excavation (General) 3-12
3.3.3.1 Subarea 1 (Arsenic Soil Contamination Area) 3-13
3.3.3.2 Subarea 2 (Radium Hot Spot Area) 3-13
3.3.3.3 Subarea 3 (Infrastructure) 3-14

3.3.4 Utilities [Subarea 3 (Infrastructure)] 3-15
3.4 Impacted Material Management (General) 3-16
3.4.1 Contaminated Soil and Debris (General) 3-16
3.4.2 Excavation Water (General) 3-17
3.4.3 Other Materials (General) 3-17
3.5 Trench Backfilling [Subarea 3 (Infrastructure)] 3-17
3.6 Precertification and Interim Grading (General) 3-18

4.0 Project-Specific Environmental Controls and Monitoring 4-1
4.1 Natural Resource Impacts 4-1
4.2 Air Pathway 4-2
4.2.1 Noise 4-3
4.2.2 Fugitive Emissions 4-3
4.2.3 Airborne Radiological Particles 4-6
4.2.4 Radon 4-7
4.2.5 Direct Radiation 4-7
4.3 Surface Water Pathway 4-7
4.4 Groundwater Pathway 4-9

5.0 Project-Specific Health and Safety 5-1

6.0 Remedial Action Management Strategy 6-1
6.1 Organization and Responsibilities 6-1
6.1.1 Management 6-2
6.1.1.1 SDFP Project Director 6-2
6.1.1.2 Engineering/Planning Manager and Execution Manager 6-3
6.1.1.3 Records Management 6-4
6.1.1.4 Project Controls 6-4
6.1.2 Primary Technical Areas 6-5
6.1.2.1 Engineering 6-5
6.1.2.2 Construction 6-6
6.1.2.3 Characterization 6-7
6.1.3 Functional Support 6-7
6.1.3.1 Safety and Health 6-8
6.1.3.2 Radiological Control 6-8
6.1.3.3 Environmental Compliance 6-8
6.1.3.4 Quality Assurance/Quality Control 6-9
6.1.3.5 Waste Disposition 6-9
6.1.3.6 Natural Resources 6-9
6.1.3.7 Cultural Resources 6-9
6.1.3.8 Procurement 6-10
6.1.4 Coordination of Excavation Site Activities 6-10
6.1.4.1 Visual Observation 6-11
6.1.4.2 Sampling and Monitoring 6-11
6.1.4.3 Radiological Occupational Monitoring 6-11
6.1.4.4 Asbestos Monitoring 6-11
6.1.4.5 Material Documentation 6-11
6.1.4.6 Occupational Health and Safety 6-11

6.1.4.7 Construction Monitoring 6-11
6.1.4.8 Surveying 6-12
6.1.4.9 Visual Dust Monitoring 6-12
6.1.4.10 Environmental Monitoring 6-12
6.1.4.11 Safety Inspections 6-13
6.1.5 Field Team 6-13
6.1.6 Management of Field Personnel 6-13
6.2 Configuration Management 6-13
6.3 Construction Management 6-13
6.3.1 Status Meetings 6-14
6.3.2 Surveillance and Inspection 6-14
6.3.3 Safety and Health Oversight 6-14
6.3.4 Radiological Monitoring and Oversight 6-15
6.4 Impacted Material Management 6-15
6.5 Contingency Management 6-17
6.5.1 Materials Which Require Special Handling 6-18
6.5.2 Unexpected Contamination or Soil Conditions 6-18
6.5.3 Unexpected Discovery of Cultural or Historic Resources 6-18
6.6 Data and Records Management 6-19
6.7 QA/QC and Regulatory Audit 6-19
6.8 Integration of A2PII Project with Other SDFP and FEMP Activities 6-20
6.9 Remedial Action and Certification Schedule 6-21

References R-1

Appendix A Design Criteria Package
Appendix B Predesign Characterization Data
Appendix C List of Technical Specifications
Appendix D Drawings

000006

LIST OF TABLES

Table 2-1	Preliminary List of ASCOCs
Table 2-2	OSDF Waste Acceptance Criteria
Table 2-3	Final Remediation Levels for Soil
Table 2-4	Above-FRL Data Summary
Table 2-5	Arsenic Soil Contamination Area Statistics
Table 2-6	Area A2PII Revised List of ASCOCs
Table 3-1	Remaining Infrastructure Area Quantities
Table 3-2	Radium Hot Spot Excavation Parameters and Quantities
Table 6-1	Contingency Plans for Recognized but Unexpected Conditions
Table 6-2	A2PII Primary Records and Associated Files
Table 6-3	A2PII Remedial Action and Certification Schedule

LIST OF FIGURES

Figure 1-1	Generalized Sitewide Remediation Areas
Figure 1-2	A2PII Subarea Layout
Figure 2-1	A2PII Boundaries, Surface Features and Topography
Figure 2-2	RI/FS Borings in A2PII
Figure 2-3	Real-Time Scan – Entire Area
Figure 2-4	Real-Time Scan – Total Uranium
Figure 2-5	Real-Time Scan – Thorium-232
Figure 2-6	Real-Time Scan – Radium-226
Figure 2-7	Real-Time Above-FRL for Radium-226
Figure 2-8	Predesign and RI/FS Borings
Figure 2-9	Arsenic Soil Contamination Area
Figure 2-10	Radium-226 Above-FRL Borings Determined by Real-Time Scanning
Figure 2-11	Radium-226 Borings around A2P2-PT2-10 – Radium Hot Spot
Figure 2-12	Real-Time Scanning around Radium-226 Boring A2P2-PT2-10
Figure 2-13	Above-FRL for Radium-226 in the Remaining A2PII Areas
Figure 2-14	Variation of Excavation Depth with Sample Depth
Figure 3-1	A2PII Radium Hot Spot Location Map
Figure 3-2	A2PII Radium Hot Spot (Enlarged)
Figure 6-1	Organization Chart for the SDFP A2PII Project

LIST OF ACRONYMS AND ABBREVIATIONS

A1PI	Area 1, Phase I
A1PII	Area 1, Phase II
A2PI	Area 2, Phase I
A2PII	Area 2, Phase II
ACGIH	American Conference of Governmental and Industrial Hygienists
ACHP	Advisory Council on Historic Preservation
ALARA	As Low As Reasonably Achievable
ARARs	applicable or relevant and appropriate requirements
ASCOC	area-specific constituent of concern
AWWT	Advanced Waste Water Treatment (Facility)
CDL	Certification Design Letter
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFC	Certified for Construction
CFR	Code of Federal Regulations
COC	constituent of concern
CT	Construction Traveler
dBA	decibels on A-weighted scale
DCN	Design Change Notice
DOE	U.S. Department of Energy
ECDC	Engineering/Construction Document Control
EMS	Excavation Monitoring System
EPA	U.S. Environmental Protection Agency
FEMP	Fernald Environmental Management Project
FRL	final remediation level
FTL	Field Tracking Log
GIS	Geographical Information System
HDPE	high density polyethylene
HPGe	high-purity germanium (detector)
HWMU	hazardous waste management unit
IEMP	Integrated Environmental Monitoring Plan
IIMS	Integrated Information Management Systems
IRDP	Integrated Remedial Design Package
IROD	Interim Record of Decision
mg/kg	milligrams per kilogram
NaI	sodium iodide
MTL	Material Tracking Location
NPDES	National Pollution Discharge Elimination System
NRRP	Natural Resource Restoration Plan
NRTs	Natural Resource Trustees
OEPA	Ohio Environmental Protection Agency
OHPO	Ohio Historic Preservation Office
OSDF	On-Site Disposal Facility
OSHA	Occupational Safety and Health Administration
OU	operable unit
pCi/g	picoCuries per gram
PG	Performance Grade

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued)

ppm	parts per million
PSP	Project Specific Plan
QA/QC	quality assurance/quality control
RCI	Request for Clarification of Information
RCRA	Resource Conservation and Recovery Act
RCT	Radiological Control Technician
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RSS	Radiation Scanning System
RTIMP	Real Time Instrumentation Measurement Program
RTRAK	Radiation Tracking System
RWP	Radiological Work Permit
S&H	Safety and Health
SDFP	Soil and Disposal Facility Project
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
SP	Soil Stockpile
SWIFTS	Sitewide Waste Information Forecasting and Tracking System
SWPPP	Storm Water Pollution Prevention Plan
SWRB	Storm Water Retention Basin
SWUs	Southern Waste Units
TBC	to be considered criterion
UST	underground storage tank
VOC	volatile organic compound
WAC	waste acceptance criteria
WAO	Waste Acceptance Organization
yd^3	cubic yards

EXECUTIVE SUMMARY

This Implementation Plan describes the remediation of soil, sediment, and at- and below-grade structures and debris in Areas 2, Phase II (A2PII) at the Fernald Environmental Management Project (FEMP), Fernald, Ohio. This Implementation Plan follows the appropriate remedial design/remedial action steps listed in the Sitewide Excavation Plan (SEP; DOE 1998a) (i.e., predesign investigations, remedial design, and remedial action activities). Post-remediation, precertification, certification, and restoration will be addressed in future documents [e.g., the Certification Design Letter (CDL) and Natural Resources Restoration Plan (NRRP; DOE 2002)].

A2PII has been divided into four subareas so that the regulatory agencies can approve the remedial design/remedial action for each subarea independently. These four subareas are Subarea 1 (Arsenic Soil Contamination Area), Subarea 2 (Radium Hot Spot), Subarea 3 (Infrastructure), and Subarea 4 (Remaining Area). As the integrating document for the Integrated Remedial Design Package (IRDP), this Implementation Plan addresses the predesign investigation, remedial design, remedial action, and precertification activities for each subarea. Additionally, the plan discusses the project-specific environmental controls and monitoring, and remedial action management strategy for A2PII in general. The Design Criteria Package, predesign characterization data, and list of IRDP drawings and technical specifications are attached to the Implementation Plan as appendices.

A2PII covers approximately 63 acres in the southwest portion of the FEMP. The A2PII remedial action involves removing at- and below-grade structures and debris, as well as excavating contaminated soil and sediment that exceed the final remediation levels (FRLs). The primary constituents of concern are arsenic and radium-226. Based on historical knowledge, A2PII did not include any significant production facility or waste disposal process.

The primary remedial actions addressed in this Implementation Plan by subarea include the following:

- Subarea 1 (Arsenic Soil Contamination Area): Removal of approximately 10,300 cubic yards (yd^3) of soil contaminated with arsenic
- Subarea 2 (Radium Hot Spot): Removal of approximately 44 yd^3 of soil contaminated with radium-226

- Subarea 3 (Infrastructure): Removal of approximately 6,000 yd^3 of at- and below-grade structures, roadways, and underground utilities not related to groundwater remediation

- Subarea 4 (Remaining Area): No remedial action is planned.

Following excavation, contaminated materials will be transported to either the On-Site Disposal Facility (OSDF) or staged for off-site shipment to a permitted disposal facility. No material in A2PII is known to be above the radiological or chemical OSDF waste acceptance criteria (WAC).

The remedial action in Subarea 1 (Arsenic Soil Contamination Area) has already occurred. Subarea 2 (Radium Hot Spot) will be remediated in 2002. A remedial strategy for Subarea 3 (Infrastructure) is presented instead of a design due to the potential modifications and uses of these infrastructures to support other FEMP activities. An addendum to this Implementation Plan will be submitted to the regulatory agencies upon determination of future uses, completion of additional predesign investigation and subsequent remedial design associated with Subarea 3.

Remedial action requirements shown on the construction drawings and described in the technical specifications were developed in accordance with the concepts described in this Implementation Plan, as guided by the OSDF WAC Attainment Plan (DOE 1998b) and the SEP.

1.0 INTRODUCTION

This Implementation Plan describes the U.S. Department of Energy's (DOE's) remediation of soil, sediment, and at- and below-grade structures and debris in Area 2, Phase II (A2PII) at the Fernald Environmental Management Project (FEMP) in southwestern Ohio.

Remedial activities in A2PII are planned in accordance with the Operable Unit (OU) 3 Interim Record of Decision (IROD) for Remedial Actions and Responsiveness Summary (DOE 1994) and Record of Decision (ROD) for Remedial Actions at OU3 (DOE 1996a), which address at- and below-grade structures and debris, as well as the ROD for Remedial Actions at OU5 (DOE 1996b), which addresses remediation of soil and sediment and environmental media.

This Implementation Plan and the Sitewide Excavation Plan (SEP; DOE 1998a) satisfy the Amended Consent Agreement [U.S. Environmental Protection Agency (EPA) 1991] requirement for a Remedial Action Work Plan. In addition, this Implementation Plan and the associated remedial design (construction drawings and technical specifications) constitute the Integrated Remedial Design Package (IRDP), as outlined in the Remedial Design Work Plan for Remedial Actions at OU5 (DOE 1996c). As an integrating document, this IRDP facilitates regulatory agency review of the remedial design and summarizes the remedial action scope of work. Remedial actions described in this plan are being conducted in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and corrective action requirements of the Resource Conservation and Recovery Act (RCRA). The Implementation Plan conforms to the general model outline for IRDPs provided in Section 7.0 of the SEP.

The FEMP has been divided into nine remediation areas (Figure 1-1) that are organized around the Remedial Investigation/Feasibility Study (RI/FS) OUs and off-site locations. The FEMP Sitewide Sequencing Plan, included as Appendix B of the FEMP SEP, provided a generic planning remediation schedule for each area. Revised schedule for major A2PII remedial actions and certification activities are provided in Section 6.0 of this Implementation Plan.

Section 1.0 of this Implementation Plan describes the scope of work for A2PII Implementation Plan including the inclusions and exclusions, remedial area background and description, scope and general

approach of the Implementation Plan, programmatic strategy, summary of regulatory drivers, components of the remedy, and lessons learned.

1.1 A2PII INCLUSIONS AND EXCLUSIONS

Two areas within the original Area 2, Phase I (A2PI) boundary (Equipment Wash Facility and the Non-Impacted Material Stockpile 2) have been included in A2PII for purposes of this Implementation Plan (refer to Figure 1-2). Since both the Equipment Wash Facility and Non-Impacted Material Stockpile 2 are located outside the Southern Waste Unit (SWU) battery limits, the ROD for Remedial Action at OU2 (DOE 1995) and corresponding final remediation levels (FRLs) do not govern the remediation of these areas. The OU5 ROD will govern the removal of the Equipment Wash Facility and Non-Impacted Stockpile 2.

There are several areas within A2PII that will not be addressed and discussed in the Implementation Plan. Areas excluded from the A2PII Implementation Plan are as follows:

1. Pilot Plant Ditch: The pilot plant ditch (the ditch that drains from the Advanced Wastewater Treatment (AWWT) area to Paddys Run immediately south of the OU4 Detention Basin) will be addressed under a separate implementation plan for stream corridors throughout the FEMP

2. Previously Certified Areas: Soil Stockpile 3 footprint and soil pile MTL-HRD-011 have already been certified [see Certification Report for A2PII - Part Three Soil Stockpile Footprint (DOE 2001a) and Certification Report for Area 2, Phase III - Part One, MTL-HRD-011 (DOE 1999a), respectively]

3. OU5 Groundwater Treatment Infrastructure: There are several extraction and re-injection wells located throughout A2PII. The remediation of these wells, supporting utilities (underground south plume force main and electrical conduits), and access way (SWU Access Road) are not included in the scope of this Implementation Plan. The extraction and re-injection wells are required for long-term treatment of the Great Miami Aquifer governed under the OU5 ROD

4. Long-Term Service Utilities: There are two underground utilities that supply the site with drinking water and natural gas. These utilities are needed to support long-term operations at the FEMP. Also the FEMP Meteorological Tower which is located within A2PII will need to remain operational past the closure of the site to support the long-term stewardship of the OSDF.

1.2 REMEDIATION AREA BACKGROUND AND DESCRIPTION

A2PII is comprised of approximately 63 acres of the FEMP and is located east of Paddys Run, north of the SWU, south of the Silos Area, and southwest of the Former Production Area (refer to Figure 1-2). A2PII has been divided into four subareas so that the regulatory agencies could approve the Remedial Design/Remedial Action for each subarea independently. A2PII includes the following subareas:

1. Subarea 1 (Arsenic Soil Contamination Area): The arsenic soil contamination area (approximately 1.1 acres) is located near the northwest portion of A2PII. The removal of soil contaminated with arsenic is the primary scope of the remediation activities for this subarea

2. Subarea 2 (Radium Hot Spot): The radium hot spot (approximately 2,100 square feet) is located near western portion of A2PII. The removal of soil contaminated with radium-226 is the primary scope of the remediation activities for this subarea

3. Subarea 3 (Infrastructure): The infrastructure includes the Trailer Complex Area (approximately 2.7 acres), the Equipment Wash Pad (approximately 1.1 acres), a Subcontractor Area (approximately 1.3 acres), and a portion of the Impacted Material Haul Road and nearby former footprint of debris pile MTL-HRD-012 (approximately 1.1 acres). In addition, the infrastructure area includes both the water line that services both the Trailer Complex and the Equipment Wash Facility and a portion of the transfer line that are to be removed under this Implementation Plan. The removal of the at- and below-grade structures, roadways, and underground utilities, not related to groundwater remediation, is the primary scope of the remediation activities for this subarea

4. Subarea 4 (Remaining Area): The remaining area (approximately 56 acres) includes the areas not included in the arsenic contamination area, radium hot spot, and infrastructure subareas. The remaining area includes the Non-Impacted Material Stockpile 2. No remedial action is planned for Subarea 4 (Remaining Area).

The primary constituents of concern (COCs) for A2PII are arsenic and radium-226. Section 2.0 presents a complete discussion of A2PII COCs. There are no known above-On-Site Disposal Facility (OSDF) waste acceptance criteria (WAC) areas, RCRA areas, hazardous waste management units, or underground storage tanks within A2PII.

1.3 SCOPE AND GENERAL APPROACH OF THE IMPLEMENTATION PLAN

The A2PII Implementation Plan consists of the following sections:

- Section 1.0 – Introduction, which summarizes the purpose and scope of this Implementation Plan and describes programmatic strategies and requirements for A2PII remedial action.

- Section 2.0 – Predesign Investigations, which describes the COCs for A2PII, the surface and subsurface conditions, the nature and extent of contamination, and the anticipated excavation boundaries based on RI/FS data and other data collected to fill data gaps. This section addresses the characterization data for Subarea 1 (Arsenic Soil Contamination Area) and Subarea 2 (Radium Hot Spot) in detail. This section also presents the existing characterization data available for Subarea 3 (Infrastructure) and Subarea 4 (Remaining Area).

- Section 3.0 – Remedial Action Approach, which presents the work associated with site preparation, removal of at- and below-grade structures and debris, excavation of contaminated soil and sediment, real-time monitoring of the excavation surface, management of waste streams in accordance with final disposition requirements, management of surface water and perched water seepage in the excavation, and documentation showing that the soil in the area meets the FRLs for all COCs.

- Section 4.0 – Project-Specific Environmental Controls and Monitoring, which discusses environmental controls and associated monitoring established with respect to natural resources and air, surface water, and groundwater pathways.

- 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 following: A2PII organization and responsibilities, configuration management, construction management, impacted material management, contingency management, data and records management, quality assurance/quality control (QA/QC) and regulatory audit, integration of A2PII activities with other Soil and Disposal Facility Project (SDFP) and FEMP activities, and remedial action and certification schedule.

- Appendix A – Design Criteria Package, which summarizes design criteria, applicable or relevant and appropriate requirements (ARARs) and to be considered (TBC) items.

- Appendix B – Predesign Characterization Data, which tabulates predesign characterization data used to develop the remedial design.

- Appendix C – List of Technical Specifications, which list technical specifications that are submitted with this Implementation Plan to constitute the IRDP for A2PII.

- Appendix D – Drawings, which provides the drawings and plans submitted with this Implementation Plan to constitute the IRDP for A2PII.

As described in the SEP, the Programmatic Strategy for area-specific Remedial Design/Remedial Action at the FEMP includes the following steps:

- Predesign investigations
- Remedial design
- Remedial action

- Precertification of excavated areas
- Certification of excavated areas
- Postremedial action.

1.4 PROGRAMMATIC STRATEGY

This Implementation Plan includes the first four steps of the programmatic strategy.

Specific performance requirements to accomplish the scope of work presented in this plan are provided in the Design Criteria Package, technical specifications, construction drawings, and the Construction Traveler (CT). The CT will be reviewed and approved by the DOE and Fluor Fernald.

1.4.1 Predesign Investigation

Predesign investigation activities began in A2PII in September 1999 and are currently ongoing. Sampling activities to date have been focused on isolated areas where arsenic and radium-226 have been detected. Sampling activities have been completed for Subarea 1 (Arsenic Soil Contamination Area) and Subarea 2 (Radium Hot Spot). Predesign characterization of Subarea 3 (Infrastructure) will be finalized as areas become available based on discontinuation of use. The predesign investigation for Subarea 3 (Infrastructure) will be supplemented at a later date by an addendum to this Implementation Plan (refer to Table 6-3 in Section 6.0 for the submittal date for the Implementation Plan addendum). No additional predesign investigation in planned for Subarea 4 (Remaining Area), based on RI/FS data, historical knowledge and limited existing predesign investigation data for Subarea 4.

1.4.2 Remedial Design

The remedial design for A2PII began in February 2002. The remedial design for Subarea 1 (Arsenic Soil Contamination Area) includes construction drawings. Due to continued usage of structures and utilities in Subarea 3 (Infrastructure), the soils adjacent to and underneath Subarea 3 (Infrastructure) have not been fully investigated; therefore, the remedial design has not been completed. A Remedial Strategy Drawing, Drawing 99X-5500-G-00734, has been included in this IRDP to illustrate current plans for future remediation. This drawing will not govern field remediation activities; rather, the remedial design for Subarea 3 (Infrastructure) will be submitted to the agencies as an addendum to this Implementation Plan following completion of predesign investigations. No remedial design drawings have been nor will be prepared for either Subarea 2 (Radium Hot Spot) or Subarea 4 (Remaining Area). Subarea 2 (Radium Hot Spot) will be remediated in accordance with Section 3 and the approved IRDP for A2PII. Based on

preliminary characterization data and process knowledge, no remedial design is required for Subarea 4 (Remaining Area).

The relevant sections of the Technical Specifications for Area 3A/4A Site Preparation govern the remedial actions for Subarea 1 (Arsenic Soil Contamination Area). The relevant sections of the Technical Specifications for SDFP Area 3A/4A Excavation govern the remedial actions for Subarea 2 (Radium Hot Spot). Technical specifications referenced in the Subarea 3 (Infrastructure) discussions in Section 3.0 are included with this IRDP for reference and will be submitted to the regulatory agencies for approval in an addendum to this Implementation Plan.

The remedial design for excavation is based on:

- RI/FS data on the nature of COC concentrations in soil
- Data collected during predesign investigations to delineate the extent of contamination for above-FRL contamination.
- Location and depth of at- and below-grade man-made structures

1.4.3 Remedial Action

The remedial action for Subarea 1 (Arsenic Contaminated Soil Area) has already been completed. The remedial action for Subarea 2 (Radium Hot Spot) and Subarea 3 (Infrastructure) have yet to be performed, but are scheduled as indicated in Table 6-3. No remedial action is planned for the Subarea 4 (Remaining Area). The A2PII remedial action will be performed in accordance with Section 3.0 and is scheduled as indicated in Table 6-3.

The final extent of excavation will be based on actual field conditions (e.g., previously unidentified debris), radiological field survey measurements (i.e., real-time surveys), and physical sampling results during remedial action.

Significant design changes will be documented through the Design Change Notice (DCN) process, and distributed to EPA and Ohio Environmental Protection Agency (OEPA).

Impacted material is defined as soil with above-FRL contamination or man-made materials. Additionally, sediment collected in ditches and retention basins and on erosion control structures (e.g., silt fencing) will be considered impacted. Impacted material will be removed and hauled to the OSDF for disposal if WAC are met. Impacted material that meets the chemical/radiological WAC, but not the physical WAC, will be size-reduced to achieve the WAC and delivered to the OSDF. Items that are prohibited from disposal in the OSDF will be evaluated for disposal via Waste Pit Remedial Action Project (WPRAP). If material does not meet WPRAP criteria it will be containerized for off-site shipment to a permitted disposal facility.

1.4.4 Precertification

The precertification of A2PII subareas has not been performed but will be performed in accordance with Section 3.6.

1.4.5 Certification

As stated in the SEP, a CDL will be prepared and submitted to the regulatory agencies following completion of the precertification process that summarizes the area-specific remediation completed, results of the precertification activities, and design of the certification sampling and analysis program. Certification of A2PII subareas is not governed by this IRDP (refer to Table 6-3 for the submittal schedule).

1.4.6 Postremedial Action

Following completion of certification activities and agency approval, interim restoration will be completed. Final restoration and postremedial action will follow interim restoration and be guided on a sitewide basis by the final version of the Natural Resource Restoration Plan (NRRP; DOE 2002). A2PII postremedial actions are not addressed in this IRDP.

1.5 SUMMARY OF THE REGULATORY DRIVERS

Regulatory requirements, criteria and legal obligations are the drivers for FEMP remediation activities, and Section 1.3.1 of the SEP provides the overall discussion on FEMP regulatory drivers. A summary of regulatory drivers applicable to A2PII remediation is presented in the following subsection.

1.5.1 ARARs and TBCs

Appendix A of the Design Criteria Package (refer to Appendix A of this Implementation Plan) includes the subset of ARARs and TBCs that will guide remedial design in A2PII.

1.5.2 Permits

The National Pollutant Discharge Elimination System (NPDES) permit (Permit No.1IO00004*FD), for storm water and wastewater discharges to Paddys Run and the Great Miami River, is the only permit that is pertinent to A2PII remediation. Controlled storm water discharges from A2PII are sent to the storm water retention basins (SWRBs), which are covered under the NPDES permit through the sitewide Storm Water Pollution Prevention Plan (SWPPP). Surface water collected in Basin 5 will be treated at the AWWT Facility prior to off-site discharge, in accordance with protocols listed in Section 3.0. Thus, no modifications to the permit are required for A2PII remediation activities.

1.5.3 Natural Resource Trusteeship and Related Natural and Cultural Resource Regulations

Two processes drive protection of natural resources during remediation: the Natural Resource Trusteeship process and compliance with pertinent federal and state regulations. Both of these processes have been incorporated into the A2PII remedial design.

A conceptual restoration design for A2PII has been presented to the Trustee Council as part of the NRRP. The proposed restoration, which consists of expanded prairie, upland woodlot, open water and wetland habitat, will be implemented after its review and approval by the Natural Resource Trustees (NRTs) and other stakeholders upon completion of other required remediation activities.

Regulatory drivers for the management of natural and cultural resources and associated surveys are grouped into three areas: threatened and endangered species protection, wetlands/floodplain protection, and the resolution of DOE's liability for injuries to natural resources.

1.5.3.1 Threatened and Endangered Species

Based on updated FEMP property surveys conducted in 1993-1994, DOE does not expect to encounter any federal- or state-listed threatened or endangered species or critical habitat in the areas to be addressed by the A2PII remediation project. Therefore, no additional threatened or endangered species surveys are planned for the area.

1.5.3.2 Wetlands/Floodplains

No wetland impacts are anticipated during the remediation of A2PII. The 1993 sitewide wetland delineation identified approximately 36 acres of jurisdictional wetlands and 8.9 acres of waters of the United States within the 1,050-acre property. The 1993 Wetland Delineation was approved by the U.S. Army Corps of Engineers, Louisville District Office, in August 1993 (Ebasco 1993). Since the 1993 delineation, DOE has identified 1.9 acres of wetlands that have been formed as the result of construction activities at the FEMP. Although the FEMP plans to avoid or minimize impacts to these areas to the maximum extent practicable during remediation, approximately 10 acres of wetlands have been impacted or are planned to be impacted requiring mitigation. These planned impacts will occur as a result of CERCLA remediation activities and have been identified in the appropriate OU ROD. The NRRP includes DOE plans for conducting wetland mitigation activities on the FEMP. The NRRP currently includes plans to conduct two wetland mitigation projects to create the required 15 acres of new wetlands.

1.5.3.3 Resolution of DOE's Liability for Injuries to Natural Resources

The NRTs are working to resolve liability that DOE faces for injuries to natural resources under CERCLA. In 1986, the State of Ohio filed a claim against DOE for injuries to natural resources. The claim has been in stay while negotiations are proceeding toward resolution. The State of Ohio has designated OEPA as their trustee representative in matters involving natural resource injuries. The Fernald NRTs have jointly developed the NRRP and have tentatively agreed that DOE, through implementation of the plan, will resolve natural resource liability at the FEMP, including the 1986 State of Ohio claim. The NRTs signed a Memorandum of Understanding in July 2001, formally agreeing to implementation of the NRRP. The NRTs are currently working on a final settlement agreement expected later in 2002.

1.5.4 Cultural Resource Management

The DOE, the Ohio Historic Preservation Office, and the Advisory Council on Historic Preservation (ACHP) have entered into a "Programmatic Agreement Regarding Archaeological Investigations at the Fernald Environmental Management Project" (DOE 1997), pursuant to 36 Code of Federal Regulations (CFR) Part 800.13. A2PII has been surveyed in accordance with this agreement. Potential historic properties discovered have undergone data recovery after consultation with the Ohio Historic Preservation Office and the Advisory Council on Historic Preservation. No additional archaeological

surveys are planned for A2PII. However, a contingency plan is in place to ensure that any additional cultural resources discovered during remediation activities are recognized and protected (refer to Section 6.5.3).

1.6 COMPONENTS OF THE REMEDY

A2PII remediation activities address specific components of the selected remedies set forth in the OU2, OU3, and OU5 RODs for debris and environmental media, including at- and below-grade structures, soil, sediment, perched water, storm water and wastewater. These activities are coordinated closely with OSDF construction (an OU2 ROD remedy component) and Decontamination and Dismantlement of above-grade structures (an OU3 IROD remedy component), which are being conducted under other FEMP remedial action plans. A summary of OU3 and OU5 remedy components (in italics) that are particularly relevant to this plan, and an indication of specific actions that will be taken in A2PII, is as follows:

- OU3 IROD and ROD

  - *Remove gross contamination from material in facilities and dismantle facilities.* Gross contamination will be detected by visual inspection and radiological monitoring during excavation activities. There are no former production facilities within A2PII that require gross materials to be removed. Contamination will be removed through the excavation of utilities, slabs, foundations, and impacted soils.

  - *Release materials (unrestricted/restricted release), as economically feasible, for recycling, reuse, or disposal.* At- and below-grade structures to be excavated generally will be processed (e.g., size reduced), if necessary, and dispositioned in the OSDF. None of these materials are considered to be economically feasible for recycling or reuse.

  - *Dispose of process residues, waste product materials, and process-related metals off site.* There are no known process residues, waste product materials, or process-related metals in A2PII.

  - *Treat materials to meet OSDF and/or off-site disposal facility WAC.* No material in A2PII is expected to require treatment to meet OSDF WAC. Excavated materials that exceed OSDF chemical/radiological WAC will be handled as necessary by Fluor Fernald Waste Management Operations to meet the WAC of either the OSDF or an off-site facility, depending on the material.

  - *Dispose of materials that exceed the OSDF WAC off site; dispose of remaining materials in the OSDF.* There is no known above OSDF WAC material in A2PII.

- *Establish administrative controls through deed restrictions and access controls.* Access controls will be maintained for A2PII during the remediation activities.

- OU5 ROD

  - *Perform verification sampling to establish horizontal and vertical boundaries of excavation required to attain FRLs for soil and sediment.* Predesign investigations were performed or will be performed and submitted to the agencies at a later date through an addendum to this Implementation Plan to augment historical data and refine excavation limits, as discussed in Section 2.0.

  - *Excavate contaminated soil and sediment as necessary to meet FRLs; use mitigation measures as necessary to minimize potential short-term impacts to human health and the environment.* Based on RI/FS data and predesign investigations (Section 2.0), the material will be excavated as described in Section 3.0. Mitigation measures to minimize short term impacts will be taken with respect to natural and cultural resources (Sections 1.5.3 and 4.1), air pathway (Section 4.2), water pathways (Sections 4.3 and 4.4), and health and safety (Section 5.0).

  - *Perform certification sampling following excavation of contaminated soil and sediment to demonstrate that FRLs have been attained.* Real-time scanning, sampling and analysis in the excavated areas to confirm that material with COC levels above FRLs has been removed. As discussed in Section 7.2 of the SEP, a CDL will detail the proposed certification activities. If results of the certification sampling and analysis indicate that above-FRL contamination remains, then supplemental excavation and certification sampling and analysis will be performed. The certification program is discussed in Section 3.4 of the SEP.

  - *Apply DOE's As Low As Reasonably Achievable (ALARA) principles by using hand-held instruments to support verification sampling and excavation processes and, to the extent economically practical and by using detection limits achievable with hand-held instruments, reduce the remediation level for on-property soil containing relatively nonleachable uranium from 82 parts per million (ppm) to 50 ppm.* Uranium is not a primary COC for excavation in A2PII. Precertification (Section 3.6) and certification activities will be conducted to ensure that FRLs are achieved.

  - *Dispose of contaminated soil and sediment that meets the on-site WAC in the OSDF. Where possible, treat soil and sediment that exceeds the OSDF WAC to meet the WAC or treat, if necessary, and dispose of such soil at an off-site facility.* Material in A2PII that is known to be above FRLs, and meets the OSDF WAC, will be placed in the OSDF. Other materials that do not meet the WAC for the OSDF will be handled so that they either meet the WAC of either the OSDF or an off-site facility (includes possible chemical treatment or size reduction). There is no known above-WAC material in A2PII.

- *Excavate contaminated soil containing perched water that presents an unacceptable threat to the underlying aquifer through contaminant migration; dispose of this excavated soil in a manner consistent with methods indicated above for soil; treat the perched water and storm water collected during these excavation operations, as required (treatment in AWWT preceded, if necessary, by pretreatment to address any listed hazardous wastes).* There is no known contaminated perched groundwater in A2PII. Water with volatile organic compounds (VOCs) will be routed to the AWWT Phase II system. Storm water will be collected and routed, as necessary, to the SWRB for treatment through the AWWT Phase I system.

- *Collect contaminated storm water, using the existing FEMP retention basin, as necessary to minimize discharge of contaminants to Paddys Run; dewater sludges from the basin and dispose of them in the OSDF or, if they exceed OSDF WAC, in an appropriate off-site facility. Collect and treat contaminated storm water and wastewater as necessary to attain FRLs in Paddys Run and the Great Miami River and mass-based limits for discharges to the Great Miami River.* Surface water will be pumped, as necessary, from excavations and routed to the SWRB for subsequent treatment through the AWWT Phase I system.

- *Continue to employ institutional controls, including access controls and monitoring, to ensure continued protectiveness.* Access to A2PII will be restricted using barriers, construction signs, and procedural controls for the duration of remedial activities. Similarly, monitoring will continue to be conducted in accordance with the Integrated Environmental Monitoring Plan (IEMP; DOE 2001b). Long-term institutional controls necessary to implement restoration goals under the site's selected remedy are presented in the NRRP.

- *Restore the site.* Restoration of A2PII will be conducted in a manner consistent with the NRRP, and will include select backfilling of the excavation, grading areas disturbed by excavation as necessary to restore positive drainage, and establishing interim vegetation cover to prevent erosion.

1.7 LESSONS LEARNED

A lessons learned program has been implemented to apply knowledge accumulated during successive remedial efforts conducted under the SEP. Lessons learned from past remedial activities in Area 1, Phase I (A1PI), Area 1, Phase II (A1PII), A2PI, and Areas 3A and 4A have been incorporated into the A2PII IRDP to ensure that remedial activities carried out under this plan meet applicable requirements and achieve the highest quality level possible. Some of the most important lessons include:

- Establish a single project director that is responsible for the entire SDFP

- Obtain regulatory approval on Project Specific Plans (PSPs) prior to implementing the work

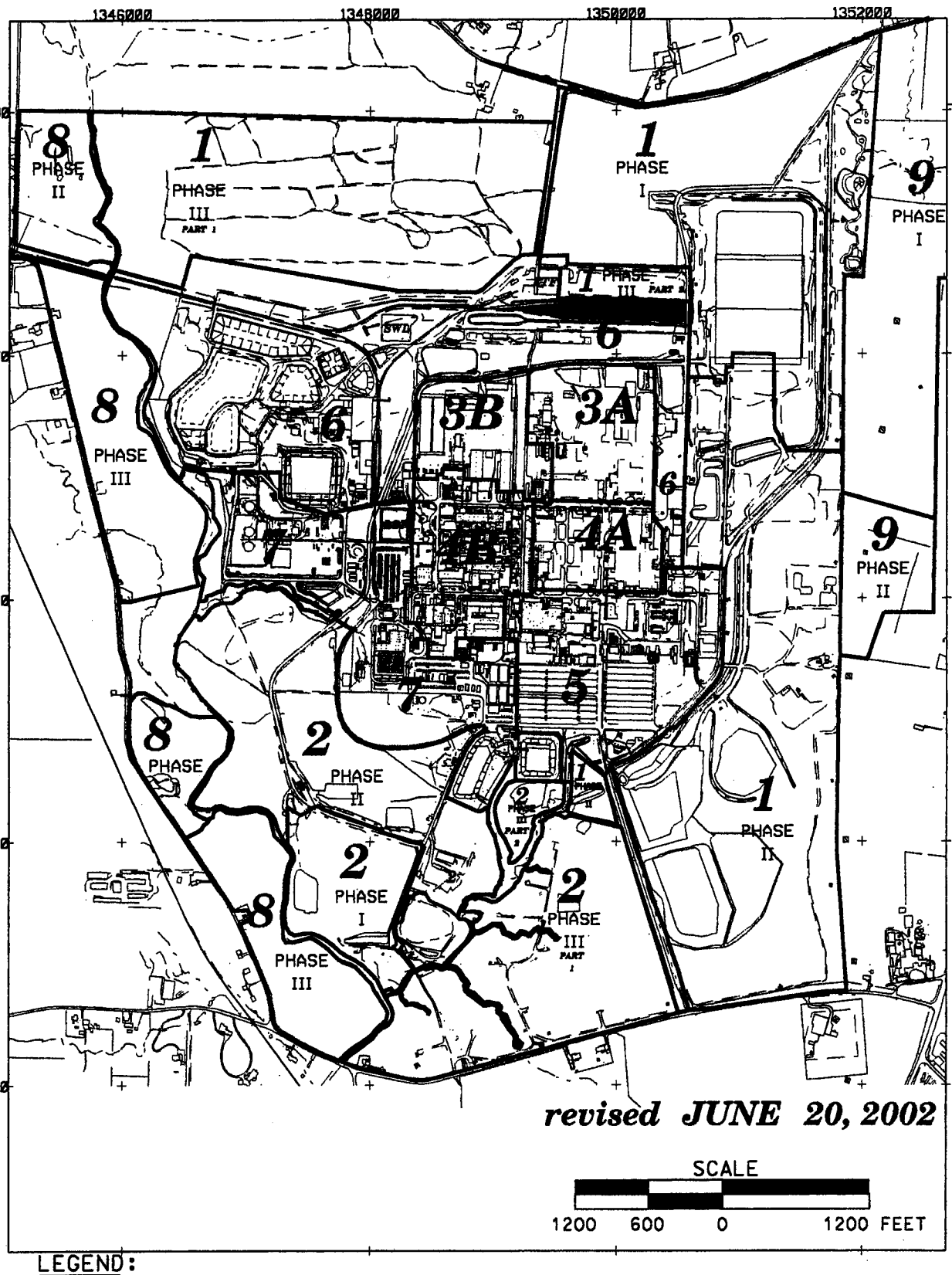
- Complete sampling and analysis activities before submitting IRDP (if possible), and include available data in the Implementation Plan

- Identify excavation depth and sample control points on figures

- Perform continuous visual observation of the excavation face to identify and segregate special material

- *In situ* gamma spectroscopy will not be proposed as an analytical method for certification activities

- Because the general complexity of remedial activities varies from area to area, soil remediation approaches at the FEMP will continue to evolve with each successive remedial effort.



LEGEND:

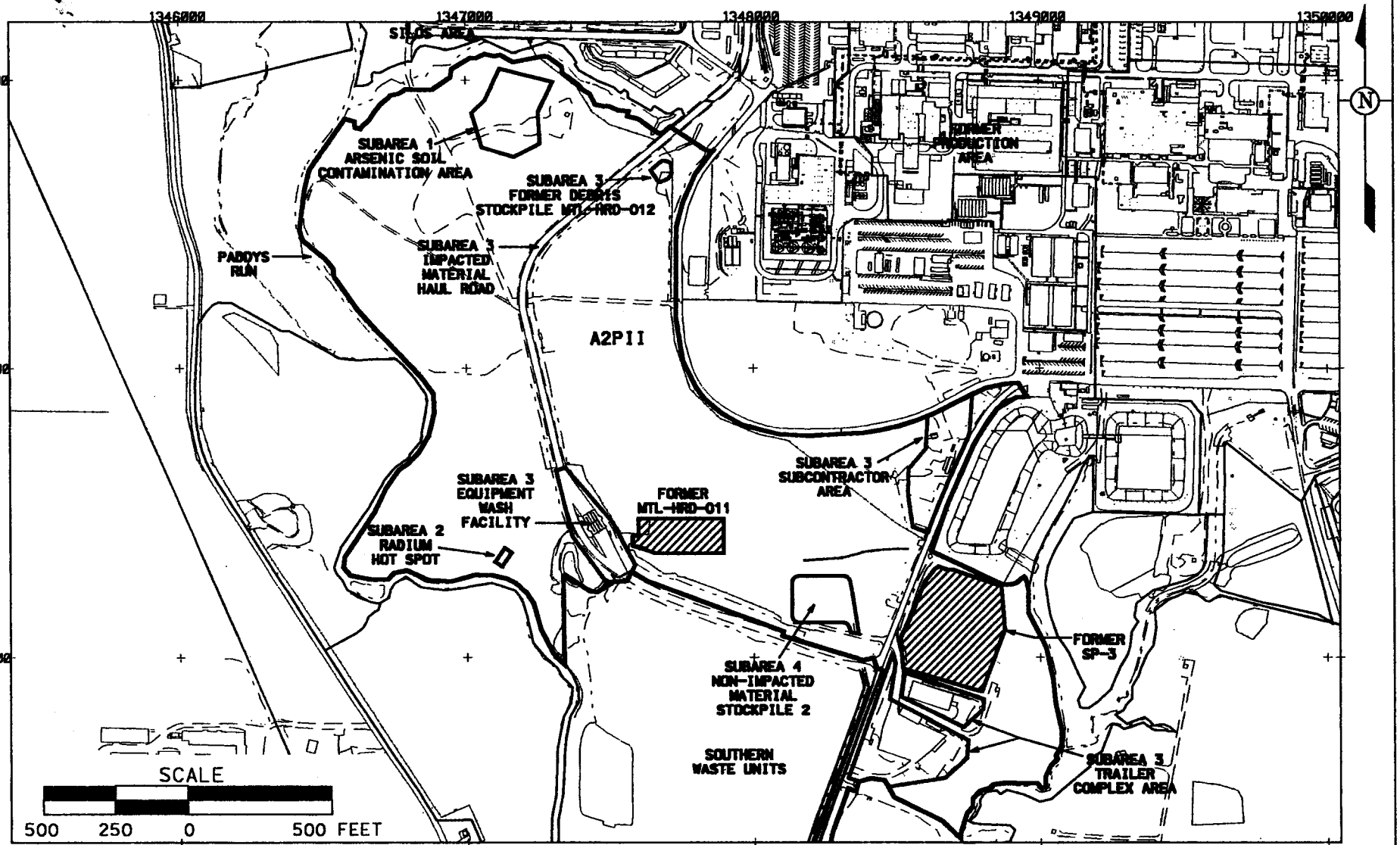
1 REMEDIATION AREA

REMEDIATION AREA BOUNDARIES

FIGURE 1-1.
GENERALIZED SITEWIDE
REMEDIATION AREAS

STATE PLANAR COORDINATE SYSTEM 1983

24-JUN-2002



LEGEND:

A2PII BOUNDARY

CERTIFIED AREA

NOTES:
1) SUBAREA 4 INCLUDES AREAS WITHIN A2PII NOT INCLUSIVE OF SUBAREAS 1, 2 OR 3.
2) CERTIFIED AREAS NOT INCLUDED IN A2PII.

FIGURE 1-2. A2PII SUBAREA LAYOUT

v:\#2fm12\dgn\[illegible]a2p2-306.dgn
STATE PLANA[illegible]DINATE SYSTEM 1983

25-JUN-2002

000026

2.0 PREDESIGN INVESTIGATIONS AND CHARACTERIZATION DATA

2.1 GENERAL APPROACH

The general approach in characterizing A2PII is described in the following subsections, 2.1.1 through 2.1.9. Each of these subsections are applicable to the entire A2PII including all subareas; the Arsenic Soil Contamination Area (ASCA), the Radium Hot Spot, the Infrastructure Area, and the Remaining A2PII Areas.

2.1.1 Summary of Surface and Subsurface Physical Conditions

A2PII is approximately 63 acres and is made up of two sections. Both sections are located in the southwest portion of the FEMP. The first section of A2PII is bounded by the SWUs and the Impacted Material Haul Road to the south, Paddys Run to the west, the Pilot Plant Drainage Ditch and Silos area to the north, and the South Construction Access Road and Building 45 Access Road to the east. This section of A2PII is divided by the Impacted Material Haul Road. This area includes the SWUs Equipment Wash Facility (Wash Facility) and the Subcontractor Area, which will all be addressed in further revisions to this IRDP. This area also includes Soil Pile MTL-HRD-011, which was certified in November 1999 in the Certification Report for Area 2, Phase III Part One (DOE 1999b). The Pilot Plant Drainage Ditch was a part A2PII, but it is now included in the Stream Corridors Area. The majority of this section consists of open, grass-covered fields and pine wood lots.

The second section of A2PII, which will be addressed in further revisions of this IRDP, encompasses the Trailer Complex, which is bounded by the South Construction Access Road to the west, the stream corridors to the east, the former Soil Stockpile (SP) 3 to the north, which was certified in April 2001 in the Certification Report for A2PII Part Three SP-3 Footprint (DOE 2001b). Figure 2-1 depicts the boundaries of A2PII along with the surface features and area topography.

2.1.2 Summary of the RI/FS Investigation

Extensive soil sampling was performed at the FEMP in the late 1980s and early 1990s as part of the RI/FS investigation to characterize the nature and extent of contamination resulting from decades of uranium-metal production. Figure 2-2 presents locations for RI/FS soil borings in A2PII. Most boring locations shown on the figures represent multiple samples collected at depths ranging from 0.5 to 40 feet below the surface (i.e., each boring location was used to collect multiple samples).

2.1.3 Preliminary Constituents of Concern

Based on results of the RI/FS investigation, the SEP presented a preliminary list of area-specific constituents of concern (ASCOCs) for Remediation Area 2 (Table 2-1) and stated that a more thorough screening of ASCOCs would be performed for each remediation area during the design phase. The additional COC screening for A2PII is discussed in Section 2.4.

2.1.4 OSDF Waste Acceptance Criteria

The OSDF WAC were established in the OU2 and OU5 RODs. Soil excavated from A2PII must meet the concentration-based WAC in OU5 ROD to be eligible for disposal in the OSDF (Table 2-2). If soil exceeds the OSDF radiological WAC, it will have to be segregated for off-site disposal. For the special case of soil with above-WAC organic COCs, disposal at the OSDF is permitted if the soil treatment results in the COC levels falling below the established WAC. The A2PII RI/FS data were compared to the OSDF WAC to identify areas that exceed the OSDF WAC. This comparison confirmed that there are no areas within the A2PII boundary that exceed the OSDF WAC.

2.1.5 Final Remediation Levels for Soil

Similar to the OSDF WAC, the OU5 ROD established the FRLs for soil remediation (Table 2-3). FRLs are the cleanup goals for the FEMP and are defined as the average concentration of a contaminant that can remain in the soil and be considered protective of human health and the environment. Remediation in A2PII will remove contaminated soil until the residual concentration of the constituents is at or below the respective FRL.

A search of the RI/FS data was performed to identify all areas containing above-FRL concentrations for the preliminary COCs in A2PII (Table 2-1). Results from this search were used to establish the areas where additional data were needed to delineate the extent of above-FRL contamination. Sampling performed to further delineate or confirm the above-FRL contamination is discussed in Section 2.2.

2.1.6 Hazardous Waste Management Units

A hazardous waste management unit (HWMU) is defined as a contiguous area of land in which hazardous waste is placed, or the largest area in which there is significant likelihood of mixing hazardous waste constituents in the same area. There are 14 HWMUs at the FEMP that will be closed during site

excavation under the RCRA/CERCLA integrated remedial response. None of the above mentioned HWMUs have been identified within the A2PII boundary.

2.1.7 Underground Storage Tanks

There are 13 underground storage tanks (USTs) at the FEMP that have been closed by removal or closed in place in accordance with RCRA requirements. Closure of a UST involves removing the UST's contents and residues, removing the tank structures and equipment, and removing contaminated soil from the UST excavation. Attainment of soil FRLs and completion of final closure will be demonstrated during soil excavation activities. None of the above mentioned USTs have been identified within the A2PII boundary.

2.1.8 Identification of Potentially Characteristic Areas

Based on historical process knowledge and soil contaminant concentration levels identified through the OU5 RI/FS investigation, six geographic areas of the FEMP have a reasonable potential for containing RCRA characteristic waste that provides an opportunity for treatment. None of the potentially characteristic areas are located in A2PII boundary. Likewise, the results of further sampling and analysis have not identified any additional locations of potentially characteristic material.

2.1.9 High Leachability Zones

The OU5 FS Report did not identify any contamination zones in the A2PII boundary with the potential for leaching.

2.2 SUMMARY OF PREDESIGN INVESTIGATIONS

Predesign investigations have been completed to supplement RI/FS information on the nature and extent of contamination in A2PII. The specific goals included filling data gaps, confirming questionable analytical results, bounding above-WAC or above-FRL areas, and identifying the location of surface above-FRL and above-WAC areas through real-time scanning. The following predesign investigations were completed to meet these goals:

- *PSP for Predesign Sampling in A2PI Non-Waste Units and Part One of A2PII (DOE 1999b)*

  Along with A2PI, this investigation area included the extreme southern portion of A2PII, which lies upgradient from A2PI and has been designated as A2PII Part One. Physical and real-time sampling was performed in this plan. The borings in this area were advanced to a depth of 4 feet and were analyzed for total uranium, thorium-228, thorium-232, radium-226, and radium-228.

- *PSP for Predesign Investigation Sampling in A2PII – Parts Two and Three (DOE 1999c)*

  This investigation included physical and real-time sampling. The physical sampling investigated the above-FRL RI/FS data for total uranium, arsenic, and beryllium and any locations identified by the real-time readings for total uranium, radium-226, and radium-228. The real-time sampling investigated the area within the A2PII boundary defined in this document.

Surface samples, which are done by real-time scanning or physical sampling, are defined as soil samples at a depth not greater than 6 inches and subsurface samples, which are done by physical sampling, are defined as soil samples collected at a depth greater than 6 inches.

The sampling and analysis performed under each of these investigations is summarized and discussed in the following sections and the analytical results from the predesign investigations are included in Appendix B.

2.2.1 Real-Time Scanning

Real-time scanning measures the surface for total uranium, radium-226, and thorium-232 using the Radiation Tracking System (RTRAK), Radiation Scanning System (RSS), and high-purity germanium (HPGe) detectors. Real-time scanning was performed on the majority of the accessible soil cover in A2PII. On real-time Figures 2-3 through 2-6, the RTRAK and RSS traverses as patterns composed of small squares and HPGe shots are shown as circles. Figure 2-3 depicts the real-time coverage of A2PII, Figure 2-4 shows the real-time coverage for total uranium, Figure 2-5 shows the coverage for thorium-232, and Figure 2-6 shows the coverage for radium-226.

Based on the real-time scanning results uranium surface contamination in the areas north and west of the Impacted Material Haul Road is below-FRL. Surface locations were identified by the HPGe as being above-FRL for radium-226 (Figure 2-7). Physical samples were taken at these locations and are further discussed in Sections 2.2.3.2.1 and 2.2.3.4.1.

2.2.2 Physical Sampling

Surface and subsurface predesign samples within A2PII were collected under two separate PSPs:

- Predesign Sampling in the A2PI Non-Waste Units and A2PII – Part One
- Predesign Sampling in the A2PII – Parts Two and Three

All RI/FS sample locations are shown on Figure 2-2. All above-FRL RI/FS sample locations and the predesign sample locations created to investigate the above-FRL RI/FS locations are shown on Figure 2-8. All above-FRL analytical results discussed in the following summaries are listed in Table 2-4.

2.2.3 Subareas in A2PII

2.2.3.1 Investigation of Subarea 1 - Arsenic Soil Contamination Area

A search of the FEMP Sitewide Environmental Database (SED) was performed of the RI/FS and predesign data in A2PII and above-FRL contamination was detected for arsenic in the north central portion of A2PII. This area is referred to as the ASCA (Figure 2-8).

2.2.3.1.1 Extent of Above-FRL Contamination in the Arsenic Soil Contamination Area

The RI/FS data identified two samples, 200029 and 200030, exceeding the FRL for arsenic. These samples were collected at boring 11369 at depths of 0.17 and 2.25 feet respectively (Figure 2-1). Extensive sampling (consisting of 62 borings, all beginning with A2P2-PT2-1 and ending with one or two alphabetical characters) at depths up to 8 feet has been done in the ASCA to bound the arsenic contamination (Figure 2-9).

Boring A2P2-PT2-1 was taken to a depth of 4 feet at the same location as the RI/FS boring 11369 and was above-FRL from 0 to 3 feet. In an attempt to bound the above-FRL, four additional borings, A2P2-PT2-1A, 1B, 1C, and 1D, were taken surrounding the original location. Each boring was located a distance of 5 feet from the original location. All of the sample results were above-FRL at depths ranging from 0 to 3 feet. Borings A2P2-PT2-1A and 1D were advanced to a depth of 6 feet in an attempt to vertically bound the above-FRL at these locations. The results of these additional samples did vertically bound the above-FRL at 6 feet, but additional sampling was required to laterally bound the arsenic contamination. Six additional borings, A2P2-PT2-1E, 1F, 1G, 1H, 1I, and 1J, located 5 to 15 feet from

the original boring, A2P1-PT2-1, were sampled to depths of 6 feet. All of these borings except A2P2-PT2-1G were above-FRL at depths ranging from 0 to 4 feet.

Over a period of 13 months, 51 additional borings were added and were advanced to depths of 6 to 8 feet (Figure 2-9). The ASCA was bound on the entire east side. Three locations, A2P2-PT2-2AK, 1AL, and 1AM, to the north, west, and south respectively, were still above-FRL. The maximum depth of contamination in the ASCA was 6 feet below surface

2.2.3.1.2 Determination of the Excavation Boundaries in the Arsenic Soil Contamination Area

Excavation boundaries for the ASCA were established based on the constructability and safe slope configurations necessary to effectively excavate the above-FRL material. This information is combined to form a complete model of the volume of material that should be excavated from the ASCA. The safe slope configurations and soil volumes associated with the excavation of the ASCA are discussed in further detail in Section 3.0.

The amount of excavation necessary to capture above-FRL soil is determined by plotting the location of the contamination, drawing an excavation shape around the contamination, establishing the depths of excavation and fitting safe slopes to the indicated depths. The fitted safe slopes correspond to the design excavation depths.

To verify that above-FRL soil has been captured by the excavation profiles the depth of each above-FRL sample result in all of A2PII was compared to the design excavation depth at the same location. If the sample depth was deeper than the excavation depth, then the excavation contours were adjusted to capture the additional above-FRL material. The results of these comparisons have been graphically represented for all A2PII COCs (Figure 2-14). When reading these graphs, note that depths are plotted relative to Mean Sea Level, and the diagonal line corresponds to a slope of 1:1 to represent the case where the excavation and sample depth are equal. Above-FRL sample points that fall below the line are captured by the designed excavation (i.e., the sample depth is shallower than the excavation depth at that location). Above-FRL sample points that fall above the line are not captured by the designed excavation (i.e., the sample depth is deeper than the excavation depth at that location). There are six points above the line, four of which are addressed in this section. The other two are addressed in Section 2.2.3.4.1.

Through predesign investigation, the ASCA was bound to the northwest at boring A2P2-PT2-1VV, to the southwest at boring A2P2-PT2-1AE, and on the entire east side at borings A2P2-PT2-1GG, 1NN, 1S, 1R, and 1AG. As stated in Section 2.2.3.1.1, the ASCA was not bounded to the north, west, or south. These locations (A2P2-PT2-1AK, A2P2-PT2-1AL, A2P2-PT2-1AM) had arsenic at concentrations just above the FRL, 18.4 milligrams per kilogram (mg/kg), 12.2 mg/kg, and 14.7 mg/kg respectively. Location A2P2-PT2-1AK had an additional interval that was above FRL at 16.8 mg/kg. Location A2P2-PT2-1AC had an interval exactly at the FRL. Statistical analyses were performed on all of the data in the ASCA (Table 2-5). These statistical analyses were consistent with those performed on all certification units in an attempt to ascertain the area-wide impact, if any, by not removing these three remaining points. The data was analyzed in two separate ways thus creating two different data subsets from the entire ASCA data set. The first set was created to examine the surface values after excavation. This subset included the 0 to 1-foot interval of the three non-excavated points, the surface interval of location A2P2-PT2-1AC, as well as the exposed intervals of the remaining points after excavation. The second subset was created to examine the surface of the excavation as described above but included the highest interval of three non-excavated points instead of the surface interval and the highest interval of location A2P2-PT2-1AC. The results of both of these statistical analyses demonstrated that this area would pass the certification criteria, including the hot spot criterion, therefore no further bounding/excavation was warranted.

2.2.3.2 Investigation of Subarea 2 - Radium Hot Spot

As stated in Section 2.3.2, real-time scanning was performed on the majority of the accessible soil cover in A2PII. During the process of real-time scanning, the HPGe readings identified one surface location as being greater than two times the FRL for radium-226. This location is at the top of a steep slope in the southwest corner of A2PII (Figure 2-10). This Area is referred to as the Radium Hot Spot.

2.2.3.2.1 Extent of Above-FRL Contamination in the Radium Hot Spot

Due to the real-time reading of two times the FRL discussed in Section 2.2.3.2, this area was investigated further for radium-226 by taking physical samples at boring A2P2-PT2-10 to a depth of 4 feet from surface. The results of this sampling were above-FRL at from 0 to 2 feet. Additional physical sampling (A2P2-PT2-10A through 10 I) was performed in the Radium Hot Spot to confirm and bound the above-FRL readings (Figure 2-11). Borings A2P2-PT2-10A, 10B, 10D, 10F, 10H, and 10I were all above-FRL. These borings were located at the top, middle, east, and bottom of the steep slope. This

area was only bound to the west. In addition to the physical sampling, real-time HPGe readings were performed in the area to further bound the contamination (Figure 2-12).

2.2.3.2.2 Determination of the Excavation Boundaries at the Radium Hot Spot

Excavation boundaries for the Radium Hot Spot were established based on physical samples in conjunction with real-time scanning. Based on the physical sampling results, boring A2P2-PT2-10C bound the area to the northeast, boring A2P2-PT2-10G bound the area to the west, and boring A2P2-PT2-10 bound the area to the south. The real-time screening further bound the area at the above-FRL borings listed in Section 2.2.3.2.1. This area, which is 70 feet by 30 feet, will be excavated to depths of 0.5 to 2 feet. This information is combined to form a complete model of the volume of material that should be excavated from the Radium Hot Spot. The soil volumes and boundaries associated with the excavation area of the Radium Hot Spot are discussed in further detail in Section 3.0.

2.2.3.3 Investigation of Subarea 3 - Infrastructure

The Infrastructure includes the Trailer Complex, the Wash Facility, a portion of the Impacted Material Haul Road and nearby footprint of a former debris pile (MTL-HRD-012), and the Subcontractor Area. To date, there has been no predesign investigation of the Infrastructure in A2PII. Additional samples will be taken throughout these areas to further define the extent of excavation necessary to remove the infrastructure as well as any impacted soil within the area. This sampling will be varianced to the existing A2PII Predesign PSPs and performed prior to the finalization of the designs for infrastructure removal. All data will be incorporated into an addendum to this IRDP, which will be submitted at a later date.

2.2.3.4 Investigation of Subarea 4 - Remaining A2PII Areas

The Remaining A2PII Areas consist of everything but the ASCA, the Radium Hot Spot, and the Infrastructure. The area north of the east/west portion of the Impacted Material Haul Road including Non-Impacted Material Stockpile No. 2 was in A2PI, but in responses to the EPA and OEPA comments on the IRDP for A2PI Non-Waste Units Perimeter Areas (DOE 2001c), this area is now considered part of A2PII.

2.2.3.4.1 Extent of Above-FRL Contamination in the Remaining A2PII Areas

A search of the FEMP SED was performed of RI/FS and predesign data in A2PII and above-FRL contamination was detected for uranium, arsenic, and beryllium in the Remaining A2PII Areas.

The RI/FS data identified one sample, 007084, at boring 2009 as exceeding the FRL for total uranium at a depth of 40 feet (Figure 2-8). This area is located in the northwest corner of A2PII. One boring, A2P2-PT2-4, was conducted at the same location to confirm and bound the above-FRL result of 132 ppm at the RI/FS location. The results of the predesign sampling were well below the FRL for total uranium. Therefore, this area is not identified as an above-FRL area.

Two samples, 200058 at boring 11371 and 121098 at boring 500318/SS-33 exceeded the FRL for arsenic at the surface. The first RI/FS sample (200058), which was collected at boring 11371, is located between the southwest corner of the former Non-Impacted Material Stockpile No. 2 and the east/west portion of the Impacted Material Haul Road at a depth of 2.5 feet (Figure 2-8). The arsenic result was 12.3 mg/kg and the FRL for arsenic is 12 mg/kg. Since the result is very close to the FRL limit and this area will undergo extensive sampling for certification, this location was not bounded during the predesign investigation as stated in the PSP for Predesign Sampling in A2PI Non-Waste Units and Part One of A2PII.

The second RI/FS sample (121098), which was collected at boring 500318/SS-33, is located on the northwest tip of A2PII (Figure 2-8). One boring, A2P2-PT2-2, was conducted at the same location to confirm and bound the above-FRL result of 26 mg/kg at the RI/FS location. The results of the predesign sampling were below the FRL for arsenic. Therefore, this area is not identified as an above-FRL area.

One sample, 121033 at boring SS-36, exceeded the FRL for beryllium. This RI/FS sample is located southwest of the Wash Facility and south of Basin 4 at a depth of 0.5 feet (Figure 2-8). The beryllium result is 1.7 mg/kg, while the FRL for beryllium is 1.5 mg/kg. Because the result is very close to the FRL limit and this area will undergo extensive sampling for certification, this location was not bounded during the predesign investigation as stated in the PSP for Predesign Sampling in A2PI Non-Waste Units and Part One of A2PII.

Real-time scanning was performed on the majority of the accessible soil cover in A2PII. Approximately 18 surface locations were identified by the HPGe readings as being above-FRL for radium-226 (Figure 2-7). Twelve of these locations (A2P2-PT1-9 through 12, A2P2-PT2-15 through 20) were investigated as a result of response to Comment No. 7 of the IRDP for A2PI Non-Waste Units Perimeter Area (DOE 2001?). They were located just north of the east/west portion of the Impacted Material Haul Road. The other four locations (A2P2-PT2-23 through 26) were investigated for consistency because their concentrations were similar to the aforementioned 12 locations (Figure 2-10). HPGe readings were done again at these locations as well as physical sampling to confirm and bound the above-FRL readings if needed (Figures 2-10 and 2-13). Two locations, A2P2-PT1-13 and -14, were not taken because they were under water and two locations were not investigated because they were excavated with the ASCA, which excluded them from physical sampling. All of the results from this sampling were below FRL; therefore no further action is required.

Two locations in A2PII north of the east/west portion of the Impacted Material Haul Road were identified as being above-FRL for radium-226 by the real-time readings during A1PI Excavation as per the PSP for A1PI South Field Excavation Characterization (DOE 1999d). Physical samples, SF-HR1 and SF-HR2 were taken and analyzed for radium-226 and total uranium (Figure 2-8). Based on the results of this sampling, this area was scraped not less than 3 feet to capture the above-FRL soil. No further action is necessary.

To date, the area east of the Impacted Material Haul Road has not had real-time scanning performed (Figures 2-3 through 2-6). Process and historical knowledge indicates the aforementioned area has not been impacted. Furthermore, there is no planned remedial action for the Remaining A2PII Areas based on RI/FS data, existing predesign data, and process knowledge.

2.3 IDENTIFICATION OF AREA-SPECIFIC CONSTITUENTS OF CONCERN

Section 2.1.1 identified the preliminary list of COCs for A2PII, which was based on the results of sampling and analysis performed during the RI/FS investigation. Based on the results of predesign sampling and analysis, Table 2-6 presents the revised list of COCs that will be used for A2PII excavation. The list of primary COCs has remained the same and some of the secondary COCs have been eliminated. The COCs were chosen based on the following three criteria:

- The constituent is widespread in A2PII and is commonly found at above-FRL concentrations (i.e., the primary COCs)

- The constituent is present at above-FRL concentrations at depths that drive the design excavation contours in those areas

- Physical sampling that identified above-FRL material.

TABLE 2-1
PRELIMINARY LIST OF ASCOCs

Primary COCs	Secondary COCs
Radium-226	Aroclor-1254
Radium-228	Aroclor-1260
Thorium-228	Arsenic
Thorium-232	Benzo(a)pyrene
Total Uranium	Beryllium
	Bromodichloromethane
	Cesium-137
	Dibenzo(a,h)anthracene
	1,1-Dichloroethene
	Dieldrin
	Lead
	Neptunium-237
	Technetium-99
	Thorium-230

TABLE 2-2
OSDF WASTE ACCEPTANCE CRITERIA

WAC Constituent	Maximum Concentration
Neptunium-237	3.12×10^{9} pCi/g
Strontium-90	5.67×10^{10} pCi/g
Technetium-99	29.1 pCi/g
Total Uranium	1030 mg/kg
Alpha-chlordane	2.89 mg/kg
Bis(2-chloroisopropyl)ether	2.44×10^{-2} mg/kg
Bromodichloromethane	9.03×10^{-1} mg/kg
Carbazole	7.27×10^{4} mg/kg
Chloroethane	3.92×10^{5} mg/kg
1,1-Dichloroethene	11.4 mg/kg
1,2-Dichloroethene	11.4 mg/kg
4-Nitroaniline	4.42×10^{-2} mg/kg
Tetrachloroethene	128 mg/kg
Toxaphene	1.06×10^{5} mg/kg
Trichloroethene	128 mg/kg
Vinyl chloride	1.51 mg/kg
Boron	1.04×10^{3} mg/kg
Mercury	5.66×10^{4} mg/kg

pCi/g – picoCuries per gram

TABLE 2-3
FINAL REMEDIATION LEVELS FOR SOIL

Constituent	Final Remediation Level
Radionuclides	
Cesium-137	1.4 pCi/g
Neptunium-237	3.2 pCi/g
Radium-226	1.7 pCi/g
Radium-228	1.8 pCi/g
Technetium-99	30 pCi/g
Thorium-228	1.7 pCi/g
Thorium-232	1.5 pCi/g
Uranium, Total	82 mg/kg
Inorganics	
Arsenic	12 mg/kg
Beryllium	1.5 mg/kg
Lead	400 mg/kg
Organics	
Aroclor-1254	0.13 mg/kg
Aroclor-1260	0.13 mg/kg
Benzo(a)pyrene	2 mg/kg
Bromodichloromethane	4 mg/kg
Dibenzo(a,h)anthracene	2 mg/kg
1,1-Dichloroethene	0.41 mg/kg
Dieldrin	0.015 mg/kg

TABLE 2-4
ABOVE-FRL DATA SUMMARY

Boring ID	Sample ID	Depth (feet)	Parameter	Above-FRL Value	FRL Limit
ARSENIC SOIL CONTAMINATION AREA DATA					
11369 (RI/FS)	200029	0 - 0.17	Arsenic	20.3 mg/kg	12 mg/kg
11369 (RI/FS)	200030	2 - 2.5	Arsenic	39.6 mg/kg	12 mg/kg
A2P2-PT2-1	A2P2-PT2-1-1-RM	0 - 1	Arsenic	17.3 mg/kg	12 mg/kg
A2P2-PT2-1	A2P2-PT2-1-2-RM	1 - 2	Arsenic	30.4 mg/kg	12 mg/kg
A2P2-PT2-1	A2P2-PT2-1-3-RM	2 - 3	Arsenic	26.4 mg/kg	12 mg/kg
A2P2-PT2-1A	A2P2-PT2-1A-1-RM	0 - 1	Arsenic	24.4 mg/kg	12 mg/kg
A2P2-PT2-1A	A2P2-PT2-1A-3-RM	2 - 3	Arsenic	24.6 mg/kg	12 mg/kg
A2P2-PT2-1A	A2P2-PT2-1A-4-M	3 - 4	Arsenic	13.2 mg/kg	12 mg/kg
A2P2-PT2-1A	A2P2-PT2-1A-5-M	4 - 5	Arsenic	13.4 mg/kg	12 mg/kg
A2P2-PT2-1AA	A2P2-PT2-1AA-2-M	1 - 2	Arsenic	16.6 mg/kg	12 mg/kg
A2P2-PT2-1AA	A2P2-PT2-1AA-3-M	2 - 3	Arsenic	21.5 mg/kg	12 mg/kg
A2P2-PT2-1AA	A2P2-PT2-1AA-4-M	3 - 4	Arsenic	15.2 mg/kg	12 mg/kg
A2P2-PT2-1AB	A2P2-PT2-1AB-3-M	2 - 3	Arsenic	15.4 mg/kg	12 mg/kg
A2P2-PT2-1AD	A2P2-PT2-1AD-4-M	3 - 4	Arsenic	12.8 mg/kg	12 mg/kg
A2P2-PT2-1AF	A2P2-PT2-1AF-3-M	2 - 3	Arsenic	13.8 mg/kg	12 mg/kg
A2P2-PT2-1AF	A2P2-PT2-1AF-4-M	3 - 4	Arsenic	35.7 mg/kg	12 mg/kg
A2P2-PT2-1AF	A2P2-PT2-1AF-5-M	4 - 5	Arsenic	26.4 mg/kg	12 mg/kg
A2P2-PT2-1AH	A2P2-PT2-1AH-3-M	2 - 3	Arsenic	16.2 mg/kg	12 mg/kg
A2P2-PT2-1AH	A2P2-PT2-1AH-4-M	3 - 4	Arsenic	14 mg/kg	12 mg/kg
A2P2-PT2-1AI	A2P2-PT2-1AI-2-M	1 - 2	Arsenic	12.6 mg/kg	12 mg/kg
A2P2-PT2-1AI	A2P2-PT2-1AI-3-M	2 - 3	Arsenic	12.2 mg/kg	12 mg/kg
A2P2-PT2-1AI	A2P2-PT2-1AI-4-M	3 - 4	Arsenic	16 mg/kg	12 mg/kg
A2P2-PT2-1AJ	A2P2-PT2-1AJ-3-M	2 - 3	Arsenic	14.2 mg/kg	12 mg/kg
A2P2-PT2-1AJ	A2P2-PT2-1AJ-5-M	4 - 5	Arsenic	15.7 mg/kg	12 mg/kg
A2P2-PT2-1AJ	A2P2-PT2-1AJ-6-M	5 - 6	Arsenic	12.6 mg/kg	12 mg/kg
A2P2-PT2-1AK	A2P2-PT2-1AK-3-M	2 - 3	Arsenic	18.4 mg/kg	12 mg/kg
A2P2-PT2-1AK	A2P2-PT2-1AK-4-M	3 - 4	Arsenic	16.8 mg/kg	12 mg/kg
A2P2-PT2-1AL	A2P2-PT2-1AL-3-M	2 - 3	Arsenic	12.2 mg/kg	12 mg/kg
A2P2-PT2-1AM	A2P2-PT2-1AM-4-M	3 - 4	Arsenic	14.7 mg/kg	12 mg/kg
A2P2-PT2-1B	A2P2-PT2-1B-1-RM	0 - 1	Arsenic	33.1 mg/kg	12 mg/kg
A2P2-PT2-1B	A2P2-PT2-1B-3-RM	2 - 3	Arsenic	23.7 mg/kg	12 mg/kg
A2P2-PT2-1BB	A2P2-PT2-1BB-2-M	1 - 2	Arsenic	12.9 mg/kg	12 mg/kg
A2P2-PT2-1BB	A2P2-PT2-1BB-3-M	2 - 3	Arsenic	12.9 mg/kg	12 mg/kg
A2P2-PT2-1C	A2P2-PT2-1C-1-RM	0 - 1	Arsenic	23.3 mg/kg	12 mg/kg
A2P2-PT2-1C	A2P2-PT2-1C-3-RM	2 - 3	Arsenic	23.1 mg/kg	12 mg/kg
A2P2-PT2-1CC	A2P2-PT2-1CC-2-M	1 - 2	Arsenic	19.3 mg/kg	12 mg/kg
A2P2-PT2-1CC	A2P2-PT2-1CC-3-M	2 - 3	Arsenic	19.5 mg/kg	12 mg/kg
A2P2-PT2-1CC	A2P2-PT2-1CC-4-M	3 - 4	Arsenic	15.7 mg/kg	12 mg/kg
A2P2-PT2-1CC	A2P2-PT2-1CC-5-M	4 - 5	Arsenic	18.5 mg/kg	12 mg/kg

TABLE 2-4
ABOVE-FRL DATA SUMMARY

Boring ID	Sample ID	Depth (feet)	Parameter	Above-FRL Value	FRL Limit
A2P2-PT2-1D	A2P2-PT2-1D-1-RM	0 - 1	Arsenic	23 mg/kg	12 mg/kg
A2P2-PT2-1D	A2P2-PT2-1D-3-RM	2 - 3	Arsenic	14.8 mg/kg	12 mg/kg
A2P2-PT2-1D	A2P2-PT2-1D-4-M	3 - 4	Arsenic	12.6 mg/kg	12 mg/kg
A2P2-PT2-1DD	A2P2-PT2-1DD-2-M	1 - 2	Arsenic	17.8 mg/kg	12 mg/kg
A2P2-PT2-1DD	A2P2-PT2-1DD-3-M	2 - 3	Arsenic	17.9 mg/kg	12 mg/kg
A2P2-PT2-1E	A2P2-PT2-1E-1-RM	0 - 1	Arsenic	18.8 mg/kg	12 mg/kg
A2P2-PT2-1E	A2P2-PT2-1E-3-RM	2 - 3	Arsenic	13 mg/kg	12 mg/kg
A2P2-PT2-1E	A2P2-PT2-1E-4-RM	3 - 4	Arsenic	12.3 mg/kg	12 mg/kg
A2P2-PT2-1EE	A2P2-PT2-1EE-6-M	5 - 6	Arsenic	16.7 mg/kg	12 mg/kg
A2P2-PT2-1F	A2P2-PT2-1F-1-RM	0 - 1	Arsenic	32.6 mg/kg	12 mg/kg
A2P2-PT2-1F	A2P2-PT2-1F-3-RM	2 - 3	Arsenic	37.4 mg/kg	12 mg/kg
A2P2-PT2-1FF	A2P2-PT2-1FF-2-M	1 - 2	Arsenic	12.2 mg/kg	12 mg/kg
A2P2-PT2-1FF	A2P2-PT2-1FF-3-M	2 - 3	Arsenic	16.1 mg/kg	12 mg/kg
A2P2-PT2-1FF	A2P2-PT2-1FF-5-M	4 - 5	Arsenic	13.5 mg/kg	12 mg/kg
A2P2-PT2-1H	A2P2-PT2-1H-1-RM	0 - 1	Arsenic	28.6 mg/kg	12 mg/kg
A2P2-PT2-1HH	A2P2-PT2-1HH-5-M	4 - 5	Arsenic	12.4 mg/kg	12 mg/kg
A2P2-PT2-1I	A2P2-PT2-1I-1-RM	0 - 1	Arsenic	21.6 mg/kg	12 mg/kg
A2P2-PT2-1I	A2P2-PT2-1I-3-RM	2 - 3	Arsenic	17.3 mg/kg	12 mg/kg
A2P2-PT2-1I	A2P2-PT2-1I-4-RM	3 - 4	Arsenic	12.4 mg/kg	12 mg/kg
A2P2-PT2-1II	A2P2-PT2-1II-5-M	4 - 5	Arsenic	15.6 mg/kg	12 mg/kg
A2P2-PT2-1J	A2P2-PT2-1J-1-RM	0 - 1	Arsenic	22.4 mg/kg	12 mg/kg
A2P2-PT2-1J	A2P2-PT2-1J-3-RM	2 - 3	Arsenic	38.1 mg/kg	12 mg/kg
A2P2-PT2-1J	A2P2-PT2-1J-4-RM	3 - 4	Arsenic	17.5 mg/kg	12 mg/kg
A2P2-PT2-1JJ	A2P2-PT2-1JJ-3-M	2 - 3	Arsenic	20.6 mg/kg	12 mg/kg
A2P2-PT2-1JJ	A2P2-PT2-1JJ-5-M	4 - 5	Arsenic	12.4 mg/kg	12 mg/kg
A2P2-PT2-1K	A2P2-PT2-1K-1-M	0 - 1	Arsenic	17.4 mg/kg	12 mg/kg
A2P2-PT2-1K	A2P2-PT2-1K-3-M	2 - 3	Arsenic	27.2 mg/kg	12 mg/kg
A2P2-PT2-1K	A2P2-PT2-1K-4-M	3 - 4	Arsenic	22.6 mg/kg	12 mg/kg
A2P2-PT2-1KK	A2P2-PT2-1KK-2-M	1 - 2	Arsenic	13.2 mg/kg	12 mg/kg
A2P2-PT2-1L	A2P2-PT2-1L-1-M	0 - 1	Arsenic	25.3 mg/kg	12 mg/kg
A2P2-PT2-1L	A2P2-PT2-1L-3-M	2 - 3	Arsenic	37.9 mg/kg	12 mg/kg
A2P2-PT2-1L	A2P2-PT2-1L-4-M	3 - 4	Arsenic	13.5 mg/kg	12 mg/kg
A2P2-PT2-1L	A2P2-PT2-1L-5-M	4 - 5	Arsenic	12.3 mg/kg	12 mg/kg
A2P2-PT2-1LL	A2P2-PT2-1LL-1-M	0 - 1	Arsenic	36.4 mg/kg	12 mg/kg
A2P2-PT2-1LL	A2P2-PT2-1LL-2-M	1 - 2	Arsenic	63.6 mg/kg	12 mg/kg
A2P2-PT2-1LL	A2P2-PT2-1LL-3-M	2 - 3	Arsenic	34 mg/kg	12 mg/kg
A2P2-PT2-1LL	A2P2-PT2-1LL-4-M	3 - 4	Arsenic	12.6 mg/kg	12 mg/kg
A2P2-PT2-1M	A2P2-PT2-1M-1-M	0 - 1	Arsenic	19.1 mg/kg	12 mg/kg
A2P2-PT2-1M	A2P2-PT2-1M-2-M	1 - 2	Arsenic	24.2 mg/kg	12 mg/kg
A2P2-PT2-1MM	A2P2-PT2-1MM-1-M	0 - 1	Arsenic	13.2 mg/kg	12 mg/kg
A2P2-PT2-1MM	A2P2-PT2-1MM-2-M	1 - 2	Arsenic	24.8 mg/kg	12 mg/kg

TABLE 2-4
ABOVE-FRL DATA SUMMARY

Boring ID	Sample ID	Depth (feet)	Parameter	Above-FRL Value	FRL Limit
A2P2-PT2-1MM	A2P2-PT2-1MM-3-M	2 - 3	Arsenic	50.8 mg/kg	12 mg/kg
A2P2-PT2-1MM	A2P2-PT2-1MM-4-M	3 - 4	Arsenic	15.3 mg/kg	12 mg/kg
A2P2-PT2-1MM	A2P2-PT2-1MM-5-M	4 - 5	Arsenic	18.6 mg/kg	12 mg/kg
A2P2-PT2-1OO	A2P2-PT2-1OO-2-M	1 - 2	Arsenic	13.6 mg/kg	12 mg/kg
A2P2-PT2-1OO	A2P2-PT2-1OO-3-M	2 - 3	Arsenic	13.6 mg/kg	12 mg/kg
A2P2-PT2-1OO	A2P2-PT2-1OO-6-M	5 - 6	Arsenic	25.2 mg/kg	12 mg/kg
A2P2-PT2-1P	A2P2-PT2-1P-4-M	3 - 4	Arsenic	14.7 mg/kg	12 mg/kg
A2P2-PT2-1PP	A2P2-PT2-1PP-3-M	2 - 3	Arsenic	12.3 mg/kg	12 mg/kg
A2P2-PT2-1Q	A2P2-PT2-1Q-4-M	3 - 4	Arsenic	20.4 mg/kg	12 mg/kg
A2P2-PT2-1QQ	A2P2-PT2-1QQ-3-M	2 - 3	Arsenic	16.6 mg/kg	12 mg/kg
A2P2-PT2-1RR	A2P2-PT2-1RR-2-M	1 - 2	Arsenic	12.9 mg/kg	12 mg/kg
A2P2-PT2-1RR	A2P2-PT2-1RR-3-M	2 - 3	Arsenic	14.4 mg/kg	12 mg/kg
A2P2-PT2-1RR	A2P2-PT2-1RR-6-M	5 - 6	Arsenic	15 mg/kg	12 mg/kg
A2P2-PT2-1SS	A2P2-PT2-1SS-2-M	1 - 2	Arsenic	21.9 mg/kg	12 mg/kg
A2P2-PT2-1SS	A2P2-PT2-1SS-3-M	2 - 3	Arsenic	19.4 mg/kg	12 mg/kg
A2P2-PT2-1SS	A2P2-PT2-1SS-4-M	3 - 4	Arsenic	28.2 mg/kg	12 mg/kg
A2P2-PT2-1SS	A2P2-PT2-1SS-6-M	5 - 6	Arsenic	15.9 mg/kg	12 mg/kg
A2P2-PT2-1T	A2P2-PT2-1T-1-M	0 - 1	Arsenic	30.1 mg/kg	12 mg/kg
A2P2-PT2-1TT	A2P2-PT2-1TT-1-M	0 - 1	Arsenic	17.4 mg/kg	12 mg/kg
A2P2-PT2-1TT	A2P2-PT2-1TT-2-M	1 - 2	Arsenic	17.3 mg/kg	12 mg/kg
A2P2-PT2-1V	A2P2-PT2-1V-3-M	2 - 3	Arsenic	24.7 mg/kg	12 mg/kg
A2P2-PT2-1V	A2P2-PT2-1V-4-M	3 - 4	Arsenic	18.7 mg/kg	12 mg/kg
A2P2-PT2-1W	A2P2-PT2-1W-2-M	1 - 2	Arsenic	28.2 mg/kg	12 mg/kg
A2P2-PT2-1W	A2P2-PT2-1W-3-M	2 - 3	Arsenic	21.4 mg/kg	12 mg/kg
A2P2-PT2-1W	A2P2-PT2-1W-4-M	3 - 4	Arsenic	38.8 mg/kg	12 mg/kg
A2P2-PT2-1WW	A2P2-PT2-1WW-2-M	1 - 2	Arsenic	13.7 mg/kg	12 mg/kg
A2P2-PT2-1WW	A2P2-PT2-1WW-3-M	2 - 3	Arsenic	13.9 mg/kg	12 mg/kg
A2P2-PT2-1X	A2P2-PT2-1X-1-M	0 - 1	Arsenic	17.2 mg/kg	12 mg/kg
A2P2-PT2-1X	A2P2-PT2-1X-2-M	1 - 2	Arsenic	21.8 mg/kg	12 mg/kg
A2P2-PT2-1X	A2P2-PT2-1X-3-M	2 - 3	Arsenic	13 mg/kg	12 mg/kg
A2P2-PT2-1XX	A2P2-PT2-1XX-3-M	2 - 3	Arsenic	12.2 mg/kg	12 mg/kg
A2P2-PT2-1Y	A2P2-PT2-1Y-3-M	2 - 3	Arsenic	12.7 mg/kg	12 mg/kg
A2P2-PT2-1Y	A2P2-PT2-1Y-4-M	3 - 4	Arsenic	40.5 mg/kg	12 mg/kg
A2P2-PT2-1YY	A2P2-PT2-1YY-4-M	3 - 4	Arsenic	18.2 mg/kg	12 mg/kg
A2P2-PT2-1Z	A2P2-PT2-1Z-1-M	0 - 1	Arsenic	13.3 mg/kg	12 mg/kg
A2P2-PT2-1Z	A2P2-PT2-1Z-2-M	1 - 2	Arsenic	21 mg/kg	12 mg/kg
A2P2-PT2-1Z	A2P2-PT2-1Z-3-M	2 - 3	Arsenic	22.1 mg/kg	12 mg/kg
A2P2-PT2-1Z	A2P2-PT2-1Z-4-M	3 - 4	Arsenic	23.6 mg/kg	12 mg/kg
A2P2-PT2-1ZZ	A2P2-PT2-1ZZ-3-M	2 - 3	Arsenic	23.9 mg/kg	12 mg/kg
A2P2-PT2-1ZZ	A2P2-PT2-1ZZ-4-M	3 - 4	Arsenic	12.3 mg/kg	12 mg/kg

TABLE 2-4
ABOVE-FRL DATA SUMMARY

Boring ID	Sample ID	Depth (feet)	Parameter	Above-FRL Value	FRL Limit
RADIUM HOT SPOT AREA DATA					
A2P2-PT2-10	A2P2-PT2-10-1-R	0 - 1	Radium-226	16 pCi/g	1.7 pCi/g
A2P2-PT2-10	A2P2-PT2-10-2-R	1 - 2	Radium-226	4.078 pCi/g	1.7 pCi/g
A2P2-PT2-10A	A2P2-PT2-10A-1-R	0 - 1	Radium-226	1.9 pCi/g	1.7 pCi/g
A2P2-PT2-10B	A2P2-PT2-10B-1-R	0 - 1	Radium-226	2.8 pCi/g	1.7 pCi/g
A2P2-PT2-10D	A2P2-PT2-10D-1-R	0 - 1	Radium-226	8.1 pCi/g	1.7 pCi/g
A2P2-PT2-10F	A2P2-PT2-10F-1-R	0 - 1	Radium-226	6.7 pCi/g	1.7 pCi/g
A2P2-PT2-10H	A2P2-PT2-10H-1	0 - 1	Radium-226	8.1 pCi/g	1.7 pCi/g
A2P2-PT2-10I	A2P2-PT2-10I-1	0 - 1	Radium-226	1.8 pCi/g	1.7 pCi/g
REMAINING A2PII AREAS DATA					
* 2009 (RI/FS)	007084	38.5 - 40	Uranium, Total	132 mg/kg	82 mg/kg
11371 (RI/FS)	200058	2 - 2.5	Arsenic	12.3 mg/kg	12 mg/kg
• 500318/SS-33 (RI/FS)	121098	0 - 0.5	Arsenic	26 mg/kg	12 mg/kg
SS-36 (RI/FS)	121033	0 - 0.5	Beryllium	1.7 mg/kg	1.5 mg/kg
** SF-HR1	SF-HR1-ROOT-RB	0 - 0.5	Total Uranium	247 mg/kg	50 mg/kg

* Locations have been resampled and are below FRL
** Sample was removed in A2PI Excavation

TABLE 2-5
ARSENIC SOIL CONTAMINATION AREA STATISTICS

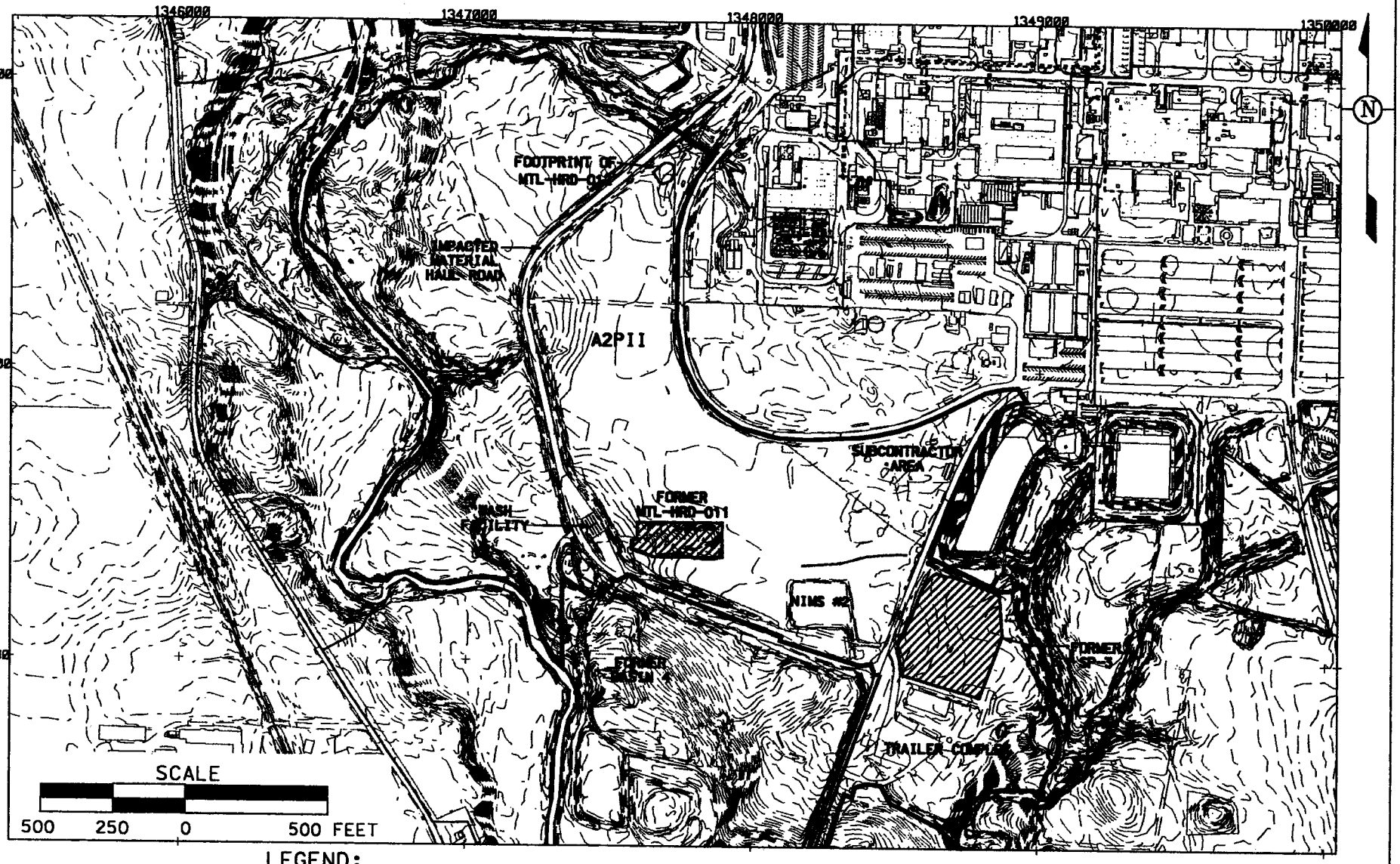
ID	Surface	Maximum
A2P2-PT2-1A	3.83	3.83
A2P2-PT2-1D	4.76	4.76
A2P2-PT2-1K	5.56	5.56
A2P2-PT2-1L	5.23	5.23
A2P2-PT2-1M	5.00	5.00
A2P2-PT2-1P	8.35	8.35
A2P2-PT2-1Q	6.00	6.00
A2P2-PT2-1R	1.93	1.93
A2P2-PT2-1S	4.70	4.70
A2P2-PT2-1T	1.97	1.97
A2P2-PT2-1V	8.97	8.97
A2P2-PT2-1W	6.80	6.80
A2P2-PT2-1X	5.38	5.38
A2P2-PT2-1Y	4.55	4.55
A2P2-PT2-1Z	2.46	2.46
A2P2-PT2-1AA	0.82	0.82
A2P2-PT2-1BB	3.56	3.56
A2P2-PT2-1CC	2.96	2.96
A2P2-PT2-1DD	2.31	2.31
A2P2-PT2-1EE	8.08	8.08
A2P2-PT2-1FF	9.46	9.46
A2P2-PT2-1GG	1.99	1.99
A2P2-PT2-1HH	7.49	7.49
A2P2-PT2-1II	7.51	7.51
A2P2-PT2-1JJ	8.40	8.40
A2P2-PT2-1KK	7.13	7.13

ID	Surface	Maximum
A2P2-PT2-1LL	2.68	2.68
A2P2-PT2-1MM	5.15	5.15
A2P2-PT2-1NN	1.75	1.75
A2P2-PT2-1OO	1.90	1.90
A2P2-PT2-1PP	11.00	11.00
A2P2-PT2-1QQ	9.85	9.85
A2P2-PT2-1RR	15.00	15.00
A2P2-PT2-1SS	15.90	15.90
A2P2-PT2-1TT	1.29	1.29
A2P2-PT2-1UU	3.73	3.73
A2P2-PT2-1VV	5.56	5.56
A2P2-PT2-1WW	5.27	5.27
A2P2-PT2-1XX	4.96	4.96
A2P2-PT2-1YY	3.84	3.84
A2P2-PT2-1ZZ	2.22	2.22
A2P2-PT2-1AB	2.19	2.19
A2P2-PT2-1AD	7.18	7.18
A2P2-PT2-1AE	3.96	3.96
A2P2-PT2-1AF	6.88	6.88
A2P2-PT2-1AG	3.35	3.35
A2P2-PT2-1AH	3.85	3.85
A2P2-PT2-1AI	11.20	11.20
A2P2-PT2-1AJ	12.60	12.60
A2P2-PT2-1AC	11.40	12.00
A2P2-PT2-1AK	7.61	18.40
A2P2-PT2-1AL	7.87	12.20
A2P2-PT2-1AM	9.74	14.70

	Surface	Maximum
Limit	12.0	12.0
Units	mg/kg	mg/kg
Confidence Level	90%	90%
Max. Result	15.90	18.40
Standardized Skewness	-1.400	-0.911
W-statistic Prob. #	0.312	0.564
Test Procedure	t-Test (LN)	t-Test (LN)
Sample Size	53	53
Nondetects	0	0
Est. Mean*	6.06	6.45
UCL	6.96	7.49
Prob. > Limit	- -	- -
Est. Mean - Pass / Fail	Pass	Pass
2x Rule - Pass / Fail	Pass	Pass
a posteriori Sample	4	4
Size calculation	Pass	Pass

TABLE 2-6
A2PII REVISED LIST OF ASCOCs

Primary COCs	Secondary COCs
Radium-226	Arsenic
Radium-228	Beryllium
Thorium-228	
Thorium-232	
Total Uranium	



LEGEND:

A2P2 BOUNDARY

CERTIFIED AREA

DRAFT

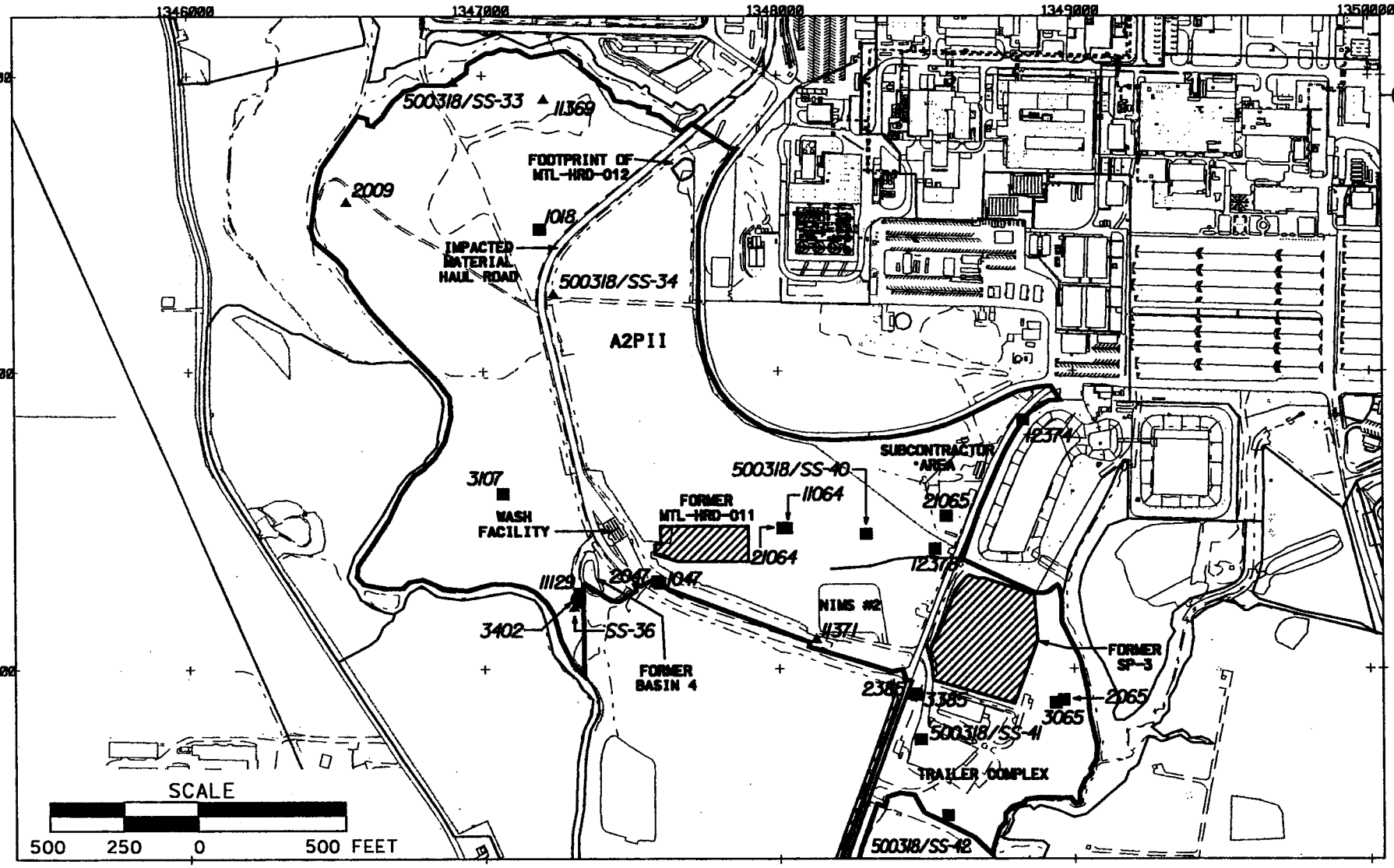
FIGURE 2-1. A2PII BOUNDARIES, SURFACE FEATURES AND TOPOGRAPHY

v:\2fm12\dgn\loc\A2P2-301.DGN
STATE PLANAR COORDINATE SYSTEM 1983

20-JUN-2002

000047

4328



LEGEND:

A2P2 BOUNDARY

CERTIFIED AREA

BELOW FRL RI/FS BORING

ABOVE FRL RI/FS BORING

DRAFT

FIGURE 2-2. RI/FS BORINGS IN A2PII

v:\2fm12\dgn\a2p2-300.dgn
STATE PLANA DINATE SYSTEM 1983

20-JUN-2002

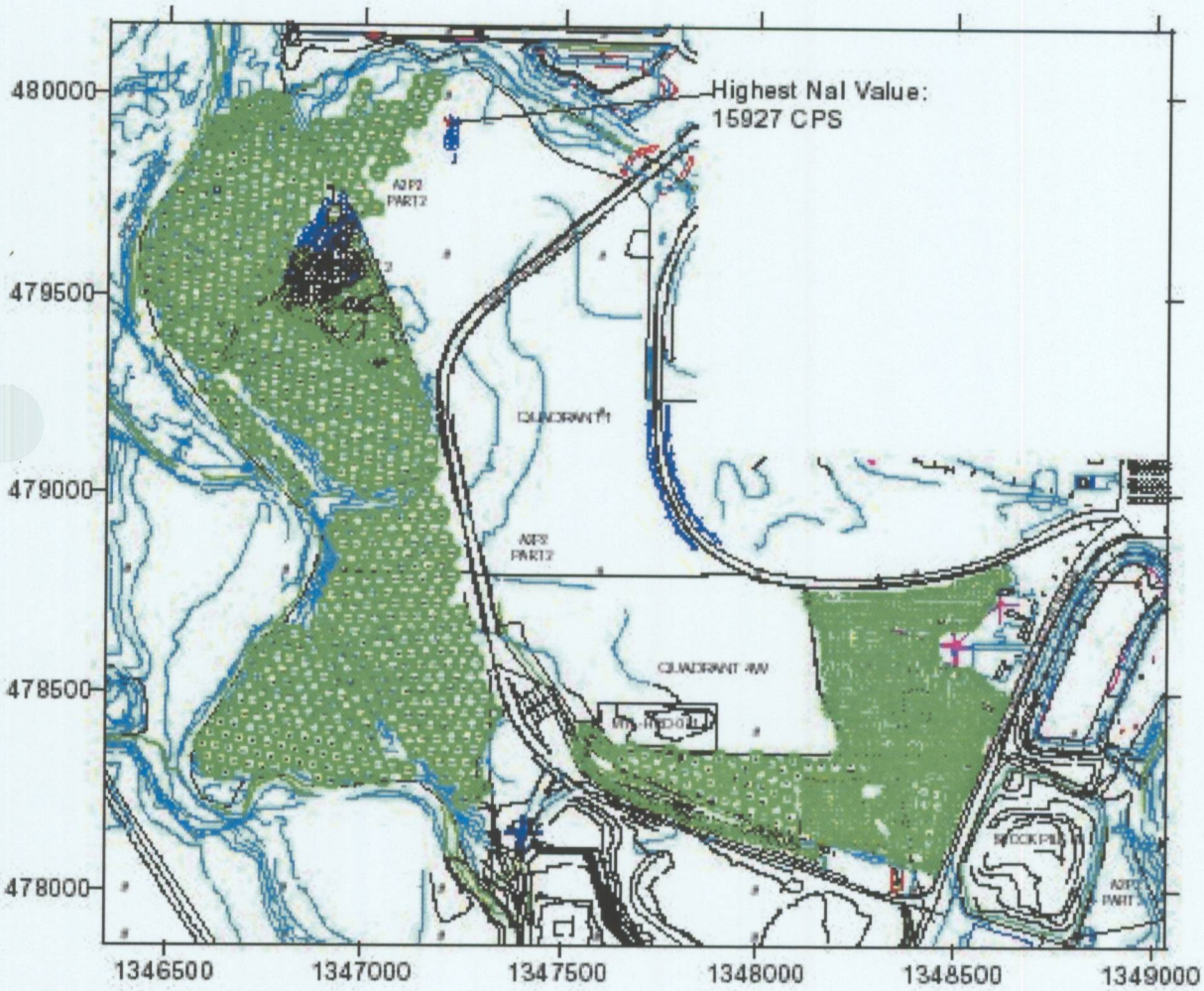
000048

Figure 2-3.Real-Time Scan - Entire Area

A2PII

N

Total Gross Counts per Spectrum
Field of View to scale
NaI Batch#: RSS1- 582,634; RTRK- 768,776,786-787, 846-848
HPGe DET#: 30687,30716,30904,31204,31265,40743
Measurement Dates: 11/19/99 - 05/14/01



NaI
TCPS
- 0.00 to 3000.00
- 3000.00 to 5000.00
- 5000.00 to 15000.00
- 15000.00 to 18000.00
- 18000.00 to 99999.00

HPGe shown for coverage only

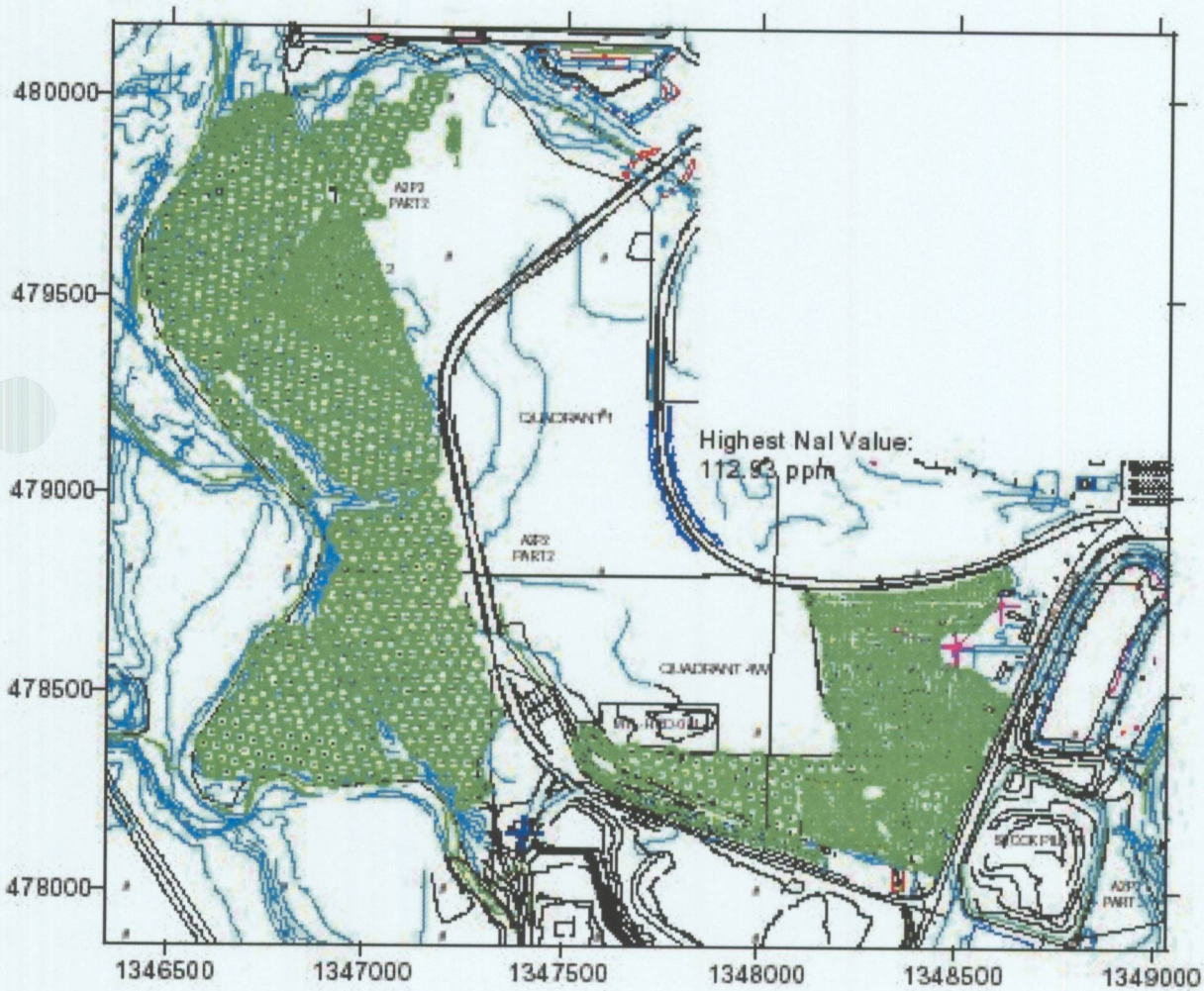
RTIMP DWG Title: A2P2_PT1,2,3_P1_TC.srf
Project Name: A2P2 PT 2&3 PreDesign
Project #: 20450-PSP-0001
Prepared By: B. McDaniel/11058
Date Prepared: 06/06/02
Support Data: A2P2_PT1,2,3_NaI.xls
A2P2_PT1,2,3_100cm_HPGe.xls

Figure 2-4.Real-Time Scan - Total Uranium

A2PII

N

Moisture Corrected Total Uranium
Field of View to scale
NaI Batch#: RSS1- 582,634; RTRK- 768,776,786-787, 846-848
HPGe DET#: 30687,30716,30904,31204,31265,40743
Measurement Dates: 11/19/99 - 05/14/01



NaI Tot U (ppm)
-58.00 to 82.00
82.00 to 164.00
164.00 to 9999.00

HPGe Tot U (ppm)
0.00 to 82.00
82.00 to 164.00
164.00 to 9999.00

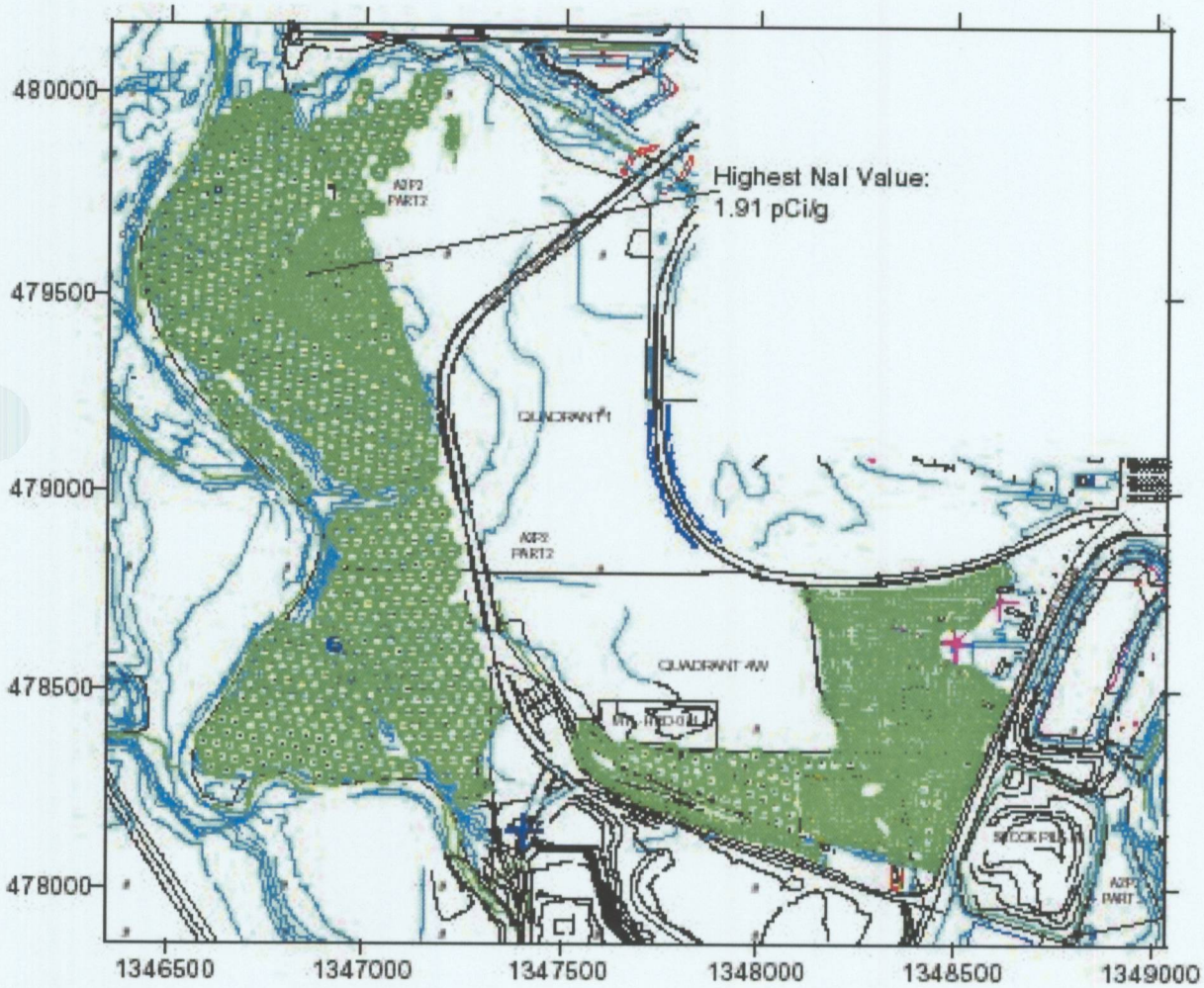
RTIMP DWG Title: A2P2_PT1,2,3_P1_TU.srf
Project Name: A2P2 PT 2&3 PreDesign
Project #: 20450-PSP-0001
Prepared By: B. McDaniel/11058
Date Prepared: 06/06/02
Support Data: A2P2_PT1,2,3_NaI.xls
A2P2_PT1,2,3_100cm_HPGe.xls

Figure 2-5.Real-Time Scan - Thorium-232

A2PII

N

Moisture Corrected Thorium-232
Field of View to scale
NaI Batch#: RSS1- 582,634; RTRK- 768,776,786-787, 846-848
HPGe DET#: 30687,30716,30904,31204,31265,40743
Measurement Dates: 11/19/99 - 05/14/01



NaI TH-232 (pCi/g)
-0.08 to 1.50
1.50 to 3.00
3.00 to 9999.00

HPGe TH-232 (pCi/g)
0.00 to 1.50
1.50 to 3.00
3.00 to 9999.00

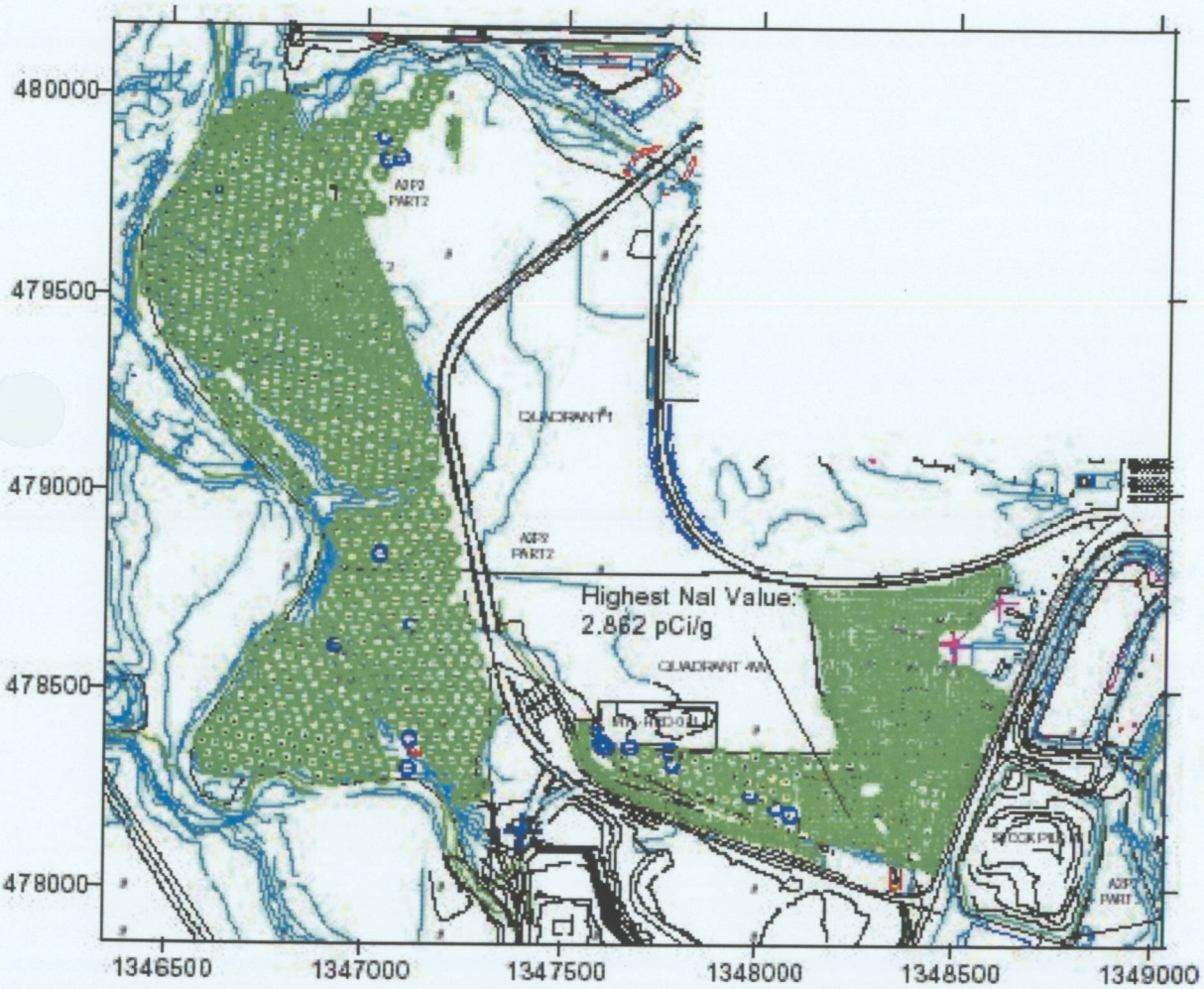
RTIMP DWG Title: A2P2_PT1,2,3_P1_TH.srf
Project Name: A2P2 PT 2&3 PreDesign
Project #: 20450-PSP-0001
Prepared By: B. McDaniel/11058
Date Prepared: 06/06/02
Support Data: A2P2_PT1,2,3_NaI.xls
A2P2_PT1,2,3_100cm_HPGe.xls

Figure 2-6.Real-Time Scan - Radium-226

A2PII

N

Moisture Corrected Radium-226
Field of View to scale
NaI Batch#: RSS1- 582,634; RTRK- 768,776,786-787, 846-848
HPGe DET#: 30687,30716,30904,31204,31265,40743
Measurement Dates: 11/19/99 - 05/14/01



NaI RA-226 (pCi/g)
-0.18 to 1.70
1.70 to 3.40
3.40 to 9999.00

HPGe RA-226 (pCi/g)
0.00 to 1.70
1.70 to 3.40
3.40 to 9999.00

RTIMP DWG Title: A2P2_PT1,2,3_P1_RA.srf
Project Name: A2P2 PT 2&3 PreDesign
Project #: 20450-PSP-0001
Prepared By: B. McDaniel/11058
Date Prepared: 06/06/02
Support Data: A2P2_PT1,2,3_NaI.xls
A2P2_PT1,2,3_100cm_HPGe.xls

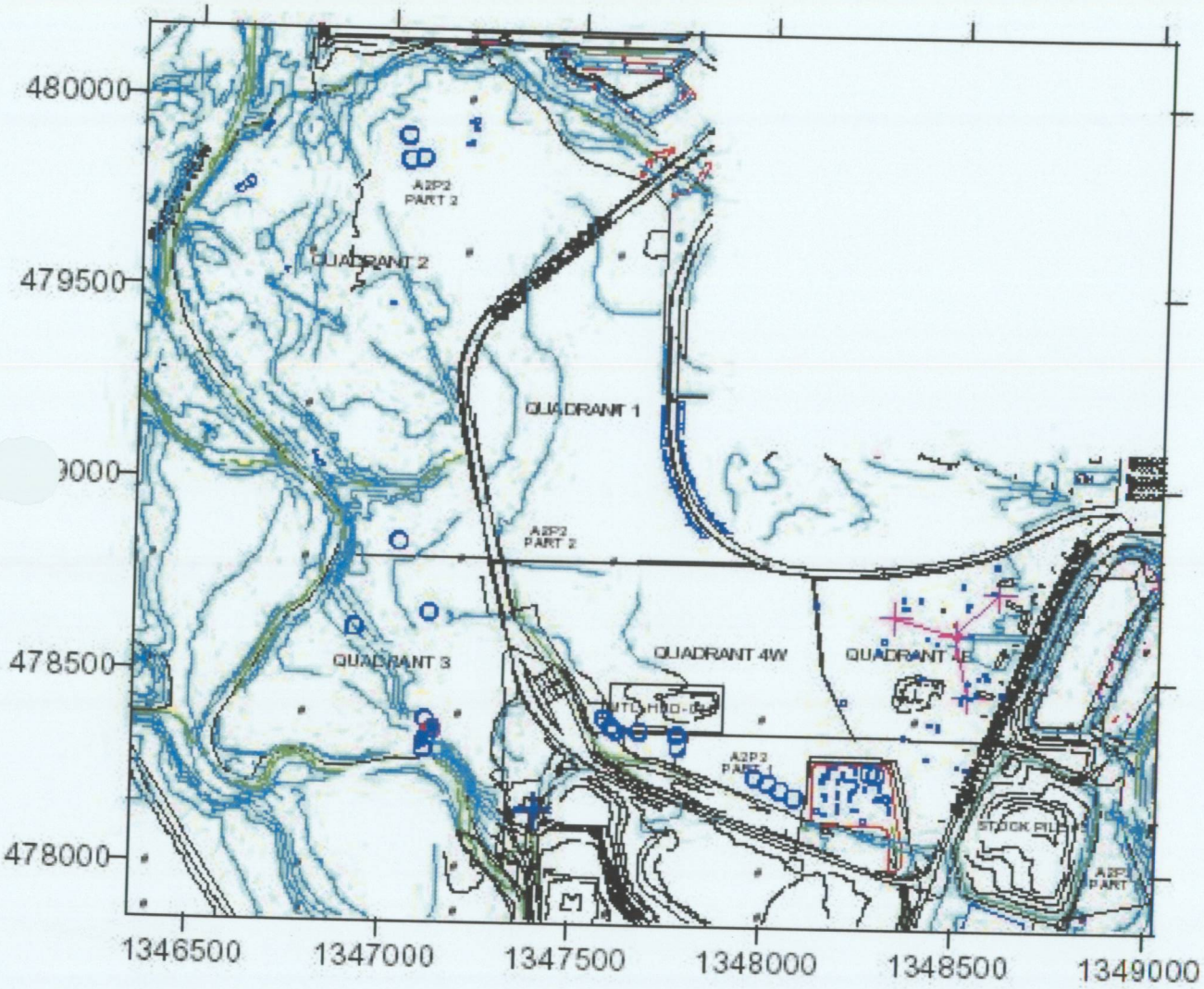
Figure 2-7.Real-Time Above FRL for Radium-226

A2PII

Moisture & Radon Corrected Radium 226 , >FRL

N

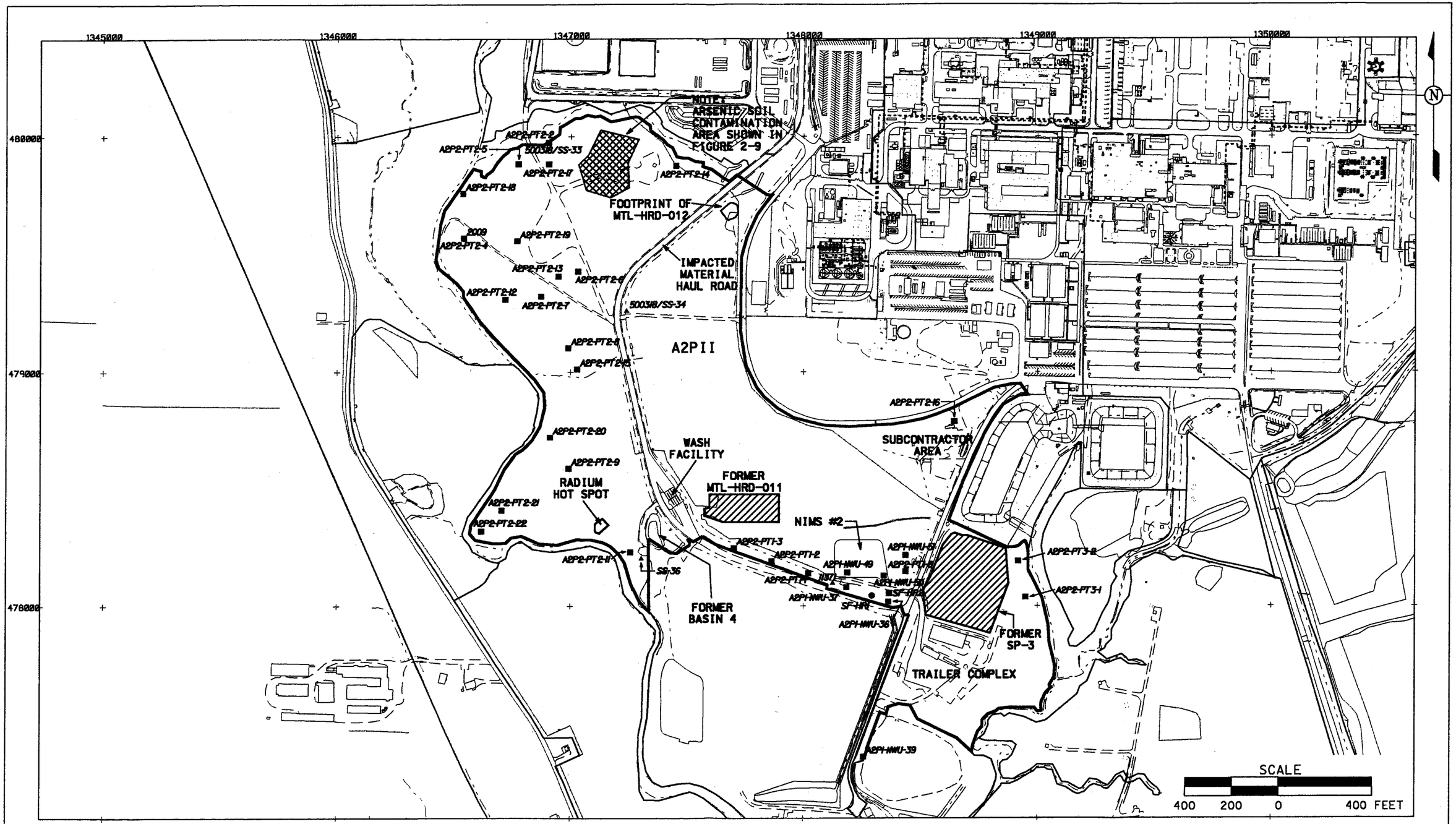
RSS Batch #: 582, 634
RTRK Batch #:768,776,786,787, & 846-848
Measurement Dates:11/19/1999 - 03/22/2001
Field of View to scale



NaI RA-226 (pCi/g)
0.00 to 1.70
1.70 to 3.40
3.40 to 9999.00

HPGe RA-226 (pCi/g)
0.00 to 1.70
1.70 to 3.40
3.40 to 9999.00

RTIMP DWG Title:A2P2_PT12&3_RA_2PT_MC_FRL.SRF
Project Name: PreDesign Sampling in A2P2 Pt12&3
Project #: 20450-PSP-0001
Prepared By: D.Seiller/8533
Date Prepared: 02/04/02
Support Data: A2P2_PT12&3_NaI_FRL.xls
A2P2_PT12&3_31cm_HPGe_FRL.xls
A2P2_PT12&3_100cm_HPGe_FRL.xls



LEGEND:

A2P2 BOUNDARY

CERTIFIED AREA

▲ ABOVE FRL RI/FS BORING

■ BELOW FRL PREDESIGN BORING

● ABOVE FRL PREDESIGN BORING

DRAFT

FIGURE 2-8. PREDESIGN AND RI/FS BORINGS

v:\#2fm12\dgn\loo\a2p2-302.dgn STATE PLANAR COORDINATE SYSTEM 1983 20-JUN-2002

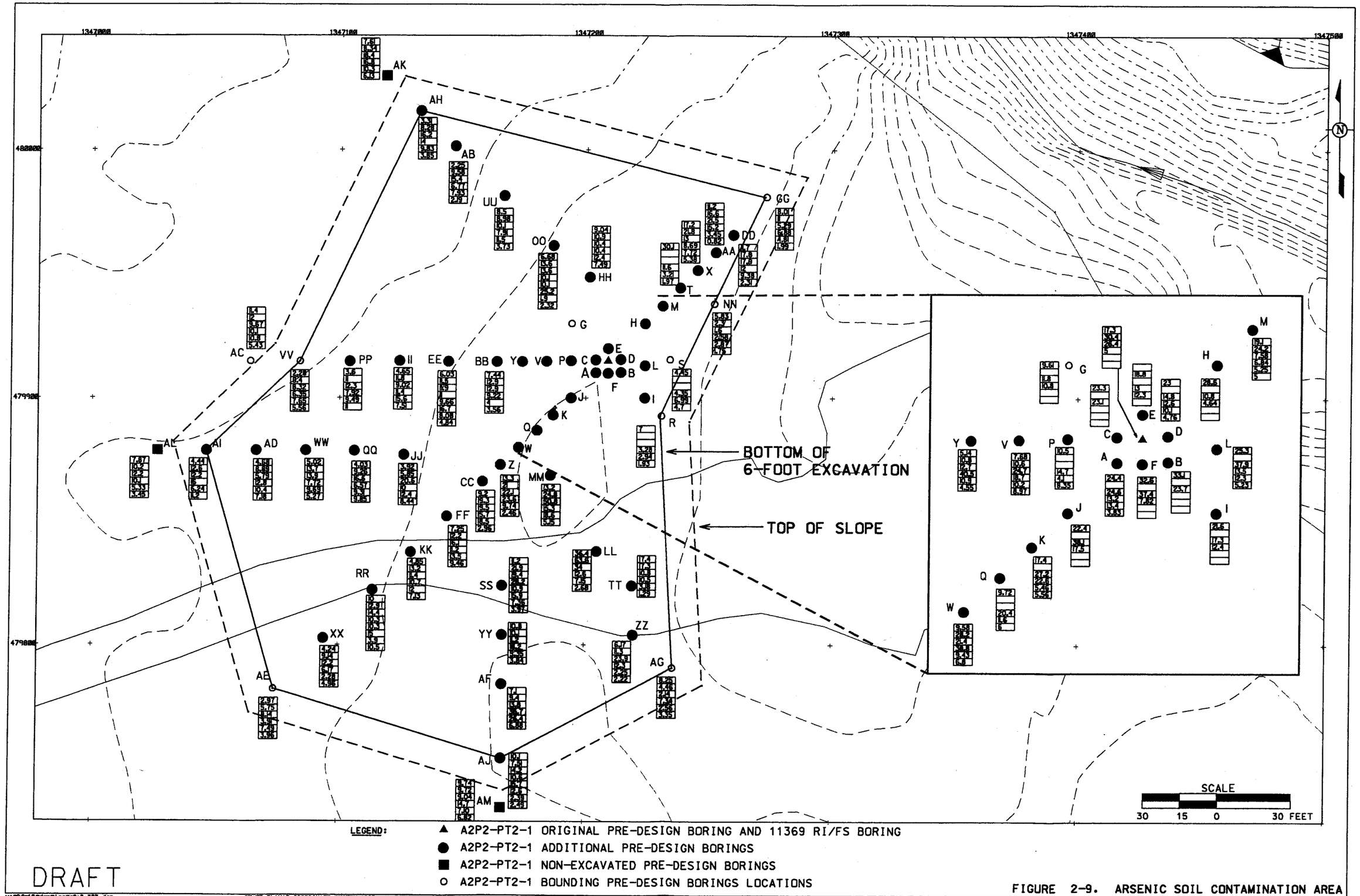


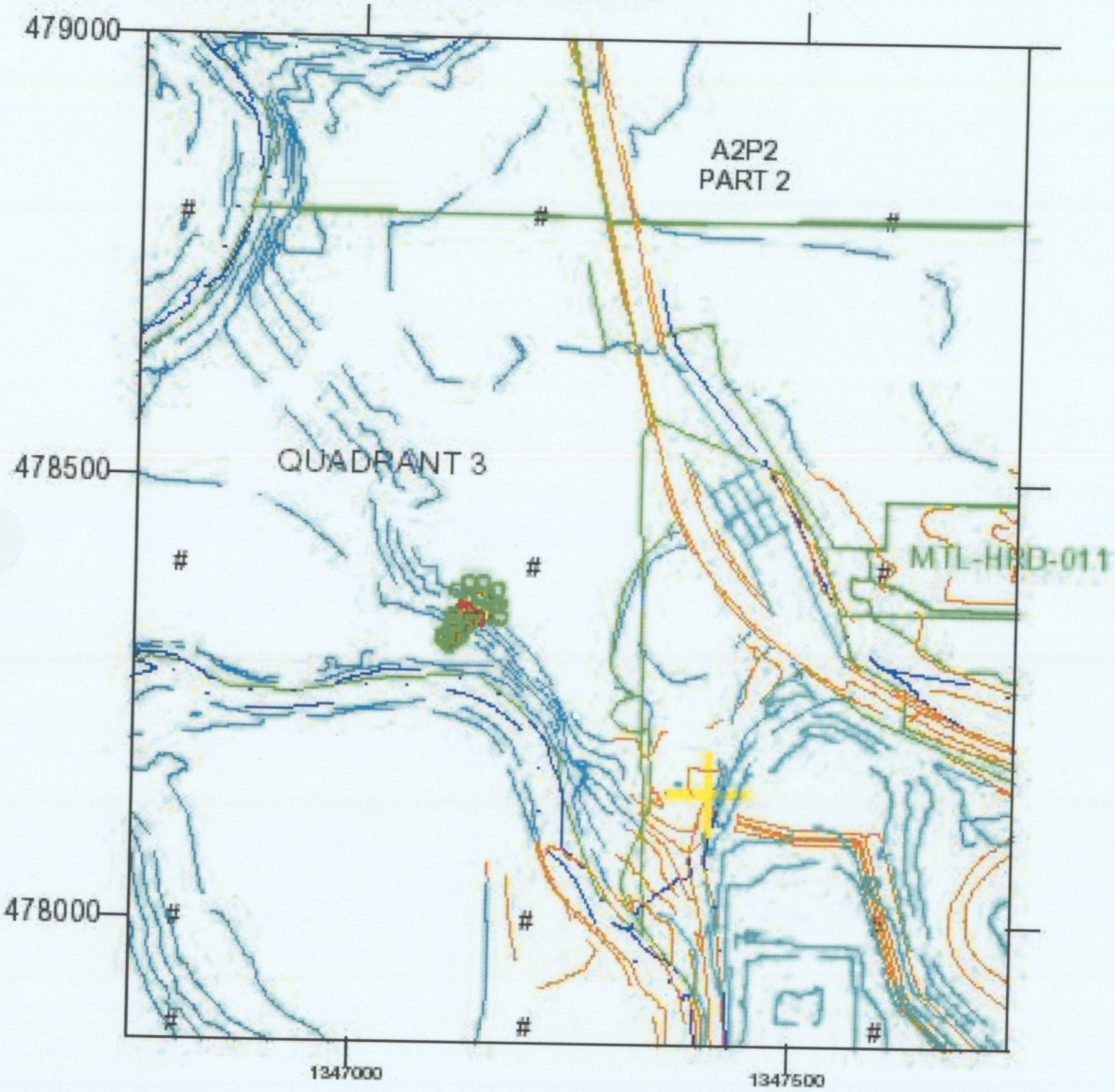
FIGURE 2-9. ARSENIC SOIL CONTAMINATION AREA

Figure 2-12.Real -Time Scanning around Radium-226 Boring A2P2-PT2-10

A2PII Radium Hot Spot

N

Radon & Moisture Corrected Ra-226
Field of View to scale
HPGe DET#:30687, 30904, 31204, 31265
Measurement Date: 08/16/00 - 05/21/02



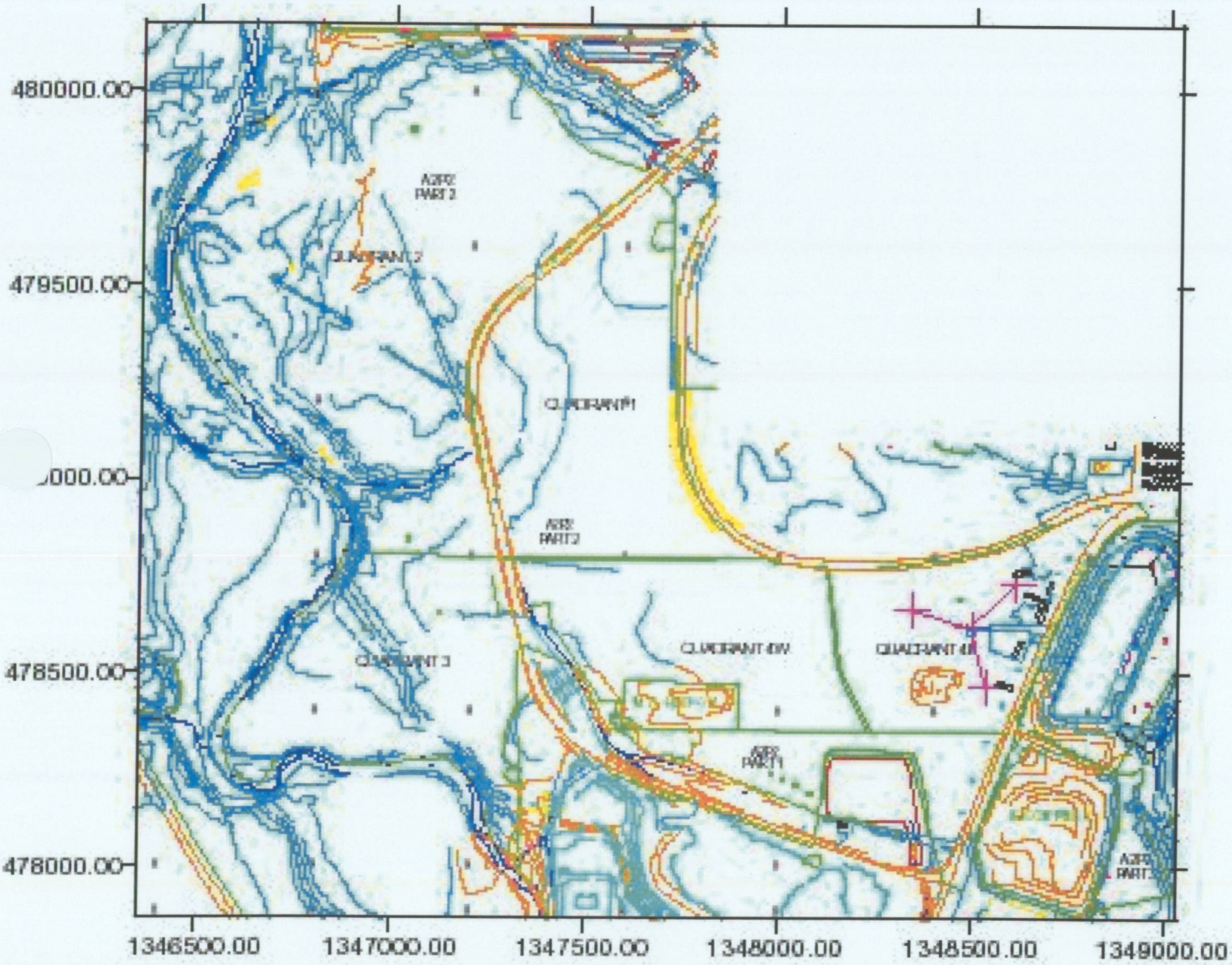
HPGe @ 31cm Ra-226 (pCi/g)	HPGe @ 100cm Ra-226 (pCi/g)
0.00 to 3.40	0.00 to 3.40
3.40 to 9999.00	3.40 to 9999.00

RTIMP DWG Title: A2P2_PT2_ALL_RA_HS.srf
Project Name: A2P2 PT 2&3 PreDesign
Project #: 20450-PSP-0001
Prepared By: Brian McDaniel/D.Seiller
Date Prepared: 05/22/02
Support Data:
A2P2_PT2_RA_HS_HPGe_31cm.xls;
A2P2_PT2_RA_HS_HPGe_100cm.xls

Figure 2-13. Above FRL for Radium-226 in the Remaining Area 2 Phase II Areas

N

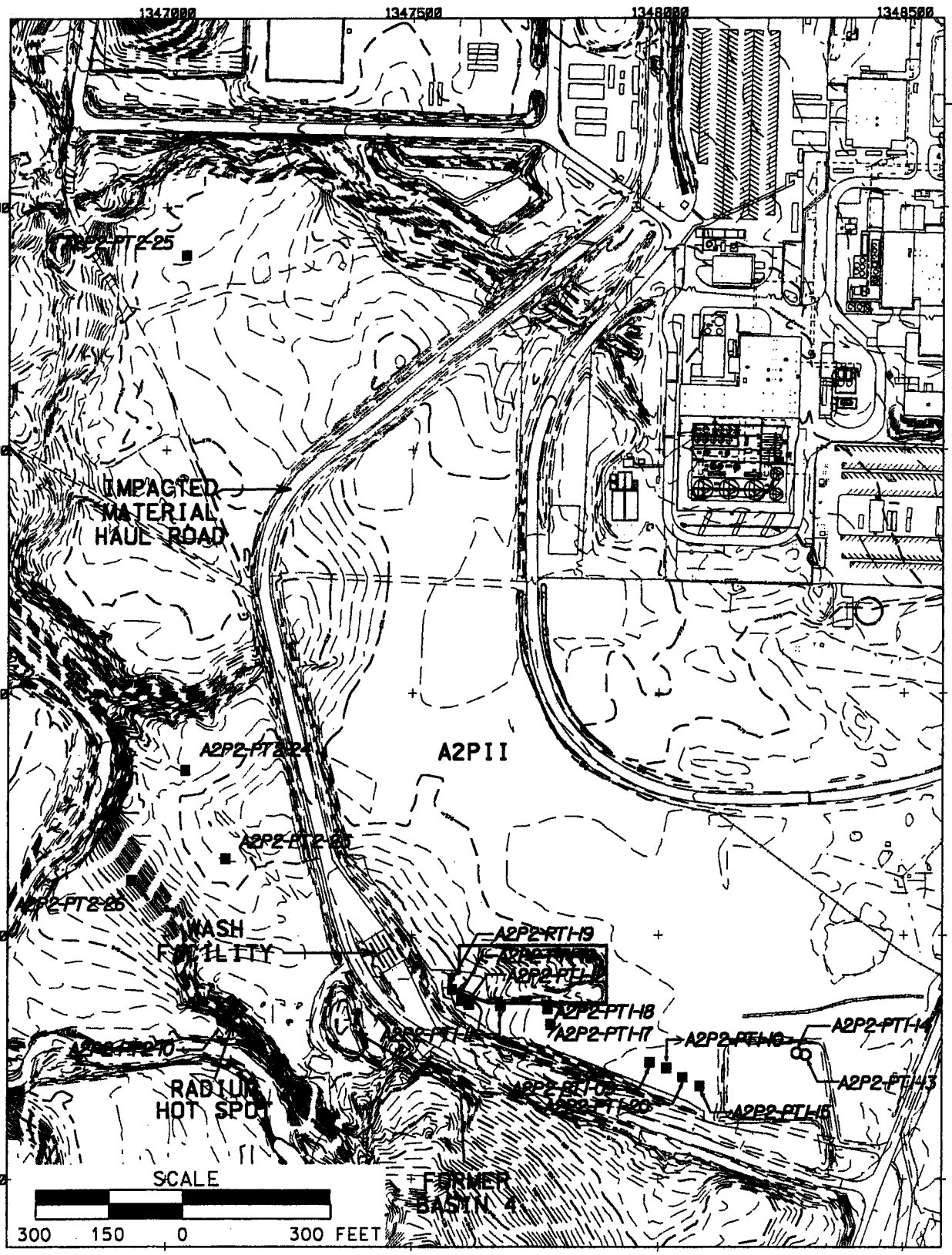
Radon and Moisture Corrected RA-226
Field of View to Scale
HPGe DET#: 30687,30904,31204
Measurement Dates: 06/12/02 - 06/13/02



HPGe @ 31cm
RA-226 (pCi/g)

- 0.00 to 1.70
- 1.70 to 3.40
- 3.40 to 10.00

RTIMP DWG TITLE: A2P2_RA_GT_FRL_BORING_LOCATIONS.srf
Project Name: A2P2 PreDesign
Project #: 20450-PSP-0001
Prepared By: Brian McDaniel
Date Prepared: 06/13/02
Support Data: A2P2_RA_GT_FRL_BORING_LOCATIONS.xls



LEGEND:

■ BELOW-FRL SAMPLE

● ABOVE-FRL SAMPLE

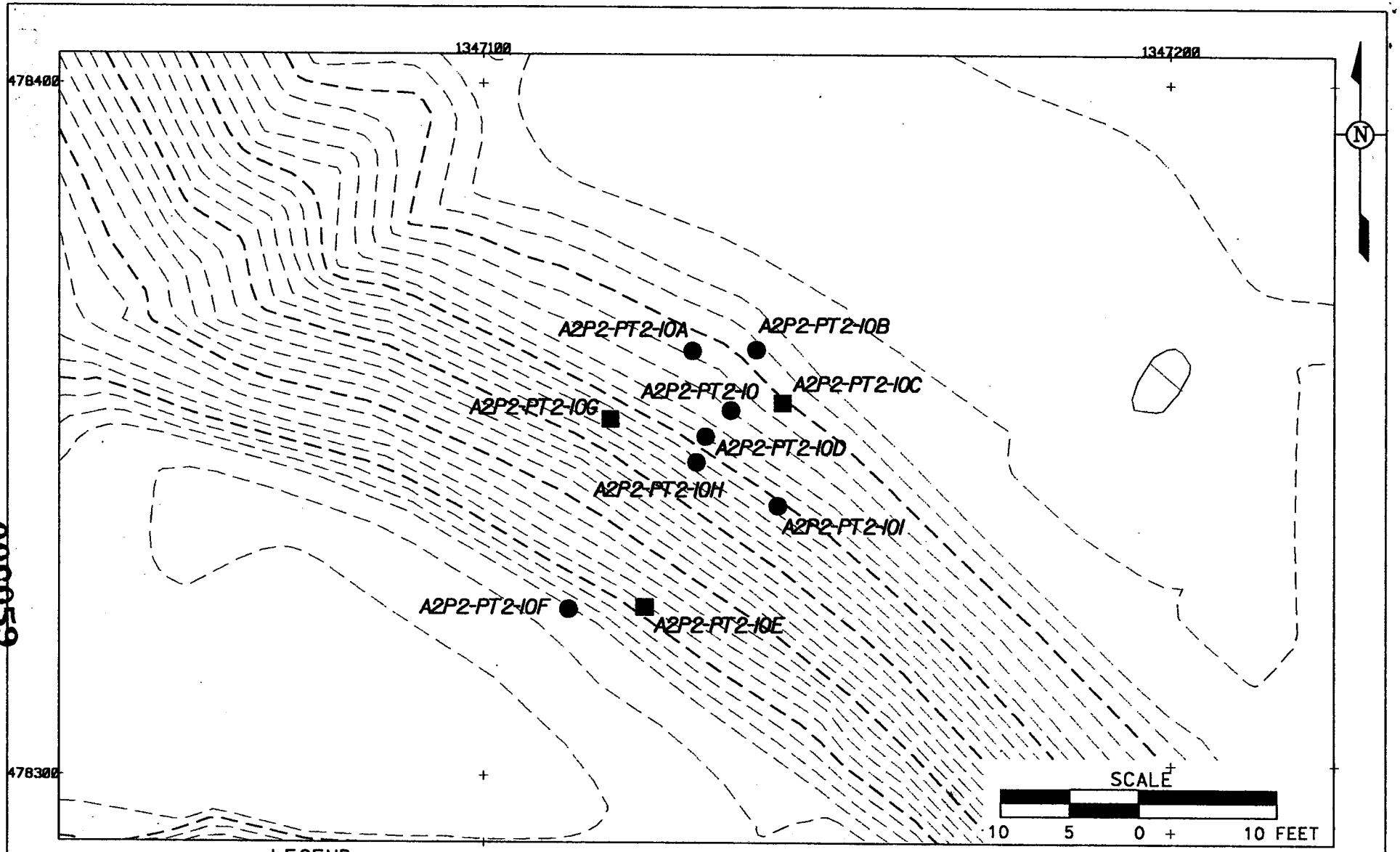
○ NOT TAKEN

FIGURE 2-10.
RADIUM-226 ABOVE-FRL BORINGS
DETERMINED BY REAL-TIME SCANNING

v:\2-fml2\dgn\1.00\c2p2-304.dgn

STATE PLANAR COORDINATE SYSTEM 1983

20-JUN-2002



LEGEND:

■ BELOW-FRL SAMPLE

● ABOVE-FRL SAMPLE

DRAFT

FIGURE 2-11.
RADIUM-226 BORINGS AROUND
A2P2-PT2-10 - RADIUM HOT SPOT

v:\#2fml2\dgn\log\a2p2-305.dgn 20-JUN-2002
STATE PLANAR COORDINATE SYSTEM 1983

000059

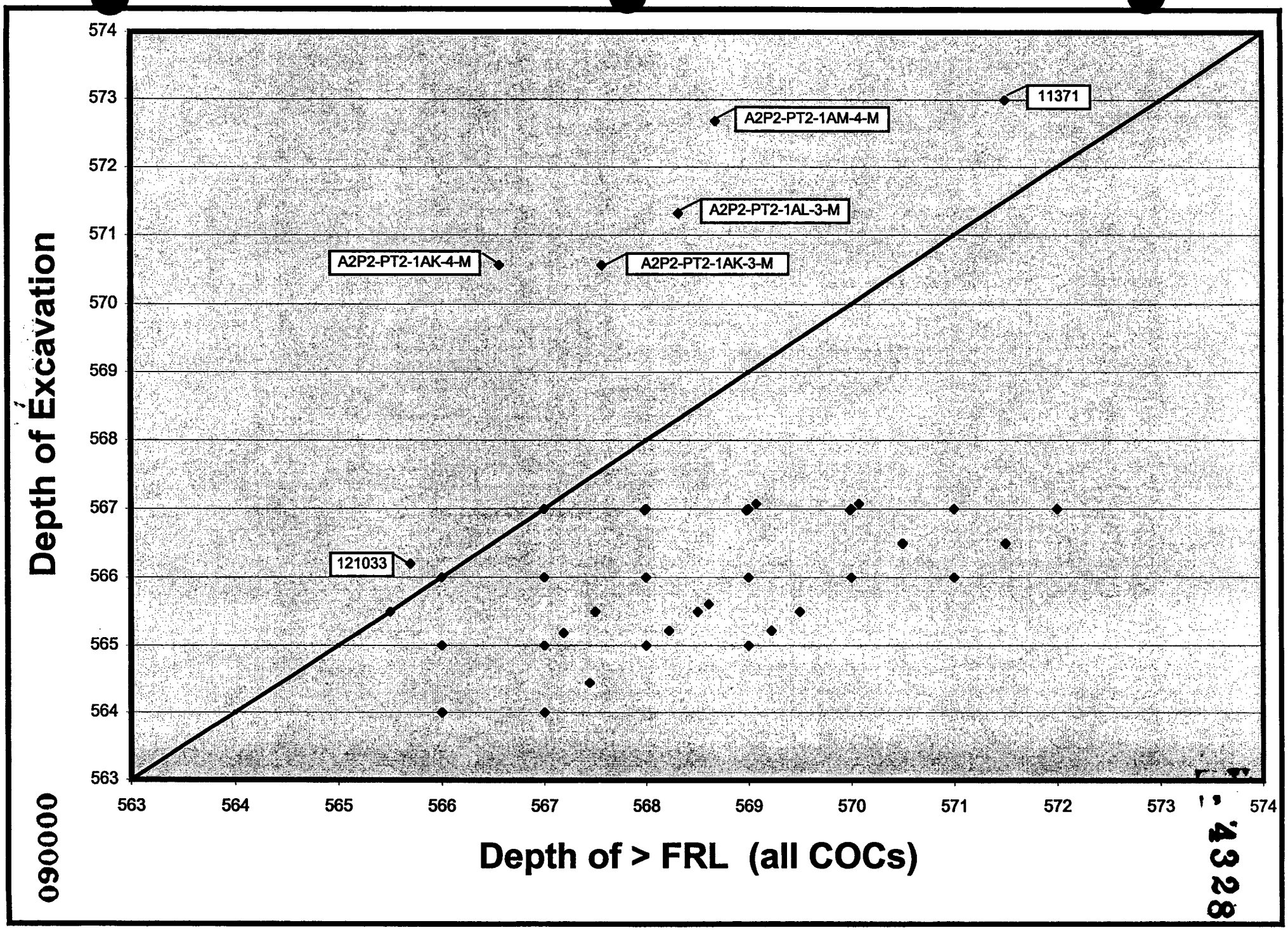


FIGURE 2-14. VARIATION OF EXCAVATION DEPTH WITH SAMPLE DEPTH

090060

4328

3.0 REMEDIAL ACTION APPROACH

This section describes the technical approach to A2PII remedial action. The remedial action approach discussed in this Implementation Plan follows the general guidance provided in Sections 3.0 and 4.0 and Appendix F of the SEP.

Remedial actions in A2PII will be discussed for three separate subareas in the following paragraphs as applicable; Subarea 1 (Arsenic Soil Contamination Area), Subarea 2 (Radium Hot Spot Area), and Subarea 3 (Infrastructure). No remedial action is planned for Subarea 4 (Remaining Area), based on RI/FS data, historical knowledge and existing predesign investigation data for Subarea 4. Therefore, there will be no further discussion of remedial action for Subarea 4 in this section.

Remediation of Subarea 1 began in Spring 2002 and was completed in May 2002. Subarea 2 is currently in a planning phase and scheduled to be remediated in Summer 2002. Excavation strategy for Subarea 2 is detailed in the following paragraphs. Subarea 3, inclusive of the Equipment Wash Facility, Impacted Material Haul Road and nearby footprint of former debris stockpile MTL-HRD-012, Trailer Complex Area, Subcontractor Area, and associated utilities, are scheduled to begin remedial actions in Fiscal Year 2005.

Predesign characterization of Subarea 3 will be finalized as areas become available based on discontinuation of use. Based on RI/FS and preliminary predesign characterization data, for this document, it is assumed the majority of A2PII, with the exception of Subarea 1 (Arsenic Soil Contamination Area) and Subarea 2 (Radium Hot Spot Area), will require no remedial action with respect to contaminants. The discussions involving remediation of Subarea 3 (Infrastructure) assume that "man-made" facilities installed in this area, plus the underlying 6 inches of soil, will be removed. As real-time scanning [i.e., the use of sodium iodide (NaI) and HPGe detectors] and sampling characterization is completed and results are analyzed, an addendum to this Implementation Plan and any related remedial action documents will be prepared, as necessary, and submitted to the regulatory agencies.

Construction drawings and technical specifications will specify the remedial actions to be implemented, and they will comprise part of the documentation governing construction activities. Construction

activities will be further governed by a Construction Traveler that describes general site requirements for soil excavation and remediation projects.

- Construction Drawing 99X-5500-G-00624 details the scope of remedial action performed for Subarea 1 (Arsenic Soil Contamination Area). As noted on the construction drawing, technical specifications for FSC-642 (Technical Specifications for Area 3A/4A Site Preparation) governed the construction activities. These technical specifications were selected because the Area 3A/4A Site Preparation was being performed simultaneously and technically applicable to the remediation of Subarea 1 (Arsenic Soil Contamination Area). As-builts are currently being prepared. The haul route utilized for transport of excavated materials to the OSDF is shown on Construction Drawing 99X-5500-G-00735.

- No construction drawings have been nor will be prepared for remedial action of Subarea 2 (Radium Hot Spot Area), however, the proposed traffic flow plan is shown on Construction Drawing 99X-5500-G-00735. Remediation will be in accordance with the text in this section and approved IRDP for A2PII. The Technical Specifications for SDFP, Area 3A/4A Excavation and this approved Implementation Plan will govern construction activities for remediation of Subarea 2 (Radium Hot Spot Area).

- Due to continued usage of structures and utilities in Subarea 3 (Infrastructure), the soils adjacent to and underneath Subarea 3 (Infrastructure) have not been fully investigated and therefore, the remedial design has not been completed. A Remedial Strategy Drawing, Drawing 99X-5500-G-00734, has been included in this IRDP to illustrate current plans for future remediation, which will be amended as necessary and resubmitted following completion of the predesign investigation. The proposed traffic flow plan from Subarea 3 (Infrastructure) to the OSDF is shown on Construction Drawing 99X-5500-G-00735. Technical specifications referenced in the Subarea 3 (Infrastructure) discussions in this section are included with this IRDP for reference and will be amended as necessary and resubmitted upon completion of the remedial design. These technical specifications are a portion of the Technical Specifications for Soil Excavation Projects that are being developed as comprehensive non-area specific requirements for self-performance of future excavation and remediation projects.

For the readers clarification, the following discussions of the remedial action approach for A2PII that are similar and applicable to each of the three subareas are included in paragraphs titled "General". If details pertaining to a subarea warrant specific requirements, the paragraph is divided into subparagraphs, and titled appropriately.

3.1 SITE PREPARATION (GENERAL)

Site preparation activities associated with remediation of each subarea include site boundaries and controls, surveying and site layout, surface water management, trenching to isolate undocumented

below-grade utilities, establishing and identifying support facilities, and real-time scanning. Additional details are provided in the following text and in the referenced construction drawings and technical specifications.

3.1.1 Site Boundaries and Controls

3.1.1.1 Subarea 1 (Arsenic Soil Contamination Area)

Subarea 1 (Arsenic Soil Contamination Area) is located in the wooded area bounded on the north by the Pilot Plant Drainage Ditch, the southeast by the Impacted Material Haul Road, and the southwest by the gravel road that leads from the Impacted Material Haul Road to the southwest corner of the Silos area. Refer to Construction Drawing 99X-5500-G-00624 for the site boundaries described. Due to the remote location of the project and its being confined by limited access for authorized personnel, project personnel controlled access to the site. Following completion of the excavation, rope fencing was installed along the project boundary. Although characterization data identified several locations to contain a potential for radium, requiring constant radiological technician coverage, radium was not found during remediation. Therefore, no additional radiological controls were required.

3.1.1.2 Subarea 2 (Radium Hot Spot Area)

Subarea 2 (Radium Hot Spot Area) is remotely located in a wooded area where the boundary is not easily defined by physical features. Subarea 2 (Radium Hot Spot Area) consists of a small area at the top, along, and at the toe of a relatively steep slope. Subarea 2 (Radium Hot Spot Area) is found in the approximate area 200 feet west of former Basin 4, 50-feet north of Paddys Run, and 125-feet northwest of a steeper slope termed the "Slope of Dread". Refer to Figure 3-1 for the location described. The area to be excavated will be bounded with a rope fence for access control. The fence will be posted as a contamination area and a temporary radiological control point will be established.

3.1.1.3 Subarea 3 (Infrastructure)

Subarea 3 (Infrastructure), shown on Construction Drawing 99X-5500-G-00734, includes the Impacted Material Haul Road from the Pilot Plant Drainage Ditch south to the termination of the pavement just southeast of the Equipment Wash Facility (and associated culverts) and nearby footprint of former debris stockpile MTL-HRD-012, Equipment Wash Facility and Basin 5 (and associated utilities), Trailer Complex Area (and associated utilities), and the Subcontractor Area. A rope or construction/safety fence will bound the perimeters of the remedial action areas of Subarea 3 (Infrastructure) for access control. A

radiological technician will survey the areas as excavation progresses to determine if radiological controls will be required. Currently, the Equipment Wash Facility and Basin 5 remediation are the only suspect areas that may require a radiological boundary and temporary control point based on the historical processes performed.

3.1.2 Surveying and Site Layout

3.1.2.1 Subarea 1 (Arsenic Soil Contamination Area)

The excavation area was surveyed and staked to determine the limit of site work including limits of excavation, clearing, and surface water control. Prior to excavation, approximately 1 acre of trees required felling and removal. A subcontractor cleared the area, chipped the trees and brush, stockpiled the chips for future reuse, and ground the remaining stumps *in situ* with a stump grinder. The area is currently in the process of being surveyed to determine final excavated volumes and to prepare as-builts.

3.1.2.2 Subarea 2 (Radium Hot Spot Area)

The excavation area will be surveyed and staked to determine the limit of site work including the limit of excavation. Currently, two access routes are proposed. One access route is proposed from former Basin 4, which requires removal of several dead trees, in order to excavate the top of the hill and two thirds of the steep slope. The second access route is proposed from the South Field area via Paddys Run streambed, requiring minimal clearing of saplings on the plateau between the excavation area and Paddys Run, to excavate the remainder of the slope and the plateau. Access utilizing the second route will be planned for periods with minimal precipitation to ensure that Paddys Run streambed will be dry.

3.1.2.3 Subarea 3 (Infrastructure)

Surveys will be performed to layout below-grade utilities, to establish limits of site work, and to determine banked soil volumes delivered to the OSDF. Utilities to be removed will be located and staked for removal. The Remedial Strategy Drawing 99X-5500-G-00734 illustrates areas requiring remedial action based on historical knowledge of activities and presence of man-made materials. The Execution Manager or his designated representative (Construction Manager) will field locate many of the support facilities, such as laydown areas, soil dewatering areas, secondary haul routes, fuel transfer points, and Special Materials Transfer Areas. The Construction Manager may propose multiple locations for the Special Materials Transfer Area, in accordance with Technical Specification Section 02205.

3.1.3 Surface Water Management (General)

Due to the relatively small remediation areas within A2PII, a Surface Water Management Plan will not be written. The following paragraphs will be substituted for a formal Surface Water Management Plan. Surface water includes run-on, runoff and seepage of groundwater into excavated areas.

3.1.3.1 Subarea 1 (Arsenic Soil Contamination Area)

Subarea 1 (Arsenic Soil Contamination Area) is located in a relatively flat area. No surface water runoff controls were necessary due to containment of runoff within the excavation as excavation progressed with no route for runoff to reach existing drainage pathways. Additionally, the existing topography to the east and south contained several low spots, which minimized the amount of runon received by the excavation area; therefore no diversions or berms were deemed necessary. An excavation sump was excavated at the northern-most, and lowest elevation, location of the excavation. Following rain events, excavation water collected in the sump was allowed 24 to 48 hours to settle, and then was pumped into the Pilot Plant Drainage Ditch. Upon completion of excavation, water was allowed to pond within the excavated area. Remediation excavation of the Pilot Plant Drainage Ditch may be tied to Subarea 2 (Arsenic Soil Contamination Area) if it is desired to drain the area or minimize the depth of water.

3.1.3.2 Subarea 2 (Radium Hot Spot Area)

Due to the remote location of Subarea 2 (Radium Hot Spot Area), the site stormwater management system can not be utilized. Silt fence will be installed, in accordance with Technical Specification Section 02275, between the excavation area and Paddys Run for runoff control to minimize the potential for suspended solids reaching Paddys Run. Subarea 2 (Radium Hot Spot Area) will be remediated beginning with excavation at the top of the slope and proceeding down over the slope. Excavation will be sequenced so that a new area will not be started prior to confirmation that upgradient excavation is complete. Real-time monitoring of each excavation surface, as described in Section 3.3, will provide assurance that the radium activity is reduced to the appropriate level prior to moving to the next downslope excavation sequence. The Construction Manager will coordinate real-time scanning on a daily basis to minimize risk of potentially contaminated suspended solids reaching Paddys Run in the event of precipitation. Following real-time confirmation of removal of radium activity at the top of the steep slope, surface soils will be mounded in the shape of a berm to minimize erosion of the excavated slope due to surface water runon.

3.1.3.3 Subarea 3 (Infrastructure)

The Trailer Complex Area primarily drains to the south towards the former Active Flyash Pile. Runoff is intercepted by a ditch located along the north edge of the former Active Flyash Pile and flows to the east to a tributary to Paddys Run. Surface water run-on will be controlled by maintaining existing ditches within and surrounding the area. Facility and utility removal rather than contamination drive excavation in the Trailer Complex Area. The existing ditch and berm located on the southern edge of the excavation area will capture the runoff to the south. Silt fence will be installed, in accordance with Technical Specification Section 02275, along the ditch for runoff control. If uranium, thorium, or radium contamination is found by real-time scans of either the preliminary surface scan or below the asphalt/gravel layer, then a berm and a sump area will be constructed north of the ditch. The water in the sump area will be pumped to the SWRB via hose.

The Equipment Wash Facility and remaining paved portion of the Impacted Material Haul Road is bordered on the north by a ditch that captures runoff from the wooded area and bordered to the south by former Basin 4. The utilities, indicated on Remedial Strategy Drawing 99X-5500-G-00734, which direct flow from the north ditch line to the south under the Equipment Wash Facility access ramp and the Impacted Material Haul Road will be removed and backfilled after real-time monitoring has confirmed the absence of uranium, thorium, and radium contamination. Basin 5, located between the Equipment Wash Facility and the Impacted Material Haul Road will collect runoff that will be pumped to the SWRB through the existing aboveground 3-inch high density polyethylene (HDPE) pipeline. The sump pump and the 3-inch HDPE pipeline will remain in place to dewater excavation water until precertification is complete.

The Subcontractor Area will be sloped to the east towards the two existing culverts located along the South Construction Access Road shown on Remedial Strategy Drawing 99X-5500-G-00734. The northern culvert directs flow directly into the SWRB. The southern culvert directs flow to the ditch located between the SWRB and former SP-3. A maximum of 6 inches of excavation water will pond at the inlet of the northern culvert following excavation. Pumping of excavation water from this location will only be required to perform real-time scanning for precertification and physical sample collection for certification. The excavation will be graded to meet existing contours of the ditch that directs flow to the southern culvert to prevent excavation water from ponding. Prior to soil disturbance, silt fence will be installed, in accordance with Technical Specification Section 02275, along the perimeter of the

excavation to filter runoff before it reaches the culverts. Surface water run-on will be controlled by maintaining existing ditches within and surrounding the area.

3.1.4 Trenching to Isolate Undocumented Below-Grade Utilities (General)

Due to the limited number of utilities in this area, reduced or minimal risk of unknown utilities, and remote excavation locations, the isolation of utilities through trenching not necessary for excavation in A2PII.

3.1.5 Establishing and Identifying Support Facilities

3.1.5.1 Change-Out Facility, Contractor Office Trailer, Break Trailer, and Cool-Down Trailer (General)

Personnel performing and managing A2PII remedial actions will not require project-specific support facilities. Existing facilities will be used in support of this activity. Personnel and equipment will be transported into the remote project area.

3.1.5.2 Contractor Laydown Area (General)

Laydown areas for construction materials and equipment will be field located in accessible zones that are free of contamination, and lie outside of areas designated for excavation.

3.1.5.3 Water and Electrical Source (General)

Water for dust control will be provided by production wells located on the eastern side of the Lime Sludge Ponds and east of the OSDF Contractor Administration Area.

Portable generators are the source for the electric power to feed pumps and other electrical needs in A2PII.

3.1.5.4 Fuel Transfer Point (General)

Fuel will be brought into the active remediation area to refuel equipment. A transfer point at the project boundary will be identified by the Construction Manager to allow off-site vendors to transfer fuel into the working area.

3.1.5.5 Haul Routes (General)

Haul routes to the OSDF, A3A-016, and SP-7 for A2PII will be as shown on Construction Drawing 99X-5500-G-00735.

3.1.5.5.1 Subarea 1 (Arsenic Soil Contamination Area)

The haul route to the OSDF from Subarea 1 (Arsenic Soil Contamination Area) utilized the Phase I Haul Route to travel the section of the Impacted Material Haul Road that is controlled but uncontaminated to the former SP-1 area of A3A-016 to prevent the need for wheel washing. Trucks returned by reversing the same route. The material was reloaded from A3A-016 where haul trucks traveled the remainder of the Impacted Material Haul Road to the OSDF.

3.1.5.5.2 Subarea 2 (Radium Hot Spot Area)

The haul route to the OSDF from Subarea 2 (Radium Hot Spot Area) will utilize the Phase I Haul Route as described above.

3.1.5.5.3 Subarea 3 (Infrastructure)

The haul routes to the OSDF from the remedial action areas of Subarea 3 (Infrastructure) will utilize the Phase II Haul Route to travel north on the South Construction Access Road, cross the Buildings 30/45 Access Road, turn east through the south lane of the former Taco parking lot, turn north along the west edge of the Main (west) Parking Lot, turn east on the 2nd lane of the Main (west) Parking Lot, turn north onto "D" Street, turn east onto "1" Street, turn north onto "E" Street, and turn east just past Building 77 into the OSDF. A temporary wheel wash station will be installed along "E" Street and the trucks will return by reversing the same route and passing through the wheel wash station. Currently, the route from the remedial action area including the Impacted Material Haul Road and nearby footprint of former debris stockpile MTL-HRD-012 are shown to follow the Phase I Haul Route described above. The haul route for remediation of this area is dependant on the remediation schedule.

3.1.6 Real-Time Scanning (General)

If site preparation activities will disturb soil below a depth of 6 inches, then the Construction Manager will coordinate with the Manager of the Real-Time Instrument Measurement Program (RTIMP) to arrange for a real-time scan of the surface prior to any activity that disturbs the soil. Real-time scans of the affected area will be performed to ensure that above-WAC levels of uranium are absent. Upon

completing the scan and receiving verification on the absence of above-WAC material, site preparation activities can be executed per the construction documents.

3.2 AT- AND BELOW-GRADE STRUCTURE DEMOLITION (GENERAL)

Removal of utility lines, concrete, and asphalt apply only to Subarea 3 (Infrastructure) portion of A2PII. No building footer or basement wall demolition is anticipated. Table 3-1 provides volume estimates for at- and below-grade debris.

3.2.1 Utility Lines [Subarea 3 (Infrastructure)]

The utilities to be removed are associated with Subarea 3 (Infrastructure) areas as indicated on Remedial Strategy Drawing 99X-5500-G-00734. The Construction Manager in conjunction with Waste Acceptance Organization (WAO), Health and Safety, and Radiological Control personnel will determine the most effective method for removal of utilities. In general, an excavator and/or a chain saw will be used to excavate and size reduce the utility lines and associated debris. Utility trenching activities will be monitored by Health and Safety, Radiological Control, and WAO personnel for unsafe conditions or special materials (e.g., high organic-vapor readings, elevated radioactivity, visual observation of pipe interior). Debris generated from utility removal will be placed in the OSDF if it meets physical WAC and passes visual inspection (refer to Section 3.4). Debris not meeting physical WAC will be size reduced to meet requirements. Debris that cannot be size reduced or fails visual inspection will be managed for off-site disposal. Soil and bedding material associated with utility removal will be managed as described in Section 3.3.4.

Refer to Section 3.3.4 for discussion of the planned method for removal of utilities. The majority of the 3-inch HDPE discharge line from Basin 5 to the SWRB is the exception to this methodology as it is located above ground and will require minimal excavation. Approximately 60 feet of the total 1,270-feet of this line is buried within the side slope of the western SWRB. This utility will be the last to be removed, as it will serve as the discharge pipe for surface water runoff collected in Basin 5 through precertification. The remaining utilities to be removed are as follows:

- The abandoned 4-inch HDPE containment with 2-inch HDPE carrier pipe and associated manholes that served as the discharge line for the former West Seepage Station and East Seepage Station.

- The 2-inch drinking water line will be air-gapped by others at the location shown on the Remedial Strategy drawing and will be removed from the Trailer Complex to the Equipment Wash Facility. The remaining branches, which fed the trailers and an exterior faucet, will also be removed.

- A portion of the remaining abandoned 6-inch HDPE carrier with 10-inch HDPE containment Transfer Line, including associated clean-outs, that served as the discharge line from former Basins 1, 2 and 3 to the SWRB will be removed between the locations indicated on the Remedial Strategy drawing. The remaining sections will be capped by fusion welding a cap on the 6-inch line and will remain in place until remediation of the SWRB and Groundwater Treatment System.

- Miscellaneous culverts as indicated on the Remedial Strategy drawing will be removed.

3.2.2 Concrete, Asphalt Roadways and Parking Lots [Subarea 3 (Infrastructure)]

Approximately 10 percent of the ground surface in A2PII is covered with concrete and asphalt. This concrete and asphalt is found in Subarea 3 (Infrastructure). The quantity estimates are based on topographic maps and include the Equipment Wash Facility, concrete pads, roadways, and parking lots. A sequenced schedule for demolition and removal will be developed by the Construction Manager to determine the most efficient methods and equipment for removing, sizing, and transporting the concrete and asphalt. Concrete and asphalt debris transported to the OSDF must be sized to meet physical WAC for the OSDF (WAC Attainment Plan for the OSDF; doe 1998b). A limited volume of concrete may be selected for size reduction to provide aggregate for roads and ramps constructed in contaminated areas.

The Equipment Wash Facility consists of a 10-inch thick pad of reinforced concrete atop a 6-inch gravel base. The ingress and egress ramps to the Equipment Wash Facility consist of 8 to 12 inches of asphalt with asphalt curbs along the edges. The ramps also have a 6-inch gravel base. Structural details are provided on referenced Construction Drawings noted on Remedial Strategy Drawing 99X-5500-G-00734. This area includes a 480-linear feet by 24-foot wide portion of the Impacted Material Haul Road consisting of 9 inches of asphalt pavement over a 6-inch gravel base.

The additional portion of approximately 1,885 linear feet by 24 feet wide of the Impacted Material Haul Road, with a cross-section as previously described, will be excavated and removed. This portion is located between the Equipment Wash Facility and the Pilot Plant Drainage Ditch. The remaining portion of this road from the Pilot Plant Drainage Ditch to the north including the Silos crossing will remain for continued access to the Silos area and will be removed when Area 7 is remediated.

The Trailer Complex Area contains a small 4-inch thick asphalt parking lot to be removed. The paved parking lot was originally a 6-inch gravel area, but poor drainage in the area caused poor stability in the underlying soil, requiring asphalt placement. More than half of the remaining 3-acre area is covered by 6-inch gravel areas for additional parking, laydown areas, and roadways. The gravel roadway between the former salt storage structure (TS-8) and Trailer 138 will be left in place to allow access to the valve house northeast of the Trailer Complex Area. This roadway will be remediated along with the Groundwater Treatment System. Currently, the former salt storage structure (TS-8) is under construction where a 4-inch gravel base and a 9-inch concrete pad is being installed over the existing 1-foot stone base. The facility is being altered for use as the new site receiving area.

The subcontractor area contains a minimal amount of asphalt paving that served as a small parking area along the shoulder of the South Construction Access Road that will be removed. Approximately 1 acre of the remaining area is surfaced with a 6-inch layer of gravel for parking and equipment and tool laydown areas.

The remaining portion of the paved South Construction Access Road is not included in the A2PII remediation. This road will remain for continued access to the Groundwater Treatment System and will be removed when the corresponding utility corridor is remediated.

3.3 SOIL EXCAVATION, MONITORING AND SEGREGATION (GENERAL)

Excavation to remove impacted material will follow the general guidance of Excavation Approach D, as discussed in the SEP.

3.3.1 Above-WAC, RCRA and Soil Treatment (General)

Based on RI/FS data, historical knowledge and limited existing predesign investigation data, above-WAC or RCRA soil is not anticipated to be encountered in A2PII. If above-WAC material is encountered during ongoing characterization activities, then the material will be excavated by traditional above-WAC excavation methodology in accordance with Technical Specification Section 02205 and managed for appropriate off-site disposal. If RCRA contaminated material is encountered during the ongoing characterization activities, then a plan will be developed and submitted to the regulatory agencies for approval prior to any further action.

It is not anticipated that soil that may require treatment for organic compounds will be encountered in A2PII. However, if encountered during ongoing characterization activities, a treatment plan will be developed and submitted to the regulatory agencies for approval prior to initiating any treatment work.

3.3.2 HWMUs and USTs (General)

No HWMU or UST footprints are located within A2PII.

3.3.3 General Excavation (General)

The general approach to massive soil excavation is presented in the SEP. Massive soil excavation is in contrast to discrete soil excavation that will be carried out throughout A2PII, with the exception of Subarea 1 (Arsenic Soil Contamination Area), for general excavation and to remove utilities. Time will be scheduled to allow real-time monitoring of newly exposed soil lying below gravel, asphalt, and concrete surfaces. Real-time monitoring is required to identify potential above-WAC zones prior to general excavation operations.

Several work areas may be active within the project boundaries at any given time. A minimum of two active work areas will be required to allow the contractor and real-time monitoring crew to switch between active work areas. The real-time monitoring crew will survey one excavation while construction removes soil from another excavation.

If slopes created during excavation work are to remain dormant for more than 24 hours, with the exception of trenches for utility removal, then they must be no steeper than the following criteria:

- Interim slopes - slopes present for six months to two years, 2:1
- Temporary slopes - slopes present for less than six months, 1.5:1.

These criteria have been established based on the geotechnical properties of the soil and a maximum surcharge loading of 108,000 pounds at the top of the slope (DOE 1998c). These criteria limit the excavation equipment size to a Caterpillar 350L excavator or less. Soil sampling and geotechnical testing may be conducted to demonstrate less stringent criteria are acceptable, pending approval by a registered Professional Engineer in the State of Ohio.

3.3.3.1 Subarea 1 (Arsenic Soil Contamination Area)

Subarea 1 (Arsenic Soil Contamination Area) was excavated by conventional construction methodology using an excavator and a bulldozer. This remediation successfully removed material that contained greater than two times the FRL for arsenic. The bulldozer pushed the soil to a load-out point where the excavator loaded it into articulated haul trucks, which hauled the soil to the former SP-1 area of A3A-016. The soil was reloaded from A3A-016 and hauled to the OSDF. The excavation was driven by arsenic contamination with no presence of radiological COCs, therefore real-time monitoring and excavation in lifts was not necessary. The excavator cut side slopes, as shown on Drawing 99X-5500-G-00624, around the perimeter of the excavation and around the tree designated to be protected. The calculated volume of arsenic contaminated soil excavated and hauled to the OSDF was 10,300 cubic yards (yd^3).

3.3.3.2 Subarea 2 (Radium Hot Spot Area)

In order to minimize disturbance to trees and vegetation in the area, Subarea 2 (Radium Hot Spot Area) is primarily planned to be excavated by hand. An excavator will setup at the top of the hill and an articulated truck will back in to a position within reach of the excavator. Laborers will secure themselves by a Health and Safety approved fall protection lanyard fastened to stable trees as excavation progresses over the steep slope. The laborers will shovel the contaminated soils and miscellaneous debris into the excavator bucket. The bucket will not be overfilled to prevent spillage when loading into the truck. The soil and debris will be hauled to A3A-016 and from there to the OSDF. Excavation may occur using the excavator in areas that are accessible without causing extensive damage to the trees on the slope and where deemed to be too steep for personnel to safely perform work by Health and Safety personnel.

Due to the close proximity of trees, the likelihood of encountering roots is probable. It is envisioned that a short-handled, sharp-edged shovel, such as a duck-billed shovel will be made available for cutting through small roots and working on steep sloped areas. Soils will be excavated around larger roots so as not to harm the nearby trees.

The primary excavation area consists of a rectangular area approximately 70-foot by 30-foot by 6-inches deep. Table 3-2 details excavation dimensions, depths, and quantities of excavation below the 6-inch rectangular cut that are correlated with boring locations, as shown on Figure 3-2.

Subarea 2 (Radium Hot Spot Area) will be remediated by beginning excavation at the top of the slope and proceeding down the slope to the base of the slope. Excavation will be sequenced so that a new area will not be started prior to confirmation that upgradient radium-226 activity is below the appropriate level. Real-time monitoring will provide confirmation that radium-226 activity is below the action level, and excavation will then be considered complete for that portion of the slope. However, additional excavation may be required based on real-time analysis of the excavated areas. The Construction Manager will coordinate real-time scanning on a daily basis.

Real-time scans will utilize the Excavation Monitoring System (EMS), which consists of the NaI and HPGe detectors and associated computer hardware mounted to the arm of an excavator. The EMS is well suited for reaching over steep embankments and it will serve as the primary scanning platform for this work scope.

At the end of shift, or prior to stopping for the weekend, the excavator or backhoe will be secured by including the bucket within the roped off area. If the forecast calls for precipitation, then the bucket will be covered by plastic. Once excavation progresses to a point where the excavator can no longer reach, equipment will be relocated to the toe of the slope. The excavator may be replaced by a backhoe due to the limited work area and to minimize disturbance of vegetation. It is planned to excavate this area during a dry period so that the area can be accessed via Paddys Run from the South Field area. The haul truck will be staged within Paddys Run adjacent to the excavation area. Excavation will continue as previously described until confirmation that all contamination has been removed to meet FRLs.

3.3.3.3 Subarea 3 (Infrastructure)

Approximately 10 percent of the A2PII surface is covered by asphalt and concrete. Real-time scanning with *in situ* gamma spectroscopy techniques will be performed on remedial areas to be excavated, as shown on Remedial Strategy Drawing 99X-5500-G-00734, prior to beginning demolition to ensure that above-WAC uranium levels are absent. Concrete will be demolished by use of an excavator equipped with a hoe-ram or shear attachment. The concrete, asphalt, and gravel will be pushed to a load-out point designated by the Construction Manager, segregated to meet OSDF categories by an excavator, and loaded into articulated trucks for hauling and disposal at the OSDF. The soil surface under the asphalt and concrete will be scanned with *in situ* gamma spectroscopy techniques to determine if surface contamination is present below the asphalt, concrete, or gravel areas once they are removed and to

determine the disposition of the soil in accordance with Technical Specification Section 02205. Table 3-1 summarizes estimated quantities from Subarea 3 (Infrastructure) remedial areas.

3.3.4 Utilities [Subarea 3 (Infrastructure)]

Utility lines to be removed in A2PII are found in Subarea 3 (Infrastructure) and are identified on Remedial Strategy Drawing 99X-5500-G-00734. Based on historical knowledge of the utilities to be removed, contamination is not anticipated. Due to scheduling, it is planned to certify the surface soils prior to removing the utilities. The following paragraphs detail the planned approach to utilize a combination of *in situ* gamma measurements and laboratory analyses to demonstrate the soil and bedding material removed from the trench meet OSDF WAC and site FRLs.

Utility lines will be removed using a backhoe or excavator and trenching techniques. The surface area above utilities will be certified with laboratory analyses of physical samples. Overburden soil will be excavated and stockpiled adjacent to the trench to be used backfill. There are very few data points on contamination existing in bedding material and soil below utility lines, due to penetration permit requirements that forbid subsurface investigation of utility bedding material, where utilities remain active. Therefore, the Construction Manager and WAO personnel will observe the excavation and cease the excavation of overburden soil when the pipe or bedding material is encountered. Once the pipe and bedding material is identified as such, the piping will be cut by the excavator bucket or by chainsaw, as necessary, and excavated. The pipe interior will be inspected by WAO personnel to determine its disposition. If the pipe is free of visible process residue, then it will be size reduced to meet OSDF WAC. The piping, bedding, and 6-inches of underlying and adjacent soil will be loaded and hauled for placement in the OSDF. Pipe that is deformed, closed or otherwise not amenable to visual inspection of the interior walls, and any soil that fails the above-WAC scan, will be hauled to SP-7 or a destination designated by WAO personnel and managed for appropriate off site disposal.

After the bedding material and 6-inches of underlying and adjacent soil is removed, the floor and walls will be scanned by the RTIMP group, using the EMS, to ensure that uranium, thorium, and radium hot spots are absent. The absence of hot spots will indicate that the floor of the trench is ready for the collection of certification samples. At 50-foot intervals, samples will be collected for FRL attainment (i.e., certification). If the trench is too deep for personnel to access, the excavator or backhoe will excavate a bucket of soil from the trench bottom to allow sample collection. Excess soil in the bucket

will be returned to where it was obtained. The trench will then be backfilled, at risk, using the stockpiled overburden soil. Excess backfill necessary to meet surrounding grade will be obtained from an adjacent certified area. The backfill will be compacted in accordance with Technical Specification Section 02206 to meet the surrounding grade. As warranted by the real-time scan and analytical results, the trench bottom will be re-excavated if results indicate COCs are above their FRLs. Real-time scans and additional physical samples will be collected until the walls and bottom of the trench meet all applicable FRLs.

3.4 IMPACTED MATERIAL MANAGEMENT (GENERAL)

Impacted material consists of radiologically contaminated soil and debris, organic-contaminated soil, and other material (e.g., asbestos, process residues, etc). Excavated material that meets OSDF WAC will be placed in the OSDF in accordance with the Impacted Materials Placement Plan. Material that does not comply with OSDF WAC will be transferred to a destination designated by WAO personnel and managed for appropriate off site disposal. Above-WAC materials will be shipped to an off site disposal facility. General information on the handling and tracking of impacted materials is provided in Section 3.3.2 of the SEP.

Impacted material will be managed in a manner that ensures material placement objectives at the OSDF are met. For example, impacted material needed for the OSDF select layer must be stockpiled to ensure the material quantity needed is available during the scheduled OSDF liner or select impacted material layer construction. Additionally, soil/debris placement ratios for the OSDF must be maintained through proper stockpiling of soil and debris.

3.4.1 Contaminated Soil and Debris (General)

Contaminated soil and debris removed from A2PII will be assigned a source tracking number unique to each remediation area. Excavated soil and debris will be hauled to the OSDF if physical, chemical and radiological WAC are met. Soil and debris that does not meet OSDF WAC will be hauled to a destination designated by WAO personnel and managed for appropriate off site disposal.

3.4.2 Excavation Water (General)

Excavation water includes surface water run-on and seepage of groundwater into excavated areas. Refer to Section 3.1.3, Surface Water Management, for discussions pertaining to the handling of excavation water.

3.4.3 Other Materials (General)

Section 3.3.2.2 of the SEP identifies special materials that, when encountered, require WAO personnel input before determining disposition. Materials from this list may be encountered in A2PII include:

- Piping and pumps
- Uranium metal
- Miscellaneous debris
- Acid brick.

Some of these materials can be placed in the OSDF if they meet the physical and chemical WAC, and if a visual inspection of pipe interiors is passed. Materials that do not meet the OSDF WAC will be placed at a destination designated by WAO personnel and managed for appropriate off-site disposal. Information on the identification, management, and tracking of these materials is provided in the SEP (refer to Section 3.6 and Appendix F of SEP).

3.5 TRENCH BACKFILLING [Subarea 3 (Infrastructure)]

Backfilling of excavated areas will not be permitted until the certification process is completed. An exception to this approach is trenches excavated to remove utilities.

Soil removed from above the utility lines that is certified will be set aside and used to backfill the trench after the utility lines, bedding material, and 6-inches of underlying and adjacent soil is removed. Section 3.3.4 describes the excavation, sampling, and disposition of material removed from trenches. Technical requirements regarding the compaction of the backfill are presented in Technical Specification Section 02206. As the trench will be backfilled before analytical results are obtained on the collected soil samples, the trench is backfilled with the risk of re-excavating should the soil samples exceed the established FRLs.

3.6 PRECERTIFICATION AND INTERIM GRADING (General)

A precertification PSP will be submitted as a separate document to the regulatory agencies for review and approval. Precertification activities will commence after the design grade has been reached and all other construction in the area is complete. The precertification area will be delineated and controlled to prevent cross-contamination of environmental media. Real-time monitoring of the design grade will be performed to precertify the area as attaining the uranium, thorium, and radium FRL goals. Interim grading, defined as grading that occurs for slope maintenance and to prevent unsafe working conditions, is dependent on actual field conditions and may occur prior to or after precertification. The frequency of interim grading in a given excavation will be a function of the slope materials and their ability to maintain grade during precipitation events that occur prior to completion of certification and the restoration grading. Excavations in A2PII are primarily shallow, with the exception of trenching to remove utilities, which are backfilled. Therefore, there are currently no plans to perform interim grading other than ensuring positive drainage and prevention of ponded water.

A CDL/PSP for certification will be submitted to the regulatory agencies for review and approval (refer to Table 6-3 for the schedule). After precertification activities are completed, certification samples will be collected in a timely fashion to minimize the cost and time associated with pumping surface water out of the excavation. Final grading and vegetation requirements for the slopes will be addressed in the NRRP.

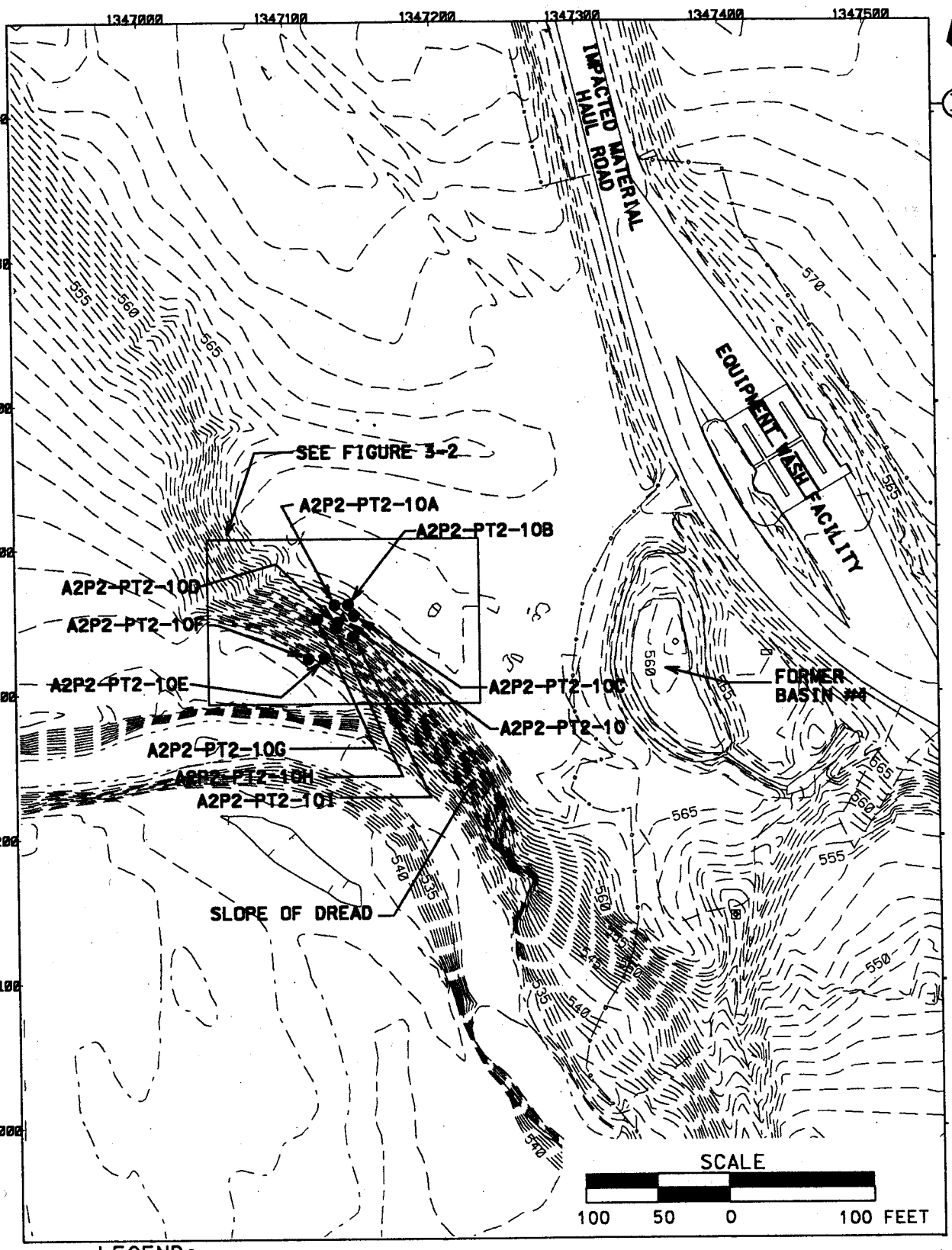
TABLE 3-1
SUBAREA 3 (INFRASTRUCTURE)
AT- AND BELOW-GRADE DEBRIS AND SOIL QUANTITIES

Remedial Area	At- and Below Grade Debris Quantity				Soil/Bedding Quantity (yd^3)
	Concrete (yd^3)	Asphalt (yd^3)	Gravel (yd^3)	Piping (lft)	
Equipment Wash Facility	123	650	508	----	874
Trailer Complex Area	34	223	1543	----	2206
Subcontractor Area	----	7	807	----	1066
Impacted Material Haul Road	----	1257	838	----	903
Piping					
3-inch HDPE (from Equipment Wash Facility to SWRB)	----	----	----	1270	----
2-inch Drinking Water	----	----	----	1580	176
Two 4-inch HDPE West/East Seepage Station Discharge	----	----	----	2455	274
Six 10-inch HDPE Transfer Line	----	----	----	400	46
Misc. Culverts	----	----	----	310	36

TABLE 3-2
SUBAREA 2 (RADIUM HOT SPOT)
EXCAVATION PARAMETERS AND QUANTITIES

Location	Excavation Parameters [a]	Contaminated Soil Quantity
Primary Excavation	D = 6-inches, L = 70-feet, W = 30-feet, SS = 0H:1V (Straight-walled)	38.89 yd^3
A2P2-PT2-10	D = 2-feet, Bot = Top = 4-feet, SS = 0H:1V (Straight-walled) D = 1-foot, Bot = 4-feet, Top = 6-feet, SS = 2H:1V (to surface)	0.83 yd^3
A2P2-PT2-10A	D = 1-foot, Bot = 4-feet, Top = 6-feet, SS = 2H:1V (to surface)	0.36 yd^3
A2P2-PT2-10B	D = 1-foot, Bot = 4-feet, Top = 6-feet, SS = 2H:1V (to surface)	0.36 yd^3
A2P2-PT2-10C	No Additional Excavation	
A2P2-PT2-10D	D = 1-foot, Bot = 4-feet, Top = 6-feet, SS = 2H:1V (to surface)	0.36 yd^3
A2P2-PT2-10E	No Additional Excavation	
A2P2-PT2-10F	D = 1-foot, Bot = 10-feet, Top = 15-feet, SS = 5H:1V (to surface)	2.27 yd^3
A2P2-PT2-10G	No Additional Excavation	
A2P2-PT2-10H	D = 1-foot, Bot = 4-feet, Top = 6-feet, SS = 2H:1V (to surface)	0.36 yd^3
A2P2-PT2-10I	D = 1-foot, Bot = 4-feet, Top = 6-feet, SS = 2H:1V (to surface)	0.36 yd^3
	Total	43.79 yd^3

[a] D=Depth from existing grade, L=Length, W=Width, Bot=Bottom Diameter, Top=Top Diameter at 6-inch below existing grade, SS=Side Slopes, H=Horizontal, V=Vertical



LEGEND:

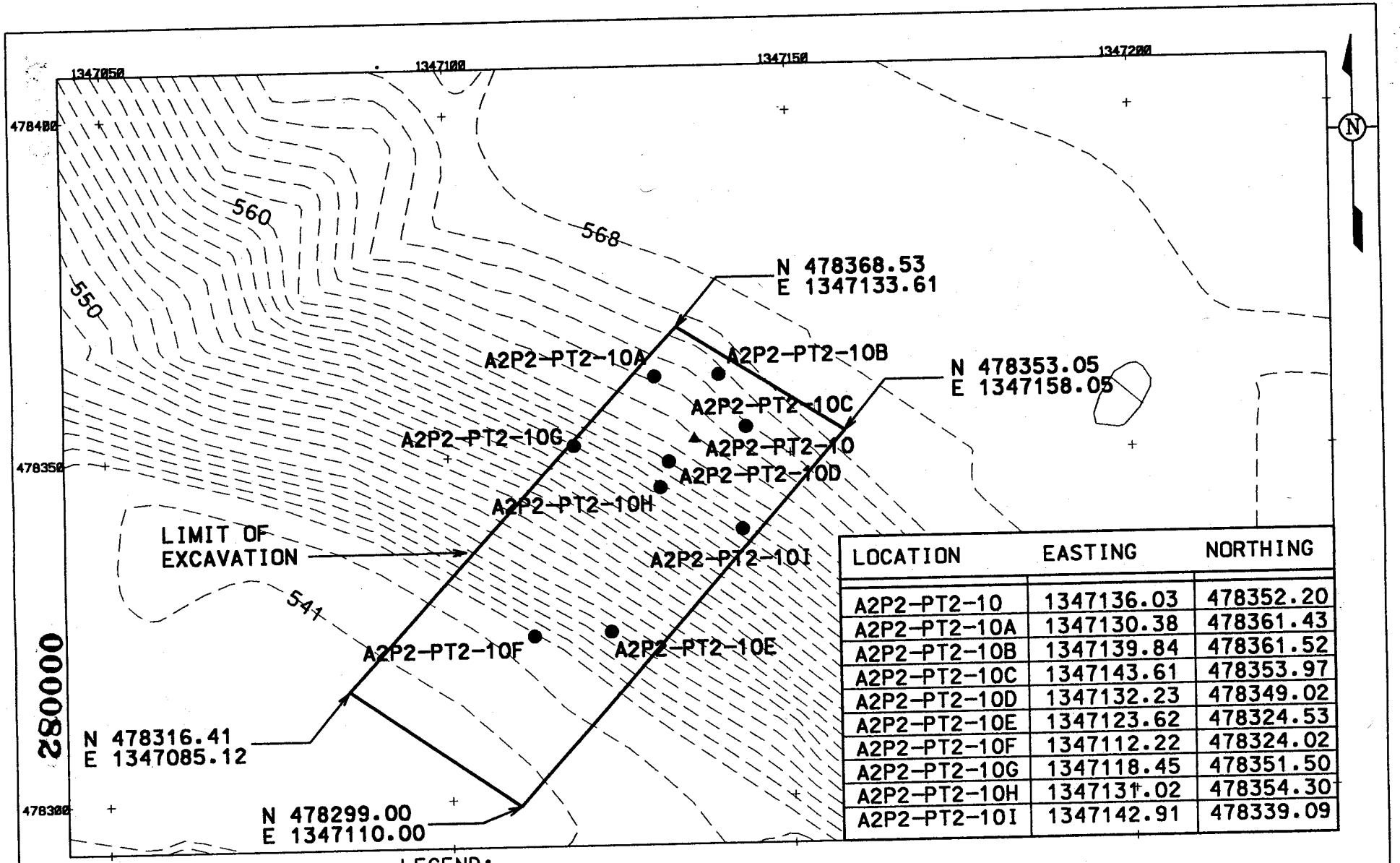
▲ A2P2-PT2-10 ORIGINAL PRE-DESIGN SAMPLE LOCATION

● A2P2-PT2-10 BOUNDING BORINGS

FIGURE 3-1. A2PII RADIUM HOT SPOT LOCATION MAP

STATE PLANAR COORDINATE SYSTEM 1983

24-JUN-2002



LOCATION	EASTING	NORTHING
A2P2-PT2-10	1347136.03	478352.20
A2P2-PT2-10A	1347130.38	478361.43
A2P2-PT2-10B	1347139.84	478361.52
A2P2-PT2-10C	1347143.61	478353.97
A2P2-PT2-10D	1347132.23	478349.02
A2P2-PT2-10E	1347123.62	478324.53
A2P2-PT2-10F	1347112.22	478324.02
A2P2-PT2-10G	1347118.45	478351.50
A2P2-PT2-10H	1347131.02	478354.30
A2P2-PT2-10I	1347142.91	478339.09

LEGEND:

▲ A2P2-PT2-10 ORIGINAL PRE-DESIGN SAMPLE LOCATION

● A2P2-PT2-10 BOUNDING BORINGS

SCALE

20 10 0 20 FEET

FIGURE 3-2.
A2PII RADIUM HOT SPOT (ENLARGED)

v:\a2fm12\dgn\loc\a2p2-115.dgn
STATE PLANAR COORDINATE SYSTEM 1983

24-JUN-2002

280000

4.0 PROJECT-SPECIFIC ENVIRONMENTAL CONTROLS AND MONITORING

This section defines the project-specific environmental controls and monitoring that will be performed during remediation of A2PII, use of the resulting information, and how the information will be integrated with sitewide monitoring and reporting requirements. Control mechanisms and monitoring/inspection requirements are provided to account for the air, surface water, and groundwater pathways, as well as impacts to natural resources (i.e., natural areas, endangered species, wetlands, and cultural resources). The general sitewide controls and monitoring are discussed in Section 5.0 of the SEP.

The IEMP quarterly reporting cycles provide a link between each project remediation activity and the individual project-specific remediation actions across the entire FEMP. Information provided by the project may include improvements to the surface-water management system, the location of additional air monitors, or newly identified groundwater pathways. Normally, routine decisions made by the SDFP to react and respond to project-specific operating conditions and process-control objectives (e.g., extending boundaries of a real-time survey) will not be reported as part of the IEMP reporting cycles. These types of routine decisions will be maintained as part of the project record and will be considered normal practice to achieve project-specific operating objectives.

4.1 NATURAL RESOURCE IMPACTS

On-property natural resource impacts include those associated with natural areas, threatened and endangered species, cultural resources, and wetlands/floodplains. Section 5.0 of the SEP establishes a three-component strategic control mechanism for natural resource impacts:

- Identify unavoidable impacts to natural resources anticipated to result from remediation activities
- Plan and design remediation activities to limit resource damage that is unavoidable
- Conduct natural resource restoration projects to restore remediated areas.

Unavoidable impacts anticipated within A2PII were identified in the OU3 and OU5 RODs. There are no wetlands or endangered species identified within A2PII. The majority of A2PII is made up of the southern pine plantation. Restoration plans for the southern pine plantation call for thinning approximately 50 percent of the trees to removed diseased and dying trees and open areas for the

replanting of native species. Any clearing required in the southern pines will be designed in a manner that is consistent with restoration plans to the degree possible. In the event that more than 50 percent of the southern pine plantation requires clearing, restoration plans for that area would be adjusted accordingly. The portion of A2PII between the southern pines and Paddys Run contains a more diverse stand of deciduous vegetation that should be protected to the degree possible. Any clearing required in the area for excavation, access points, staging areas, and equipment laydown will be designed to minimize impacts to the wooded area adjacent to Paddys Run. Restoration will address any disturbances to A2PII through the establishment of drainage patterns and vegetation consistent with Section 4.0 of the NRRP.

Archaeological Site 33HA680 is located within A2PII and is potentially eligible for the National Register of Historic Places. The initial investigation and report on the site was conducted in 1996 and revealed both prehistoric and historic components and will require a Phase 3 Data Recovery. This site should be avoided if possible during remediation. In the event that disturbance to this area cannot be avoided, the site will require additional investigation prior to any disturbance. A data recovery will be required to obtain any information of archaeological significance prior to any unavoidable disturbance of the site. In the event cultural resources are discovered during excavation of other portions of A2PII, contingency plans will be developed to deal with the discovery per the intent of component two.

4.2 AIR PATHWAY

This subsection presents the control and monitoring requirements for the air pathway during remediation of A2PII. The air pathway includes fugitive emissions (visible dust), airborne radiological particulates, and radon. Also included in this section are noise and direct radiation. 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). Regulatory protocols established in these monitoring programs will be used to ensure that project-specific data are of comparable quality and are beneficial in evaluating and reporting project-specific air pathway releases. Administrative and engineering control techniques, in accordance with Fugitive Dust Control Requirements (RM-0047), will be implemented during A2PII remediation activities to mitigate potential emissions of fugitive dust and airborne radiological particles.

4.2.1 Noise

Noise control and abatement during the A2PII remediation will include mufflers on equipment and machinery, proper maintenance of equipment and machinery, and rescheduling heavy equipment use times in the field if late operational hours are needed. The number of remediation activities performed after sunset will be minimized.

To ensure that the Occupational Safety and Health Administration (OSHA) and American Conference of Governmental and Industrial Hygienists (ACGIH) noise limits are met, an administrative action level below these limits will be set (Section 5.0 of this Implementation Plan). This administrative action level will be used to assess the need for hearing protection for field personnel in the remediation areas, for maintenance of vehicles and machinery, and for additional noise control and abatement.

Noise monitoring will be conducted as part of A2PII project-specific health and safety requirements. Noise measurements will be made in the field by Fluor Fernald and Contractor Safety and Health (S&H) personnel, using safety and health protocols for noise monitoring. The noise measurements will assess whether administrative action levels are exceeded, the need for hearing protection, the need for maintenance of vehicles and machinery, the need for additional noise control or abatement, and compliance with OSHA and ACGIH occupational noise limits.

The noise monitoring program will develop area-specific background levels before starting excavation activities and monitor noise levels during remedial activities. Field personnel will be responsible for documenting noise levels in the field in accordance with records management guidelines presented in Section 6.7, as well as for initiating noise abatement measures. If background noise levels are within 5 dBA (decibels on the A-weighted scale) of the administrative action level (85 dBA, as specified in the safety and health requirements), S&H personnel will contact the project manager to begin appropriate corrective actions.

4.2.2 Fugitive Emissions

Fugitive emissions shall be controlled during the A2PII remediation in accordance with Fugitive Dust and Control Requirements (RM-0047). Water, commercially available dust suppression agents, or other appropriate methods and proactive work practices will be used to minimize dust generation during A2PII remedial activities. In general, dust generation during soil excavation, handling, hauling, and placement

will be controlled using work practices that include cleaning paved haul roads or applying water (or other dust suppressant agents) to paved and unpaved haul roads. Water or other dust suppression agents will be applied in sufficient quantities to reasonably minimize dust generation, but limited so that they do not result in water migration beyond work area boundaries.

For excavation activities, dust control will be focused on making the material less dusty. The principal control mechanism will be the inherent moisture in the soil; during dry conditions, dust control will be initiated before excavation. If visible dust emissions occur during excavation, then one or more of the following dust control methods will be used:

- Apply more water mist
- Add surfactant or other agents to the water mist
- Apply resins, crusting agents, or foams in lieu of water mist.

For soil handling, hauling, and placement activities, dust control will focus on making the transported material unlikely to become airborne. The principal control mechanism will be reliance on inherent moisture in the soil coupled with a 20-mph speed limit during hauling on paved haul roads (10-mph speed limit on unpaved haul roads). If visible dust emissions occur during handling, hauling, or placement, then one or a combination of the following dust control methods will be used:

- Change configuration of material (e.g., place less in the trucks)
- Apply water mist
- Add surfactant or other agents to the water mist
- Apply resins, crusting agents, or foams in lieu of water mist
- Reduce truck speed
- Cover load bed.

The numbers or types of dust suppression equipment in operation will not preclude stopping work if there is visible dust or excessive visible dust. Increasing levels of visible dust indicate a need to increase dust control effort, including possible alteration, slowdown, or temporary suspension of the work activities generating the visible dust. The work activities observed to be generating the visible dust will be temporarily suspended if the visible dust exceeds the site-specific limit or Ohio standard (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.

Personnel will be on call during non-work periods seven days per week (including holidays) to respond to an "off-hours dust alert," which is defined as whenever Fluor Fernald gives notification to the contractor that visible particulate emissions exceed the site-specific limits during non-work periods. Site personnel will notify the contractor of such an alert and dust suppression will begin no more than three hours after such notification.

As part of the Safe Work Plan for the project, a Dust Control Plan will be developed that:

- Describes how field personnel will implement the Dust Control Plan, monitor for visible dust, progressively implement increased dust control or alter work activities when required, and maintain appropriate records of dust control activities
- Lists methods to be used to suppress dust and the associated frequency that routine dust suppression measures are to be implemented
- Describes the materials to be used to suppress dust - e.g., water, dust suppression agents, etc.
- Lists the specific types and quantities of equipment to be used to suppress dust
- Provides a description of the notification process, including designation of personnel, that the contractor intends for SDFP personnel to utilize during non-work periods to notify the contractor of an "off-hours dust alert."

Fluor Fernald will review the Contractor's Dust Control Plan against these criteria. Approval of the plan by Fluor Fernald is required before authorization of earthmoving activities.

Project personnel will tour the active remediation areas at the start of the day and periodically during the day. Real-time observation of visible dust, in accordance with the criteria described in Fugitive Dust Control Requirements (RM-0047), will be used to assess fugitive dust emissions and implement corrective measures, as needed. Additionally, paved roadways/parking areas, unpaved roadways/parking areas, and wind erosion from storage piles will be subjected to visual monitoring in accordance with 40 CFR Part 60, Appendix A, Method 22, "Visual Determination of Fugitive Emissions from Material Sources and Smoke Emission from Flares" (on-site training required). Excavation, hauling, and storage-pile activities will be subjected to opacity measurements in accordance with 40 CFR Part 60, Appendix A, Method 9, "Visual Determination of Opacity of Emissions from Stationary Sources" (or an approved alternative method). This method requires off-site training.

Field Managers will be responsible for documenting visible emissions and maintaining monitoring records in the field, as well as for initiating fugitive dust abatement measures. In accordance with the record keeping guidelines defined in Section 6.7, daily information that will be recorded as part of the A2PII remediation project includes:

- The date, weather conditions, and scheduled work activities (e.g., excavation, trenching, hauling, placement, compaction, loading, etc.)
- Opacity readings (if any) in accordance with 40 CFR Part 60, Appendix A, Method 9, "Visual Determination of Opacity of Emissions from Stationary Sources" (or an approved alternative method) [Note: not required for off-hours dust alert responses]
- Visual monitoring data (if any) in accordance with 40 CFR 60, Appendix A, Method 22, "Visual Determination of Fugitive Emissions from Material Sources and Smoke Emission from Flares"
- Time of dust-alert notification (if any) given to the contractor, names of the individuals involved (SDFP individual who gave the notification, contractor individual notified, and dust-alert responders), and time of initiation of dust suppression activity [Note: required only for days when such notification occurs]
- Identification of areas (or segments) where dust control was performed
- The manner or type of dust control activity(ies) applied to each area or segment
- Application rate of water or other dust suppression agents - at a minimum, tank truck load capacity and number of tank loads applied to each area or segment
- Identification of the party(ies) responsible for the dust control activity in each area or segment - at a minimum, name of the contractor.

4.2.3 Airborne Radiological Particles

All airborne radiological particles associated with A2PII remediation activities are anticipated to be from fugitive emissions. Control mechanisms for fugitive emissions are presented in Section 4.2.2, and these mechanisms provide sufficient control to alleviate environmental and public safety concerns arising from A2PII soil remediation activities.

Airborne radiological particles associated with A2PII remediation activities will be monitored via the sitewide airborne particulate monitoring program presented in Section 6.0 of the IEMP. The IEMP monitoring network surrounds the FEMP and encompasses all the current and expected diffuse and point sources at the FEMP. Data collected under the IEMP particulate monitoring program will be used to

assess the collective effect of concurrent remediation activities at the FEMP, per regulatory drivers described in Section 6.0 of the IEMP.

Supplements or modifications to the IEMP monitoring program are not anticipated to be required as a result of A2PII soil remediation activities. Monitoring stations surround the FEMP and the monitoring frequency and analyses addressed by the IEMP adequately address the COCs in the remediation area. Therefore, there are no plans to relocate monitor stations prior to soil remediation activities in A2PII.

4.2.4 Radon

Emission of radon from soil being remediated in A2PII is not anticipated to be an environmental or public safety concern. Hence, no project-specific radon control mechanisms are needed for A2PII soil remediation activities.

Sitewide radon emissions are monitored via the monitoring program presented in Section 6.0 of the IEMP. No supplement or modification to that program is anticipated for A2PII soil remediation activities. Radon monitoring stations surround the FEMP and will not be relocated for A2PII soil remediation activities.

4.2.5 Direct Radiation

Project-specific direct radiation control mechanisms beyond those provided by fugitive emissions control are not required for environmental or public safety concerns associated with A2PII soil remediation activities. Environmental radiation levels associated with A2PII soil remediation activities will be monitored via the sitewide environmental direct radiation monitoring program (Section 6.0 of the IEMP). No supplement or modification to the IEMP is anticipated to be needed for A2PII soil remediation activities, and monitoring stations will not be relocated from their present positions.

4.3 SURFACE WATER PATHWAY

As a condition of its NPDES permit (Ohio EPA Permit No. 1IO00004*F) the FEMP was required to develop and implement a 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 facility and describes the practices that will be employed to reduce pollutants within surface water discharges. This plan also contains provisions on the inspection program that must be

implemented to ensure that discharges of storm water associated with construction and industrial activities comply with the requirements of the FEMP NPDES permit.

A2PII is located adjacent to Paddys Run and most runoff from the area enters Paddys Run directly. Runoff from the southern edge of A2PII enters the SWUs and runoff from the northern edge of A2PII enters the Pilot Plant Drainage Ditch that leads to Paddys Run. Once soil remediation activities begin in A2PII, appropriate silt fences will be installed to control runoff to Paddys Run, the Pilot Plant Drainage Ditch, and surrounding areas.

The SWPPP mandates that construction activity inspections be conducted in the remediation area on a weekly basis. The FEMP's construction activity inspection program performs weekly inspections within all site construction areas and after any rain events totaling 0.5 inches 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.

Inspections conducted in the A2PII project will ensure that:

- Erosion and sedimentation control measures are in place and are well maintained
- Work practices and housekeeping activities are conducted in a manner that reduces the potential discharge of pollutants in association with storm water discharges from disturbed areas
- Corrective actions related to the establishment and/or maintenance of erosion and sedimentation control structures are documented and tracked to resolution
- Excessive erosion and/or situation to off-property waterways is not occurring as a result of construction activities initiated under the A2PII Part Two soil remediation activities.

The SEP discusses potential project-specific storm water monitoring programs for soil remediation areas located outside the Former Production Area drainage basin. The objectives of such a program would be to monitor performance of erosion and sedimentation control structures (e.g., sediment traps and basins) against their anticipated design efficiencies, and to determine whether the runoff presents an unacceptable impact to surface water quality or presents an unacceptable cross-media impact to the Great Miami Aquifer. Specific surface-water monitoring tasks applicable to the A2PII Project are discussed in Section 3.5.1.

4.4 GROUNDWATER PATHWAY

In A2PII, soil remediation activities are not expected to impact the Great Miami Aquifer. The sitewide management strategy for monitoring groundwater during remedial activities is described in detail in Section 3.0 of the IEMP, which lists the objectives, regulatory drivers, monitoring, data evaluation, and reporting requirements for the program.

5.0 PROJECT-SPECIFIC HEALTH AND SAFETY

All FEMP employees, visitors, vendors, and contractors associated with remedial activities in A2PII are required to abide by:

- Site work permits, and
- A Traveler Package prepared by Fluor Fernald.

If required, a Project Specific Health and Safety Plan will be developed in accordance with procedure SH-0001, Developing Project Specific Health and Safety Requirements, excavation and impacted material placement activities related to A2PII.

An Industrial Hygiene Monitoring Plan will be developed to address COCs for the A2PII project area and will comply with all federal, state, and local requirements (e.g., OSHA, ACGIH).

The Traveler Package will identify training requirements, tasks, hazards, and mitigators. The Traveler Package may be revised, as tasks and/or associated hazards are identified, added, or deleted. The detailed Traveler Package will be maintained at the project site, with controlled copies in the project document control files.

In addition to the permits, Traveler Package, and the requirements of this document, the contractor will comply with all federal, state, and local requirements (e.g., OSHA). Fluor Fernald managers and supervisors are responsible for ensuring that the Traveler Package complies with the environmental safety and health/training requirements and ensuring compliance with the Work Plan. All personnel have stop-work authority for imminent safety hazards resulting from noncompliance with the applicable health and safety practices. Health and safety requirements and procedures for this Implementation Plan will be governed by the Safety Performance Requirements Manual (RM-0021), site work permits, Traveler Package, and the overall strategy discussed in the SEP (Section 6.0).

Fluor Fernald will assign an occupational health and safety representative to the design team to review all project design documents and ensure compliance with all applicable worker safety and health regulations. Fluor Fernald will provide all radiological occupational monitoring, including Radiological Control Technicians (RCTs), to support remediation activities. The radiological work requirements for

A2PII remediation activities will be detailed in activity-specific Radiological Work Permits (RWPs). Personnel performing work under a RWP will be briefed on the specific hazards and task requirements before work begins. Radiological control personnel will evaluate the data obtained from field surveys to determine the effectiveness of the radiological controls.

Fluor Fernald will provide safety and health coverage, including air sampling for non-radiological contaminants. Fluor Fernald will perform periodic walk-throughs to assure compliance with OSHA regulations and safety and health requirements.

6.0 REMEDIAL ACTION MANAGEMENT STRATEGY

This section describes the following: A2PII organization and responsibilities, configuration management, construction management, impacted material management, contingency management, data and records management, QA/QC and regulatory audit, integration of A2PII activities with other SDFP and FEMP activities, and remedial action and certification schedule.

6.1 ORGANIZATION AND RESPONSIBILITIES

The 1991 Amended Consent Agreement between DOE and EPA Region V (EPA 1991) decrees that both agencies have ultimate project management responsibility, with DOE as the designated lead agency. OEPA has an oversight and advisory role, as defined by regulatory agreements, for wastewater management (NPDES), hazardous waste management and HWMU closure, dust and noise control, groundwater monitoring, and air and water pathways.

The DOE-FEMP Remedial Action Project Manager is responsible for ensuring that FEMP remedial actions meet project goals, standards, specifications and requirements, while the DOE OU5 Team Leader provides DOE-FEMP programmatic direction for at- and below-grade remediation of A2PII. DOE-FEMP will assign a Facility Representative to conduct field oversight of the project through Technical Leads that will be responsible for construction, excavation/remediation, engineering, QA/QC, health and safety, environmental controls and monitoring, and other pertinent aspects of the project. The DOE-FEMP Facility Representative and Technical Leads will consult with the OU5 Team Leader or DOE Remedial Action Project Manager, as appropriate, to seek prompt resolution of any issues or problems.

DOE's primary contractor, Fluor Fernald, is responsible for overall management and remediation at the FEMP. Remedial activities will be performed by the A2PII Project Team, which will consist of personnel working for DOE's primary contractor. The A2PII Project Team consists of personnel in SDFP, supported by other FEMP functional areas and subcontractors as necessary. Senior SDFP personnel will provide project management, construction management, technical, and regulatory guidance to the Project Team.

As work progresses, the project organization will change to perform each particular phase of the project as efficiently as possible. The basic organization will stay the same throughout the project; however, leadership will be shifted between the SDFP Engineering/Planning Manager to the SDFP Execution Manager (also called the Construction Manager) during the project. During the characterization, design, and certification phases, the project will be managed by the Engineering/Planning Manager. During the construction phases, the project will be managed by the Execution Manager. This organizational structure provides clear lines of responsibility and experienced leadership to the appropriate technical phases of the project.

The A2PII Project Team includes personnel in the following groups (refer to Figure 6-1):

- Management
- Primary technical areas
- Functional support.

The roles and responsibilities of SDFP personnel within each group are presented below, and personnel who serve as points of interface between SDFP and other FEMP projects are discussed in Section 6.8.

6.1.1 Management

A2PII management includes the SDFP Project Director, Deputy Director, Engineering/Planning Manager, Execution Manager, and administrative support. Each of these positions is discussed below, and many of the positions are described in greater detail in FEMP procedures and project documents.

6.1.1.1 SDFP Project Director

The SDFP Project Director (Project Director) has overall responsibility for the general direction, guidance, management, and oversight of the project, and reports directly to the Director of Projects. In this role, the Project Director's direct reports include the Engineering/Planning Manager, the Execution Manager and the SDFP Deputy Director (Deputy Director). The Project Director also serves as the primary contact for the SDFP with the DOE and the regulatory agencies. In the Project Director's absence, or as assigned by the Project Director, the Deputy Director will have the overall responsibilities of the Project Director.

6.1.1.2 Engineering/Planning Manager and Execution Manager

The Engineering/Planning Manager and Execution Manager oversee and manage the project and have overall responsibility to complete the project scope within budget and on schedule. The transition point between the design and construction phases of the project is the approval of the IRDP and certified-for-construction (CFC) drawings. During the characterization, design, and certification phases of the project, the project is managed by the Engineering/Planning Manager which includes his direct reports from Engineering, Restoration Management, Characterization/Waste Management, and RTIMP. Also, support is provided from other SDFP support personnel from QA/QC, project controls, administration, safety and health, radiological control, surveying, and construction. During construction, the overall project is managed by the Execution Manager and his direct reports including construction superintendents, construction engineers, labor support, logistical support, safety and health, and radiological control. He is also supported by the Engineering/Planning Manager and his team.

The general responsibilities of the Engineering/Planning Manager include:

- Overall management of characterization, design and certification phases
- Developing the IRDP and obtaining regulatory approval of the project
- Assuring the technical accuracy and quality of the CFC drawings and the technical specifications through the completion of construction
- Ensuring that the DCN process is properly evaluated and efficiently managed by the Project Engineer
- Managing the Project Engineer, Characterization/Waste Management Lead, RTIMP Lead, and other SDFP resources to provide timely and sufficient technical support per the Execution Manager's request during construction
- Facilitating implementation of FEMP oversight functions (e.g., QA/QC, WAO, etc.) on engineering and characterization procedures
- Closing Nonconformance Reports on engineering and characterization procedures and/or deliverables.

The Execution Manager is in charge of, and accountable for, A2PII construction activities, including:

- Managing SDFP construction personnel (i.e., Construction Superintendents, Construction Engineers, Construction Coordinators, Logistical Support, Surveying/CADD, and Labor Support)

- Obtaining the required FEMP permits and ensuring permit requirements are fully understood and followed by field personnel

- Facilitating timely and sufficient implementation of FEMP oversight functions (e.g., QA/QC, Safety and Health, WAO, etc.) on construction procedures and/or deliverables

- Closing Nonconformance Reports on construction procedures and/or deliverables

- Providing documentation, information and support to satisfy the Standard Start-up Review requirements for long-term pumping facilities

- Requesting engineering, characterization, and other administrative support during construction through the Engineering/Planning Manager.

6.1.1.3 Records Management

Project records are submitted to Engineering/Construction Document Control (ECDC). Project personnel are responsible for the management of project records until they have been submitted to ECDC. Specific responsibilities of project personnel include:

- Interfacing with ECDC,
- Managing project documents
- Coordinating the review and comment response process for project documents.

6.1.1.4 Project Controls

The Project Controls group provides the Project Director, Engineering/Planning Manager, and Execution Manager with cost and schedule information for control accounts within the project. Specific responsibilities include:

- Ensuring cost and schedule requirements are defined, planned, and monitored against an integrated baseline so that performance can be measured and reported consistent with overall commitments, budgets and available funding

- Establishing cost, schedule, and technical baselines and maintaining them through the issuance of change proposals

- Collecting monthly status reports to identify trends which may result in forecast variances from the baselines

- Assisting the SDFP Cost Account Manager and other project personnel in the various administrative duties associated with establishing baselines and forecasts, and ensuring that charges are directed to the proper accounts as defined in the baselines

- Working with sitewide training coordinators to ensure that individuals assigned to the project are in compliance with established training procedures and guidelines

- Working with project and site commitment trackers to ensure that project commitments are entered into the tracking systems and that responsible personnel are kept informed of the requirements of each commitment

- Providing adequate documentation of commitment completion to project and sitewide trackers.

6.1.2 Primary Technical Areas

The primary technical areas that support soil remediation in A2PII are:

- Engineering
- Construction
- Characterization.

6.1.2.1 Engineering

The SDFP Engineering staff (engineering staff) under SDFP Engineering Manager (Engineering Manager) direction performs Title I and II design and engineering services by creating CFC design drawings and technical specifications. The engineering staff also prepares specific sections of the Implementation Plan and provides technical input during the development and review of the IRDP, including the CFC package. The Engineering Manager reports to the Engineering/Planning Manager on project-specific remedial designs, as well as associated documentation and design modifications. During construction, the Engineering Manager will assign a Project Engineer who will perform Title III engineering services which include processing Requests for Clarification or Information (RCIs) and creating and/or processing DCNs. Specific responsibilities of the engineering staff include:

- Preparing CFC engineering documents

- Developing responses to RCIs

- Developing, reviewing, and/or approving DCNs

- Reviewing and approving vendor data submittals or engineering and design components

- Revising construction drawings and technical specifications when necessary

- Reviewing and approving "as-built drawings" supplied by the construction contractors at the completion of field work
- Preparing work statements and verifying that contractual work has been performed by the contract CADD technical staff
- Verifying that regulatory commitments are completed and approved
- Conducting inspection of erosion and sediment control measures.

6.1.2.2 Construction

Under the lead of the Execution Manager, remedial action construction will be performed by building trades labor and/or the construction support contractor reporting directly to SDFP construction management personnel. The Execution Manager has Construction Superintendents, Construction Engineers, Construction Coordinators, Logistical Support, Surveying/CADD, and Labor Support personnel on staff to support these activities. During remedial design, construction will provide input in the form of lessons learned and formal reviews of design drawings and technical specifications to ensure the design is constructable. Specific responsibilities include:

- Managing the building trades labor force to self perform the A2PII construction
- Coordinating daily work activities in the field and providing technical direction to the construction support contractor as necessary
- Providing, reviewing, and/or approving submittals as listed on the submittal register prepared by Engineering
- Utilizing project and functional area resources as necessary
- Installing and maintaining erosion and sediment control measures.

Construction field personnel will be qualified to supervise the performance of tasks associated with the A2PII remedial activities. They are responsible for coordinating and supervising their work as well as any subcontractor work in A2PII. At a minimum, Construction's representatives will be responsible for the following:

- Implementing a safety program in accordance with FEMP requirements
- Discussing and interpreting the A2PII design and informing Engineering of any discrepancies between the plans, specifications and field conditions

- Distributing documentation required by the project specifications in a timely manner
- Attending project coordination meetings
- Scheduling the applicable remedial activities
- Maintaining a daily log of A2PII activities and assisting the Execution Manager or his designated representative in reviewing and approving submittals, as necessary
- Implementing and verifying QC procedures required of the contractor and/or their subcontractors.

6.1.2.3 Characterization

The Characterization/Waste Management Lead (Characterization Lead) will coordinate A2PII field measurements, sample collection, laboratory analyses, and data management associated with the characterization of waste materials and soil in A2PII. These responsibilities include:

- Developing PSPs and coordinating sampling and analysis to support pre-design characterization activities
- Evaluating and reporting characterization data to provide recommendations and documentation
- Reporting precertification and certification sampling/measurements.

The Characterization Lead will oversee sampling and analytical activities that support the remedial design and certification of A2PII. Sampling personnel are responsible for providing input on PSPs, collecting field data, and performing data management for project sampling activities, as directed by the Characterization Lead. An exception to this is scheduled environmental monitoring outlined in the IEMP, which is performed by environmental monitoring personnel. The individual sampling tasks are defined in PSPs prepared by the Characterization Lead and support personnel.

6.1.3 Functional Support

The A2PII Project will require support from personnel in other FEMP functional areas, and these individuals will be matrixed to the project. Generally, the lead technical group will manage the functional support staff. To the extent possible, functional support will be provided by personnel dedicated to the SDFP (e.g., QA/QC, Safety and Health, etc).

6.1.3.1 Safety and Health

Safety and Health support during the project will be provided by the Safety and Health Lead and his direct reports. This support will include:

- Preparing Safety and Health documents for the project (including a Safety Assessment)
- Reviewing documents as they are prepared for compliance with Safety and Health requirements
- Implementing the A2PII Project-Specific Health and Safety Plan, as required
- Assuring that FEMP personnel and contractors follow safe work practices.

The Safety and Health Lead and his direct reports have stop-work authority if unsafe work practices go uncorrected. In addition, any employee working at the FEMP can stop work if they feel that a work situation is unsafe.

6.1.3.2 Radiological Control

Radiological control support during the project will include:

- Preparing required radiological control documents for the project (including radiological ALARA
- Reviewing project documents as they are prepared for compliance for radiological requirements.

6.1.3.3 Environmental Compliance

Environmental Compliance support during the project will come from the Closure Project Regulatory Management Division when needed and it may include:

- Preparing required Environmental Compliance documents for the project, including the ARARs and TBC summary in the Design Criteria Package and the ARARs crosswalk
- Reviewing project documents as they are prepared for Environmental Compliance requirements
- Coordinating with internal and external groups, including regulatory agencies, regarding regulatory matters
- Providing oversight to ensure compliance with environmental requirements.

6.1.3.4 Quality Assurance/Quality Control

The SDFP QA/QC Lead and his direct reports (QA/QC representatives) will be matrixed to the project from the FEMP QC Operations organization and the QA/QC Lead will report to the Project Director in an administrative fashion, while retaining an independent oversight role. The QA/QC Lead will be responsible for developing and implementing QA plans for the project, with the primary responsibility being oversight of QA/QC activities during design, sampling, waste disposition, and construction excavation tasks. To ensure compliance with FEMP requirements and procedures, the QA/QC representatives will monitor and provide support to the project in accordance with quality program elements identified in the FEMP Quality Assurance Program (RM-0012), the Sitewide Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Quality Assurance Project Plan (SCQ), and the SEP Quality Assurance Project Plan. QA/QC representatives have stop-work authority if quality concerns go unresolved.

6.1.3.5 Waste Disposition

A FEMP WAO representative will provide waste management support. Support will include preparation of Project Waste Identification and Disposition forms (PWIDs), definition of Material Tracking Locations (MTLs), technical direction and oversight for waste stream segregation and management, preparation of Field Tracking Logs (FTLs) and OSDF Manifests, preparation of waste stream profiles, and coordination with the Execution Manager and the Waste Management Manager for handling and disposition of waste streams.

6.1.3.6 Natural Resources

Personnel within the Natural Resources organization will be responsible for assessing potential damages to natural resources within A2PII during the design and planning stages of the project. Natural resources personnel will also be responsible for planning and implementing interim and final restoration of A2PII as described in the NRRP. However, natural resources personnel will not monitor natural resources impacts, as this monitoring is covered under the IEMP and is performed by environmental monitoring personnel.

6.1.3.7 Cultural Resources

Cultural Resources will be responsible for handling unexpected discoveries of cultural resources during site preparation and excavation in A2PII. Because much of the upper 2 to 3 feet of soil in the production

area has been disturbed, cultural resources should not be found during site preparation activities. However, the deep excavations to remove uranium contamination could encounter cultural resources, which will be handled in accordance with Section 6.5.3.

6.1.3.8 Procurement

FEMP Procurement will assist the A2PII Project Team in obtaining equipment, services, and materials needed or the project. The principal support will be in the area of procuring materials and equipment for removal of soil and at- and below-grade concrete structures. Procured equipment and material will meet the technical specification requirements defined in the submittal register. Vendor data will be submitted to the project team management to review and ensure design and technical specification requirements are met. Responsibility for maintenance and repair of procured equipment and material lies with Construction.

6.1.4 Coordination of Excavation Site Activities

Several non-excavation activities will be on going at each active excavation site. Because of the potential safety hazards associated with large construction equipment and open excavations, these activities must be coordinated and supervised. Non-excavation activities include:

- Visual observation,
- Sampling and monitoring
- Radiological occupational monitoring
- Asbestos monitoring
- Material documentation
- Occupational Health and Safety monitoring
- Construction monitoring
- Surveying
- Visual dust monitoring
- Environmental monitoring
- Safety inspections.

The following paragraphs describe each of these activities, the personnel involved, and the time required for their tasks. In addition to the coordination responsibilities, Construction will have one full-time equipment operator, the equivalent of one full-time truck driver, and a part-time supervisor at each active excavation area.

6.1.4.1 Visual Observation

The active face of excavations will be monitored visually and continuously to identify special materials encountered during excavation. WAO and Construction personnel will monitor the excavation face. Special materials that are likely to be encountered during excavation activities include asbestos, miscellaneous debris, piping, non-pressurized containers, non-soil residues, uranium metal, and acid brick. A complete list of special materials is given in Section 2.5.8 of the SEP.

6.1.4.2 Sampling and Monitoring

Physical sampling and/or RSS/RTRAK or HPGe monitoring will be performed as necessary during excavation of A2PII. In general, RSS/RTRAK or HPGe monitoring will be conducted after each excavation lift in areas known to contain soil above the OSDF WAC. HPGe monitoring may also be used to precertify the area with respect to achieving FRLs for uranium, thorium, and radium. Physical samples may be necessary to characterize suspect zones when special materials are encountered. Sampling and monitoring work will be performed under the direction of the Characterization Lead.

6.1.4.3 Radiological Occupational Monitoring

Radiological Control will have one full-time RCT in the field to monitor the ambient radiation level of the excavation, ensure RWP compliance, assess changes in ambient radiation levels that affect the radiological classification of the area, and to scan any special materials encountered. Additional information on RCT monitoring and oversight is provided in Section 6.3.4.

6.1.4.4 Asbestos Monitoring

When excavation activities encounter material suspected of containing asbestos, a qualified asbestos hazard abatement specialist (as certified by the Ohio Department of Health) must be present to monitor the removal of the material. Personal breathing zone and general area air sampling for asbestos may be required. Asbestos is likely to be encountered during the removal of electrical lines and utilities, and it may also be found in the form of buried transite panels.

6.1.4.5 Material Documentation

A WAO representative will complete the OSDF Manifest and FTL to document the transfer of material from A2PII to the OSDF or other MTLs. Trucks hauling to the OSDF from A2PII must leave the excavation with an OSDF Manifest. The manifest will track the material to a project by identifying

initial, interim, and final MTLs. The WAO representative will use verbal and written information from contractor personnel to document movements between MTLs. Additional information on field documentation information management can be found in Section 3.6.4 of the SEP.

6.1.4.6 Occupational Health and Safety

FEMP Safety and Health will be responsible to monitor the work area for occupational health and safety concerns that include: occupational dust, compliance with the Traveler Package, chemical exposure, other hazards, and changes in field conditions affecting worker safety. FEMP Safety and Health will periodically observe health and safety conditions at the active excavation area. Additional monitoring information is discussed in Section 6.3.3.

6.1.4.7 Construction Monitoring

FEMP Construction will direct and monitor the remediation work for compliance with the CFC documents. One full-time FEMP construction person will be assigned to A2PII field activities and additional part-time personnel will be assigned on a periodic basis. Other surveillance and inspection responsibilities are discussed in Section 6.3.2.

6.1.4.8 Surveying

Construction will have a two- to three-person survey crew in the field on an intermittent basis to provide construction control and measure the excavation volume for progress reporting.

6.1.4.9 Visual Dust Monitoring

Construction will have the primary responsibility to monitor the construction area for compliance with the best available technology dust policy requirements. Additional details on fugitive dust control requirements (i.e., per RM-0047) and best available technology dust policy are discussed in Section 5.0 of the SEP.

6.1.4.10 Environmental Monitoring

Environmental monitoring will be done on a regular basis by FEMP personnel. Weekly inspections of surface water control facilities will be supplemented with inspections after every major rain event, per the SWPPP requirements and Section 3.5.1. Groundwater and air monitoring is covered under the IEMP.

6.1.4.11 Safety Inspections

The Execution Manager or his designated representative will lead a weekly joint safety inspection of the work area. Participants will include Construction and Safety and Health representatives. Additional Safety and Health oversight functions are discussed in Section 6.3.3.

6.1.5 Field Team

The typical field team that will provide oversight at each excavation will consist of one RCT to cover occupational monitoring of ambient radiation, one WAO representative to observe the excavation materials and one WAO representative to prepare waste manifestation documents and one construction representative for oversight of field activities. It is possible that more people could be near an active excavation site at any one time (e.g., utility engineer, Safety and Health, project management, etc). However, only personnel required for actual construction activities will be allowed within 50 feet of the active excavation.

6.1.6 Management of Field Personnel

The potentially large group of personnel at a single excavation site at any given time creates logistical and safety concerns. Therefore, the responsibility for the management and coordination of field personnel and activities has been assigned to Construction. Personnel needing access to the excavation site will sign in with Construction before entering the excavation area and sign out upon leaving the area. This type of administrative control provides Construction with information on the number of people in a given area at any time, which is critical information needed in the event of an emergency.

6.2 CONFIGURATION MANAGEMENT

Configuration management will not be implemented on the A2PII project since it does not apply to these performance grade (PG) 4 and PG-5 facilities.

6.3 CONSTRUCTION MANAGEMENT

Fluor Fernald Construction (Construction) is responsible for implementing this remedial action project in accordance with DOE direction. Construction will directly perform the remediation work through the use of building trades labor working directly for Construction or to a much lesser extent, using the site construction support contractor where appropriate. In addition, Construction will be responsible for construction management during the work. 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 Execution Manager or his designated representative will ensure that safety concerns are brought to the attention of the FEMP Safety and Health Officer and the responsible Construction team members to ensure timely resolution of the concerns.

6.3.1 Status Meetings

The Execution Manager, or his designated representative, will conduct regularly scheduled status meetings with the Engineering/Planning Manager, Engineering, Health and Safety, QA/QC, and others, as warranted. The meetings will address action item status, project progress, planning, schedule status, safety items, quality, environmental protection, and problem resolution.

Construction supervision will prepare a daily report (or log) covering the previous day's work status and identifying any safety or quality problems encountered. This report and any supplementary reports will ultimately be retained in the FEMP project file.

6.3.2 Surveillance and Inspection

Construction supervision has first line responsibility to inspect work and correct any deficiencies. The Execution Manager, Engineering/Planning Manager or their designated representative(s) will conduct inspections and surveillances to ensure the design is being properly implemented and contract requirements are being satisfied. QC inspections will be in accordance with the Construction QA Plan and design requirements. If a deficiency is noted, then Construction will implement the necessary corrective action(s) as soon as possible.

6.3.3 Safety and Health Oversight

The SDFP Safety and Health Lead, or his designated representative, will perform safety oversight of the A2PII construction. While FEMP personnel are responsible for following safety requirements identified in the Traveler Package, as appropriate, the assigned A2PII Safety and Health representative will perform periodic surveillance of the A2PII remedial action to monitor compliance. Although project personnel have stop-work authority for imminent safety hazards, the Safety and Health representative will have stop-work authority (in the event of a threat to worker and/or public safety) until the proper corrective follow-up actions are taken. The Safety and Health representative will be the single point of contact for safety, industrial hygiene, and fire protection issues. The Radiological Engineer is

responsible for radiological concerns. Health and safety issues and concerns will be directed to the Execution Manager for resolution/implementation.

6.3.4 Radiological Monitoring and Oversight

To ensure occupational radiological compliance, FEMP RCTs will be assigned to the A2PII project. The assigned RCTs will perform the necessary radiological monitoring and oversight to provide documentation that demonstrates project compliance with regulatory occupational exposure control requirements. The A2PII Traveler Package will be the basis for the required project occupational radiological monitoring and it will identify action levels to ensure personnel radiological safety, as well as industrial/occupational safety.

6.4 IMPACTED MATERIAL MANAGEMENT

Impacted materials generated during A2PII remediation will be managed under the FEMP Waste Disposition Program, which is implemented as an integrated effort by WAO, waste programs, and construction organizations. Roles and responsibilities for each of these organizations are established in procedure EW-1022, On Site Tracking and Manifesting of Impacted Material.

Programmatic controls begin with waste planning during the predesign phase, at which time a volume estimate for each waste type (e.g., exceeds OSDF WAC, special materials, RCRA, etc.) is prepared, characterization methods are specified, and tentative interim (if required) and final means of disposal are identified. During project execution, waste streams are segregated by disposition categories and managed in the context of the following characterization, storage, and disposal options:

- Bulk Waste Streams: On-Site Disposition
  - Physical matrix allows bulk management
  - Meets the OSDF chemical, radiological, and physical WAC
- Bulk Waste Streams: Off-site Disposition
  - Physical matrix allows bulk management
  - Exceeds the OSDF radionuclide WAC (rail transport)
  - Exceeds the OSDF chemical WAC (truck transport)

- Containerized Waste Streams: Off-site Disposition
  - Exceeds OSDF chemical, radiological or physical WAC
  - Cannot be processed to meet OSDF WAC
- Containerized Waste Streams: On-Site Disposition
  - Physical matrix or nature of waste does not allow bulk management
  - Requires processing in a controlled area to meet OSDF WAC
  - Requires confirmatory sampling for OSDF WAC
  - Special Material that meets the OSDF WAC, but requires special handling for health and safety concerns.

Bulk waste stream information will be managed in the Integrated Information Management Systems (IIMS) database. Anticipated impacted material segregation protocols are listed in Technical Specification Section 02205. The relationship between IIMS and other site databases are illustrated on Figure 3-9 in the SEP. IIMS is designed to accommodate fast track, bulk waste stream characterization, OSDF WAC attainment demonstration, and OSDF manifesting by using site characterization data. It interfaces with the SED through the State of Ohio NAD 83 coordinate system to track historical RI/FS and newly generated data with the excavated material moved from the source location. It also interfaces with the Sitewide Waste Information Forecasting and Tracking System (SWIFTS) to allow electronic transfer of bulk waste inventory to the container management system, when containerization is required.

Field information for input to IIMS will be collected on FTLs and OSDF Manifests, with information subsequently entered into IIMS. Key data elements that are recorded on these forms are listed below:

- Project number and name
- Source MTL
- Interim or final disposition MTL (FTL only)
- Estimated volume of material
- Material matrix or profile number
- Generation date
- Signature.

Copies of FTLs and OSDF Manifests are kept in the project files.

MTLs are defined electronically in IIMS using the State of Ohio NAD 83 coordinate system. Prior to project start-up, SED data are reviewed and contiguous areas with like data are identified as unique MTLs. MTLs are identified on project drawings and in the field. When data from an FTL log is entered

to IIMS, SED data for the specified MTL is tied to excavated soil volumes that have been moved to either an interim (pre-remediation area, stockpile, or container) or final (OSDF disposal) location. IIMS maintains transaction histories to provide cumulative analytical data for soil volumes that are moved more than one time. The main types of MTLs include WAC attainment areas, stockpiles and the OSDF.

A root profile is assigned to each of the five primary waste streams designated for OSDF disposal:

Profile # 91,000 OSDF Category 1	Soil and soil-like material
Profile # 92,000 OSDF Category 2	Debris for en masse placement
Profile # 93,000 OSDF Category 3	Debris for individual placement
Profile # 94,000 OSDF Category 4	High organic content (humus and vegetation)
Profile # 95,000 OSDF Category 5	Friable asbestos-containing material, sludges, and materials requiring case-by-case approval

The waste profile number facilitates electronic information retrieval from IIMS. Numeric extensions (e.g., 91,001...95,999) are used for further waste stream delineation on an as-needed basis. The second digit of the profile number identifies the OSDF category. Wastes manifested to the OSDF will be covered under a waste stream profile. The manifest number is used to retrieve characterization information from IIMS, if required, to support a determination that the waste meets WAC.

6.5 CONTINGENCY MANAGEMENT

Conditions that are unexpected cannot be managed through established excavation guidelines, and they are not accommodated in the detailed remedial design. These conditions will be dealt with according to contingency management protocols and plans set forth in Appendix F of the SEP. The contingencies are categorized as follows:

- Unearthing of materials that require special handling (e.g., asbestos)
- Encountering contamination or soil conditions that may pose a risk to human health or the environment if standard excavation practices are used (e.g., process residues), or which are significantly different than expected, or which may affect other operations
- Discovering unexpected utilities or cultural/historic resources.

6.5.1 Materials Which Require Special Handling

Special materials, and the protocol for their handling, are given in Appendix F of the SEP and procedure EW-1024. The special materials that are likely to be encountered during A2PII excavation activities include asbestos-containing materials, acid brick, piping, and miscellaneous debris. Some special materials may meet OSDF WAC, while others will require off-site shipment. The SDFP and WAO will provide assistance to FEMP Construction for field decisions related to the management and disposition of special materials. If applicable, WAO will arrange for movement of materials to the appropriate storage and handling areas for characterization, treatment evaluation, and/or final disposition arrangements. Additional details are provided in Technical Specification Section 02205.

6.5.2 Unexpected Contamination or Soil Conditions

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 the approved IRDP. If conditions are significantly different than the approved IRDP design, than one of the following options will be exercised:

- Revise the IRDP design within SEP guidelines, submit a letter to regulatory agencies describing the design revision, and proceed with excavation
- Stop work at the boundary of the problem condition, and address the continued excavation in a subsequent IRDP
- Discuss optional approaches with the regulatory agencies to determine if the area must be addressed as an exception to SEP guidelines.

Table 6-1 addresses the specific situations relative to discovery of unknown underground utilities and unexpected above-WAC material.

6.5.3 Unexpected Discovery of Cultural or Historic Resources

If cultural resources are discovered, then the contingency plan described in Appendix F of the SEP and procedure EP-0003 will be implemented. The construction personnel will be trained to the plan and must recognize a potential cultural resource when encountered. 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. The specialty contractor is required to be on site within four hours. DOE will consult with the appropriate parties [e.g., Ohio Historic Preservation Office (OHPO), pursuant to 36 CFR

Part 800] to determine a course of action that will avoid and minimize any adverse impacts to the extent practical. If human remains, associated funerary objects, unassociated funerary objects, sacred objects, or objects of cultural patrimony are discovered, the appropriate Native American tribe(s) will be consulted. During the consultation, DOE will cease activity in the immediate area and make a reasonable attempt to secure the remains and/or objects. Construction work stoppages in the immediate area could last a minimum of 30 days.

6.6 DATA AND RECORDS MANAGEMENT

Management of data and records for A2PII remediation will be in general accord with the strategy and protocols as described in Section 3.6 of the SEP and the quality assurance protocols for data management activities described in Appendix E of the SEP. The primary documents that will be generated during A2PII remediation, and the files in which they will be maintained, are identified in Table 6-2.

6.7 QA/QC AND REGULATORY AUDIT

A2PII project activities will be assessed to verify compliance to program requirements specified in this Implementation Plan. The assessment will include audits, surveillances and inspections commensurate to the scope and level of verification needed for the field tasks, contract execution, and programmatic implementation of driver documents. QA programmatic drivers are the DOE-approved FEMP QA Plan (RM-0012), the EPA-approved SCQ, and Appendix E of the SEP Quality Assurance Project Plan.

The applicable quality requirements will be specified in project-planning documents. These documents include Data Quality Objectives and PSPs that serve as planning and field instructions for environmental real-time and physical sampling activities. Additionally, the engineering design packages will include the necessary QC to assure conformance to design specifications. The FEMP QA Plan (RM-0012) describes the appropriate QA requirements for the self-performed construction. Other documents that require QA review and concurrence are procedures and purchase requisitions.

The SDFP QA/QC Lead will coordinate project QA/QC oversight through audits, surveillances, inspections, vendor surveys, and other internal assessments needed to verify quality issues associated with the IRDP activities. External assessments from the FEMP will also be coordinated with the SDFP QA/QC Lead. Construction will be responsible for documenting field inspections, nonconformance identification, and corrective actions in a timely and controlled manner.

The DOE-FEMP, EPA, and OEPA have access to IRDP field activities, planning documents, and databases as necessary to assess and verify IRDP implementation. The OEPA has FEMP oversight responsibility for NPDES, RCRA, dust and noise control, ground water monitoring, air and water pathways, and related split-sampling programs.

FEMP procurement requisitions are reviewed and signed by the SDFP QA/QC Lead. The A2PII QA/QC representative will identify material receipt requirements and the frequency of vendor source inspections, as necessary. Nonconforming items will be tagged and stored as unacceptable until corrective measures are determined.

6.8 INTEGRATION OF A2PII PROJECT WITH OTHER SDFP AND FEMP ACTIVITIES

A2PII remediation activities are planned and conducted in cooperation with other SDFP and FEMP remediation projects and activities to ensure effective and efficient attainment of project-specific and sitewide remediation objectives. The integration with FEMP support groups is established through functional support representatives that are integral members of the A2PII Project team (e.g., environmental compliance, natural and cultural resource management, sampling and analysis, QA, construction management). As noted in Section 6.1, the Engineering/Planning Manager and Execution Manager are responsible for ensuring that coordination is established and maintained with other projects and support groups, and the Project and Construction Engineers are responsible for implementing this coordination on a day-to-day basis. Key interfaces with other SDFP and FEMP organizations not directly represented on the A2PII Project Team include the following:

- Sitewide Planning and Scheduling
  - Integrating the A2PII plan and schedule with the FEMP master schedule
- OSDF Project
  - Planning and scheduling activities to ensure timely placement of Solid Waste Landfill and Fire Training Facility impacted material into the OSDF in accordance with the Impacted Materials Placement Plan and other pertinent requirements

- Demolition Projects
  - Coordinating above-grade demolition of A2PII components with at- and below-grade remediation of these facilities by SDFP under this Implementation Plan
- Aquifer Restoration and Wastewater Projects
  - Treatment of storm water and perched water collected and managed from the excavation through Phase I or Phase II of the AWWT system
  - Assessing potential adverse effects on the Great Miami Aquifer from deep excavations, if appropriate, and designing and implementing measures to ensure protectiveness
- Site Utilities
  - Coordinating installation of electrical power supply and communications lines to A2PII Support Area and Radiological Control Point Facility
  - Coordinating as necessary to remove, replace, or relocate other utilities
- WAO
  - WAO, an FEMP organization independent of both the soil- and debris-generating projects and the receiving OSDF project, has programmatic responsibility for the OSDF WAC attainment compliance assurance program presented in the WAC Attainment Plan. WAO representatives will provide oversight of field activities from the origin of excavated impacted material to OSDF receipt.
- FEMP Real Estate Office
  - Coordinating to obtain cooperation of Cincinnati Gas and Electric on matters potentially affecting their utility facilities or areas within easements for these facilities
  - Coordinating to secure agreement for off-property remedial activities, if necessary (e.g., off-property impacted area sampling and excavation).

6.9 REMEDIAL ACTION AND CERTIFICATION SCHEDULE

In accordance with the Amended Consent Agreement, this Implementation Plan identifies A2PII project-specific milestones for remedial actions and certification activities (Table 6-3). These milestones are subject to enforceable deadlines by EPA and OEPA.

TABLE 6-1
CONTINGENCY PLANS FOR RECOGNIZED BUT UNEXPECTED CONDITIONS

Condition	Contingency Plan
Discovery of unexpected underground utilities	Stop work in the area. Coordinate with Site Utilities and, if appropriate, non-DOE utility owner to determine utility location information, jurisdiction, operational status, necessary safe shutdown requirements (e.g., electrical de-energizing, gas pipeline capping and purging), and remediation options. Revise the design within SEP guidelines and protocols described in this Implementation Plan for known utilities. Submit a letter to regulatory agencies describing the design revision, and proceed with excavation.
Discovery of above-WAC material outside of areas designated for excavation in the IRDP	Prepare options for remediation. If the design would conform to SEP guidelines, submit letter describing investigation plans, design changes, and schedule implications to the regulatory agencies, complete design, and proceed. Otherwise, discuss optional approaches with the regulatory agencies to determine if the area must be addressed as an exception to guidelines.

TABLE 6-2
A2PII PRIMARY RECORDS AND ASSOCIATED FILES

Document	File *
Construction drawings, Technical Specifications and Associated Field Logs	IIMS GIS Component ECDC
Miscellaneous Field Logs	ECDC
Manifest-type Documents	IIMS SWIFTS Component ECDC
Containerized Impacted Material Documents	IIMS SWIFTS Component Site Operating Record
Analytical Data and Associated Field Logs	IIMS SED Component ECDC

GIS = Geographic Information System

TABLE 6-3
A2PII REMEDIAL ACTION AND CERTIFICATION SCHEDULE

Remedial Action Subarea(s)	Submit Implementation Plan Addendum to Regulators	Complete CFC Package	Begin Remedial Action	Complete Remedial Action	Submit CDL to Regulators	Submit Certification Report to Regulators
1	N/A	11-20-01 (A)	2-19-02 (A)	5-16-02 (A)	12-1-02	5-1-03
2	N/A	N/A	8-19-02	9-30-02	12-1-02	5-1-03
3	1-15-05	3-15-05	4-1-05	9-30-05	12-1-05 *	5-1-06 *
4	N/A	N/A	N/A	N/A	12-1-02	5-1-03

* Addendum to CDL and Certification Report
(A) = Actual Date
N/A = Not Applicable

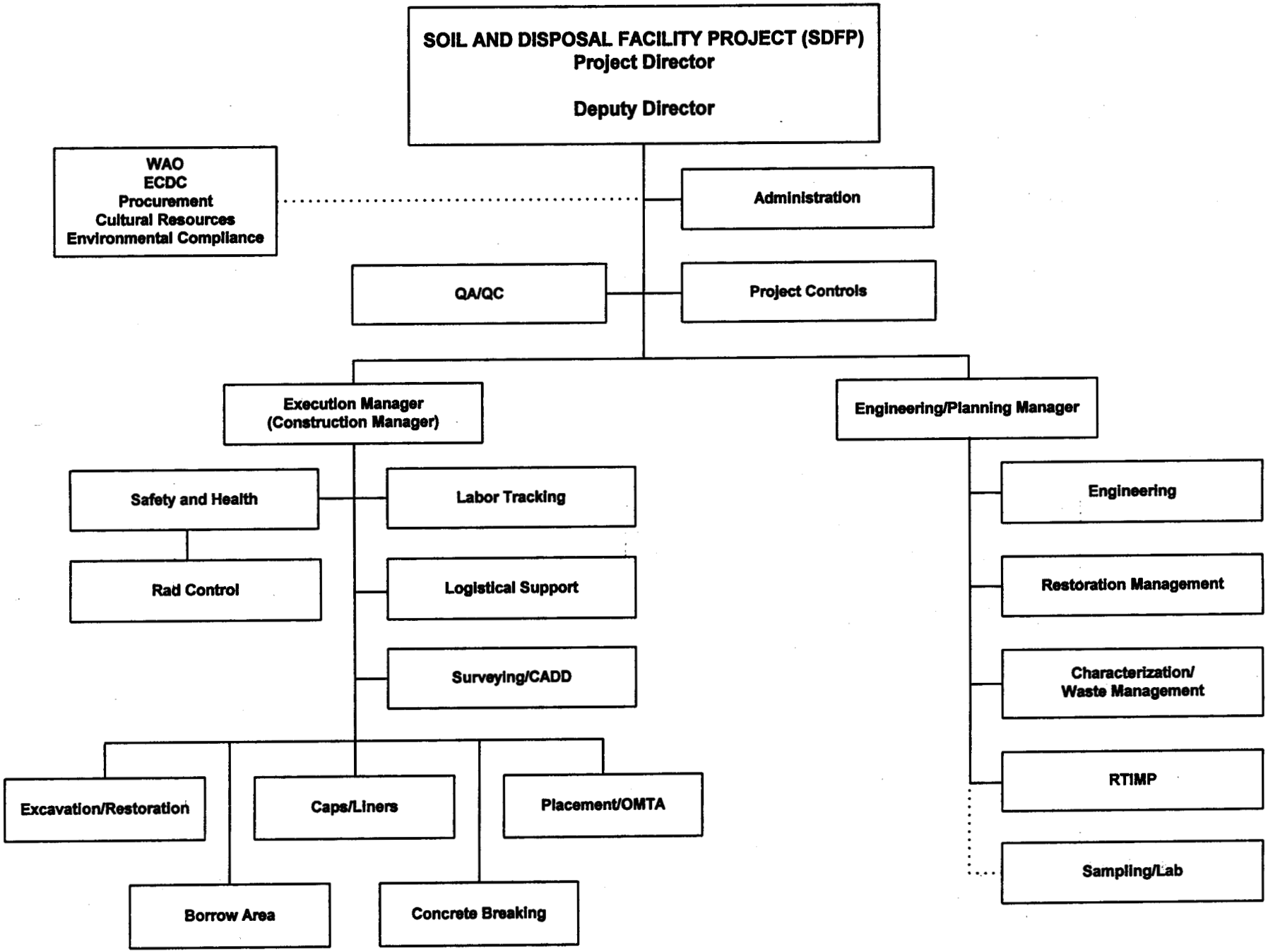


FIGURE 6-1 ORGANIZATIONAL CHART FOR THE SDFP A2PII PROJECT

000148

43 23

REFERENCES

EBASCO Environmental, 1993, "Wetlands Delineation Report of the Fernald Environmental Management Project, Butler and Hamilton Counties, Ohio," prepared for FERMCO, Cincinnati, Ohio.

U.S. Department of Energy, 1994, "OU3 Interim Record of Decision for Remedial Actions and Responsiveness Summary," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 1995b, "Record of Decision for Remedial Actions at Operable Unit 2," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 1996a, "Record of Decision for Remedial Actions at Operable Unit 3," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 1996b, "Record of Decision for Remedial Actions at Operable Unit 5," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 1996c, "Remedial Design Work Plan for Remedial Actions at Operable Unit 5," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 1997, "Programmatic Agreement Among the U.S. Department of Energy, Fernald Office, the Advisory Council on Historic Preservation, and the Ohio Historic Preservation Office Regarding Archeological Investigations at the Fernald Environmental Management Project," March 6, 1997, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 1998a, "Sitewide Excavation Plan," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 1998b, "Waste Acceptance Criteria Attainment Plan for the On-Site Disposal Facility," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 1998c, "Geotechnical Engineering Report for Project Order 177, A-E Support Services for Geotechnical Investigation of the Former Plant Area," Draft, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 1999a, "Certification Report for Area 2, Phase III Part One," Draft, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 1999b, "Project Specific Plan for Predesign Sampling in Area 2, Phase I Non-Waste Units and Part One of Area 2, Phase II," Revision 0, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 1999c, "Project Specific Plan for Predesign Investigation Sampling in Area 2, Phase II – Parts Two and Three," Revision 0, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 1999e, "Project Specific Plan for Excavation Characterization of the South Field," Revision 1, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2001, "Integrated Environmental Monitoring Plan," Revision 2, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2002, "Natural Resource Restoration Plan," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Environmental Protection Agency, 1991, Consent Agreement as Amended under CERCLA Sections 120 and 106(a), in the matter of U.S. Department of Energy, Feed Materials Production Center, Fernald, Ohio, U.S. EPA Region V.

APPENDIX A

DESIGN CRITERIA PACKAGE

4328

DESIGN CRITERIA PACKAGE FOR THE AT- AND BELOW-GRADE REMEDIATION OF THE FORMER PLANT AREA

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

MAY 2002

20201-DC-0001
REVISION 4A

000122

DESIGN CRITERIA PACKAGE FOR THE AT- AND BELOW-GRADE REMEDIATION OF THE FORMER PLANT AREA

20201-DC-0001
REVISION 4A

APPROVALS:

Christopher R. Neumann, Project Engineer Soil and Disposal Facility Project	Date
Anthony Snider, Lead Project Engineer Soil and Disposal Facility Project	Date
Uday Kumthekar, P.E., Engineering Manager Soil and Disposal Facility Project	Date
Jyh-Dong Chiou, Program Manager Soil and Disposal Facility Project	Date

REVISION SUMMARY

Revision	Date	Description of Revision
Rev. 0	10 March 1999	Initial issuance of the Design Criteria Package for the At- and Below-Grade Remediation of the Former Plant Area
Rev. 1	26 January 2000	Refined Approvals page
		Revised Figure 5-1
		Revised design storm and water release requirements for surface water management
		Clarified perched water management narrative
Rev. 2	31 March 2000	Added Revision Summary page
		Noted characterization criteria for 3-D computer excavation model
		Renamed Figure 5-1
		Added Figure 5-2
		Clarified applicability of ODNR requirements for surface water management
		Refined Options 1 and 2 for perched water management
		Clarified characterization of stockpiles
		Refined intended transportation routes
		Revised interim restoration criteria
Rev. 3	March 2001	Added title of Rainwater and Land Development in Sections 4.0 and 5.4
		Deleted references to Water Management Facility and Biodentrification Surge Lagoon
		Clarified disposition of VOC-contaminated water

REVISION SUMMARY (Continued)

Revision	Date	Description of Revision
		Clarified disposition of surface water from certified area
		Revised traffic requirements
Rev. 4A	April 2002	Revised Approvals page
		Added Area 6 (including General Area, Former Pit Area, Former Production Area, the Solid Waste Landfill, and Fire Training Facility) and Area 2, Phase II areas to be included under the scope of this document
		Deleted references to A/E subcontractor and construction contractor and replaced with Soil and Disposal Facility Project Engineering Group and Soil and Disposal Facility Project Construction Group
		Replaced Figure 5-1
		Deleted Figure 5-2
		Added alternative to pump water requiring AWWT Phase II treatment through temporary HDPE piping

DESIGN CRITERIA PACKAGE FOR THE AT- AND BELOW-GRADE REMEDIATION OF THE FORMER PLANT AREA

Table of Contents

1.0 Scope 1

2.0 Comprehensive Design Requirements 1
- 2.1 Technical Requirements 2
- 2.2 Safety and Health Requirements 2
- 2.3 Environmental Requirements 3
- 2.4 Utility Requirements 3

3.0 ARARs and TBCs 3

4.0 Regulations, Codes, Standards, Orders, Manuals, and Guides 4

5.0 Project Specific Requirements 7
- 5.1 Excavation Requirements 8
- 5.2 Sequencing Within and Between Remediation Areas 10
- 5.3 Impacted Material Management 10
- 5.4 Surface Water Management 11
- 5.5 Perched Water Management 12
- 5.6 Equipment and Personnel Monitoring Decontamination 13
- 5.7 Environmental Monitoring and Sampling 13
- 5.8 Certification 14
- 5.9 Predesign Sampling Requirements to Support Design 14
- 5.10 Sampling Requirements for Containerized Soil-Like Materials 14
- 5.11 Transportation 14
- 5.12 Restoration 15

6.0 Assumptions Inherent in the Project Scope 16

Appendix A 17

LIST OF ACRONYMS AND ABBREVIATIONS

A/E	Architect/Engineer
ALARA	as low as reasonably achievable
ARAR	applicable or relevant and appropriate requirements
ASCE	American Society of Civil Engineers
ASCOC	area-specific constituent of concern
AWWT	Advanced Waste Water Treatment (facility)
BAT	best available technology
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	*Code of Federal Regulations*
COC	constituents of concern
DAC	derived air concentration
DCP	Design Criteria Package
DOE	U S. Department of Energy
EPA	U. S. Environmental Protection Agency
FEMP	Fernald Environmental Management Project
FRL	final remediation level
FTF	Fire Training Facility
GMA	Great Miami Aquifer
gpm	gallons per minute
HWMU	hazardous waste management unit
NAD	North American Datum
NOAA	National Oceanic and Atmospheric Administration
OAC	Ohio Administrative Code
ODNR	Ohio Department of Natural Resources
ODOT	Ohio Department of Transportation
OEPA	Ohio Environmental Protection Agency
OSDF	On-Site Disposal Facility
OU	Operable Unit
PPE	personal protective equipment
ppm	parts per million
RCRA	Resource Conservation and Recovery Act of 1976
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SCS	Soil Conservation Service
SEP	Sitewide Excavation Plan
SWL	Solid Waste Landfill
SWRB	Storm Water Retention Basin
TBC	to be considered
USGS	U.S. Geologic Survey
WAC	waste acceptance criteria
WPM	Waste Programs Management

LIST OF TABLES

Table A-1 Groupings of ARARs and TBCs Used in Table A-2 ..... A1

Table A-2 Pertinent ARARs and TBCs A2-A74

LIST OF FIGURES

Figure 5-1 Areas with Lower Uranium FRL Due to High Leachability 9

DESIGN CRITERIA PACKAGE FOR THE AT- AND BELOW-GRADE REMEDIATION OF THE FORMER PLANT AREA

1.0 Scope

The purpose of this Design Criteria Package (DCP) is to assemble the specific criteria and assumptions for the at- and below-grade remediation of the Former Plant Area of the Fernald Environmental Management Project (FEMP). The Former Plant Area is comprised of the Former Production Area (Areas 3A, 3B, 4A, and 4B) and the Administration Area (Area 5), and for the scope of this document, shall include Area 6 (including General Area, Former Waste Pit Area, outlying areas of the Former Production Area, Solid Waste Landfill (SWL) and Fire Training Facility (FTF)), and Area 2, Phase II. Comprehensive development of design criteria relating specifically to the project requirements is conducive to orderly and accurate development of preliminary and definitive designs.

The remediation objective for the Former Plant Area is to excavate and remove impacted material, including contaminated soil, perched groundwater, at- and below-grade man-made structures (such as pavements, building foundations, basements, debris, and underground utilities, with the possible exception of pile foundations driven below contaminated depths), residual above-grade man-made structures (such as utility poles, fire hydrants, equipment foundations, and bollards), and soil-like containerized materials remaining after Operable Unit (OU) 3 demolition activities. Impacted material will be transported for placement in the On-Site Disposal Facility (OSDF), temporarily staged for bulk shipment off site, or containerized for on-site or off-site treatment, depending on attainment of OSDF waste acceptance criteria (WAC). Remediation will be sequenced and integrated with other projects near the subject remediation area. Project documents to be prepared subsequent to this DCP will be written with the goal of achieving this remediation objective.

Also included in the scope of this DCP is the design of support facilities such as personnel and equipment decontamination areas, construction support areas, packaging, material stockpiles, surface water management, erosion and sediment control facilities, and all other facilities (including utilities) necessary to excavate and handle impacted material with the intent of mitigating effects to human health and the environment.

2.0 Comprehensive Design Requirements

The overall remediation objective for the Former Plant Area is to excavate, remove, and dispose all impacted material. Based on constituents of concern (COCs), levels of contamination, and the ability to meet OSDF WAC, impacted materials will be placed at the OSDF, temporarily staged before placement at OSDF, shipped to an appropriate off-site disposal facility, or containerized for on-site or off-site treatment. Impacted material includes soil, man-made structures, and other material with contaminant concentrations above the final remediation levels (FRLs). This presents the comprehensive design requirements necessary to achieve technical, health and safety, and environmental objectives. Project specific requirements are presented in Section 5.0 of this DCP.

2.1 Technical Requirements

The Soil and Disposal Facility Project (SDFP) Engineering Group will prepare technical Title I and Title II design documents for remediation of the Former Plant Area. These documents will include construction drawings, specifications, and other documents that clearly describe requirements and general procedures of the proposed remediation. The SDFP Engineering Group will utilize all available reports and plans that summarize previous investigations of the area (e.g., environmental analyses and geotechnical data). The SDFP Construction Group will use these design documents to implement the excavation activities after U. S. Department of Energy (DOE), U. S. Environmental Protection Agency (EPA), and Ohio Environmental Protection Agency (OEPA) approval.

The design will address the following technical requirements:

- Excavation Criteria and Objectives - Excavation criteria and objectives to remediate impacted materials will be developed and presented in design documents. The criteria in design documents will be performance-oriented. The SDFP Construction Group will develop specific excavation methodologies. Design drawings must clearly show the estimated limit of excavation based on analytical and geotechnical data, environmental and stratigraphic modeling, and other appropriate information.
- Excavation Requirements - Impacted material will be excavated as efficiently as possible. As stated above, design drawings will clearly show the estimated limit of excavation. Further, perched groundwater zones encountered during excavation will be excavated with the contaminated soil. Design documents will present a general methodology to excavate impacted material, as well as procedures to minimize potential impacts to the underlying Great Miami Aquifer (GMA) during excavation.
- Flexibility - The design effort will prepare documents that can adjust to actual field conditions encountered during remediation (i.e. contingency will be built into the design). Further, the design will be developed as a phased excavation approach with contingency noted to ensure that cost-saving measures, enhanced excavation techniques, and identified problems are incorporated.
- Consistent with Final Land Use – The primary focus of restoration activities will be to establish a system of wetland and open water habitats with supporting woodlands and grasslands to support a diverse natural system. Design plans will be integrated with this final land use plan.
- Contingency Plans - Contingency plans for encountering unexpected material, structures, or utilities will be developed during design activities. Also, contingency plans will be developed for adverse weather conditions, seasonal shutdowns, as well as due regard for existing and/or ongoing remedial operations.

2.2 Safety and Health Requirements

The design will incorporate engineered safety controls/measures specific to the work scope to promote safe execution of the project.

Radiologically contaminated soil and other material can become airborne during excavation and material transportation. Dust suppression methods that implement the best available technology

(BAT) will be used to control airborne emissions in accordance with FEMP procedure RM-0047, Fugitive Dust Control Requirements. Monitoring for airborne radioactive particles will be performed by Fluor Fernald during excavation activities.

Title 10 *Code of Federal Regulations* (CFR) 835.1002 requires that airborne particles are controlled and inhalation of such material by workers is kept to levels as low as reasonably achievable (ALARA). Therefore, activities that increase worker exposure, such as eating, drinking, and smoking, will not be permitted in any radiologically controlled work area. Requirements for respirators will be determined on a task-specific basis, considering the environmental conditions.

Applicable worker safety and health requirements will apply to this project. This includes the requirement that site workers have Hazardous Waste Operations and Emergency Response training in accordance with 29 CFR 1910.120. Exposure rate goals for radiological workers are identified in Section 5.0 of this DCP.

2.3 Environmental Requirements

Remediation of the Former Plant Area is part of the FEMP sitewide environmental remediation. Therefore, the remedial design will address protection of the environment during construction and improvement of the environment at the completion of remedial activities.

Environmental considerations include using existing data to develop a computer model of the estimated limit of excavation; evaluating and analyzing site geology, perched groundwater, and surface water flow characteristics; and incorporating regulatory requirements into the design.

Collection and transfer of perched groundwater and subsequent treatment of that water at the Advanced Waste Water Treatment (AWWT) facility will be addressed during design. Similar technical approaches to stormwater run-on/runoff and erosion and sediment control will be addressed in the design.

2.4 Utility Requirements

Consideration will be given to utilities required to support FEMP remedial actions. Design documents will address utility relocation and/or decommissioning. Energy source utilities entering or exiting the remediation area will be identified during design. Utility services required during remediation activities will be included in the design. Precautions and reporting requirements for potentially unidentified utilities will be included in design documents and project permitting.

3.0 ARARs and TBCs

The remediation design of the Former Plant Area will conform to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) § 121(d)(2), which requires that remedial actions protect human health and the environment while complying with applicable or relevant and appropriate requirements (ARARs). To be considered (TBC) criteria will also be evaluated as part of design activities. This includes nonpromulgated criteria,

advisories, and guidance issued by federal and state governments that may or may not be legally binding.

Pertinent ARARs and TBCs for the sitewide soil remediation effort are included in the Sitewide Excavation Plan (SEP). These ARARs and TBCs for at- and below-grade remediation of the Former Plant Area have been reissued and are appended to this document (Tables A-1 and A-2 in Appendix A).

4.0 Regulations, Codes, Standards, Orders, Manuals, and Guides

This document contains references to general regulations, codes, standards, orders, manuals, and guides that apply to Title I and Title II design work. Requirements listed in the latest edition of each of the following documents will apply, unless otherwise noted.

American Society of Civil Engineers (ASCE)

- ASCE 77 — Design and Construction of Urban Stormwater Management Systems

Code of Federal Regulations (CFR)

- 10 CFR 835 — Occupational Radiation Protection
- 10 CFR 1022 — Compliance with Floodplains/Wetlands Environmental Review Requirements
- 29 CFR 1910 — Occupational Safety and Health Standards
- 29 CFR 1926 — Safety and Health Regulations for Construction
- 40 CFR 122 — EPA Administered Permit Program: The National Pollutant Discharge Elimination System (NPDES)
- 40 CFR 125 — Criteria and Standards for the NPDES
- 40 CFR 192 — Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings
- 40 CFR 240 — Guidelines for the Thermal Processing of Solid Wastes
- 40 CFR 256 — Guidelines for Development and Implementation of State Solid Waste Management Plans
- 40 CFR 260 — Hazardous Waste Management System: General
- 40 CFR 261 — Identification and Listing of Hazardous Wastes
- 40 CFR 262 — Standards Applicable to Generators of Hazardous Wastes
- 40 CFR 263 — Standards Applicable to Transporters of Hazardous Wastes
- 40 CFR 264 — Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
- 40 CFR 265 — Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

Fluor Fernald Procedures

- ED-12-2007 ALARA Review
- ED-12-3001 Engineering Design Initiation
- ED-12-3002 Collection, Verification, and Use of Engineering Data
- ED-12-4004 Design Package
- ED-12-4005 Calculation Preparation and Review Process
- ED-12-4006 Specifications Preparation and Issue
- ED-12-4007 Drawing Preparation and Issue
- FD-1000 Sitewide CERCLA Quality Assurance Project Plan (SCQ)
- NS-0003 Safety Assessment Hazard Screening and Classification
- RM-0012 Quality Assurance Program
- RM-0039 Storm Water Pollution Prevention Plan
- RM-0047 Fugitive Dust Control Requirements

National Oceanic and Atmospheric Administration (NOAA)

- NOAA/TP40 Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from One to 100 Years

Ohio Administrative Code (OAC)

- OAC 4101 Ohio Basic Building Code and Related Codes

Ohio Department of Natural Resources (ODNR)

- ODNR Rainwater and Land Development, Ohio's Standards for Stormwater Management Land Development and Urban Stream Protection, Second Edition, 1996

Ohio Department of Transportation (ODOT)

- ODOT Construction and Material Specifications

Ohio Environmental Protection Agency (OEPA)

- OEPA Stormwater Pollution Prevention Plan Checklist

Soil Conservation Service (SCS), U. S. Department of Agriculture

- TR55 Urban Hydrology for Small Watersheds

U. S. Department of Energy (DOE)

- DOE 5480.19 Conduct of Operations
- DOE 5480.23 Nuclear Safety Analysis Reports
- DOE-STD-1021 Natural Phenomena Hazards Performance Categorization Guidelines for Structures, Systems, and Components

U.S. Geologic Survey (USGS)

- 1983 NAD Ohio State Plane Coordinate System South, Zone 3402

The following are the primary reference documents that apply to the design of the at- and below-grade remediation of the Former Plant Area. Copies of these documents will be readily available to design personnel.

- Sitewide Excavation Plan, 2500-WP-0028, Revision 0, July 1998
- National Pollutant Discharge Elimination System Permit, Ohio EPA Permit Number 1IO00004*ED, September 27, 1995
- Functional Requirements Document for the Former Plant Area, 20300-PL-0003, Revision 2, February 2002
- Advanced Conceptual Design, 20201-PL-0002, Revision 0, 24 May 1999

The following are secondary reference documents that apply to the design of at- or below-grade remediation of the Former Plant Area. Copies of these documents will be readily available to design personnel.

- Geotechnical Sampling and Testing Plan of the Former Plant Area, Revision 0, April 1997
- Geotechnical Engineering Report for Project Order 177, A-E Support Services for Geotechnical Investigation of the Former Plant Area, 20800-RP-0001, Revision C, March 1998
- Impacted Materials Placement Plan On-Site Disposal Facility, 20100-PL-007, Revision 3, October 2001
- Waste Acceptance Criteria Attainment Plan for the On-Site Disposal Facility, 20100-PL-0014, Revision 0, June 1998
- Natural Resource Impact Assessment and Natural Resource Restoration Plan, 20300-RP-0002, Revision D, 212E-PL-0003, Revision E, July 1998
- Strategic Utilities Plan Summary, Final, 1996
- 1997 Integrated Site Environmental Report, 51350-RP-0001, June 1998

The following are tertiary reference documents that apply to the design of at- and below-grade remediation of the Former Plant Area. Copies of these documents will be available to design personnel.

- OU3 Remedial Investigation and Feasibility Study Report (4 volumes), February 1996
- OU3 Record of Decision for Final Remedial Actions, August 1996
- OU5 Remedial Investigation Report (18 volumes), March 1995
- OU5 Feasibility Study Report (3 volumes), June 1995
- OU5 Record of Decision for Final Remedial Actions, January 1996
- OU2 Remedial Investigation Report, 1995
- OU2 Feasibility Study Report, 1995
- OU2 Record of Decision for Final Remedial Actions, 1995
- Utility Design Reconstitution (Parsons PO 141)
- WPRAP Remediation System Design, 10100 (Parsons PO 145)

- Rerouted North Entrance Road, 20120 (Parsons PO 145/158)
- Site Preparation and Underground Utilities, 40310 (Parsons PO 146)
- Southern Waste Units, 20400 (Parsons PO 165)
- Paddys Run Trestle Upgrade, 10200 (Parsons PO 167, includes all OU1 Railroad Upgrades and Additions)
- Closeout Package Report for Area 3 Remedial Design Services, 20810-RP-0003, Revision 0, November 1997 (Parsons PO 180)
- On-Site Disposal Facility Design, 20100
- Borrow Source Evaluation for Fill of the Deep Area 3 Excavations Located Near the On-Site Disposal Facility, 20810-RP-0001, August 1997

5.0 Project Specific Requirements

This section addresses primary and general deliverable requirements for Title I and Title II design as applied in Fluor Fernald engineering procedures. This DCP will be used to govern both Title I and Title II design efforts for at- and below-grade remediation of the Former Plant Area.

Title I design generally includes, but is not limited to the following:

- Definition of project design criteria to meet project specific ARARs/TBCs and establishment of quality levels for systems, structures, and components
- Expansion of conceptual design drawings in greater detail or development of new drawings based on new design concepts (including locating and sizing structures, systems, and components)
- Development of an outline of technical specifications
- Development of conceptual-level technical approaches to address health, safety, and environmental protection requirements
- Development of preliminary cost estimates

Title II design typically advances the preliminary design developed in Title I engineering and planning to a level suitable for construction. Title II design generally includes the following:

- Preparation of final working drawings, specifications and implementation plans
- Development of bidding documents, as required
- Finalization of cost estimates
- Project coordination of all parties involved with the project
- Development of refined construction and procurement schedules

The Title I and Title II design documents will present information necessary to perform remediation activities. These documents will present the remediation plan and excavation sequencing, while allowing flexibility to make adjustments in the field based on actual conditions encountered. The documents will represent a practical approach based on lessons learned from other projects completed and currently underway on site.

The documents will present specific functional requirements in the following areas:

- Utility Isolation Requirements
- Excavation Requirements
- Sequencing Within and Between Remediation Areas 3A, 3B, 4A, 4B, 5, SWL, FTF, A2PII, 6 (General Area, Former Pit Area, and Former Production Area)
- Impacted Material Management
- Surface Water Management
- Perched Water Management
- Equipment and Personnel Decontamination
- Environmental Monitoring and Sampling
- Certification
- Predesign Sampling Requirements to Support Design
- Sampling Requirements for Containerized Soil-Like Materials
- Transportation
- Interim Restoration

5.1 Excavation Requirements

Excavation will be performed to remove impacted material in the Former Plant Area. Excavation strategies have been set forth in the SEP. The slope limits for excavation will be no steeper than those recommended by Parsons in the Geotechnical Engineering Report for Project Order 177, A-E Support Services for Geotechnical Investigation of the Former Plant Area (20800-RP-0001). The maximum limit of 1.5H:1V slope with 15-foot wide benches every 13-feet vertically will govern design of excavation slopes. Design documents will be developed based on a 3-D computer model of the extent of excavation. The 3-D computer model included in the Advanced Conceptual Design (20201-PL-0002) will be modified and updated during Title I design to support the design effort. Three FRLs for total uranium - 20 mg/kg within high-leachability areas (see Figure 5-1), 82 mg/kg outside high-leachability areas, and 38.6 mg/kg within the SWL boundaries, will be used to develop the 3-D computer model for extent of excavation in accordance with the SEP. An additional ALARA goal of 50 mg/kg for total uranium will be reached if soil with uranium concentrations of 50 mg/kg or greater is within one lift thickness (3 $\pm$ 1 foot) of an area of soil exceeding the 82 mg/kg uranium FRL. The following types of impacted material will be addressed in the design:

- Soil with contaminant concentration levels above OSDF WAC (WAC for soil contaminants are listed in the SEP)
- Soil with area-specific constituents of concern (ASCOCs) above the FRL
- Soil with the potential to exhibit Resource Conservation and Recovery Act (RCRA) toxicity characteristics (as identified in the SEP)
- At- or below-grade man-made structures, debris, and utilities (with the possible exception of pile foundations driven below contaminated depths)
- Above-grade man-made structures remaining after OU3 demolition activities
- Fill material
- Contaminated and non-contaminated perched groundwater
- Encountered special materials (as defined in the SEP)

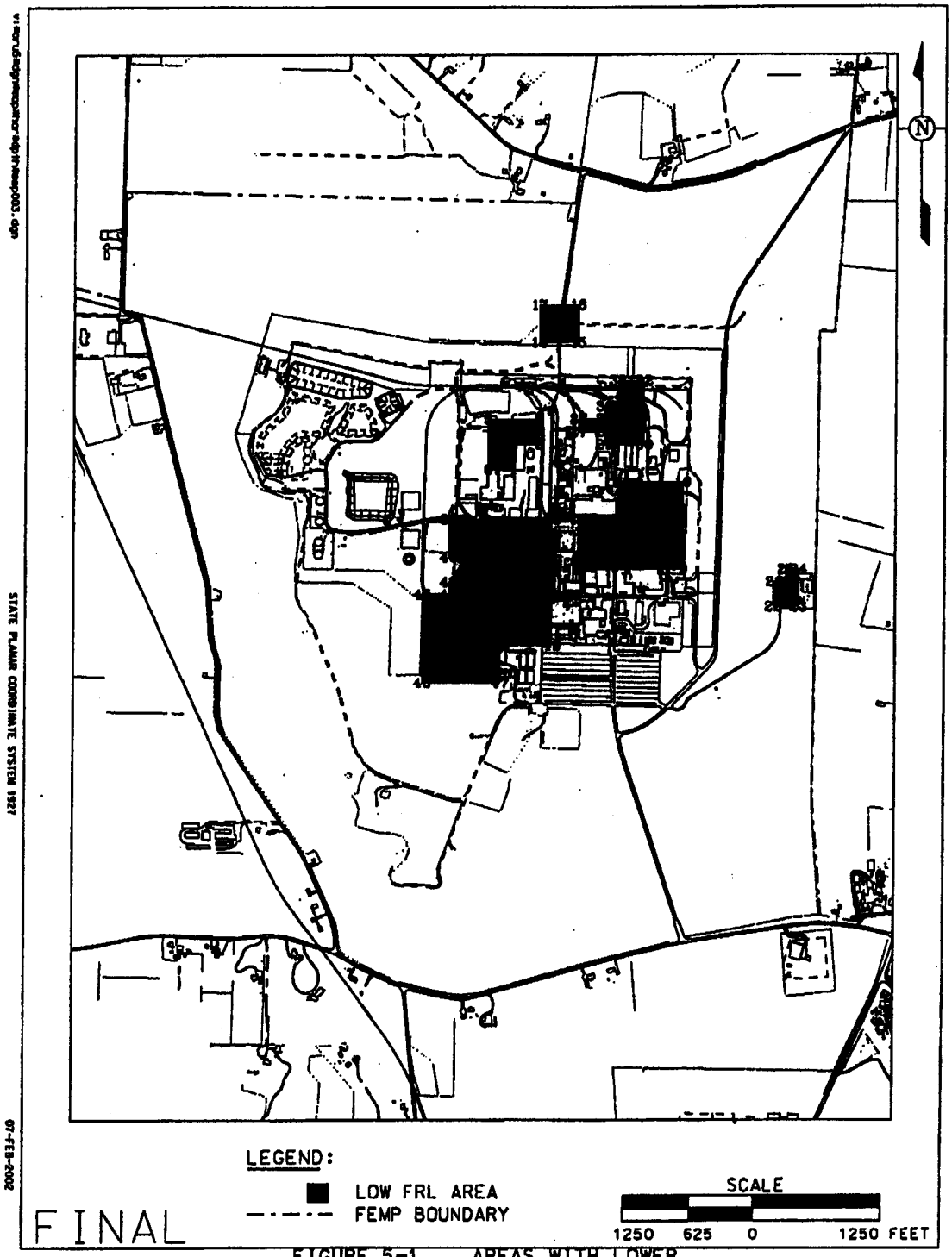


FIGURE 5-1. AREAS WITH LOWER URANIUM FRL DUE TO HIGH LEACHABILITY

- The design must identify locations and depths where elevated levels of contamination are known to exist.
- This will be done using the 3-D computer model to provide the preliminary extent of excavation based on total uranium concentrations in Areas 3A, 3B, 4A, and 4B.
- The top 2 feet of gravel and soil will be removed during the remediation of Areas 3A, 3B, 4A, 4B, 5 and 6 (Former Production Area).
- The top 6 inches of gravel and soil will be removed during the remediation of Area 6 (General Area).
- A minimum of 6 inches of soil will be removed following removal of gravel, asphalt, or concrete in areas altered by establishment of infrastructure facilities (i.e. trailer complex, parking lot, etc.) in Area 2, Phase II.
- When excavating for borrow material, the bottom of the excavation will be at least 5 feet above the unsaturated sand and gravel deposits of the GMA.
- Excavation must maximize OSDF Category 1 material, as defined in the OSDF Impacted Materials Placement Plan.

5.2 Sequencing Within and Between Remediation Areas

The Sitewide Sequencing Plan is summarized for areas within the Former Plant Area, as follows: Area 3A, Area 4A, Area 4B, Area 5, Area 3B, Area 6 General Area, Area 6 Former Waste Pits, and Area 6 Former Production Area. Area 2, Phase II, the SWL and the FTF excavations will be used as supplemental areas to ensure material needs for the OSDF are met.

Utilities must be sequenced into remediation areas to provide utility requirements for the SDFP Construction Group. The Utilities Integration Group will provide much of the required coordination, but it does not necessarily cover all of this project's specific needs. Specific utility systems that must be considered in this project include electric power, telecommunications, alarms, potable water, firewater, sanitary sewers, and storm sewers.

The 20A electrical substation east of Plant 1 pad is the designated tie in location for electrical power. Office facilities and dewatering pump stations will require electrical service. These are located on the periphery or within each remediation area.

5.3 Impacted Material Management

Impacted material excavated from the Former Plant Area will consist of radiologically contaminated soil and debris, RCRA waste, former HWMUs, USTs, and other material. Excavated material that meets on-site radiological, physical, and chemical WAC will be placed in the OSDF in accordance with the Impacted Materials Placement Plan. Material that fails to meet physical WAC may be size reduced to allow placement in the OSDF. Material that cannot be size reduced to meet on-site physical WAC will be transferred to temporary staging areas for shipment off site to a permitted and licensed disposal facility. Temporary staging areas will be designated by Fluor Fernald.

Impacted materials exceeding chemical WAC may be treated, according to the nature of the contaminant, material type, and regulatory requirements. Material that does not meet the chemical WAC will generally be transferred to temporary staging areas before off-site shipment

unless it can be treated to meet WAC. During design, the cost-effectiveness of treating materials to meet on-site chemical WAC versus off-site disposal will be evaluated.

Soil containing radiological constituents (e.g., uranium, technetium-99, etc.) above the WAC limits will be excavated and staged for off-site disposal. If soil in a RCRA area exhibits toxicity characteristics and overlaps with an area delineated as exceeding radiological WAC, the soil and any associated debris will be staged separately to await a decision by Fluor Fernald Waste Programs Management (WPM) on treatment and final off-site disposal options.

The amount of Category 1 material needed to place other OSDF material categories (e.g. concrete) is limited. Therefore, the design will maximize the amount of Category 1 (i.e., soil and soil-like material) being dispositioned to the OSDF, while attaining FRLs in a cost-effective manner.

5.4 Surface Water Management

A Surface Water Management Plan will be developed to address both stormwater and erosion and sediment control. The stormwater management component will address water storage within the project site from the 10-year, 24-hour storm event. Sitewide pump and retention capacities will be designed so that the following criteria are met.

- Draining and pumping water out of the excavation area will occur within 72 hours (3 days) after the event.
- The existing stormwater retention basin (SWRB), or any newly constructed retention basins, will not be redesigned.

Erosion and sediment control requirements will address construction, remediation, and long-term conditions. The surface water management system for each remedial area will be designed to meet the following requirements:

- Surface water runoff from disturbed and noncertified areas will be collected and managed.
- Surface water run-on will be diverted away from deep excavations.
- Surface water runoff not requiring AWWT Phase II wastewater treatment will be routed to the existing SWRB via the existing storm sewer system within the Former Plant Area.
- Surface water runoff requiring AWWT Phase II wastewater treatment will be pumped into portable tanks and transported to treatment by the Construction Manager or shall be pumped through temporary HDPE piping, based on the volume and most economical route.
- Surface water from disturbed areas will be sent through a sediment basin or shall pass through an engineered erosion control structure, such as silt fences and/or riprap check dams, to remove gross suspended solids prior to being released into the storm sewer system.
- Upon completion of remedial activities and certification of the remediated area, drainage of surface water from the certification buffer area will be collected and pumped outside of the remediated area. The capacity of ditches and culverts along the drainage route will be verified to ensure they can handle the additional flows without flooding adjacent areas and nearby roadways.
- Any new holding tanks will be nonmetallic and contain lifting lugs to ease transport.

- Any required secondary containment must be easily assembled and disassembled for reuse.

During design the following items will be evaluated:

- preventing or minimizing uncontaminated surface water run-on to disturbed areas; and
- removal of gross suspended solids

The stormwater and sediment control structures will be evaluated, selected, designed, and coordinated, as appropriate, to be consistent with the objectives set forth in Storm Water Pollution Prevention Plan (RM-0039), Rainwater and Land Development, Ohio's Standard for Stormwater Management Land Development and Urban Stream Protection, and sound engineering judgment. The standards set forth in ODNR will not be incorporated into the design of this project in areas where runoff from disturbed surfaces are either discharged into the existing storm sewer system for subsequent AWWT Phase I treatment or collected for AWWT Phase II treatment. The existing stormwater system will be used as much as possible; it may be rerouted but it will not be upgraded since it will be removed during the course of this project. Use of hay bales is not standard engineering practice at the site. Silt fences and/or riprap check dams will be utilized as the primary erosion control devices.

Stormwater calculations will be based on TR-55 or other commonly accepted stormwater design practices, where applicable. The usage of any other stormwater design practice must be documented in design calculations.

5.5 Perched Water Management

The evaluation and analysis of geology and groundwater flow characteristics will be incorporated into the design process. This information will be used to develop design and construction procedures and methods to minimize potential contamination of the GMA and remediated areas during remediation and construction. The design of perched groundwater extraction/removal will address slope stability and dewatering requirements of open excavations, particularly for excavations penetrating significant zones of coarse-grained materials.

The need for pretreatment of remediation-generated wastewater, before discharging water to the appropriate main treatment loop of the AWWT (i.e., Phase I and Phase II), will be evaluated during design using the AWWT wastewater acceptance guidelines; these guidelines are based on NPDES permit requirements and coordinated with the AWWT facility.

The AWWT capacity for water treatment is 600 gallons per minute (gpm) for Phase I and 300 gpm for Phase II. Surface water collected in remediation areas will be treated via the AWWT Phase I System. Excavation surface water collected with perched groundwater that contains volatile organic compounds will be pumped into portable tanks and transported to the AWWT or will be pumped through temporary HDPE piping to be treated via the Phase II treatment system.

The estimated volume of surface water requiring AWWT Phase II treatment will be included with the estimated volume of perched groundwater.

000140

5.6 Equipment and Personnel Monitoring Decontamination

Radiological control point facilities will be constructed at the ingress/egress points in the designated support areas. Temporary decontamination facilities and/or radiological control point facilities from previous remediation work will be considered for use, when practical. Treated or uncontaminated groundwater will be used for dust control. Before releasing equipment or support materials from a radiological area to an off-site area, radiological control personnel will perform an unrestricted release survey. Decontamination will be performed, as necessary, to support the release of equipment and/or support materials off site.

Exposure levels for personnel performing remedial work associated with at- and below-grade structures in the Former Plant Area are expected to be well below 10 CFR 835 exposure limits. The ALARA process described in engineering procedure ED-12-2007, ALARA Review, will be implemented in a manner consistent with 10 CFR 835 requirements to ensure that personnel exposures are controlled at levels that are reasonably achievable. The goal for total effective dose equivalent is not to exceed 200 mrem/yr/person.

External exposure rates are expected to be well below 0.5 mrem/hr and will be routinely monitored throughout the performance of work on the project. Airborne radioactive material levels contributing to personnel internal exposures are not expected to exceed 4 derived air concentrations (DAC)-hrs/week/person. BAT will be used to minimize fugitive dust emissions and control airborne radioactive materials such that only administrative controls are necessary to maintain personnel internal exposures at levels consistent with ALARA. Occupational air sampling will be performed routinely throughout the project to evaluate airborne radioactive particles. The collected radiological data will be assessed to establish performance indicators that evaluate the remediation project against established goals.

A radiation protection program will be in place to manage and control exposure to operations involving radioactive materials. Surface contamination and airborne radioactivity levels will be monitored as the project progresses to ensure that occupational radiation hazards are minimized. Based on the nature of the work and the hazard present, the prescribed personal protective equipment (PPE) and controls will be correct and appropriate for the work being performed. Based on evaluation of the radiological survey data obtained during remedial activities, engineering and administrative controls will be adjusted as necessary.

5.7 Environmental Monitoring and Sampling

Environmental monitoring and sampling is not included in the scope of this document. However, sequencing of construction to include environmental monitoring and sampling will be incorporated into the detailed designs. This includes excavation control characterization, environmental radiological monitoring, and certification sampling that will be performed by Fluor Fernald. Fluor Fernald will provide oversight for the incorporation of environmental monitoring and sampling into the detailed design and the implementation of associated procedures. The two principal components of environmental monitoring and sampling (real time scanning and safety and health monitoring) are discussed in the SEP.

5.8 Certification

Between certified areas where deep remedial excavations have occurred and nonremediated/noncertified areas, transitional certification zones will be established that allow sufficient space for stable excavation slopes and run-on prevention systems. Transitional certification zones cannot be certified until the adjacent nonremediated areas are excavated. Because of this transitional requirement, the active remediation area within the Former Plant Area and its associated certification area will not cover exactly the same area. A certification area within the Former Plant Area will generally be smaller than and offset from its associated remediation area.

5.9 Predesign Sampling Requirements to Support Design

In each remediation area, the following predesign sampling and analytical efforts will be completed before the 90 percent submittal of the Title II design:

- Delineation of RCRA soil in areas designated as possessing the potential to contain RCRA constituents
- Radiological surveys, sampling, and analysis to establish surficial extent of above-WAC materials
- Footprint survey for identified hazardous waste management units (HWMUs).
- Subsurface investigation to identify extent of above-WAC material, FRL boundaries, below present grade pads, roads, and building foundations

Within each remediation area, all stockpiles will be characterized prior to remedial excavation.

5.10 Sampling Requirements for Containerized Soil-Like Materials

Sampling and analytical efforts for characterization of soil-like materials in portable waste containers stored within a given remedial area should be completed before the start of remedial excavation within that remedial area or the waste should be relocated to another remediation area facility to appropriately and safely store the waste. Soil-like waste materials stored in nonmovable containers should be characterized before the completion of Title I design.

5.11 Transportation

Traffic and transportation patterns and requirements will be developed during Title I and Title II design and coordinated with other FEMP remediation and administrative activities. The remediation documents will illustrate routes and/or provisions to transport impacted material to the OSDF and other on-site destinations during remediation (e.g., above-WAC drop-off point, SP-7), while minimizing the impact to other non-construction-related traffic in the area.

Principal haul routes to SP7, OSDF, OMTA areas, and soil treatment areas will use existing road surfaces. The Impacted Material Haul Road, at the northern boundary of Area 3A, will be the controlled haul route to SP7, OSDF, and OMTA areas. Impacted material excavated for placement in the OSDF will be hauled to the OMTA southern entrance point and follow the contaminated haul route to the active cell. Above grade debris from the remediation activities

outside Area 3A will be hauled to the OMTA Bulk Debris and Container areas via 2nd Street.

Materials containerized within the excavation area will be placed at the Special Material Transfer Area (SMTA) and hauled directly from the SMTA. In order to haul directly from an established SMTA, the SMTA must be located on the perimeter of the excavation area with direct access to controlled roadways, and have proper administrative and engineering radiological controls.

Traffic routing will be controlled to minimize haul routes through contaminated areas. Haul routes through contaminated areas will be controlled to prevent cross-contamination of certified clean areas. Traffic will be routed via paved roads, to the extent practical, to minimize dust generation and cross-contamination.
Removal of roads will be sequenced to optimize their use during remediation. Existing roads will be used to support as many areas as possible to minimize new construction costs and reduce waste generation.

5.12 Restoration

Grading and filling will be minimized in postexcavated areas (except for safety and GMA protection concerns). In general and where practical, interim restoration should integrate the project with the sitewide Natural Resource Restoration Plan.

Borrow material used for fill will be obtained from certified or precertified areas within the Former Plant Area.

Borrow material used as fill, prior to certification, within high-leachability areas must be obtained from other certified or precertified high-leachability areas, or must otherwise be shown to meet the 20 mg/kg uranium FRL.

Due to the requirement to ensure protection of the GMA, excavations within the Former Plant Area that either breach the sand and gravel deposits of the GMA or extend within 5-feet of GMA sand and gravel deposits must be plugged with uncontaminated clay-like material as quickly as possible. The GMA sands and gravels will not be used for structural or general borrow material.

Borrow material used as fill, prior to certification, within the SWL area must be obtained from other certified or precertified areas, or must otherwise be shown to meet the 38.6 mg/kg uranium FRL.

Winterization will be necessary to ensure that an excavation area can be reentered in the spring in minimal time following winter shutdown. These activities include stabilization of all exposed surfaces within the project limits, maintenance of all drainage channels and erosion and sediment control devices, protection of liquid lines susceptible to freezing, and submittal of itemized winter maintenance plans.

Since all topsoil and gravel within the Former Plant Area will be excavated and disposed during remedial activities, topsoil and gravel usage will not be included in any interim grading, backfilling, or vegetation plan or design. Restoration grading to be completed for this project will be considered interim grading, which may later be altered to a final restoration grade.

6.0 Assumptions Inherent in the Project Scope

This DCP does not address or govern:

- final restoration grading, backfilling, and vegetation requirements or designs;
- use of topsoil and associated certification process during final restoration; and
- excavation of contamination in the GMA sand and gravel layer; and
- remediation of Waste Pit material in Area 6.

APPENDIX A

TABLE A-1

GROUPINGS OF ARARs AND TBCs USED IN TABLE A-2

Natural and Cultural Resources	Threatened and Endangered Species Protection	A2-A3
	Archeological, Historic, and Cultural Resource Protection	A3-A6
Air Pathway	Noise Pollution Control	A7
	Air Emissions	A7-A19
Surface Water Pathway	Floodplain/Wetlands Protection	A20-A27
	Discharge to Surface Water	A28-A31
Groundwater Pathway	Groundwater Protection	A32
	Wells - Construction	A32
	Wells - Abandonment	A33
Soil Remediation	Closure of Underground Storage Tanks	A34
	Closure of Hazardous Waste Management Units	A34-A38
	Radionuclide Concentrations	A39-A42
	Lead Concentration	A43
	PCB Concentration	A43
	Certification of Cleanup	A44
Impacted Material Management	Definitions and General Facility Standards	A45-A58
	Management of Low-level Radioactive Material	A59
	Management of Hazardous Remediation Waste	A60-67
	Management of PCB-tainted Material	A68
Post-Closure	Description of Post-closure Care	A69-A71
	Modifications to Post-closure Care Plan or Period	A71
	Property Use Restrictions	A72-A73
	Post-closure Notice/Survey Plat	A73
	Deed Notation	A74

TABLE A-2

PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
NATURAL & CULTURAL RESOURCES						
THREATENED & ENDANGERED SPECIES PROTECTION						
Procedures for Implementing the National Environmental Policy Act 40 CFR §6.302(h) 10 CFR Part 1021 Endangered Species Act 16 U.S.C. §1531, et seq. Endangered and Threatened Wildlife and Plants 50 CFR §17.21, §17.31, §17.61, §17.71, and §17.94 Interagency Cooperation-Endangered Species Act 50 CFR §402.01	All federal agencies must ensure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of the constituent elements essential to the conservation of a listed species within a defined critical habitat. Additional requirements apply if it is determined that a proposed activity could adversely affect these species or their habitat.	Appl	Appl	Appl	Findings of 1993-94 updated surveys at the FEMP property: • Populations of the state-listed threatened Sloan's crayfish (*Orconectes sloanii*) are located in sections of Paddy's Run. • Good habitat for the federally-listed endangered Indiana bat (*Myotis sodalis*) exists along Paddy's Run and the storm sewer outfall ditch. • Suitable habitat exists in limited areas for the federal-listed endangered running buffalo clover (*Trifolium stoloniferum*), and only in the northern woodlot for the state-listed threatened spring corralroot (*Corallorhiza wisteriana*). • Marginal habitat for the state-listed endangered cave salamander (*Eurycea lucifuga*) exists in a very limited single area. • Neither habitat nor populations were located for the state-listed endangered mountain bindweed (*Polygonum cilinode*) and slender fingergrass (*Digitaria filiformis*).	Section 5.1 of the Sitewide Excavation Plan. However, DOE does not expect to encounter any federal- or state-listed threatened or endangered species or critical habitat in the areas to be addressed by this remediation project; no additional surveys conducted or planned.

000147

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
THREATENED & ENDANGERED SPECIES PROTECTION, continued						
Interagency Cooperation-Endangered Species Act 50 CFR §402.12(a), (b)	A biological assessment shall evaluate the potential effects of the action on listed and proposed critical habitat and determine whether any such species or habitat are likely to be adversely affected by the action and is used in determining whether formal consultation or a conference is necessary. These procedures are required for federal actions that are "major construction activities."	Appl	Appl	Appl	No critical habitat is present on the Fernald property. Updated surveys of the FEMP property in 1993 found marginal habitat for the state-listed endangered cave salamander (*Eurycea lucifuga*) exists in a very limited single area.	See preceding.
Endangered Species Regulations ORC 1531.25	No person shall take or possess any native species of wild animal, or any eggs or offspring thereof, that is endangered with state-wide extinction.	Appl	Appl	Appl	Updated surveys of the FEMP property in 1993-94 found populations of the state-listed threatened Sloan's crayfish (*Orconectes sloanii*) in sections of Paddy's Run.	See preceding.
Endangered Species Regulations ORC 1518.02 OAC 1501:18-1	No person shall root-up, injure, destroy, remove, or carry away on or from public highways, public property, or waters of the state, or on or from the property of another, without the written permission of the owner, lessee, or other person entitled to possession, any endangered plant listed in OAC 1501:18-1.	Appl	Appl	Appl	Surveys of the FEMP property in 1994 did not locate populations of the following plants: the federal-listed endangered running buffalo clover (*Trifolium stoloniferum*); the state-listed endangered mountain bindweed (*Polygonum cilinode*) and slender fingergrass (*Digitaria filiformis*); and the state-listed threatened spring corralroot (*Corallorhiza wisteriana*).	See preceding.
ARCHAEOLOGICAL, HISTORIC AND CULTURAL RESOURCE PROTECTION						
Antiquities Act of 1906 16 U.S.C. §431	No person may appropriate, excavate, injure, or destroy any historic or prehistoric ruin or monument, or any object of antiquity situated or controlled by the Government of the United States without an applicable permit. Identification and preservation of cultural resources on federal lands is required, including natural landmarks.	Appl	Appl	Appl	Proposed areas of disturbance will be surveyed and consultation will occur between DOE, the Advisory Council on Historic Preservation and the State of Ohio Historic Preservation Office (OHPO) as agreed upon in the Programmatic Agreements (later entries).	Section F.4.2 of the Sitewide Excavation Plan
Historic Sites Preservation Act 16 U.S.C. §461-467		√	Appl	Appl		

000148

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Archaeological Resources Protection Act 16 U.S.C. § 470aa-470ll Procedures for Implementing the National Environmental Policy Act 40 CFR §6.301(c) Protection of Archaeological Resources 43 CFR §7.4(a)	Whenever any Federal agency finds, or is notified, in writing, by an appropriate historical or archaeological authority, that its activities in connection with any Federal construction project or federally licensed project, activity, or program may cause irreparable loss or destruction of significant scientific prehistorical, historical, or archaeological data, such agency shall notify the Secretary of the Interior, in writing, and shall provide the Secretary with appropriate information concerning the project, program, or activity. No person may excavate, remove, damage, or otherwise alter or deface or attempt to excavate, remove, damage, or otherwise alter or deface any archaeological resource located on public lands unless such activity is pursuant to a permit. If an EPA activity may cause irreparable loss or destruction of significant scientific, prehistoric, historic, or archaeological data, the responsible official or the secretary of the Interior is authorized to undertake data recovery and preservation activities.	Appl	Appl	Appl	See preceding.	See preceding.
National Historic Preservation Act (NHPA) 16 U.S.C. §470 Protection of Historic Properties 36 CFR Part 800 Procedures for Implementing the National Environmental Policy Act 40 CFR §6.301(a), (b)	A federal agency (DOE) must take into account the effect of an undertaking on historic properties and accord the Advisory Council on Historic Preservation a reasonable opportunity to comment. Historic properties are defined as any prehistoric or historic district, building, site, structure, or object included in or eligible for inclusion in the National Register of Historic Places. This term includes artifacts, records, and persons released to and located within such properties. Historic properties that are to be substantially altered or demolished must be recorded for future use and reference. The purpose of this Act is not only to protect those properties listed in or eligible for the National Register of Historic Places, but also those properties that have not been listed or formally determined eligible for the listings. The heads of all Federal agencies shall assume responsibility for the preservation of historic properties which are owned or controlled by such agency. Prior to any Federal undertaking which may directly and adversely affect any National Historic Landmark, the head of the responsible agency shall, to the extent possible, minimize the harm to such landmark.	Appl	Appl	Appl	See preceding.	See preceding.
Archaeological and Historic Preservation Act 16 U.S.C. §469	Upon discovery that a project may cause the irreparable loss, destruction, significant scientific finding, prehistorical finding, or loss of historical or archaeological data, DOE must notify the Dept. of the Interior in writing and provide appropriate information concerning the project. DOE must, with possible assistance from the OHPO, undertake recovery, protection, and preservation of the data.	✓	Appl	Appl	See preceding.	See preceding.

000149

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	ARCHAEOLOGICAL, HISTORIC AND CULTURAL RESOURCE PROTECTION, continued					
Executive Order 11593, Protection and Enhancement of Cultural Environment 3 CFR Part 54	An inventory of a site with potential historic places is required for eligibility in the National Register of Historic Places.	✓	Appl	Appl	See preceding and following entries.	See preceding.
Programmatic Agreement Regarding Disposition of Facilities under the Operable Unit 3 Record of Decision for Interim Remedial Action at the Fernald Environmental Management Project (January 16, 1996)	• Prepare a report package describing the primary buildings and structures at the FEMP, using existing information to provide information regarding construction details, production process descriptions, design changes, current structural conditions, and current use. The report package is to include written descriptions, photographs, representative engineering drawings, and videotape, as appropriate. If existing documentation is not adequate, additional documentation will be obtained (i.e., additional photographs). Representative support buildings and structures are to be documented with photographs and written summaries as well. • Prepare a separate report package describing the FEMP's role in the DOE weapons complex and the significance of the FEMP contribution to the U.S. defense.		✓	✓	Draft reports have been submitted to the Ohio Historic Preservation Office (OHPO). Once finalized, both documents will be available to the public in the Public Environmental Information Center and archived as appropriate.	See preceding.
Programmatic Agreement Regarding Archaeological Investigations at the Fernald Environmental Management Project (March 6, 1997)	Annual report packages, the first of which must be submitted on July 1,1997, must be submitted to the Ohio Historic Preservation Office (OHPO) and the Advisory Council on Historic Preservation (the Advisory Council) containing the following information: 1 list of all response actions and associated activities initiated within the year reported on; 2. map showing locations of above response actions/ associated activities; 3. list of response actions/associated activities conducted in previously surveyed (archeological survey) areas; 4. a list of surveys which identified no eligible historic properties; 5. a list of eligible historic properties that were avoided when implementing response actions and/or associated activities; 6. a list of Phase I-III reports generated; and 7. a map of locations of areas identified in item 6 and all properties identified. DOE-FEMP must also submit any and all Phase I reports generated within the last year, and not previously submitted, with the annual report. By September 2, 1997 (within 180 days of the signing of the Programmatic Agreement), submit to the OHPO and the Advisory Council a literature search, examination of aerial photographs, and use of a predictive model for all disturbed and/or contaminated areas of the FEMP (as defined in the Agreement). The predictive model is to utilize existing archeological data from the FEMP and surrounding area to determine the likelihood of additional archeological sites within the contaminated/disturbed areas and the spatial distribution, physical characteristics, and uses.	✓	✓	✓	In accordance with this programmatic agreement, the following will occur for each remediation area as needed: • survey • appropriate consultation with the OHPO and the Advisory Council • appropriate data recovery for potential historic properties discovered. Unexpected discoveries will be addressed accordingly (see Section F.4.2 of the SEP). Draft reports are under preparation for submission to the OHPO and the Advisory Council. Once finalized, the reports will be available to the public in the Public Environmental Information Center and archived as appropriate.	See preceding.

000150

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
ARCHAEOLOGICAL, HISTORIC AND CULTURAL RESOURCE PROTECTION, continued						
Native American Graves Protection and Repatriation Act 25 U.S.C. §3001 et seq.	Identification and preservation of cultural resources on federal lands is required, including natural landmarks. DOE must consult with appropriate Indian tribes before the intentional excavation or removal after an inadvertent discovery of Native American cultural items including human remains and objects of cultural significance.	Appl	Appl	Appl	DOE will consult with likely culturally affiliated tribes to determine the excavation, treatment, analysis and preparation of any extra reviews, associated funerary objects, unassociated funerary objects, sacred objects, or objects of cultural patrimony. Consultation will be coordinated with NHPA compliance when possible.	See preceding.
43 CFR Part 10	Provides for the return of human remains and cultural objects from Native American graves to affiliated tribes.	Appl	✓	✓		
American Indian Religious Freedom Act 42 U.S.C. §1996	Provides for tribal access by native peoples to grave sites and sites of cultural, symbolic, or religious significance.	Appl	Appl	Appl	See preceding.	See preceding.

000151

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
NOISE POLLUTION CONTROL						
Noise Control Act, as amended 42 U.S.C. §4901, *et seq.* Noise Pollution and Abatement Act 42 U.S.C. §7641	The public must be protected from noises that jeopardize health and welfare.	Appl	Appl	R&A	Appropriate engineering controls and best management practices will be implemented so that nuisance noise from vehicles and equipment will be reduced to the maximum practicable extent during conduct of the actions.	Section 5.1.2.1 of the Sitewide Excavation Plan
AIR EMISSIONS						
Solid Waste and Infectious Waste Regulations, Authorized, Limited, and Prohibited Solid Waste Disposal Methods OAC 3745-27-05 ORC 3734.03	Open dumping of solid waste is prohibited [OAC 3745-27-05(C)]. Solid waste disposal by means of open burning, as defined in OAC 3745-19, is permitted only as provided therein [OAC 3745-27-05(B)].	Appl	Appl	Appl		Addressed through the description of the selected remedy in the OU2 ROD (Section 9.0), OU5 ROD (Section 9.0), and OU3 ROD (Section 8.0)
Criteria for Classification of Solid Waste Disposal Facilities and Practices, Air [40 CFR §257.3-7]	Open burning of residential, commercial, institutional or industrial solid waste is prohibited. This requirement does not apply to infrequent burning of agricultural wastes in the field, silvicultural wastes for forest management purposes, land-clearing debris, diseased trees, debris from emergency clean-up operations, and ordnance [40 CFR §257.3-7].	✓	✓	Appl		
Open Burning Standards, Open Burning in Unrestricted Areas OAC 3745-19-04©	Open burning is allowed for the following purposes [OAC 3745-19-04(C)]: • Recognized horticultural, silvicultural, range, or wildlife management practices [OAC 3745-19-04(C)(5)]. • Disposal of land clearing waste if the following conditions are met [OAC 3745-19-04(C)(4)]: - The fire is set only when atmospheric conditions will readily dissipate contaminants; - The fire does not create a visibility hazard on roadways, railroad tracks, or air fields; - The fire is located at a point on the premises no less than 1000 feet from any inhabited building not located on said premises.	✓	✓	Appl		

4328

000158

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	AIR EMISSIONS, continued					
General Provisions on Air Pollution Control, Air Pollution Nuisances Prohibited OAC 3745-15-07 ORC 3704.01-.05 ORC 3734.02(I)	Measures shall be taken to adopt and maintain a program for the prevention, control, and abatement of air pollution in order to protect and enhance the quality of the state's air resource so as to promote the public health, welfare, and economic vitality of the people of the state. The emission or escape into open air from any source whatsoever of smoke, ashes, dust, dirt, grime, acids, fumes, gases, vapors, odors and combinations of the above in such a manner or in such amounts as to endanger the health, safety, and welfare of the public, or to cause unreasonable injury or damage to property shall be declared to be a public nuisance. It is unlawful for any person to cause, permit, or maintain any such public nuisance. No owner or operator of a hazardous waste facility, in the operation of the facility, shall cause, permit, or allow the emission therefrom of any particulate matter, dust, fumes, gas, mist, smoke, vapor, or odorous substances that, in the opinion of the Director [of Environmental Protection, a.k.a., the Director of the OEPA], unreasonably interferes with comfortable enjoyment of life or property by persons living or working in the vicinity of the facility, or that is injurious to public health. Any such action is hereby declared to be a public nuisance.	Appl ✓	Appl ✓	Appl R&A	Only fugitive dust (dirt, flyash, bottom ash) is anticipated from this soil remedial action project. Air pollution nuisance prohibitions will be met by employing best management practices for control of fugitive dust.	FEMP Fugitive Dust Control BAT Determination, and Section 5.1.2 of the Sitewide Excavation Plan
Particulate Matter Standards, Ambient Air Quality Standards OAC 3745-17-02(B), (C), (D) [National Primary and Secondary Ambient Air Quality Standards 40 CFR §50.6(a), (b), (c)]	The level of the primary and secondary 24-hour ambient air quality standards for particulate matter is a 150 $\mu g/m^3$, 24-hour average concentration [OAC 3745-17-02(C)]. The level of the primary and secondary annual ambient air quality standards for particulate matter is 50 $\mu g/m^3$, annual arithmetic mean (average) [OAC 3745-17-02(D)]. Particulate matter shall be measured in the ambient air as PM_{10} (particles with an aerodynamic diameter less than or equal to a nominal 10 μm).	Appl	Appl	✓	The National Ambient Air Quality Standards (NAAQS) were established as regional goals that states were required to meet and maintain. These ambient air quality standards were never intended, nor are they appropriate, as air quality standards for individual facilities. The methods used by the states to comply with the NAAQS are the State Implementation Plan (SIPs), which include state-level regulations for emission controls or emission standards (included as separate entries). By meeting these pertinent individual requirements, FEMP emissions will not cause an exceedance of the NAAQS/Ohio Ambient Air Quality Standards.	See preceding.

00C153

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Particulate Matter Standards, Non-Degradation Policy OAC 3745-17-05	The significant and avoidable deterioration of air quality in any part of the area where presently existing air quality is better than the particulate ambient air quality standards in OAC 3745-17-02 (described above) shall be prohibited.	Appl	Appl	✓	Appropriate control measures will be applied to all construction grading, excavation, loading/unloading and material management activities to reduce fugitive emissions. Also see preceding entry.	FEMP Fugitive Dust Control BAT Determination, and Section 5.1.2.2 of the Sitewide Excavation Plan
Particulate Matter Standards, Control of Visible Particulate Emissions from Stationary Sources OAC 3745-17-07(A)(1)(a)	Visible particulate emissions from any point source shall not exceed 20 percent opacity, as a 6-minute average, but shall not exceed 60 percent opacity, as a 6-minute average, at any time. Transient exceedance limits are included in this regulation.	Appl	Appl	Appl	All point sources associated with a remedial action project (i.e., sludge dewatering, etc.) will employ best available emissions control technologies to mitigate particulate emissions.	As necessary, point source monitoring requirements will be addressed in the appropriate IRDP.
Particulate Matter Standards, Control of Visible Particulate Emissions from Stationary Sources OAC 3745-17-07(B)(1)	Visible particulate emissions from any fugitive dust source shall not exceed 20 percent opacity, as a 3-minute average.	✓	✓	✓	Appropriate control measures will be applied to all construction grading, excavation, loading/unloading and material management activities to reduce fugitive emissions.	FEMP Fugitive Dust Control BAT Determination, and Section 5.1.2.2 of the Sitewide Excavation Plan

000154

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	AIR EMISSIONS, continued					
Particulate Matter Standards, Control of Visible Particulate Emissions from Stationary Sources OAC 3745-17-07 (B)(4), (5), (6)	There shall be no visible particulate emissions from any paved roadway or paved parking area except for a period of time not to exceed 6 minutes during any 60-minute observation period. There shall be no visible particulate emissions from any unpaved roadway or unpaved parking area except for a period of time not to exceed 13 minutes during any 60-minute observation period. There shall be no visible particulate emissions from any material storage piles except for a period of time not to exceed 13 minutes during any 60-minute observation period.	Appl	R&A	√	Appropriate control measures will be applied to all construction grading, excavation, loading/unloading and material management activities to reduce fugitive emissions.	FEMP Fugitive Dust Control BAT Determination, and Section 5.1.2.2 of the Sitewide Excavation Plan
Particulate Matter Standards, Restriction of Emission of Fugitive Dust OAC 3745-17-08(B)	No person shall cause or permit any fugitive dust source to be operated; or any materials to be handled, transported, or stored; or a building (or its appurtenances) or a road to be used, constructed, altered, repaired, or demolished without taking or installing reasonably available control measures to prevent fugitive dust from becoming airborne. Such reasonably available control measures shall include, but are not limited to, one or more of the following which are appropriate to minimize or eliminate visible particulate emissions of fugitive dust. • The use of water or other suitable dust suppression chemicals for the control of fugitive dust from the demolition of existing buildings or structures, construction operations, the grading of roads, or the clearing of land; or • The periodic application of asphalt, oil, water, or other suitable dust suppression chemicals on dirt or gravel roads and parking lots, and any other surfaces that may cause emissions of fugitive dust.	Appl	R&A	Appl	This requirement is applicable only to certain cities in Butler and Hamilton Counties. Appropriate control measures will be applied to all construction grading, excavation, loading/unloading and material management activities to reduce fugitive emissions.	See preceding.

000155

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Particulate Matter Standards, Restrictions on Particulate Emissions from Industrial Processes OAC 3745-17-11	The following are restrictions for particulates from any operation, process, or activity which releases or may release particulate emissions into the ambient air. These limits are based on the weight of material being processed. Process Weight at Maximum Capacity (lb/hr) — Allowable Particulate Emission Rate (lb/hr) 100 — 0.551 200 — 0.877 400 — 1.40 600 — 1.83 800 — 2.22 1000 — 2.58 *These limits do not apply to generation of fugitive dust* subject to OAC 3745-17-08 (listed above).	Appl		R&A	All point sources associated with a remedial action project (i.e., sludge dewatering, etc.) will employ best available emissions control technologies to mitigate particulate emissions.	See preceding.
Ambient Air Quality Standards for Non-methane Hydrocarbons OAC 3745-21-02(C), -03(D)	The ambient air quality guidelines for nonmethane hydrocarbons is a maximum three hour arithmetic mean concentration of 160 $\mu g/m^3$, not to be exceeded between the hours of 6 and 9 a.m. Hourly and 3-hour concentrations must be determined in accordance with prescribed methods.		Appl		The National Ambient Air Quality Standards (NAAQS) were established as regional goals that states were required to meet and maintain. These ambient air quality standards were never intended, nor are they appropriate, as air quality standards for individual facilities. The methods used by the states to comply with the NAAQS are the State Implementation Plan (SIPs), which include state-level regulations for emission controls or emission standards. By meeting these pertinent individual requirements, FEMP emissions will not cause an exceedance of the NAAQS/Ohio Ambient Air Quality Standards.	See preceding relevant Ohio air regulation citations.

000156

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	AIR EMISSIONS, continued					
National Primary and Secondary Ambient Air Quality Standards 40 CFR §50.12 Ohio Lead Emissions, Ambient Air Quality Standards—Lead OAC 3745-71-02(A)	The ambient air quality standards for lead shall be a maximum arithmetic mean of 1.5 micrograms per cubic meter during any calendar quarter.	R&A	R&A		See preceding.	See preceding
National Primary and Secondary Ambient Air Quality Standards 40 CFR Part 50	The following are the primary National Ambient Air Quality Standards (NAAQS):	R&A			Note that other NAAQSs are presented in preceding entries.	
	Criteria Pollutant / Primary Standard, ppm / Averaging Time					
	Carbon Monoxide: 9, 8-hour	R&A				
	Carbon Monoxide: 35, 1-hour					
	Nitrogen Dioxide: 0.053, Annual	R&A				
	Ozone: 0.12, 1-hour	R&A				
	Sulfur oxides: 0.03, Annual	R&A				
	Sulfur oxides: 0.14, 24-hour					
Permit to Install New Sources of Pollution OAC 3745-31-05 (A)(3)	The installation or modification and operation of an air contaminant source, solid waste disposal facility, water pollution source, disposal system, land application of sludge, or public water system, must employ the best available technology. The terms used in the above are defined in OAC 3745-15-01, unless otherwise defined in OAC 3745-31-01.	R&A	Appl	R&A	Appropriate control measures will be applied to all construction grading, excavation, loading/unloading and material management activities to reduce fugitive emissions. All point sources associated with a remedial action project (i.e., sludge dewatering, etc.) will employ best available emissions control technologies to mitigate particulate emissions.	FEMP Fugitive Dust Control BAT Determination, and Section 5.1.2.2 of the Sitewide Excavation Plan

000157

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Standards of Performance for New Stationary Sources, Subpart OOO—Standards of Performance for Nonmetallic Mineral Processing Plants 40 CFR §60.672(a), (d), (e)	No owner or operator shall cause to be discharged into the atmosphere from a crusher any emissions which: • Contain particulate matter in excess of 0.05 grams per dry cubic meter at standard conditions (g/dscm); and • Exhibit greater than 7 percent opacity Truck dumping of nonmetallic minerals into any crusher is exempt from these requirements.	R&A	✓		It is not anticipated that a crusher will be used during this remedial action project. All point sources associated with a remedial action project (i.e., sludge dewatering, etc.) will employ best available emissions control technologies to mitigate particulate emissions.	See preceding.

000158

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	AIR EMISSIONS, continued					
40 CFR Part 61, Subpart M-National Emission Standard for Asbestos, Standard for Waste Disposal for Manufacturing, Fabrication, Demolition, Renovation, and Spraying Operation 40 CFR §61.150	(a) Discharge no visible emissions [of asbestos] to the outside air during the collection, processing, packaging, or transporting of any asbestos-containing waste material, or use one of the emission control methods specified in paragraphs (a)(1) through (4) of this section: (1) Adequately wet asbestos-containing material (ACM). After wetting, seal all asbestos-containing waste material in leak-tight containers while wet; or, put materials that will not fit into containers without additional breaking into leak-tight wrapping. Label the containers or wrapped materials in accordance with 29 CFR 1910.1001(j)(2) or 1926.58(k)(2)(iii). ... (4) Use an alternative emission control and waste treatment method that has received prior approval from the Administrator. (5) As applied to demolition and renovation, the requirements above under paragraph (a) of this section do not apply to Category I non-friable ACM waste and Category II non-friable ACM waste that did not become crumbled, pulverized, or reduced to powder. "Adequately wet" means sufficiently mix or penetrate with liquid to prevent the release of particulates; if visible emissions are observed coming from the asbestos-containing material, the material has not been adequately wetted [40 CFR §61.41].	√	√	Appl		See preceding, and following sections of the Sitewide Excavation Plan: 2.5.8 Special Materials 3.3.2.2 Special Materials F.4.1.1 Asbestos
Asbestos Emission Control, Standard for Asbestos Waste Handling OAC 3745-20-05(B), (C)&(D)	(B) Discharge no visible emissions [of asbestos] during the collection, processing, packaging, transporting or deposition of any asbestos-containing waste material, and use one of the emission control methods below: (1) Adequately wet asbestos-containing material and seal the material into durable leak-tight containers or enclosure system. (2) For facilities where asbestos was not removed prior to demolition [or excavation], keep asbestos-containing waste adequately wet or sealed/encapsulated until collected for disposal.					

000159

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	(C) Seal all friable asbestos-containing waste material into durable leak-tight disposal containers or use an approved alternative disposal system in accordance with the following: (1) Label all containers of asbestos-containing waste material: DANGER CONTAINS ASBESTOS FIBERS AVOID CREATING DUST CANCER AND LUNG DISEASE HAZARD R.Q. Hazardous Substance N.O.S. asbestos ORM-E 9188 (2) Seal asbestos-containing waste materials in plastic bags at least 6 mils (0.006 inch) thick, and seal that in a second clean, leak-tight plastic bag at least 6 mils thick; or (4) Facility components coated with, covered or containing friable asbestos materials and removed in sections or units — Seal with leak-tight plastic at least 12 mils (0.012 inch) thick or leak-tight polypropylene woven fabric at least 10 mils (0.010 inch) thick; or (3) Whenever necessary to prevent any asbestos-containing waste material from penetrating a container (bag or wrap) — Seal the materials using a combination of a 6 mils thick plastic bag and a leak-tight steel, plastic, or fiber drum, or reinforced disposal box, leak-tight polypropylene woven fabric bag, or similar suitable and durable container. Fit drums with a matching lid and lock-rims. Band and seal boxes with reinforced tape or in accordance with manufacturers recommendations; or (5) Asbestos-containing waste materials, facility components, and contaminated debris may be disposed of using an alternative disposal system which has received prior approval from the Director. (D) Prepare and secure any load of asbestos-containing waste material in a manner that prevents any visible emissions [of asbestos], load loss, and spillage or leakage of liquids.					

000160

43328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	AIR EMISSIONS, *continued*					
Asbestos Emission Control, Standard for Active Asbestos Disposal Sites OAC 3745-20-06(A)&(B) [40 CFR Part 61, Subpart M-National Emission Standard for Asbestos, Standard for Active Waste Disposal Sites, 40 CFR §61.154]	(A) Each owner or operator of an active asbestos waste disposal site shall cause or permit no visible emissions [of asbestos] to the outside air; or shall comply with the requirements of paragraph (B) of this rule. (B) Rather than meet the no visible emissions requirement of paragraph (A) of this rule, each owner or operator of an active asbestos waste disposal site shall comply with the following: (1) There shall be no visible emissions from asbestos-containing waste materials during the on-site transportation, transfer, deposition or compacting operations. (2) Deposition and burial operations shall be conducted in a manner which prevents handling by equipment or persons that causes asbestos-containing waste materials to be broken-up or dispersed before the materials are buried. (3) As soon as practicable after deposition of the asbestos-containing waste materials but no later than at the end of each operating day, the asbestos-containing waste material deposited at the site during the operating day shall be buried with at least twelve inches of compacted nonasbestos-containing material. Alternatively, any owner or operator of an active asbestos waste disposal site may apply for approval of the Director [of Environmental Protection, a.k.a. Director of the OEPA] to utilize alternative control measures to bind dust, control wind erosion or convert [friable] asbestos to non-friable forms. (4) During the unloading, deposition, burial, and initial compaction of asbestos-containing materials, the owner or operator of the active [asbestos] waste disposal site shall establish a restricted area adequate to deter the unauthorized entry of the general public and any unauthorized personnel from any location within one hundred feet of the operations, and shall display the following information on a sign not less than twenty by fourteen inches, so that it is visible before entering the restricted area: ASBESTOS DUST HAZARD Do Not Remain In Area Unless Your Work Requires It Breathing Asbestos Dust Is Hazardous To Your Health	✓	✓	Appl	Pertinent to the management of asbestos-containing materials. Also note that requirements from paragraphs (A) and (B) which are pertinent to disposal of asbestos-containing materials, are included in the OSDF Impacted Materials Placement Plan. NOTE: The sizing & language for warning signs under (B)(4) at left conflicts with that required by OSHA under 29 CFR §1926.1101(k)(7). The FEMP will follow either the Ohio active asbestos waste disposal sites language or the OSHA required sign language: DANGER ASBESTOS CANCER & LUNG DISEASE HAZARD AUTHORIZED PERSONNEL ONLY OSHA does not impose a minimum sign size.	See preceding.

000161

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Asbestos Emission Control, Standard for Inactive Asbestos Disposal Sites OAC 3745-20-07(C) [40 CFR Part 61, Subpart M-National Emission Standard for Asbestos, Standard for Inactive Waste Disposal Sites, for Asbestos Mills and Manufacturing and Fabricating Operations 40 CFR §61.151]	The owner or operator may use an alternate control method that has received prior approval of the Director [of Environmental Protection, a.k.a. Director of the OEPA] rather than comply with the requirements of paragraph (A) [emissions and cover requirements] or (B) [posting and access control requirements] of this rule.	✓	✓	Appl	These requirements for inactive asbestos waste disposal sites are very similar to those for active asbestos waste disposal sites under OAC 3745-20-06 (preceding entry). During soil remediation activities under this remedial action project, the requirements for active asbestos disposal sites (preceding entry) will be followed while managing friable asbestos-containing material. Also note that requirements pertinent to disposal of asbestos-containing materials under paragraphs (A) and (C) of OAC 3745-20-07 are included in the OSDF Impacted Materials Placement Plan.	See preceding.

000162

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	AIR EMISSIONS, continued					
Asbestos Emission Control, Standard for Inactive Asbestos Disposal Sites OAC 3745-20-07(D) [40 CFR Part 61, Subpart M-National Emission Standard for Asbestos, Standard for Inactive Waste Disposal Sites for Asbestos Mills and Manufacturing and Fabricating Operations, 40 CFR §61.151(d)]	Each owner or operator of an inactive asbestos waste disposal site shall notify the Director [of Environmental Protection, a.k.a. the Director of the OEPA] in writing prior to disturbing or removing any asbestos-containing waste material. The notice shall contain:	✓	✓	✓	Submission of the project-specific IRDPs to OEPA constitute this notification.	
	• the reason for disturbing the waste,					The reason for disturbing the material is documented in the OU2, OU5 and OU3 RODs.
	• the procedures to be used to control emissions,					FEMP Fugitive Dust Control BAT Determination, the OSDF Impacted Materials Placement Plan, and following sections of the Sitewide Excavation Plan: 2.5.8 Special Materials 3.3.2.2 Special Materials 5.1.2.2 Fugitive Emissions F.4.1.1 Asbestos
	• the duration of the operation, and				Project schedules contained in project-specific IRDPs.	
	• the location of the final disposal site.					The OSDF, unless the OSDF WAC is not met; else, an off-site permitted/licensed disposal facility.

000163

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
National Emission Standards for Hazardous Air Pollutants, Subpart H—National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities, 40 CFR §61.90, §61.91 and §61.92 - .97 [Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter II (1)(b)]	Emissions of radionuclides (except radon-220 and radon-222) to the ambient air from DOE facilities shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 mrem/yr. To determine compliance with the standard, radionuclide emissions shall be determined and effective dose equivalent values to members of the public calculated using EPA-approved sampling procedures, computer models CAP-88 or AIRDOS-PC, or other procedures for which EPA has granted prior approval.	Appl	Appl	Appl		Section 6 of the Integrated Environmental Monitoring Plan (IEMP) and the following sections of the Sitewide Excavation Plan: 5.1.2.3 Airborne Radiological Particulates 5.1.2.4 Radon 5.1.2.5 Direct Radiation
National Emission Standards for Hazardous Air Pollutants, Subpart Q—National Emission Standards for Radon Emissions From Department of Energy Facilities 40 CFR §61.190, §61.192	No source at a DOE facility shall emit more than 20 pCi/m²/sec of radon-222 as an average for the entire source into the air.	Appl	Appl	R&A	The existing distribution of contaminants within the site soils attains compliance with this requirement. Will be addressed sitewide as necessary by the Integrated Environmental Monitoring Plan (IEMP).	

000164

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	FLOODPLAIN/WETLANDS PROTECTION					
Executive Order 11990, Protection of Wetlands	Federal agencies are required to take action to avoid adversely impacting wetlands wherever possible, to minimize wetland destruction, and to preserve the values of wetlands.	Appl	Appl		Floodplain and wetland impacts associated with soil remediation activities will be minimized and avoided to the maximum extent practicable. Projects with unavoidable impacts will be undertaken in accordance with 33 CFR Parts 323 and 330. A review of an overlay of each remediation area boundary on the FEMP Jurisdictional Wetland Delineation (Drwg. 75X-5500-G-00372) will be conducted to determine the approximate acreage of jurisdictional wetlands that will be dredged and filled during excavation of the remediation area. Dredge and fill activities within these wetlands will comply with the substantive requirements of Nationwide Permit Nos. 38 and 26 (subsequent entry) — promulgated in Appendix A of 33 CFR Part 330 (subsequent entry) and OEPA's corresponding State Water Quality Certification (see subsequent entry for OAC 3745-32).	Approximately 36 acres of jurisdictional wetlands and 9 acres of waters of the United States were identified on the FEMP property as a result of the 1993 Jurisdictional Wetlands & Waters of the U.S: (1993 FEMP Wetland Delineation). The U.S. Army Corps of Engineers officially approved the delineation on August 19, 1993. See also: Appendix H of the OU2 FS Report; Appendix J of the OU5 FS Report, and Appendix J of the OU3 RI/FS. The Natural Resources Restoration Plan (NRRP); also, remedial action completion reports must include NEPA compliance, as per following sections of the Sitewide Excavation Plan: 1.4.2 Related Documents 7.4 Certification Report 7.5 Other Related Future Documents
Procedure for Implementing the National Environmental Policy Act 40 CFR §6.302(a)	Federal agencies conducting certain activities must avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands, and avoid support of new construction in wetlands when a practicable alternative exists.	Appl	Appl		See preceding.	See preceding.

000165

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Executive Order 11988, Floodplain Management Procedures for Implementing the National Environmental Policy Act 40 CFR §6.302(b)	Federal agencies must evaluate the potential effects of actions they may take in a floodplain to avoid, to the extent possible, adverse effects associated with direct and indirect development of a floodplain.	Appl	Appl		Remediation is needed, and can not be avoided. Nationwide Permit # 38 (subsequent entry) authorizes such remedial activity in a floodplain. The floodplain will not be developed as a result of this federal agency action.	An updated floodplain determination was conducted in October 1992 for Paddy's Run using the U.S. Army Corps of Engineers' standard HEC2 water surface profile analysis program. The 100-year flood elevations reach the western slope of the Inactive Flyash Pile and the toe of the South Field slope.

000166

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	FLOODPLAIN/WETLANDS PROTECTION, continued					
DOE Compliance with Floodplain/ Wetlands Environmental Review Requirements 10 CFR §1022.3(a), 3(b)(1), 3(b)(2), 3(b)(3), 3(b)(5), 3(b)(6), 3(c), 3(d), 3(e)	DOE shall exercise leadership and take action to: • Avoid to the extent possible the long- and short-term adverse impacts associated with the destruction of wetlands and the occupancy and modification of floodplains and wetlands, and avoid direct and indirect support of floodplain and wetland development wherever there is a practicable alternative. • Incorporate floodplain management goals and wetlands protection considerations into its planning, regulatory, and decision-making processes and shall to the extent practicable: - Reduce the hazard and risk of flood loss. - Minimize the impact of floods on human safety, health, and welfare. - Restore and preserve natural and beneficial values served by the floodplain. - Minimize the destruction, loss, or degradation of wetlands. - Preserve and enhance the natural and beneficial values of wetlands. • Undertake a careful evaluation of the potential effects of any DOE action taken in a floodplain and any new construction undertaken by DOE in wetlands not located in a floodplain. • Identify, evaluate, and as appropriate, implement alternative actions which may avoid or mitigate adverse floodplain/wetlands impacts. • Provide opportunity for early public review of any plans or proposals for actions in floodplains and new construction in wetlands.	Appl	Appl	Appl	10 CFR Part 1022 is the DOE implementing regulation for Executive Orders 11988 and 11990 (see corresponding preceding entries).	Remediation decisions included avoidance to/ minimization of wetlands impacts. See: Appendix H of the OU2 FS Report; Appendix J of the OU5 FS Report, and Appendix J of the OU3 RI/FS. Also, see preceding entries.
DOE Compliance with Floodplain/ Wetlands Environmental Review Requirements 10 CFR §1022.5(b), (h)	This part shall apply to all proposed floodplain/wetlands actions, including those sponsored jointly with other agencies, where practicable alternatives to the proposed actions are still available. The policies and procedures of this part which are applicable to floodplain actions shall apply to all proposed actions which occur in a wetlands located in a floodplain.	Appl	Appl	Appl	See preceding entries.	See preceding entries.

000167

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
DOE Compliance with Floodplain/ Wetlands Environmental Review Requirements 10 CFR §1022.11 (a), (b), (c)	Concurrent with its review of a proposed action to determine appropriate NEPA requirements, DOE shall determine applicability of the floodplain management and wetlands protection requirements of this part. In making a floodplain determination, DOE shall utilize the Flood Insurance Rate Maps (FIRMs) or the Flood Hazard Boundary Maps (FHBMs) prepared by the Federal Insurance Administration of the Department of Housing and Urban Development to determine if a proposed action is located in the base or critical action floodplain, as appropriate. For a proposed action in an area of predominately federal or state land holdings where FIRM or FHBM maps are not available, information shall be sought from the land administering agency (e.g., Bureau of Land Management, Soil Conservation Service, etc.) or from agencies with floodplain analysis expertise.	Appl	Appl		See preceding entries.	See preceding entries.
DOE Compliance with Floodplain/ Wetlands Assessments 10 CFR §1022.12(a)	If DOE determines, pursuant to 10 CFR §§ 1022.5 and 1022.11, that this part is applicable to the proposed action, DOE shall prepare a floodplain/wetlands assessment, according to the requirements in this section (10 CFR §1022.12).	Appl	Appl		See preceding entries.	See preceding entries.
DOE Compliance with Floodplain/ Wetlands Environmental Review Requirements 10 CFR §1022.15(a)	If DOE finds that no practicable alternative to locating in the floodplain/wetland is available, consistent with the policy set forth in Executive Order 11988, DOE shall, before taking action, design, or modify its action in order to minimize potential harm to or within the floodplain or wetland.	Appl	Appl		See preceding entries.	See preceding entries.
Federal Water Pollution Control Act (a.k.a., Clean Water Act) General Regulatory Policies 33 CFR §323.3	Permits will be required for the discharge of dredged or fill material into waters of the United States including wetlands. Certain discharges specified in 33 CFR Part 330 are permitted by that regulation (nationwide permits). If a discharge of dredged or fill material is not permitted by 33 CFR Part 330 (Nationwide Permits), an individual section 404 permit will be required for the discharge of dredged or fill material into waters of the United States. Discharges of dredged or fill material into waters of the United States done by or on behalf of any Federal agency, other than the Corps of Engineers, are subject to the authorization procedures of these regulations. Remedial actions involving the discharge of dredge and fill material into these areas shall meet the substantive requirements of this section and 40 CFR Part 230.	Appl	Appl		See preceding entry for Executive Order 11990 (first Floodplain/Wetland Protection entry). Discharges of dredged and fill material not authorized by a NWP will be conducted in accordance with the substantive requirements of these regulations.	See preceding entries.

000168

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	FLOODPLAIN/WETLANDS PROTECTION, continued					
Federal Water Pollution Control Act (a.k.a., Clean Water Act) Nationwide Permit (NWP) Program 33 CFR Part 330	The U.S. Army Corps of Engineers has authorized certain categories of activities involving the discharge of dredged and fill material into wetlands and waters of the United States under the NWP program. Activities involving the discharge of dredged and fill material will be conducted in accordance with the substantive requirements of applicable NWPs as required. Discharges not authorized by NWP will be conducted in accordance with the substantive requirements of 33 CFR Part 323 and 40 CFR Part 230.	√	Appl	R&A	See preceding entries.	Following sections of the Sitewide Excavation Plan: 3.3.1 Implementation of Construction, Excavation, and Material-handling Activities 5.1.1 Natural Resource Impacts 5.1.3 Surface Water Pathway
Federal Water Pollution Control Act (a.k.a., Clean Water Act) Nationwide Permit Program 33 U.S.C. §1341(a)(1), (d) 33 CFR §330.1(c)	An activity is authorized under an Nationwide Permit (NWP) only if that activity and the permittee satisfy all of the individual NWP's terms and conditions. Potentially applicable NWPs include: • Nationwide Permit #38 — Cleanup of Hazardous and Toxic Waste - This permit authorizes specific activities required to affect the containment, stabilization or removal of hazardous or toxic waste materials that are performed, ordered, or sponsored by a government agency with established legal or regulatory authority provided the permittee notifies the district engineer. - For discharges in special aquatic sites, including wetlands, the notification must include a delineation of affected special aquatic sites, including wetlands. - This nationwide permit does not authorize the establishment of new disposal sites or the expansion of existing sites used for the disposal of hazardous or toxic waste.	Appl	Appl	R&A	See preceding entry for Executive Order 11990 (first Floodplain/Wetlands Protection entry).	January 17, 1992 letter from Donald R. Schregardus, Director of the OEPA, to the U.S. Army Corps of Engineers, "401 Certification — Grant," the OEPA conditionally certified that projects authorized by NWP #s 38 and 26 will comply with the applicable provisions of the Federal Water Pollution Control Act.
	• Nationwide Permit #26 — Headwaters and Isolated Waters Discharges - The discharge does not cause the loss of more than 10 acres of waters of the United States. - The permittee notifies the district engineer if the discharge would cause the loss of waters of the United States greater than 1 acre. - For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands. - The discharge, including all attendant features, both temporary and permanent, is part of a single and complete project.					

000169

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Federal Water Pollution Control Act (a.k.a., Clean Water Act) Nationwide Permit Program Section B(26) to Appendix A of 33 CFR Part 330	Discharges of dredged or fill material into headwaters and isolated waters [under Nationwide Permit # 26] are approved provided: • The discharge does not cause the loss of more than 10 acres of waters of the United States. • The permittee notifies the district engineer if the discharge would cause the loss of waters of the United States greater than 1 acre. • For discharges in special aquatic sites, including wetlands, the notification must also include a delineation of affected special aquatic sites, including wetlands. • The discharge, including all attendant features, both temporary and permanent, is part of a single and complete project.	✓	✓	✓	See preceding and following entries.	See preceding and following entries.

000170

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	FLOODPLAIN/WETLANDS PROTECTION, continued					
Federal Water Pollution Control Act (a.k.a., Clean Water Act) Nationwide Permit Program 33 CFR §330.4 (c)(1) Ohio Section 401 State Water Quality Certifications OAC 3745-32-02	Section 401 State Water Quality Certification pursuant to Section 401 of the Clean Water Act, or waiver thereof, is required to prior to issuance or re-issuance of individual or nationwide permits authorizing (dredge and fill) activities which may result in a discharge into waters of the United States. State Water Quality Certification is granted provided: 1. The discharge does not prevent or interfere with the attainment or maintenance of applicable water quality standards; and 2. The discharge does not result in a violation of any applicable provisions of the Federal Water Pollution Control Act (a.k.a., Clean Water Act).	Appl	Appl		See preceding and following entries.	January 17, 1992 letter from Donald R. Schregardus, Director of the OEPA, to the U.S. Army Corps of Engineers, "401 Certification — Grant," the OEPA conditionally certified that projects authorized by the NWP #s 38 and 26 (see previous entry) will comply with the applicable provisions of the Federal Water Pollution Control Act.
Federal Water Pollution Control Act (a.k.a., Clean Water Act) Nationwide Permit Program Section C of Appendix A to 33 CFR Part 330	In addition to the General Conditions, the following [Section 404 only] conditions apply only to activities that involve the discharge of dredge or fill material and must by followed in order for authorization of the nationwide permits to be valid: • No discharge of dredged or fill material may consist of unsuitable material (e.g., trash, debris, car bodies, etc.). And material discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act). • Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site, unless the District Engineer has approved a compensation mitigation plan for the specific regulated activity.	✓	✓		See preceding entries.	The Natural Resources Restoration Plan (NRRP)

000171

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	FLOODPLAIN/WETLANDS PROTECTION, continued					
Federal Water Pollution Control Act (a.k.a., Clean Water Act) Nationwide Permit Program Section C of Appendix A to 33 CFR Part 330	Factors that the District Engineer will consider when determining the acceptability of appropriate and practicable mitigation include, but are not limited to: • To be practicable, the mitigation must be available and capable of being done considering costs, existing technology, and logistics in light of overall project purposes. • To the extent appropriate, permittees should consider mitigation banking and other forms of mitigation including contribution to wetland trust funds, which contribute to the restoration, creation, replacement, enhancement, or preservation of wetlands. • Furthermore, examples of mitigation that may be appropriate and practicable include but are not limited to: reducing the size of the project; establishing buffer zones to protect aquatic resource values; and replacing the loss of aquatic resource values by creating, restoring, and enhancing similar functions and values. In addition, mitigation must address impacts and cannot be used to offset the acreage of wetland losses that would occur in order to meet the acreage limits of some of the nationwide permits.	✓	✓		See preceding entries.	The Natural Resources Restoration Plan (NRRP)
Federal Water Pollution Control Act (a.k.a., Clean Water Act) §404 (33 U.S.C. §1344) Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material, Subpart B—Compliance With the Guidelines, Restrictions on Discharge 40 CFR §230.10	No discharge of dredged or fill material shall be permitted: • If there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as, the alternative does not have other significant adverse environmental consequences. • Unless appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem. No discharge of dredged or fill material shall be permitted if it: • Causes or contributes, after consideration of disposal site dilution and dispersion, to violations of any applicable state water quality standard. • Violates any applicable toxic effluent standard or prohibition under section 307 of the Clean Water Act. • Jeopardizes the continued existence of species listed as endangered or threatened under the Endangered Species Act of 1973, as amended, or results in likelihood of the destruction or adverse modification or a habitat which is determined to be a critical habitat under the Endangered Species Act of 1973, as amended.	Appl	✓	✓	See preceding entries.	Appendix H of the OU2 FS Report; Appendix J of the OU5 FS Report, and Appendix J of the OU3 RI/FS.

000172

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	DISCHARGE TO SURFACE WATER					
Pollution to Waters of the State ORC 6111.04	No person shall cause pollution or place or cause to be placed any sewage, industrial waste, or other wastes in a location where they cause pollution of any waters of the state. No person to whom a permit has been issued shall place or discharge, or cause to be placed or discharged, in any waters of the state any sewage, industrial waste, or other wastes in excess of the permissive discharges specified under such existing permit without first receiving a permit from the Director to do so. Pollution to waters of the state is prohibited.	Appl	Appl	R&A		FEMP Site NPDES Permit Number 1IO00004*ED, the FEMP Stormwater Pollution Prevention Plan (RM-0039), Section 4 of the Integrated Environmental Monitoring Plan (IEMP), and the following section of the Sitewide Excavation Plan: 5.1.3 Surface Water Pathway
Compliance with Ohio Water Pollution Control Requirements ORC 6111.07(A), (C)	Failure to comply with water pollution control requirements is prohibited.	✓	Appl	Appl		See preceding.
Water Quality Standards, Criteria Applicable to All Waters OAC 3745-1-04	To every extent practical and possible, all surface waters of the State of Ohio shall be free from: • Suspended solids or other substances that enter the waters as a result of human activity that will form putrescent or otherwise objectionable sludge deposits • Floating debris, oil, scum and other floating materials entering the waters as a result of human activity in amounts sufficient to be unsightly or cause degradation • Materials entering the waters as a result of human activity producing color, odor or other conditions in such a degree as to create a nuisance • Substances entering the waters as a result of human activity in concentrations that are toxic or harmful to human, animal or aquatic life and/or are rapidly lethal in the mixing zone • Nutrients entering the waters in concentrations that create nuisance growths of aquatic weeds or algae	✓	R&A	R&A		See preceding.

000173

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	DISCHARGE TO SURFACE WATER, continued					
Water Quality Standards, Antidegradation Policy OAC 3745-1-05(A)&(B)	(A) Existing instream water uses as defined in OAC 3745-1-07 [subsequent entry] shall be maintained and protected. No further water quality degradation which would interfere with or become injurious to designated uses is allowable. (B) Waters in which existing water quality is better than the criteria prescribed in these rules and exceeds those levels necessary to support propagation of fish, shellfish and wildlife and recreation in and on the water shall be maintained and protected. ... Degradation of water quality shall not interfere or become injurious to existing or planned uses, and the Director shall require that ... feasible management or regulatory programs pursuant to Section 208 and 303 of the Act [Clean Water Act], 33 U.S.C. Sections 1288 and 1313, be applied to nonpoint sources.	✓	✓	Appl	Soil remedial action projects will ensure that existing instream water uses of the Great Miami River and Paddy's Run will be maintained as health protective.	See preceding.
Water Quality Standards, Great Miami River OAC 3745-1-21	Paddy's Run and the Great Miami River are designated as: • Warm water aquatic life habitat • Agricultural and industrial water supply • Primary contact recreation The Great Miami River between Ross Road (RM 95.7) to Taylorsville Dam (RM 92.6) is a state resource water, and RM 130 and 118 are public water supplies.	Appl	Appl	Appl	Discharges to the Great Miami River and Paddy's Run must not cause a violation of applicable numeric or narrative water quality standards for these designations. The FEMP effluent discharge pipe, located at River Mile (RM) 24.73 on the Great Miami River, is downstream of the state resource waters and public water supplies.	See preceding.
National Pollutant Discharge Elimination System 40 CFR §122.26(a)(l)(ii), 40 CFR §122.26(b)(14)(v), (x)	A discharge composed entirely of storm water associated with industrial activity is required to obtain a NPDES permit. These categories of facilities are considered to be engaging in "industrial activity": • Landfills, land application sites, and open dumps that receive or have received any industrial wastes (waste that is received from any of the facilities described under this subsection), including those that are subject to regulation under Subtitle D of RCRA; and • Construction activities including clearing, grading, and excavation that disturbs five acres or more of total land area.	Appl	Appl	Appl	Discharges of stormwater associated with industrial and/or construction activities are regulated in accordance with the existing FEMP NPDES Permit (Ohio EPA Number 1IO00004*ED), and the FEMP Stormwater Pollution Prevention Plan (RM-0039).	See preceding.
Ohio NPDES Permits, Ohio NPDES Permits Required OAC 3745-33-02(A)	No person may discharge any pollutant or cause, permit, or allow a discharge of any pollutant [from a point source] without applying for and obtaining an Ohio NPDES permit in accordance w with the requirements of this Chapter, 3745-33.	✓	✓	✓	See preceding and following entries.	FEMP Site NPDES Permit (Ohio EPA Number 1IO00004*ED), and the FEMP Stormwater Pollution Prevention Plan (RM-0039).

000174

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Ohio NPDES General Permits, Ohio NPDES Permit Required OAC 3745-38-02(A)	No person may discharge any pollutant or cause, permit, or allow a discharge of any pollutant from a point source without either applying for and obtaining an Ohio NPDES permit in accordance w with the requirements of Chapter 3745-33 of the Administrative Code [preceding entry], ... or have authorization to discharge under an Ohio NPDES general permit in accordance with the requirements of this chapter [3745-38]. NOTE: In September 1992, the FEMP applied for an individual stormwater permit to cover its industrial stormwater discharges to Paddy's Run. On the basis of the information provided in the original FEMP Stormwater Permit Application, Ohio EPA has chosen to regulate FEMP site industrial stormwater discharges under the individual permit process (OAC 3745-33, preceding entry), by incorporating stormwater monitoring requirements at Paddy's Run into the NPDES permit. The site NPDES permit also addresses discharges of stormwater associated with construction activities by requiring a Stormwater Pollution Prevention Plan that defines the manner in which these discharges will be managed.	✓	✓	✓	In accordance with the note at left, the general permitting process described in OAC 3745-38 is not applicable to the FEMP site stormwater discharges. Rather, these are regulated within the context of the existing FEMP NPDES Permit (Ohio EPA Number 1IO00004*ED) and the FEMP Stormwater Pollution Prevention Plan (RM-0039), both of which derive their regulatory basis from OAC 3745-33 (preceding entry).	See preceding entries.
Rules and Regulations of the Hamilton County Soil and Water Conservation District Governing Earthwork for Unincorporated Hamilton County, Ohio	Temporary and/or permanent erosion and sediment control features and devices shall be designed and constructed in general accordance with the State of Ohio Temporary Erosion Control Specifications. *Exempted* from these requirements are: • *any public work performed by or under control of any governmental agency*, provided such operations do not cause instability of any adjacent or contiguous property and substantially equivalent sediment control policies are applied [3.10 E]. • *operations involving process and stockpiling of soils or rock materials where controlled by other regulations*, provided such operations do not cause instability of any adjacent or contiguous property [3.10 H].	✓	TBC	TBC		FEMP Site NPDES Permit (OEPA Number 1IO00004*ED), and the FEMP Stormwater Pollution Prevention Plan (RM-0039), and the following sections of the Sitewide Excavation Plan: 5.1.3 Surface Water Pathway App F Implementation of Construction

000175

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	DISCHARGE TO SURFACE WATER, continued					
Federal Water Pollution Control Act (a.k.a., Clean Water Act) Subpart K—Best Management Practices (BMP) Programs 40 CFR §125.104	BMP programs shall be developed in accordance with good engineering practices and: 1) Be documented in narrative form and include any necessary plot plans, drawings or maps; 2) Establish specific objectives for the control of toxic and hazardous pollutants: (a) Each facility component or system shall be examined for its potential for causing a release of significant amounts of toxic or hazardous pollutants to waters of the United States due to equipment failure, improper operation, natural phenomena such as rain or snowfall, etc. (b) Where experience indicates a reasonable potential for equipment failure (e.g., a tank overflow or leakage), natural condition (e.g., precipitation), or other circumstances to result in significant amounts of toxic or hazardous pollutants reaching surface waters, the program should include a prediction of the direction, rate of flow and total quantity of toxic or hazardous pollutants which could be discharged from the facility as a result of each condition or circumstance; 3) Establish specific BMPs to meet the objectives identified in (2) above, addressing each component or system capable of causing a release of significant amounts of toxic or hazardous pollutants to the waters of the United States.		Appl	R&A	BMP requirements will be met by implementing FEMP's BMP Plan. The BMP Plan will be progressively updated to accommodate changing site activities during the conduct of CERCLA remedial actions.	Addressed as part of the selected remedy described in the OU5 ROD. Also see preceding entries.

000176

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
GROUNDWATER PROTECTION						
Safe Drinking Water Act 42 U.S.C. §1424(e)	All Federal financially assisted projects constructed in the area of a sole source aquifer and its principal recharge zone will be subject to EPA's review to insure that these projects are designed and constructed so that they do not create a significant hazard to public health.	Appl	Appl	Appl	A notice in 53 FR 15876 (May 4, 1988) designated the Buried Valley Aquifer System of the Great Miami/ Little Miami River Basins of southwestern Ohio as a sole or principal source of drinking water. The Fernald site is located above this aquifer.	EPA and OEPA review of project submittals
WELLS — CONSTRUCTION						
Water Well Standards, Pumping Wells OAC 3745-9-08(C)	Pumps may only be primed with potable water.		Appl		Pertains to all well pumps that require priming.	The Sitewide CERCLA Quality Assurance Project Plan (SCQ), the Integrated Environmental Monitoring Plan (IEMP), and the individual project-specific plans for sampling.
Water Well Standards, Monitoring Well Maintenance and Modification OAC 3745-9-09(A) through (C), and (E) through (G)	Monitoring wells must be maintained or modified to avoid cross-contamination of groundwater.		Appl		Pertains to all groundwater wells and piezometers.	The Sitewide CERCLA Quality Assurance Project Plan (SCQ), the Integrated Environmental Monitoring Plan (IEMP), and the following section of the Sitewide Excavation Plan: F.6.3 Monitoring Well Preservation

000177

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	WELLS — ABANDONMENT					
Water Well Standards, Abandonment of Test Holes and Wells OAC 3745-9-10	Upon completion of testing, a test hole shall be either completely filled with grout or such other material as will prevent contaminants from entering groundwater. If a well [or similar device] containing walls is not being used for obtaining groundwater or for determining the quality, quantity, or level of groundwater, it shall be completely filled with grout or other similar material as wneeded, wells, peizometers and				lysimeters are to be properly plugged and abandoned in accordance with these requirements.	The Sitewide CERCLA Quality Assurance Project Plan (SCQ), the Integrated Environmental Monitoring Plan (IEMP), and the following section of the Sitewide Excavation Plan: F.6.1 Plugging and Abandonment F.6.2 Monitoring Well Excavation

000178

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	CLOSURE OF UNDERGROUND STORAGE TANKS					
General Requirements OAC 1301:7-7-36 40 CFR §§280.61 through .66	Owner or operators of petroleum or hazardous substance underground storage tank (UST) systems must, in response to a confirmed release from the UST system, comply with abatement measures, site characterization, product removal, investigations for soil and groundwater cleanup, and corrective action plan, except for USTs excluded under 40 CFR §280.10(b) and UST systems subject to RCRA Subtitle C corrective action requirements under Section 3004(u) of RCRA, as amended.		Appl	✓	Risk-based closures are to be performed for USTs with media contamination as integrated with the CERCLA soil remediation activities.	Risk-based soil cleanup levels, known as FRLs, are established in the RODs. Following sections of the Sitewide Excavation Plan: 2.1.1.2 Underground Storage Tanks 2.2.6 UST Closure 4.0 Location-Specific Excavation Approaches App F Implementation of Construction
	CLOSURE OF HAZARDOUS WASTE MANAGEMENT UNITS					
OEPA Closure Plan Review Guidance for RCRA Facilities (Interim Final) September 1, 1993	Federal Regulations of May 2, 1986 (50 FR 16422) and March 19, 1987 (52 FR 8704) modified the closure performance standard such that risk assessment, or what constitutes "decontamination" of a site, may be considered by EPA as a closure option. On December 8, 1988 (see OAC 3745-67-28), the OEPA adopted the equivalent of the EPA's March 19, 1987 regulations, clarifying that risk assessment may be a closure option. It is OEPA and its Division of Hazardous Waste Management (DHWM) practice to consider risk assessment/risk-based closure as a possible third option for closure for all types of units [hazardous waste management units (HWMUs) and solid waste management units (SWMUs)].		TBC	✓	Risk-based closures are to be performed for HWMUs with media contamination as integrated with the CERCLA soil remediation activities (see following entry).	Risk-based soil cleanup levels, known as FRLs, are established in the RODs. Following sections of the Sitewide Excavation Plan: 2.1.1.1 Hazardous Waste Management Units 2.2.5 HWMU Closure 4.0 Location-Specific Excavation Approaches App F Implementation of Construction

000179

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
RCRA/CERCLA Integrated Closure Director's Final Findings and Orders (June 4, 1996) Section V.1	The Respondent ... shall comply with the closure regulations contained in OAC rules 3745-66-11(A) and (B), 3745-66-11(C) as applicable, 3745-66-14, and 3745-66-16 through 3745-66-20 as applicable for the HWMUs [hazardous waste management units] listed in Attachment A [to these Orders].		✓	✓	Pertinent to closures of HWMUs presented in Table 2-1 of the Sitewide Excavation Plan (derived from the DF&O's Attachment A) during the CERCLA soil remediation activities	See subsequent entries in this table for those OAC rules determined by the RODs as ARARs. While OAC 3745-66-11 and -14 are presented in the next two entries, entries for 3745-66-16 through -20 for post-closure are addressed in the subsequent Post-Closure presentation group of this table.
RCRA/CERCLA Integrated Closure Director's Final Findings and Orders (June 4, 1996) Section V.1	The Respondent ... shall comply with the closure regulations contained in OAC rules 3745-66-11(A) and (B), 3745-66-11(C) as applicable, 3745-66-14, and 3745-66-16 through 3745-66-20 as applicable for the HWMUs [hazardous waste management units] listed in Attachment A [to these Orders].		✓	✓	Pertinent to closures of HWMUs in preceding entry during the CERCLA soil remediation activities.	See preceding and subsequent entries.
Closure and Post-Closure Under Interim Standards Closure Performance Standard OAC 3745-66-11 [40 CFR §265.111]	The owner or operator shall close his facility or hazardous waste management unit (HWMU) in a manner that: (A) minimizes the need for further maintenance; (B) controls, minimizes, or eliminates, to the extent necessary to protect public health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere; and (C) complies with these closure requirements.	✓	Appl	Appl	Pertinent to closures of HWMUs during the CERCLA soil remediation activities; also cited in RCRA/CERCLA Integrated Closure DF&O @ V.1. NOTE: These requirements are the same as those for new hazardous waste facilities under OAC 3745-55-11 (40 CFR §264.111). NOTE: DOE intends, and anticipates being able, to clean (risk-based) close all identified HWMUs.	Following sections of the Sitewide Excavation Plan: 2.1.1.1 Hazardous Waste Management Units 2.2.5 HWMU Closure 4.0 Location-Specific Excavation Approaches App F Implementation of Construction

000180

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	CLOSURE OF HAZARDOUS WASTE MANAGEMENT UNITS, continued					
Closure and Post-Closure Under Interim Standards Disposal or Decontamination of Equipment, Structures and Soils OAC 3745-66-14 [40 CFR §265.114]	During the partial and final closure periods, all contaminated equipment, structures, and soils must be properly disposed of or decontaminated [to risk-based cleanup levels] [i.e., clean closed, have risk-based closure, or be closed in place], unless otherwise specified in: OAC 3745-66-97 Closure and Post-Closure Under Interim Standards: [Tank System] Closure and Post-Closure Care OAC 3745-67-28 Surface Impoundments: Closure and Post-Closure Care OAC 3745-67-58 Surface Impoundments: [Waste Piles] Closure and Post-Closure Care OAC 3745-67-80 Surface Impoundments: [Land Treatment Facility] Closure and Post-Closure Care OAC 3745-68-10 Landfills, Incinerators, Thermal Treatment, Miscellaneous Units: Closure and Post-Closure	✓	Appl	Appl	Pertinent to closures of the identified HWMUs during the CERCLA soil remediation activities; also cited in RCRA/CERCLA Integrated Closure DF&O @ V.1. **NOTE:** These requirements are the same as those for new hazardous waste facilities under OAC 3745-55-14 (40 CFR §264.114), with corresponding cross-references presented therein.	Risk-based soil cleanup levels, known as FRLs, are established in the RODs. Also see preceding entry.
Surface Impoundments: [Surface Impoundments] Closure and Post-Closure Care OAC 3745-67-28	At closure of a surface impoundment HWMU, the owner or operator must remove or decontaminate [to risk-based cleanup levels] all waste residues, contaminated waste containment system components (liners, etc.), contaminated subsoils, and structures and equipment contaminated with waste and leachate. If the owner or operator demonstrates that not all contaminated soils can be practically removed or decontaminated [to risk-based cleanup levels], he must close the HWMU and perform post-closure care in accordance with the closure and post-closure care requirements that apply to landfills under OAC 3745-66-10 to 3745-66-20 and OAC 3745-68-10 (40 CFR §264.310).		✓	✓	Pertinent to closure of surface impoundment HWMUs during the CERCLA soil remediation activities, as cited in a preceding entry. **NOTE:** These requirements are the same as those for new hazardous waste facilities under OAC 3745-56-28 (40 CFR §264.228).	See preceding.
Hazardous Waste New Facility Corrective Action, Closure and Post-Closure Requirements [Container Storage Area] Closure OAC 3745-55-78 [40 CFR §264.178]	At closure of a container storage area HWMU, the owner or operator must remove all hazardous waste and hazardous waste residues from the containment system. Remaining containers, liners, bases, and soil containing or contaminated with hazardous waste or hazardous waste residues must be removed or decontaminated [to risk-based cleanup levels].	✓	R&A	✓	Pertinent to closures of container storage area HWMUs during the CERCLA soil remediation activities **NOTE:** There are no corresponding requirements for interim status hazardous waste facilities under OAC 3745-65, -66, or -67 (40 CFR Part 265).	See preceding.

000181

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Landfills, Incinerators, Thermal Treatment, Miscellaneous Units: Closure and Post-Closure OAC 3745-68-10(A) [40 CFR §265.310(a)]	At final closure of a HWMU as a landfill ... the owner or operator must cover the HWMU ... with a final cover designed and constructed to: • provide long-term minimization of migration of liquids through the closed HWMU; • function with minimum maintenance; • promote drainage and minimize erosion or abrasion of the cover; • accommodate settling and subsidence so that the cover's integrity is maintained; and • have a permeability less than or equal to the permeability of any bottom liner system or natural subsoil present.	✓	R&A	✓	Pertinent to HWMUs that are "closed in place" — i.e., all contaminated soils can not practically be removed or decontaminated [to risk-based cleanup levels] — during the CERCLA soil remediation process. NOTE: DOE intends, and anticipates being able, to clean (risk-based) close all identified HWMUs rather than close in-place (close as a landfill).	See preceding.

000182

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	CLOSURE OF HAZARDOUS WASTE MANAGEMENT UNITS, continued					
RCRA/CERCLA Integrated Closure Director's Final Findings and Orders (June 4, 1996) Section V.2 in lieu of Closure and Post-Closure Under Interim Standards Closure Plan; Amendment of Closure Plan OAC 3745-66-12	The Respondent ... are hereby exempted from complying with OAC rule 3745-66-12 for the HWMUs identified in Attachment A of these Orders, provided that the Respondent: a. Submits the documents contained in Attachment C [of these Orders] to Ohio EPA in accordance with the dates established pursuant to the ACA [Amended Consent Agreement]. Within one week after submitting these documents to Ohio EPA, the Respondent shall submit a cross-reference index which contains pertinent page and section identifications for each HWMU that is contained in the documents and said index shall be cumulative and reference all previous document locations. ... d. Implements the final remedies as reflected in the Records of Decision issued in accordance with the ACA.		✓	✓	Pertinent to closures of HWMUs listed in preceding entries (see Table 2-1 of the Sitewide Excavation Plan, derived from the DF&O's Attachment A) during the CERCLA soil remediation activities. DOE will submit the cross-reference index for the listed HWMUs accordingly.	Following sections of the Sitewide Excavation Plan: 2.1.1.1 Hazardous Waste Mangement Units 2.2.5 Hazardous Waste Management Unit Closure 3.3.1.3 Treatment, Special Handling and Disposal Options. 3.4.7 Certification Reports

000183

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	RADIONUCLIDE CONCENTRATIONS					
Radiation Protection of the Public and the Environment DOE Order 5400.5 Chapter I (4) and Chapter II (2)	An "as low as reasonably achievable (ALARA)" process is to be used in planning and carrying out all DOE activities that have the potential to cause radiation exposure to the public. ALARA requires judgement with respect to what is reasonably achievable. Factors that relate to societal, technological, economic, and other public policy considerations shall be evaluated to the extent practicable. Factors to be considered, at a *minimum*, include: • Maximum dose to members of the public; • Collective dose to the population; • Alternative processes, such as alternative treatment of discharge streams, operating methods, or controls; • Doses for each process alternative; • Cost for each of the technological alternatives; • Examination of the changes in cost among alternatives; and • Changes in societal impact associated with process alternatives (e.g., differential doses from various pathways). Except for meeting requirements of NEPA, qualitative analyses are acceptable, in most instances, for ALARA judgements, especially when the potential doses are well below the dose limit. The bases for these judgements should be documented. More detailed analyses should be considered if the decision might result in doses that approach the limit.	TBC	TBC		In addition to the evaluations conducted as part of the CERCLA selection of remedy process [the short- and long-term risk assessments of the Comprehensive Remedial Action Risk Evaluation (CRARE) within the feasibility studies (FSs)], documentation of "equivalent evaluations" for environmental ALARA are performed in accordance with the "FEMP Environmental ALARA Plan" and retained as part of the site and project records. Also addressed through the approved selected remedy in the RODs. An ALARA goal is set in the OU5 ROD for the total uranium FRL.	Following sections of the Sitewide Excavation Plan: 2.1.3 Final Remediation Levels 2.1.5.2 Radiological Hot Spots 2.1.5.3 ALARA Requirements 2.2.2 Certifying FRL Attainment 2.2.3 Detection of and Criteria for Hot Spots 3.3.1.4 ALARA Implementa-tion 3.3.3 Precertifica-tion Activities 3.4.6 Implementa-tion Strategy for Hot Spot Criteria 3.4.7 Certification Report

000184

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	RADIONUCLIDE CONCENTRATIONS, continued					
Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings, Subpart B— Standards for Cleanup of Land and Buildings Contaminated with Residual Radioactive Materials from Inactive Uranium Processing Sites 40 CFR §192.12(a) Subpart C— Implementation 40 CFR §192.20	Remedial actions shall be conducted so as to provide reasonable assurance that, as a result of residual radioactive materials, the concentration of radium-226 in land averaged over any area of 100 m^2 shall not exceed the background level by more than: • 5 pCi/g averaged over the first 15 cm of soil below the surface, and • 15 pCi/g, averaged over 15-cm-thick layers of soil more than 15 cm below the surface. Compliance with this requirement should be shown through measurements performed within the accuracy of currently available types of field and laboratory instruments in conjunction with reasonable survey and sampling procedures.	R&A	R&A	R&A	Met through the selection of FRLs based on risk assessment, followed by certification of cleanup. The selected remedy in the OU2 and OU5 RODs established more stringent clean-up levels for radium-226 of 1.7 pCi/g, as opposed to 5.0 pCi/g above background.	See preceding.
Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings, Subpart C— Implementation 40 CFR §192.21(f) and §192.22(b)	Where radionuclides other than radium-226 and its decay product are present in sufficient quantity and concentration to constitute a significant radiation hazard from residual radioactive materials, remedial actions shall, in addition to satisfying the standards of Subpart A in 40 CFR §192.02 and Subpart B in 40 CFR §192.12 (both listed above), reduce other residual radioactivity to levels that are ALARA.	R&A	R&A	R&A	The approved selected remedy in the OU5 ROD set an ALARA goal for the total uranium FRL.	See preceding.
Postclosure Standards for Uranium and Thorium Mill Tailings, Subpart D— Standards for the Management of Uranium Byproduct Materials Pursuant to Section 84 of the Atomic Energy Act of 1954, as Amended 40 CFR §192.32 (b)(2)	The requirements for the management of uranium byproduct materials after closure of a disposal area [40 CFR §192.32(b)(1)] shall not apply to any portion of a disposal site which contains a concentration of radium-226 in land, averaged over areas of 100 m^2, which, as a result of uranium byproduct material, does not exceed the background level by more than the limits specified in 40 CFR §192.12(a) (see above).	R&A	R&A	R&A		See preceding.

00018S

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Management of Thorium Mill Tailings, Subpart E— Standards for the Management of Thorium Byproduct Materials Pursuant to Section 84 of the Atomic Energy Act of 1954, as Amended 40 CFR §192.40 - §192.42	The following are requirements for the management of thorium byproduct materials: • The provisions for the management of uranium byproduct material (40 CFR §192.32) shall apply to thorium byproduct material and: - Provisions applicable to the element uranium shall also apply to the element thorium - Provisions applicable to radon-222 shall also apply to radon-220 - Provisions applicable to radium-226 shall also apply to radium-228 With the concurrence of EPA, alternative provisions may be substituted for any of the above requirements provided the alternative provisions will provide at least an equivalent level of protection for human health and environment.	R&A	R&A	R&A		See preceding.
Radiation Protection of the Public and the Environment, DOE Order 5400.5 Chapter IV (4)(a)	Guidelines for residual concentrations of radionuclides other than thorium and radium shall be derived from the basic dose limits by means of an environmental pathway analysis using specific property data where available. Procedures for these derivations are given in DOE/CH-8901. Residual concentrations of radioactive material in soil are defined as those in excess of background concentrations averaged over an area of 100 m^2.	TBC			Considered in the development of the selected remedy in the OU2 and OU5 RODs.	See preceding.
Radiation Protection of the Public and the Environment, DOE Order 5400.5 Chapter IV (4)(a)(1) 10 CFR Part 834 (PROPOSED)	If the average residual concentration of radionuclides in any surface or below- surface area less than or equal to 25 m^2 exceeds the limit or guideline by a factor of $(100/A)^{0.5}$ [where A is the area (in square meters) of the region in which the concentrations are elevated], limits for "hot spots" shall also be developed and applied. Procedures for calculating these hot spots limits, which depend on the extent of the elevated local concentrations, are given in DOE/CH-8901. In addition, reasonable efforts shall be made to remove any source of radionuclide that exceeds 30 times the appropriate limit in the soil, irrespective of the average concentration in the soil.	TBC	TBC			See preceding.

RADIONUCLIDE CONCENTRATIONS, continued

000186

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Radiation Protection of the Public and the Environment, DOE Order 5400.5 Chapter IV (4)(a)(2)(3) 10 CFR Part 834 (PROPOSED)	The generic guidelines for residual concentrations of radium-226, radium-228, thorium-230, and thorium-232 are: • 5 pCi/g, averaged over the first 15 cm of soil below the surface; and • 15 pCi/g, averaged over 15-cm-thick layers of soil more than 15 cm below the surface. These guidelines take into account ingrowth of radium-226 from thorium-230 and of radium-228 from thorium-232, and assume secular equilibrium. If both thorium-230 and radium-226, or both thorium-232 and radium-228, are present and not in secular equilibrium, the appropriate guideline is applied as a limit for the radionuclide with the higher concentration. If other mixtures of radionuclides occur, the concentrations of individual radionuclides shall be reduced so that either the dose for the mixture will not exceed the basic dose limit or the sum of the ratios of the soil concentration of each radionuclide to the allowable limit for that radionuclide will not exceed 1. Explicit formulas for calculating residual concentrations guidelines for mixtures are given in DOE/CH-8901.	TBC	TBC		Included as it is more restrictive than the federal standard in 40 CFR §192.02, .12(a), .20, .21(f), .22(b), .32(b)(2), .40-.42.	See preceding.
Guidelines for Residual Radioactive Material—Surface Contamination DOE Order 5400.5 Chapter IV (4)(d) 10 CFR Part 834 (PROPOSED)	These generic surface contamination guidelines are applicable to existing structures and equipment. These guidelines are generally consistent with standards of the NRC (1982) and functionally equivalent to Section 4, "Decontamination for Release for Unrestricted Use," of Regulatory Guide 1.86, but apply to nonreactor facilities. These limits apply to both interior equipment and building components that are potentially salvageable or recoverable scrap. If a building is demolished, the guidelines in paragraph IV (6)(a) are applicable to the resulting contamination in the ground.		TBC		Will be used for any process facility building or structures built and/or used for the remedial action, including the AWWT, soil staging, etc.	See preceding.

000187

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	LEAD CONCENTRATION					
Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, OSWER Directive # 9355.4-12 (July 14, 1994)	EPA recommends using 400 ppm soil lead as a screening level for lead in soil for residential scenarios at CERCLA sites and at RCRA Corrective Action sites. Residential areas with soil lead below 400 ppm generally require no further action. Site-specific preliminary remediation goals (PRGs) at CERCLA sites and media cleanup standards at RCRA corrective action facilities for residential land use are described.	TBC	TBC		The selected remedy in the OU2 and OU5 RODs established this value as the lead FRL.	Following section of the Sitewide Excavation Plan: 2.1.3 Final Remediation Levels
	PCB CONCENTRATION					
Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution In Commerce, And Use Prohibitions, Subpart A— Applicability, Definitions 40 CFR §761.3	PCB materials which appear at concentrations less than 50 ppm are excluded from the PCB disposal requirements in this regulation.	R&A	✓	R&A	Operable Unit 2 does not contain PCB materials which have a concentration greater than 50 mg/kg (ppm by weight).	Following sections of the Sitewide Excavation Plan: 2.5.8 Special Materials 3.3.2.2 Special Materials F.4.1 Materials Which Require Special Handling
Subpart G— PCB Spill Cleanup Policy, Requirements for PCB Spill Cleanup 40 CFR §761.125(c)	PCBs at a concentration of greater than 50 mg/kg (ppm by weight) are subject to TSCA decontamination requirements in 40 CFR §761.120(b). Soil in restricted access areas contaminated by a PCB spill shall be cleaned to 25 mg/kg PCBs [40 CFR §761.125(c)(3)(v)]. At such times as restricted access areas (other than outdoor electrical substations) are converted to another use, the spill site shall be cleaned up to the non-restricted access area requirements of 40 CFR §761.125(c)(4)(v). Soils in non-restricted access areas contaminated by a PCB spill shall be cleaned to 10 mg/kg PCBs, provided that the soil is excavated to a minimum depth of 10 inches. The excavated soil will be replaced with clean soil (i.e., containing less than 1 mg/kg PCBs), and the spill site will be restored (e.g., replacement of turf) [40 CFR §761.125(c)(4)(v)].		TBC	TBC	Soil containing PCBs will be excavated as necessary to attain FRLs; soil concentrations are expected to be less than 50 mg/kg PCBs. The OU5 ROD established FRLs for the PCBs Arochlor-1254 and Arochlor-1260 as 0.13 mg/kg.	Following section of the Sitewide Excavation Plan: 2.1.3 Final Remediation Levels
Subpart G— PCB Spill Cleanup Policy, Sampling Requirements 40 CFR §761.130	Criteria that the EPA uses to determine the adequacy of the cleanup of spills resulting from the release of regulated PCB materials at concentrations of ≥50 mg/kg. Applies to spills which occur after May 4, 1987.			TBC	Applies to spills of regulated PCB materials (i.e., those that have a concentration ≥50 mg/kg) that occurred after May 4, 1987.	See preceding

000188

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	CERTIFICATION OF CLEANUP					
Methods for Evaluating the Attainment of Cleanup Standards, Volume 1: Soils and Solid Media EPA 230/02-89-042 NTIS PB89-234959 February 1989	This EPA guidance document describes methods for testing whether soil chemical concentrations at a site are statistically below a cleanup standard or ARAR. If it can be reasonably concluded that the remaining soil or treated soil at a site has concentrations that are statistically less than relevant cleanup standards then the site can be judged protective of human health and the environment.	TBC	✓			Following sections of the Sitewide Excavation Plan: 2.2.2 Certifying FRL Attainment 3.4 Certification App G Certification Design Rationale
RCRA/CERCLA Integrated Closure Director's Final Findings and Orders (June 4, 1996) Section V.4 in lieu of Closure and Post-Closure Under Interim Standards Certification of Closure OAC 3745-66-15	For the HWMUs identified in Attachment A of these Orders, the Respondent ... are hereby exempted from complying with OAC rule 3745-66-15 provided that they submit Remedial Action Reports for the HWMUs contained in operable units 1, 3, and 5 within 60 days from completion of remedial activities at each operable unit, which is determined by the U.S. EPA, in accordance with CERCLA. These Remedial Action Reports shall certify that the HWMUs contained in operable units 1 and 3 have been closed, and that the environmental media in operable unit 5 has been managed, in accordance with the final remedies contained in the Records of Decision and in accordance with the Director's closure performance standards. Attachment C [of these Orders] summarizes the documents that will be provided during remediation process. These CERCLA documents contain the substantive requirements of the RCRA and Ohio hazardous waste closure regulations.		✓	✓	Pertinent to closures of HWMUs listed in preceding entries (from Table 2-1 of the Sitewide Excavation Plan, derived from the DF&O's Attachment A) during the CERCLA soil remediation activities.	Following sections of the Sitewide Excavation Plan: 2.2.5 HWMU Closure 3.4 Certification 7.3 Certification Design Letter 7.4 Certification Report 7.5 Other Related Future Documents

000189

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
DEFINITIONS & GENERAL FACILITY STANDARDS						
Resource, Conservation, and Recovery Act 42 U.S.C. §6903 (27)	Solid waste means any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations and from community activities, but does not include source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954.	Appl	✓	✓		Following sections of the Sitewide Excavation Plan: 3.0 General Implementation Approach App F Implementation of Construction
Solid Waste and Infectious Waste Regulations, Definitions OAC 3745-27-01 (B)(40)	Solid wastes means such unwanted residual solid or semisolid material as results from industrial, commercial, agricultural, and community operations, *excluding earth or material from construction, mining, or demolition operations, or other waste materials of the type that would normally be included in demolition debris, nontoxic flyash, spent nontoxic foundry sand, and slag and other substances that are not harmful or inimical to public health*, and includes, but is not limited to, garbage, tires, combustible and noncombustible material, street dirt, and debris. Solid waste does not include any material that is an infectious waste or a hazardous waste. For the purpose of this definition, "semisolid material" does not contain liquids which can be readily released under normal climatic conditions, as determined by method 9095 (paint filter liquids test) in SW-846: "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods".	Appl	✓	✓		See preceding.
Solid Waste and Infectious Waste Regulations, Definitions OAC 3745-27-01 (B)(15) OAC 3745-27-30 (A), (E), (H) ORC 3734.021 (A)(1)(c), (d)	Infectious waste is defined by nine categories of waste including human blood specimens and blood products, sharp wastes used in the treatment or inoculation of human beings, and any other waste materials generated in the diagnosis, treatment, or immunization of human beings. A generator who places all sharp infectious wastes and all unused hypodermic needles, syringes, and scalpel blades into a "SHARPS" container before they are transported and who generates less than 50 lbs. of infectious wastes each month and does not hold a certificate of registration as a generator of infectious wastes may transport and dispose of infectious wastes in the same manner as solid wastes. Treated infectious wastes can be transported and disposed in the same manner as noninfectious waste. Infectious waste that is also radioactive shall be managed in accordance with applicable Ohio Department of Health and U.S. Nuclear Regulatory Commission regulations.	Appl	✓			See preceding.

000190

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	DEFINITIONS & GENERAL FACILITY STANDARDS, continued					
Identification and Listing of Hazardous Waste, Definition of Hazardous Waste OAC 3745-51-03(A) [Identification and Listing of Hazardous Waste, Subpart A—General, Definition of Hazardous Waste 40 CFR §261.3(a)]	A solid waste is a hazardous waste, if: (1) it is not excluded from regulation as a hazardous waste under OAC 3745-51-04(B) [40 CFR §261.4(b)]; and (2)(a) it exhibits any of the characteristics of hazardous waste identified in OAC 3745-51-20 to 3745-51-24, with certain exceptions noted therein; or (2)(b) *it is* listed as hazardous waste in OAC 3745-51-31 to 3745-51-33 [40 CFR §§ 261.30 - 261.35]; or (2)(c) *it is a mixture of solid and hazardous wastes;* (2)(d) it is a mixture of hazardous wastes as defined in OAC 3745-51-03(A)(2)(a) to 3745-51-03(A)(2)(c) [three previous bullets in this entry] and source material, special nuclear material, or by product material, as defined by the Atomic Energy Act of 1954, as amended, 42 U.S.C. 2011 et seq., or other radionuclides. However, only the hazardous components of the mixture are subject to regulation for purposes of this [OAC 3745-51] chapter. (2)(e) Wastewater mixed with a RCRA F-listed spent solvent waste, whose concentration is less then the following *de minimis* levels before *or* at introduction to the headworks of a Clean Water Act-regulated system, *is not a listed hazardous waste*: 1 mg/L: carbon tetrachloride; tetrachloroethene; and trichloroethene. 25 mg/L: the remaining listed spent solvents.	Appl	✓	✓	This Hazardous Waste Mixture Rule Exclusion is pertinent to management of perched water and other remediation-generated wastewaters, particularly near the Fire Training Facility (HWMU 1) and Sludge Drying Beds (HWMU 41).	See preceding. Following section of the Sitewide Excavation Plan: 2.5.4 Perched Water
Identification and Listing of Hazardous Waste, Exclusions OAC 3745-51-04(B)(4) [Identification and Listing of Hazardous Waste, Subpart A—General, Exclusions 40 CFR §261.4(b)(4)]	The following are not hazardous wastes: fly ash waste, bottom ash waste, slag waste, and flue gas emission control waste generated primarily from the combustion of coal or other fossil fuels.	Appl	✓	✓		See preceding.

000191

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Identification and Listing of Hazardous Wastes, Requirements for Recyclable Materials OAC 3745-51-06(A)(3) [40 CFR §261.6]	The following recyclable materials are not subject to regulation under rules 3745-50-40 to 3745-50-62 or Chapters 3745-52 to 3745-57 and 3745-65 to 3745-69 of the Ohio Administrative Code [Parts 262 through 266 or 268, 270, or 124 of 40 CFR], and are not subject to the notification requirements of Chapter 3734 of the Ohio Revised Code [Section 3010 of RCRA]: (b) used batteries (or used battery cells) returned to a battery manufacturer for regeneration; (c) used oil that exhibits one or more of the characteristics of hazardous waste but is recycled in some other manner than being burned for energy recovery; (d) scrap metal.	✓	✓	Appl	Pertinent to remediation generated materials. Recycling of remediation generated materials may be conducted.	Operable Unit 3 Integrated RD/RA Work Plan
Termination of Operating Licenses for Nuclear Reactors Section C.4 Decontamination for Release for Unrestricted Use U.S. Nuclear Regulatory Commission Regulatory Guide 1.86 (June 1974)	A reasonable effort shall be made to eliminate residual surface radiological contamination and to achieve the acceptable surface contamination levels stated in this guide.	✓	✓	TBC	Pertinent to releasing to off-site any potentially radiologically-contaminated materials. Radiation surveys will be performed prior to releasing any potentially radiologically-contaminated materials off-site to demonstrate compliance with the surface contamination levels stated in this guide.	Operable Unit 1 Design Criteria Package
Identification and Listing of Hazardous Waste, Subpart A—General, Definition of Hazardous Waste 40 CFR §261.3	Debris means solid material exceeding a 60-mm particle size that is intended for disposal and that is a manufactured object, plant or animal matter, or natural geologic material.	✓	Appl	Appl	Applicable to hazardous debris that will be disposed of off-site.	Operable Unit 1 Design Criteria Package, and following sections of the Sitewide Excavation Plan: 1.3.2.4 Remediation Debris 2.5.10 Off-Site Shipments F.5.2 Off-Site Disposal

000192

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
DEFINITIONS & GENERAL FACILITY STANDARDS, continued						
Land Disposal Restrictions, Subpart A—General, Definitions Applicable to This Part 40 CFR §268.2	Hazardous debris means debris that contains a listed hazardous waste, or that exhibits a characteristic of hazardous waste.	✓	Appl	Appl	"contains a listed hazardous waste" portion is not applicable to on-property disposal within a CAMU under the CAMU Rule as invoked under the OU5 ROD.	See preceding.
Hazardous Waste Regulations Contained-In Policy 58 FR 48092 (September 14, 1993) Proposed rule. 58 FR 59976 (November 12, 1993) Notice to extend comment. 59 FR 10778 (March 8, 1994) Clarification, partial withdrawal.	Hazardous soil means soil that contains RCRA hazardous waste(s) listed in Subpart D of 40 CFR Part 261, or that exhibits one or more of the characteristics of a hazardous waste as defined in Subpart C of 40 CFR Part 261. This proposed rule recommends contained-in determinations for hazardous debris, hazardous soil and other environmental media. Any person may petition the Regional Administrator to exclude, under 261.3(f)(2) or 261.3(g) of this chapter, hazardous debris and hazardous soil or other environmental media, including but not limited to groundwater, surface water, and sediment, from regulation as hazardous waste. The petition for a contained-in determination must include information sufficient to demonstrate that specific constituent concentrations in the hazardous debris, hazardous soil, or other environmental media to be excluded do not pose a hazard to human health and the environment at that site. (Such a petition is not necessary for remedial actions conducted pursuant to RCRA or CERCLA authorities provided that a similar determination is made by the Regional Administrator based on substantially equivalent information including public notice and comment requirements).		TBC	TBC	Will be considered for managing treated soil that is contaminated with RCRA waste.	Addressed in the selected remedy in the OU5 ROD. Following sections of the Sitewide Excavation Plan: 3.3 Remedial Action App F Implementation of Construction
Ohio Petroleum Contaminated Soil Policy OEPA Policy PP.01-03-200	The basis of the "contained in" policy is that environmental media, such as soil or groundwater, are not considered to be waste material. Because they are not a solid waste, the mixture rule, as set forth in OAC 3745-51-03, does not apply when they become contaminated with a listed hazardous waste but only contains the waste. The result of this policy is that if the waste constituents can be removed, the soil is no longer considered to contain a hazardous waste. Therefore, since soil is not a waste material it does not have to be de-listed in order for it to be used for its intended purpose. However, as long as the soil contains the waste material, it must be managed as a hazardous waste. If this concept is applied to petroleum-contaminated soil, the soil containing a petroleum hydrocarbon would not need to be managed as a solid waste if the contaminants were removed.	TBC	TBC		Allows for treated/clean soil to be used as backfill. Thus, any soil below FRLs can be backfilled or otherwise used as clean soil.	See preceding.
DEFINITIONS & GENERAL FACILITY STANDARDS, continued						

0001193

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Hazardous Waste Management System: General, Subpart B—Definitions 40 CFR §260.10	Remediation waste means all solid and hazardous waste, and all media (including groundwater, surface water, soils, and sediments) and debris, which contain listed hazardous wastes or which themselves exhibit a hazardous waste characteristic, that are managed for the purpose of implementing corrective action requirements under 40 CFR §264.101 and RCRA section 3008(h). For a given facility, remediation wastes may originate only from within the facility boundary, but may include waste managed in implementing RCRA sections 3004(v) or 3008(h) for releases beyond the facility boundary.	R&A	✓	✓	Under the Consent Agreement as amended in 1991 (a.k.a., the ACA), remediation at the FEMP is conducted under the authorities of CERCLA as well as RCRA sections 3004(v) and 3008(h).	Following sections of the Sitewide Excavation Plan: 1.3.2.1 Soil and Sediment 1.3.2.6 Corrective Action Management Unit Rule 2.1 Remediation Drivers 2.2.1 Demonstrating OSDF WAC Attainment
CERCLA Compliance with Other Laws Manual Section 2.7	Placement/disposal of waste does not occur under the following circumstances: • waste is consolidated within a unit (including an area of contamination that can be viewed as a single unit); • waste is capped in place, including grading prior to capping; • waste is treated in situ; and • waste is processed within the unit in order to improve its structural stability for closure or for movement of equipment over the area.	TBC	✓	TBC	See following entry on the Corrective Action Management Unit.	See following entry.

000194

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	DEFINITIONS & GENERAL FACILITY STANDARDS, continued					
Corrective Action Management Unit Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, Subpart S- 40 CFR §264.552 (58 FR 865829, February 16, 1993)	For the purpose of implementing remedies under Sec. 264.101 or RCRA Section 3008(h), the EPA Regional Administrator may designate an area at the facility as a corrective action management unit (CAMU). One or more CAMUs may be designated at a facility under the following conditions: 1) Emplacement of remediation wastes into or within a CAMU does not constitute land disposal of hazardous wastes. 2) Consolidation or emplacement of remediation wastes into or within a CAMU does not constitute creation of a unit subject to minimum technology requirements. 3) The CAMU shall facilitate the implementation of reliable, effective, protective, and cost-effective remedies. 4) Waste management activities associated with the CAMU shall not create unacceptable risks to humans or to the environment resulting from exposure to the wastes. 5) The CAMU shall include uncontaminated areas of the facility only if including such areas for the purpose of managing remediation waste is more protective than management of such wastes at contaminated areas of the facility. 6) Areas within the CAMU, where wastes remain in place after closure of the CAMU, shall be managed and contained so as to minimize future releases, to the extent practicable. 7) The CAMU shall expedite the timing of remedial activity implementation, when appropriate and applicable. 8) The CAMU shall enable the use, when appropriate, of treatment technologies (including innovative technologies) to enhance the long-term effectiveness of remedial actions by reducing the toxicity, mobility, or volume of wastes that will remain in place after closure of the CAMU. 9) The CAMU shall, to the extent practicable, minimize the land area of the facility upon which wastes will remain in place after closure of the CAMU. The owner/operator shall provide sufficient information to enable the Regional Administrator to designate a CAMU in accordance with the criteria in Sec. 264.552. Note: RCRA regulated units (HWMUs) within a CAMU are fully subject to RCRA closure regulations.	R&A	Appl	R&A	Per the selected remedy in the OU5 ROD: • the FEMP property (bounded by its property boundaries) is designated as a CAMU; • consolidation or management of on-site remediation wastes into or within the CAMU does not constitute creation of a unit subject to minimum technology requirements (MTRs) [OAC 3745-68-101 and 40 CFR §265.301(a)] and does not invoke land disposal restrictions (LDRs)[OAC 3745-59 and 40 CFR §§268.40 through .44].	Section 9.1.8 of the OU5 ROD, and following section of the Sitewide Excavation Plan: 1.3.2.6 Corrective Action Management Unit Rule

000195

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	DEFINITIONS & GENERAL FACILITY STANDARDS, continued					
Generator Standards, Hazardous Waste Determination OAC 3745-52-11(A) through (F)	A person who generates a solid waste must determine if that waste is a hazardous waste using the following method:	✓	R&A	R&A		Following sections of the Sitewide Excavation Plan: 2.1.1 RCRA 2.1.2 Waste Acceptance Criteria 3.1 Predesign Investigation 3.3.1 Implementation of Construction, Excavation, and Material-handling Activities 3.3.2 Impacted Materials Handling and Tracking 3.6 Record Keeping and Information Management
[Standards Applicable to Generators of Hazardous Waste, Subpart A—General, Hazardous Waste Determination 40 CFR §262.11]	1) First determine if the waste is excluded from regulation (not a solid waste) under OAC 3745-51-04 (40 CFR §261.4).					
	2) If the waste is not excluded from regulation, then determine if the waste is listed as a waste ("listed waste") in OAC 3745-51-30 to 3745-51-33 (Subpart D of 40 CFR Part 261).				Not pertinent for on-site disposal because of the CAMU rule (see preceding entry); pertinent for off-site treatment or disposal.	See preceding entry, and following sections of the Sitewide Excavation Plan: 2.5.10 Off-Site Shipments F.5.2 Off-Site Disposal

000196

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	3) For purposes of complying with OAC 3745-59 (40 CFR Part 268), or if the waste is not a "listed waste" per step 2 above, then determine if the waste is a "characteristic waste" as identified in OAC 3745-51-20 through 3745-51-24 (Subpart C of 40 CFR Part 261), by either (a) testing the waste using appropriate methods, or (b) applying knowledge of the hazardous characteristic of the waste in light of the materials or processes used ("process knowledge").				Per the RODs, pertinent only to the following areas: In OU2: approx. 300 cubic yards of lead-containing soil in the South Field Firing Range. In OU5: 1) Abandoned sump west of Pilot Plant; 2) Area between KC-2 Warehouse and RR tracks; 3) Trap Range; 4) Paddy's Run streambank fill materials west of OU4's Silos 1-4; 5) Scrap Metal Pile area; and 6) Area north of maintenance building.	Sections 7.4 (@ p. 7-5), 9.1 (@ p. 9-2), and 10.2.2 (@ p. 10-4) of the OU2 ROD; Section 9.1.1 (@ p. 9-6) and Table 9-1 of the OU5 ROD
Interim [Status Hazardous Waste Facility] Standards —General Provisions, General Provisions OAC 3745-65-13 through -16 [Interim Status Hazardous Waste Facility Standards, Subpart B—General Facility Standards 40 CFR §§265.13 through .16]	Owners/operators of a facility must obtain chemical and physical analyses of a representative sample of each hazardous or nonhazardous waste to be treated, stored or disposed of at the facility prior to treatment, storage or disposal. At a minimum, the analysis must contain all the information which must be known to treat, store or dispose of the waste, and may include using existing published or documented data on the waste or on waste generated from similar processes ("process knowledge") [OAC 3745-65-13].	✓	R&A	R&A	Pertinent to management of hazardous waste.	Following sections of the Sitewide Excavation Plan: 3.3.2 Impacted Materials Handling and Tracking 4.0 Location-Specific Excavation Approaches F.5 Excavated Material Management
	The facility owner/operator must prevent the unknowing entry, and minimize the possibility of unauthorized entry, to the active portion of the facility unless certain conditions apply [OAC 3745-65-14].				Controls which limit access to the FEMP will remain in place throughout remediation activities.	F.2.1 Establishing Excavation Boundaries and Access Controls

DEFINITIONS & GENERAL FACILITY STANDARDS, continued

000197

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	The facility operator must maintain and inspect all monitoring equipment, safety and emergency equipment, security devices, and operating and structural equipment that are important to preventing human health hazards. The frequency of inspection may vary by item, and should be based on the rate of possible deterioration of the equipment/item and the probability of an environmental or human health incident if the deterioration, malfunction, or operator error goes undetected [OAC 3745-65-15]. The facility operator must train personnel for procedures relevant to the positions in which they are employed [OAC 3745-65-16].					F.8 Remediation Maintenance Activities
Hazardous Waste Facility Environmental Impact ORC 3734.05(D)(6)(c)	A hazardous waste facility installation and operation permit shall not be approved unless it is proven that the facility represents the minimum adverse environmental impact, considering the state of available technology, the nature and economics of various alternatives and other pertinent considerations	✓	Appl	✓	NOTE: Incorrectly cited in RODs as OAC 3745.05(D)(6)(c).	Appendix H of OU2 FS, Appendix J of OU5 FS, and Appendix J of OU3 RI/FS.
Hazardous Waste Facility Minimum Risk ORC 3734.05(D)(6)(d)	A hazardous waste facility installation and operation permit shall not be approved unless it is proven that the facility represents the minimum risk of all the following: 1) contamination of groundwater and surface water; 2) fires or explosions from treatment, storage, or disposal methods; 3) accidents during transportation; 4) impact to public health and safety; 5) air pollution; and 6) soil contamination.	✓	Appl	✓	NOTE: Incorrectly cited in RODs as OAC 3745.05(D)(6)(d).	OU2, OU5, and OU3 FS Reports and RODs. Also, see preceding.
Interim [Status Hazardous Waste Facility] Standards—General Provisions, Preparedness and Prevention OAC 3745-65-31 through -35, and -37 [Interim Status Hazardous Waste Facility Standards, Subpart C—Preparedness and Prevention 40 CFR §§265.31 through .35, and .37]	TSD facility operators must design, construct, maintain and operate facilities to minimize the possibility of fire, explosion or any unplanned sudden or non-sudden release of hazardous waste to air, soil, or surface water which might threaten human health or the environment.	✓	R&A	R&A		See two preceding entries. For waste that is dispositioned for off-site disposal, see the Operable Unit 1 Design Criteria Package.

000198

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Interim [Status Hazardous Waste Facility] Standards—General Provisions, Contingency Plan and Emergency Procedures OAC 3745-65-51, -52, -55 and -56 [Interim Status Hazardous Waste Facility Standards, Subpart D—Contingency Plan and Emergency Procedures 40 CFR §265.51, .52, .55 and .56]	Each facility operator must have a contingency plan designed to minimize hazards to human health and the environment due to fires, explosions, or any unplanned releases of hazardous waste constituents to air, soil or surface/groundwater.	✓	R&A	R&A	Pertinent to on-site facilities that treat, store, or dispose of hazardous waste.	FEMP Emergency Plan (PL-3020); all HWMUs identified in Table 2-1 of the Sitewide Excavation Plan (and the subset identified previously in this table) are addressed in Section G: Contingency Plan of the RCRA Part B Permit Application. Also, see three preceding entries. For waste that is dispositioned for off-site disposal, see the Operable Unit 1 Design Criteria Package.
Hazardous Waste Incinerators [and Miscellaneous Units], Environmental Performance Standards OAC 3745-57-91 and -92 [Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, Subpart X—Miscellaneous Units, 40 CFR §§264.601 through .603]	Prevention of any release that may have adverse effects on human health or the environment includes, but is not limited to: A. Migration of waste constituents in the groundwater or subsurface environment. B. Migration of waste constituents in surface water, or wetlands or on the soil surface. C. Migration of waste constituents in the air. Monitoring, tests, analytical data, inspections, response, and reporting procedures and frequencies must ensure compliance with pertinent portions of the OAC.	✓	R&A	✓	Pertinent to on-site facilities that treat, store, or dispose of hazardous waste in miscellaneous units unless the CAMU Rule is applied.	See preceding.

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(d)	Low-level waste shall be characterized with sufficient accuracy to permit proper segregation, treatment, storage, and disposal. This characterization shall ensure that, upon generation after processing, the actual physical and chemical characteristics and major radionuclide content are recorded and known during all stages of the waste management process. Waste characterization data shall be recorded on a waste manifest and shall include: • the physical and chemical characteristics of the waste; • volume of the waste (total of waste and any solidification or absorbent media); • weight of the waste (total of waste and any solidification or absorbent media); • major radionuclides and their concentrations; and • packaging date, package weight, and external volume.	TBC	√	TBC	The CERCLA RI/FS process established the nature and extent of contamination at the FEMP. During excavation, monitoring will be performed in accordance with of the Sitewide Excavation Plan and individual IRDPs, and results will be documented in order to determine if impacted material meets the OSDF WACs or offsite WACs. These sources of characterization information (RI/FS sampling, pre-design investigations, FRL attainment, WAC attainment) will provide the required manifest information.	Addressed throughout the CERCLA RI/FS and selection of remedy process, culminated in the OU2, OU5 and OU3 RODs; OSDF Impacted Materials Placement Plan; following section of the Sitewide Excavation Plan: 3.3.2 Impacted Materials Handling and Tracking

000200

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	DEFINITIONS & GENERAL FACILITY STANDARDS, continued					
Waste Treatment DOE Order 5820.2A Chapter III (3)(f)	Waste treatment techniques such as incineration, shredding, and compaction to reduce volume and provide more stable waste forms shall be implemented as necessary to meet performance requirements. Use of waste treatment techniques to increase the life of the disposal facility and improve the long-term facility performance, by improved site stability and reduction of infiltrating water, is required to the extent it is cost effective. The development of large scale waste treatment facilities shall be supported by the appropriate National Environmental Policy Act documentation. Operation of waste treatment facilities shall be supported by adequate documentation.	TBC	TBC	TBC	Based upon CERCLA RI/FS data, the majority of the impacted material from OU2, OU5 & OU3 will meet the OSDF WACs and thus the performance objectives of the OSDF & DOE Order 5820.2A without treatment. This has been demonstrated through the modeling performed in the FSs to establish the OSDF WACs. Two categories of impacted materials may need to be treated before disposal. Toxicity characteristic soil from seven areas will be quantified & treated to the extent necessary to remove the toxicity characteristic that cause them to be regulated as hazardous. Physical sizing & treatment as per the OSDF Impacted Material Placement Plan will be conducted as needed on debris for proper waste placement and stability within the OSDF. Some physical treatment might also be necessary for the sludge from the OU2 Lime Sludge Ponds to decrease the moisture content before placement into the OSDF.	Addressed throughout the CERCLA RI/FS and selection of remedy process, culminated in the OU2, OU5 and OU3 RODs; OSDF Impacted Materials Placement Plan; following sections of the Sitewide Excavation Plan: 1.3.2.7 RCRA Characteristic Waste Disposal 2.1.1.3 Toxicity Characteristic Hazardous Wastes 3.3.2 Impacted Materials Handling and Tracking F.5 Excavated Material Management

000201

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	DEFINITIONS & GENERAL FACILITY STANDARDS, continued					
Radioactive Waste Management DOE Order 5820.2A Chapter III (3)(g)	The volume of waste and number of shipments of low-level wastes shall be minimized and the shipments will be conducted based on plans developed by field organizations. Generators shall provide an annual forecast in the third quarter of the fiscal year to the field organizations managing the off-site disposal facility to which the waste is to be shipped. Generators must receive advance approval from the receiving facility and shall certify prior to shipment that waste meets the receiving facility waste acceptance criteria. The certification program shall be auditable and able to withstand independent review.	TBC	TBC	TBC	The volume of impacted material to be disposed onsite in the OSDF will be minimized through a number of programs. First, extensive sampling has been performed during the CERCLA RI/FS process and the extent of excavation has been established using this data. Combined with the sampling/monitoring that will be performed during excavation in accordance with Section 3.3 of the Sitewide Excavation Plan and individual IRDPs, this will confirm that only impacted materials are excavated and sent to disposal. Compliance with the FEMP Pollution Prevention and Waste Minimization Awareness Plan will minimize the amount of low-level waste (i.e., equipment and personal protective equipment) generated during remediation.	FEMP Pollution Prevention and Waste Minimization Awareness Plan; also see preceding.
Control of Residual Radioactive Material DOE Order 5400.5 Chapter IV (6)(b) 10 CFR Part 834 (PROPOSED)	Interim storage must provide: 1) Control and stabilization features shall be designed to provide, to the extent reasonably achievable, an effective life of 50 years with a minimum life of at least 25 years.	√	TBC		The selected remedies are for a permanent remedy, not for interim storage; any short-term management of impacted material to be employed is to facilitate implementation of the permanent remedy.	The approved selected remedy in the OU2 and OU5 RODs, associated remedial design documents (i.e., IRDPs).
	2) Controls shall be designed such that radon-222 concentrations in the atmosphere above facility surfaces or openings in addition to background levels, will not exceed: (a) 100 pCi/L at any given point; (b) An annual average concentration of 30 pCi/L over the facility site; and (c) An annual average concentration of 3 pCi/L at or above any location outside the facility site. (d) Flux rates from the storage of radon producing wastes shall not exceed 20 pCi/m²/sec, as required by 40 CFR Part 61.					

000202

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	3) Controls shall be designed such that concentrations of radionuclides in the groundwater and quantities of residual radioactive material will not exceed applicable federal or state standards.					Section 5.0 of the Sitewide Excavation Plan, for environmental controls to be implemented during remediation.
	4) Access to a property and use of on-site material contaminated by residual radioactive material should be controlled through appropriate administrative and physical controls such as those described in 40 CFR Part 192. These control features should be designed to provide, to the extent reasonable, an effective life of at least 25 years.					Section 3.0 and Appendix F of the Sitewide Excavation Plan and IRDPs, for access controls to be implemented during remediation.

000203

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	MANAGEMENT OF LOW-LEVEL RADIOACTIVE MATERIAL					
Low-level Radioactive Waste Generation DOE Order 5820.2A Chapter III (3)(c)	Technical and administrative controls shall be directed to reducing the gross volume of waste generated and/or the amount of radioactivity requiring disposal. Waste reduction efforts shall include consideration of process modification, process optimization, materials substitution, and decontamination. All DOE low-level waste generators shall establish auditable programs to assure that the amount of low-level waste generated and/or shipped for disposal is minimized. Each DOE low-level waste generator shall separate uncontaminated waste from low-level waste to facilitate cost-effective treatment and disposal. Each DOE low-level waste generator preparing a design for a new process or process change shall incorporate principles into the design that will minimize the generation of low-level waste.	TBC	TBC	TBC	Implementation of the FEMP Pollution Prevention and Waste Minimization Awareness Plan will confirm that all newly generated waste is minimized during remediation. Additionally, excavation controls such as rapid test methodology and additional laboratory sampling will be implemented to confirm that only impacted material with contamination that is potentially above the FRLs is being excavated and sent to disposal. Physical sampling of the impacted materials and/or rapid test method methodology will also confirm that only material that exceeds the OSDF WAC is sent offsite for disposal.	Addressed throughout the CERCLA RI/FS and selection of remedy process, culminated in the OU2, OU5 and OU3 RODs; also, FEMP Pollution Prevention and Waste Minimization Awareness Plan.

000204

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	MANAGEMENT OF HAZARDOUS REMEDIATION WASTE					
Identification and Listing of Hazardous Waste, Residues of Hazardous Waste in Empty Containers OAC 3745-51-07(A) &(B) [Identification and Listing of Hazardous Waste, Subpart A—General, Residues of Hazardous Waste in Empty Containers 40 CFR §261.7]	Any hazardous waste remaining in either an empty container or an inner liner removed from an empty container is not subject to regulation under 40 CFR Parts 261 through 265 (RCRA requirements). A container is empty if: 1) All wastes have been removed that can be removed using the practices commonly employed to remove materials from that type of container (e.g., pouring, pumping, and aspirating); and 2) No more than 2.5 cm (1 inch) of residue remains on bottom of the container or inner liner; or 3) No more than 3 percent by weight of the total capacity of the container remains in the container or inner liner if the container is less than or equal to 110 gal. in size, or no more than 0.3 percent by weight of the total capacity of the container remains in the container or inner liner if the container is greater than 110 gal. in size.	√	R&A	Appl	Pertinent when containerizing: soil contaminated by RCRA waste; any treatment residues exhibiting RCRA characteristics including soil decontamination residues.	Following sections of the Sitewide Excavation Plan: 2.5.8 Special Materials 3.3.2.2 Special Materials App F Implementation of Construction

000205

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
MANAGEMENT OF HAZARDOUS REMEDIATION WASTE, continued						
Closure and Post-Closure Under Interim Standards, Condition of Containers OAC 3745-66-71 Compatibility of Containers OAC 3745-66-72 Management of Containers OAC 3745-66-73 Inspections OAC 3745-66-74 Special Requirements for Ignitable or Reactive Waste OAC 3745-66-76 Special Requirements for Incompatible Wastes OAC 3745-66-77 [Interim Status Standards, Subpart I—Use & Management of Containers, 40 CFR §§265.171 through .174, .176 and .177]	If a container holding hazardous waste is not in good condition (e.g., severe rusting, apparent structural defects) or begins to leak, the owner or operator must transfer the hazardous waste from this container to a container that is in good condition or manage the waste in some other way that complies with this requirement.	√	R&A	Appl	Pertinent to handling containers holding environmental media contaminated with RCRA waste.	See preceding.

000206

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
[New Facilities] Corrective Action, Closure and Post-Closure Requirements Containment OAC 3745-55-75 [Interim Status Hazardous Waste Facility Standards, Subpart I—Use & Management of Containers 40 CFR §§265.175(a) through (c)]	A containment system for RCRA container storage areas must be designed and operated to provide: 1) A sufficiently impervious base, which is sloped to collect any leaking liquids. 2) Sufficient capacity to contain liquids. 3) Prevention of run-on into the containment system. 4) A sump to prevent overflow of the collection system. Storage areas for containers holding only wastes that do not contain free liquids need not have a containment system, provided that: 1) The storage area is sloped or is otherwise designed and operated to drain and remove liquid resulting from precipitation, or 2) The containers are elevated or are otherwise protected from contact with accumulated liquid.	✓	R&A	Appl	Pertinent to handling soil contaminated with RCRA listed or characteristic hazardous waste. A Part B Permit Application for RCRA storage has been submitted to the OEPA.	See preceding.
[New Facilities] Surface Impoundments, Waste Piles, and Tanks [Waste Piles] Design and Operating Requirements OAC 3745-56-51(A) through (F)	A waste pile used to store or treat hazardous waste must have: 1) A liner that is designed, constructed, and installed to prevent any migration of waste out of the pile into the adjacent subsurface soil or groundwater or surface water at any time during the active life (including the closure period) of the waste pile, and 2) A leachate collection and removal system immediately above the liner that is designed, constructed, maintained, and operated to collect and remove leachate from the pile.	✓	R&A	✓	Pertinent to on-site hazardous waste piles used for longer than 90 days unless the CAMU Rule is applied.	Addressed through remedial design documents (IRDPs).
	The owner/operator must design, construct, operate, and maintain a run-on control system capable of preventing flow onto the active portion of the pile during peak discharge from at least a 25-yr storm and manage a runoff management system to collect and control at least the water volume resulting from a 24-hr, 25-yr storm.	✓	R&A	✓		
	If the pile contains any particulate matter which may be subject to wind dispersal, the owner or operator must cover or otherwise manage the pile to control wind dispersal.	✓	R&A	✓		FEMP Fugitive Dust Control BAT Determination, and Section 5.1.2.2 and Appendix F of the Sitewide Excavation Plan

000207

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
MANAGEMENT OF HAZARDOUS REMEDIATION WASTES, continued						
Monitoring and Inspection OAC 3745-56-54(A) and (B)	During construction or installation, liners and cover systems must be inspected for uniformity, damage, and imperfections.	✓	R&A	✓		
	Collection and holding facilities associated with run-on and runoff control system must be inspected weekly and be emptied or otherwise managed expeditiously after storms to maintain design capacity of the system.	✓	R&A	✓		FEMP Stormwater Pollution Prevention Plan (RM-0039), and Appendix F of the Sitewide Excavation Plan
Special Requirements for Ignitable or Reactive Waste OAC 3745-56-56(A) and (B) Special Requirements for Incompatible Wastes OAC 3745-56-57(A), (B) and (C) [Subpart L—Waste Piles, 40 CFR §§264.251 through .259]	Ignitable, reactive, or incompatible waste must not be added to a waste pile, unless specified in OAC 3745-56-56(A) and (B) or 57(A), (B) and (C).	✓	R&A	✓	The CERCLA RIs did not find evidence of ignitive or reactive material on-site. Impacted and non-impacted materials management will be segregated and managed in separate piles, based upon intended disposition (waste acceptance criteria).	Following sections of the Sitewide Excavation Plan: 3.3.2 Impacted Materials Handling and Tracking 4.0 Location-Specific Excavation Approaches F.5 Excavated Material Management
Temporary Units Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, Subpart S- 40 CFR §264.553 (a), (b) (58 FR 865829, February 16, 1993)	For temporary tanks and container storage areas used for treatment or storage of remediation wastes during remedial activities, the Regional Administrator may determine that a design, operating, or closure standard applicable to such units may be replaced by alternative requirements which are protective of human health and the environment. Any temporary unit to which alternative requirements are applied shall be: • located within the facility boundary; and • used solely for treatment or storage of remediation wastes.	R&A	✓	R&A	Pertinent to short-term management/storage of impacted materials during the CERCLA soil remediation activities. IRDPs can designate and utilize temporary units to facilitate remediation within the already designated CAMU. Alternative requirements which are protective of human health and the environment may be used in lieu of the design, operating, or closure requirements that would otherwise apply to such units under RCRA.	Following section of the Sitewide Excavation Plan: 1.3.2.6 CAMU Rule

000208

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, Subpart DD—Containment Building 40 CFR §§264.1100 through .1102 57 FR 37194 (August 18, 1992)	The owner or operator is not subject to the definition of land disposal in RCRA Section 3004(k) provided that the unit: 1) Is a completely enclosed, self-supporting structure that is designed and constructed of synthetic materials of sufficient strength and thickness to support themselves, the waste contents, and any personnel and heavy equipment that operate within the unit, and to prevent failure due to pressure gradients, settlement, compression, or uplift, physical contact with the hazardous wastes to which they are exposed, climatic conditions, and the stresses of daily operation, including the movement of heavy equipment within the unit and contact of such equipment with containment walls; 2) Has a primary barrier for management of solids, in addition to a liquid collection system and secondary containment for management of liquids. 3) Has controls sufficient to prevent fugitive dust emissions to meet the no visible emission standard in Sec. 264.1101(c)(1)(iv); and 4) Is designed and operated to ensure containment and prevent the tracking of materials from the unit by personnel or equipment. At closure, the owner or operator must remove or decontaminate all waste residues, contaminated containment system components, contaminated subsoil, and structures and equipment contaminated with waste and leachate, and handle them as a hazardous waste.	✓	R&A	R&A	Pertinent to excavated RCRA hazardous soil and sediment that may require short-term management/ storage during the CERCLA soil remediation activities. DOE does not anticipate utilizing containment buildings.	Following sections of the Sitewide Excavation Plan: 3.3.2 Impacted Materials Handling and Tracking 4.0 Location-Specific Excavation Approaches F.5 Excavated Material Management

002009

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	MANAGEMENT OF HAZARDOUS REMEDIATION WASTE, continued					
Procedures for Planning and Implementing Offsite Response Actions ("The CERCLA Offsite Rule") 40 CFR §300.400	Materials from remediation of a CERCLA site ("CERCLA waste") may only be transferred to offsite facilities that are in compliance with Resource Conservation and Recovery Act (RCRA), Toxic Substances Control Act (TSCA), or other applicable federal and state requirements. Only U.S. EPA has the authority to determine whether the facility in question meets the acceptability criteria and is acceptable for receiving CERCLA waste from offsite. A determination of acceptability for a potential receiving facility is to be made in advance (prior to initiating transportation offsite, and optimally prior to making offsite treatment/ storage/disposal contract arrangements). Materials covered under this rule ("CERCLA waste") are any hazardous substance, pollutant, or contaminant as defined under CERCLA sections 101(14) and 101(33). Samples of waste sent to a laboratory for characterization are exempt from the rule, as are certain treatability study waste. The receiving facility must meet compliance and release criteria presented therein. Facility is defined as the receiving unit(s) that directly stores, treats, or disposes of the CERCLA waste. Non-receiving units at the facility need not be in compliance in order for the U.S. EPA to determine that the receiving unit meets acceptance criteria. U.S. EPA may deem a facility acceptable even if certain minor violations have occurred at the facility. If a facility does not meet the criteria for receiving CERCLA wastes, the rule presents notification, determination, appeal/review and reinstatement procedures.	✓	✓	Appl	Pertinent to preparation of materials for off-site disposition.	Operable Unit 1 Design Criteria Package, and following sections of the Sitewide Excavation Plan: 2.5.10 Off-Site Shipments F.5.2 Off-Site Disposal
[Hazardous Waste] Generator Standards OAC 3745-52-20 through -23, and -30 through -33 [40 CFR §§262.20 through .23, and .30 through .33]	Before transporting hazardous waste or offering hazardous waste for transportation off-site ("pre-transport"), for either treatment or disposal, general requirements for the generator require a manifest [OAC 3745-52-20 through -23] in accordance with the requirements specified therein. Pre-transport requirements also include appropriate packaging [OAC 3745-52-30], labeling [OAC 3745-52-31], marking [OAC 3745-52-32], and placarding [OAC 3745-52-33], in accordance with the requirements specified therein.	✓	Appl	Appl	Pertinent to preparation of RCRA hazardous waste (and mixed waste) for off-site treatment and/or disposal.	See preceding.

000210

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Implementation of the United Nations Recommendations, International Maritime Dangerous Goods Code, and the International Civil Aviation Organization's Technical Instructions 59 FR 67390 (December 29, 1994) as amended by 60 FR 26796 (May 18, 1995)	These rules (final rule was effective October 1, 1995) comprehensively revise the Hazardous Materials Regulations (HMR), 49 CFR Parts 171-173, 177, and 178, with respect to hazard communication, classification, and packaging requirements based on United Nations recommendations.	✓	✓	Appl	These Hazardous Materials Regulations are requirements embedded in both the state (OAC) and federal (CFR) regulations in both the generator standards (preceding entry) and the transporter standards (subsequent entry).	See preceding generator standards entry and subsequent transporter standards entry.
[Hazardous Waste] Land Disposal Restrictions OAC 3745-59 [Land Disposal Restrictions, Subpart D—Treatment Standards 40 CFR §§268.40 through .44]	A restricted hazardous waste may be land disposed only if: 1) An extract of the waste or of the treatment residue of the waste does not exceed the value shown in 40 CFR §268.41. 2) It is treated using a technology specified in 40 CFR §268.42(a) or an equivalent treatment method. 3) The constituent concentrations in the waste or treatment residue of the waste do not exceed the value shown in 40 CFR §268.43.	✓	Appl	Appl	Not applicable to on-property disposal within a CAMU under the CAMU Rule as invoked under the OU5 ROD. Applicable to those RCRA hazardous wastes that will be dispositioned off site.	See three preceding entries.
Land Disposal Restrictions, Subpart D—Treatment Standards, Treatment Standards Expressed as Concentrations in Waste Extract 40 CFR §268.41	The maximum concentration of lead (5.0 mg/L) may not be exceeded whether it is the extract of a waste or waste treatment residual.	R&A	Appl		Not applicable to on-property disposal within a CAMU under the CAMU Rule as invoked under the OU5 ROD. Applicable to those RCRA hazardous wastes that will be disposed of off-site.	See four preceding entries.

000211

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	MANAGEMENT OF HAZARDOUS REMEDIATION WASTE, continued					
Land Disposal Restrictions, Subpart D—Treatment Standards, Contaminated Debris 40 CFR §268.45	Hazardous debris must be treated before land disposal unless the EPA determines that the debris is no longer contaminated with hazardous waste or the debris is treated to the waste-specific treatment standard for the waste contaminating the debris. Provided the debris does not exhibit a RCRA characteristic it is not subject to regulation under 40 CFR 260, 261 to 266, 268, or 270 if: 1) The hazardous debris has been treated using one of the required extraction or destruction technologies specified in 40 CFR §268.45; or 2) The debris, considering the extent of contamination, is determined to no longer be contaminated with hazardous waste.	✓	Appl	Appl	Not applicable to on-property disposal within a CAMU under the CAMU Rule as invoked under the OU5 ROD. Applicable to those RCRA hazardous wastes that will be disposed of off-site.	See five preceding entries.
[Hazardous Waste] Transporter Standards OAC 3745-53-20 through -22, -30 and -31 [40 CFR §§263.20 through .22, .30 and .31]	General requirements for the transporter during transportation of hazardous waste for off-site treatment and/or disposal require acceptance and handling of hazardous waste and use of the manifest system [OAC 3745-53-20], compliance with the manifest [OAC 3745-53-21], and recordkeeping [OAC 3745-53-22], in accordance with the requirements specified therein. Appropriate response actions must be taken for any hazardous waste discharge during transportation [OAC 3745-53-30 and -31], in accordance with the requirements specified therein.	✓	Appl	Appl	Pertinent to transportation of RCRA hazardous wastes for off-site treatment and/or disposal.	See six preceding entries.

000212

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	MANAGEMENT OF PCB-TAINTED MATERIAL					
Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution In Commerce, And Use Prohibitions, Subpart D—Storage and Disposal, Disposal Requirements 40 CFR §761.60(a)(4)	Any nonliquid PCBs at concentrations 50 mg/kg or greater in the form of contaminated soil, rags, or other debris shall be disposed of in an incinerator which complies with 40 CFR §761.70, or in a chemical waste landfill which complies with 40 CFR §761.75.		Appl	Appl	Pertinent if soil or other material containing PCBs above 50 mg/kg is excavated. PCBs were detected in soil beneath the Fire Training Facility.	Following sections of the Sitewide Excavation Plan: 3.3.2 Impacted Materials Handling and Tracking 4.0 Location-Specific Excavation Approaches F.5 Excavated Material Management
Subpart D—[PCB] Storage and Disposal, Disposal Requirements 40 CFR §761.60(e)	Any person who is required to incinerate PCBs or PCB items under this subpart and who can demonstrate that an alternate method of destroying PCBs or PCB items can achieve a level of performance equivalent to the requirements under 40 CFR §761.70 may submit a written request to either the Regional Administrator or the Director, Exposure Evaluation Division, for an exemption from the incineration requirements of 40 CFR §§ 761.70 or 761.60. The applicant must show that the alternate method of destroying PCBs will not present an unreasonable risk of injury to health or the environment.		Appl	Appl	Pertinent only if PCB contaminated soil is greater than 50 mg/kg and is treated on-property using a method besides incineration. DOE neither currently anticipates any such material nor on-property treatment for any such material under the soil remediation projects.	See preceding entry, plus following sections of the Sitewide Excavation Plan: 2.5.10 Off-Site Shipments F.5.2 Off-Site Disposal
Subpart D—[PCB] Storage and Disposal, Storage for Disposal 40 CFR §761.65	This section applies to the design of storage areas to be used for later disposal of PCBs at concentrations of 50 ppm (mg/kg or mg/L) or greater.		Appl	Appl	Pertinent to storage of PCB-contaminated material at 50 ppm or greater. DOE does not currently anticipate any such material under the soil remediation projects.	See two preceding entries.

000213

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
POST-CLOSURE						
	DESCRIPTION OF POST-CLOSURE CARE					
[New Facilities Hazardous Waste] Surface Impoundments, Waste Piles, and Tanks, [Waste Piles] Post-Closure OAC 3745-56-58(B) [Subpart L—Waste Piles, 40 CFR §§264.251 through .259]	If, after removing or decontaminating all residues and making all reasonable effort to effect removal or decontamination of contaminated components, subsoil, structures and equipment, the owner/operator finds that not all contaminated subsoil can be practically removed or decontaminated, he must close the unit/facility and perform post-closure care in accordance with OAC 3745-57-10. NOTE: If clean (or risk-based) closure is performed, then post-closure care is not required.	✓	R&A		Only pertinent to those units where risk-based FRLs are not met. DOE intends, and anticipates being able, to clean (risk-based) close all identified HWMUs.	Currently addressed in the OSDF Post-closure Care and Inspection Plan, which notes in its Prologue that it can be revised at a later date to expand the scope of coverage to encompass the entire FEMP site as needed. Will also be addressed in the Certification Report and Remedial Action Report — see following sections of the Sitewide Excavation Plan: 1.4.2 Related Documents 2.2.5 HWMU Closure 3.4.7 Certification Report 3.5.3.6 Postremediation/post-closure Care and Inspection 7.4 Certification Report 7.5 Other Related Future Documents
[New Facilities Hazardous Waste] Incinerators [and Miscellaneous Units], [Miscellaneous Units] Environmental Performance Standards OAC 3745-57-93 [Subpart X—Miscellaneous Units, 40 CFR §§264.601 through .603]	If a treatment or storage miscellaneous unit has contaminated soil or groundwater that cannot be completely removed or decontaminated during closure, the unit must also meet the requirements of OAC 3745-57-91 during the post-closure care period. The post-closure plan under OAC 3745-55-18 must specify the procedures that will be used to satisfy this requirement. A miscellaneous unit that is a disposal unit must be maintained in a manner that complies with OAC 3745-57-91 during the post-closure care period. NOTE: If clean (or risk-based) closure is performed, then post-closure care is not required.	✓	R&A		Only pertinent to those units where risk-based FRLs are not met. DOE intends, and anticipates being able, to clean (risk-based) close all identified HWMUs.	See preceding.

000214

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Closure and Post-Closure Under Interim Standards, Post-closure Care and Use of Property OAC 3745-66-17(A) [40 CFR §265.117(a)(2)]	Post-closure care of hazardous waste management units must begin after completion of closure of the unit and continue for 30 years after that date unless shortened by the Director [of the OEPA, a.k.a. the Ohio Director of Environmental Protection] in accordance with OAC 3745-66-18(G) (40 CFR §117(a)(2)). NOTE: If clean (or risk-based) closure is performed, then post-closure care is not required.	✓	Appl		NOTE: Identified in the OU5 ROD as applicable only to existing hazardous waste management units (HWMUs); also cited in RCRA/CERCLA Integrated Closure DF&O @ V.1. Only pertinent to those units where risk-based FRLs are not met. DOE intends, and anticipates being able, to clean (risk-based) close all identified HWMUs.	See preceding.
Closure and Post-Closure Under Interim Standards, Post-closure Care and Use of Property OAC 3745-66-17(A)(1) [40 CFR §265.117(a)(1)]	Post-closure care...must consist of at least the following: • monitoring and reporting; and • maintenance and monitoring of waste containment systems. NOTE: If clean (or risk-based) closure is performed, then post-closure care is not required.	✓	✓	✓	Cited in the RCRA/CERCLA Integrated Closure DF&O @ V.1. Only pertinent to those units where risk-based FRLs are not met. DOE intends, and anticipates being able, to clean (risk-based) close all identified HWMUs.	See preceding.

000215

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	DESCRIPTION OF POST-CLOSURE CARE, continued					
Closure and Post-Closure Under Interim Standards, Post-closure Plan; Amendment of Plan OAC 3745-66-18(A)&(C)	The owner of a hazardous waste disposal unit shall have a written post-closure plan, which shall identify the activities that will be carried on after closure of each unit and the frequency of those activities, and include at least: • a description of the planned monitoring activities and frequencies at which they will be performed; • a description of the planned maintenance activities and frequencies at which they will be performed, to ensure (a) the integrity of the cap and final cover or other containment systems, and (b) the functioning of the monitoring equipment; and • the name, address and telephone number of the person or office to contact about the hazardous waste disposal unit or facility during the post-closure period. NOTE: If clean (or risk-based) closure is performed, then post-closure care is not required.	✓	✓	✓	Cited in the RCRA/CERCLA Integrated Closure DF&O @ V.1. Only pertinent to those units where risk-based FRLs are not met. DOE intends, and anticipates being able, to clean (risk-based) close all identified HWMUs.	See preceding.
	MODIFICATIONS TO POST-CLOSURE CARE PLAN OR PERIOD					
Closure and Post-Closure Under Interim Standards, Post-closure Plan; Amendment of Plan OAC 3745-66-18(D)	The owner may amend the post-closure plan any time during the active life of the facility or during the post-closure period. NOTE: If clean (or risk-based) closure is performed, then post-closure care is not required.	✓	✓	✓	Cited in the RCRA/CERCLA Integrated Closure DF&O @ V.1. Only pertinent to those units where risk-based FRLs are not met. DOE intends, and anticipates being able, to clean (risk-based) close all identified HWMUs.	See preceding.
Closure and Post-Closure Under Interim Standards, Post-closure Plan; Amendment of Plan OAC 3745-66-18(G)	The post-closure plan and length of the post-closure period may be modified any time prior to the end of the post-closure care period. A modification of the post-closure plan may include, where appropriate, the temporary suspension rather than permanent deletion of one or more post-closure care requirements. At the end of the specified period of suspension, the Director [of the OEPA, a.k.a. the Ohio Director of Environmental Protection] would then determine whether the requirements should be permanently discontinued or reinstated to prevent threats to human health and the environment. NOTE: If clean (or risk-based) closure is performed, then post-closure care is not required.	✓	✓	✓	Cited in the RCRA/CERCLA Integrated Closure DF&O @ V.1. Only pertinent to those units where risk-based FRLs are not met. DOE intends, and anticipates being able, to clean (risk-based) close all identified HWMUs.	See preceding.

000216

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	PROPERTY USE RESTRICTIONS					
Closure and Post-Closure Under Interim Standards, Post-closure Care and Use of Property OAC 3745-66-17© [40 CFR §265.117(c)]	Post-closure use of property on or in which hazardous waste remain after partial or final closure must never be allowed to disturb the integrity of the final cover, liner(s), or any other component of the containment system, or the function of the facility's monitoring systems, unless the Director [of the OEPA, a.k.a. the Ohio Director of Environmental Protection] approves otherwise. NOTE: If clean (or risk-based) closure is performed, then post-closure care is not required.	✓	Appl	✓	NOTE: Identified in the OU5 ROD as applicable only to existing hazardous waste management units (HWMUs); also cited in RCRA/CERCLA Integrated Closure DF&O @ V.1. DOE intends, and anticipates being able, to clean (risk-based) close all identified HWMUs.	Currently addressed in the OSDF Post-closure Care and Inspection Plan, which notes in its Prologue that it can be revised at a later date to expand the scope of coverage to encompass the entire FEMP site as needed.
Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings Subpart A— 40 CFR §192.02(a)	Controls of residual radioactive materials from inactive uranium processing sites shall be designed to be effective for up to 1,000 years, to the extent reasonably achievable, and in any case, for at least 200 years, and provide protection of groundwater.	R&A	R&A		Most pertinent to the design and closure of the On-Site Disposal Facility.	Addressed by selected remedies of OU2 and OU5 RODs in establishment of FRLs.
Long-Term Management of Residual Radioactive Material DOE Order 5400.5 Chapter IV (6)(d) 10 CFR Part 834 (PROPOSED)	Controls of residual radioactive materials from inactive uranium processing sites shall be designed to be effective for up to 1,000 years, to the extent reasonably achievable, and in any case, for at least 200 years, and provide protection of groundwater.		TBC			Addressed by selected remedies of OU2 and OU5 RODs in establishment of FRLs.
	For long-term management of uranium, thorium, and their decay products, access to a property and use of on-site materials contaminated by residual radioactive material should be controlled through appropriate administrative and physical controls such as those described in 40 CFR 192. These controls should be designed to be effective to the extent reasonable for at least 200 years.	TBC	TBC			
Control of Residual Radioactive Material Above the Guidelines DOE Order 5400.5 Chapter IV (6)	Residual radioactive material with concentrations above the generic guidelines (see chemical-specific requirements) shall be managed in accordance with Chapter II, Requirements for Radiation Protection of the Public and the Environment, and operational and control requirements.	TBC	✓			See preceding.

000217

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
Supplemental Limits and Exceptions for Residual Radioactive Material DOE Order 5400.5 Chapter IV (7)	If special specific property circumstances indicate that the concentration guidelines or authorized limits are not appropriate, supplemental limits or an exception may be requested to those guidelines or limits.	TBC	✓			See preceding.
Release of Property DOE Order 5400.5 Chapter II (5)	Real property (land and structures), personal property, materials, and equipment shall be released if the concentration of radioactivity is within the limits of residual radioactive contamination.	TBC	✓			See preceding.
POST-CLOSURE NOTICE/SURVEY PLAT						
Closure and Post-Closure Under Interim Standards, Survey Plat OAC 3745-66-16	The owner shall submit -- to the local zoning authority, or the authority with jurisdiction over local land use, and to the Director [of the OEPA, a.k.a. the Ohio Director of Environmental Protection] -- a survey plat, prepared and certified by a professional land surveyor, indicating the location and dimensions of landfill cells or other hazardous waste disposal units with respect to permanently surveyed benchmarks. The plat must contain a note, prominently displayed, which states the owner's obligation to restrict disturbance of the hazardous waste disposal unit in accordance with OAC 3745-66-17(C).	✓	✓	✓	Cited in the RCRA/CERCLA Integrated Closure DF&O @ V.1.	Currently addressed in the OSDF Post-closure Care and Inspection Plan, which notes in its Prologue that it can be revised at a later date to expand the scope of coverage to encompass the entire FEMP site as needed.
Closure and Post-Closure Under Interim Standards, Post-closure Notices OAC 3745-66-19(A)	The owner shall submit -- to the local zoning authority, or the authority with jurisdiction over local land use, and to the Director [of the OEPA, a.k.a. the Ohio Director of Environmental Protection] -- a record of the type, location, and quantity of hazardous waste disposed of within each cell or disposal unit of the facility.	✓	✓	✓	Cited in the RCRA/CERCLA Integrated Closure DF&O @ V.1.	See preceding.

000218

4328

TABLE A-2 (Continued)
PERTINENT ARARs AND TBCs

Citation	Requirement	OU2 ROD	OU5 ROD	OU3 ROD	Remarks	Cross-Reference
	DEED NOTATION					
Closure and Post-Closure Under Interim Standards, Post-closure Notices OAC 3745-66-19(B)	The owner shall record, in accordance with state law, a notation on the deed of the facility property, or on some other instrument which is normally examined during title search, that will notify in perpetuity the potential purchasers of the property that: • the land has been used to manage hazardous wastes; • its use is restricted under the Ohio Administrative Code closure and post-closure rules; and • a survey plat and record of the type, location, and quantity of hazardous wastes disposed of within each cell or hazardous waste unit of the facility as required by OAC 3745-66-16 and OAC 3745-66-19(A) have been filed with the local zoning authority or th. the Ohio Director of Environmental Protection].	✓	✓	✓	Cited in the RCRA/CERCLA Integrated Closure DF&O @ V.1.	Currently addressed in the OSDF Post-closure Care and Inspection Plan, which notes in its Prologue that it can be revised at a later date to expand the scope of coverage to encompass the entire FEMP site as needed. Will also be addressed in the NRRP.
Closure and Post-Closure Under Interim Standards, Post-closure Notices OAC 3745-66-19©	If the owner or any subsequent owner of the land upon which a hazardous waste disposal unit was located wishes to remove hazardous wastes and hazardous waste residues in satisfaction of the criteria in OAC 3745-66-17(C), the owner may request that the Director [of the OEPA, a.k.a. the Ohio Director of Environmental Protection] approve either: • the removal of the notation on the deed to the facility property or other instrument normally examined during title search; or • the addition of a notation to the deed or instrument indicating the removal of the hazardous waste.	✓	✓	✓	Cited in the RCRA/CERCLA Integrated Closure DF&O @ V.1.	See preceding.

000219

APPENDIX B

PREDESIGN CHARACTERIZATION DATA

4828

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
12708	A2P2-PT2-12708-1-R	02/28/2000	0	1	Radium-226	1.3	pCi/g	NV	479929.42	1347228.79
12708	A2P2-PT2-12708-1-R	02/28/2000	0	1	Radium-228	1.1	pCi/g	NV	479929.42	1347228.79
12708	A2P2-PT2-12708-1-R	02/28/2000	0	1	Thorium-228	1.1	pCi/g	NV	479929.42	1347228.79
12708	A2P2-PT2-12708-1-R	02/28/2000	0	1	Thorium-232	1.1	pCi/g	NV	479929.42	1347228.79
12708	A2P2-PT2-12708-1-R	02/28/2000	0	1	Uranium, Total	6.7	ug/g	NV	479929.42	1347228.79
12708	A2P2-PT2-12708-5-R	02/28/2000	4	5	Radium-226	1.2	pCi/g	NV	479929.42	1347228.79
12708	A2P2-PT2-12708-5-R	02/28/2000	4	5	Radium-228	0.79	pCi/g	NV	479929.42	1347228.79
12708	A2P2-PT2-12708-5-R	02/28/2000	4	5	Thorium-228	0.79	pCi/g	NV	479929.42	1347228.79
12708	A2P2-PT2-12708-5-R	02/28/2000	4	5	Thorium-232	0.79	pCi/g	NV	479929.42	1347228.79
12708	A2P2-PT2-12708-5-R	02/28/2000	4	5	Uranium, Total	3.8	ug/g	UNV	479929.42	1347228.79
A2P1-NWU-36	A2P1-NWU-36-1-R	03/02/2000	0	1	Radium-226	1.5	pCi/g	NV	478018	1348363
A2P1-NWU-36	A2P1-NWU-36-1-R	03/02/2000	0	1	Radium-228	0.99	pCi/g	NV	478018	1348363
A2P1-NWU-36	A2P1-NWU-36-1-R	03/02/2000	0	1	Thorium-228	0.99	pCi/g	NV	478018	1348363
A2P1-NWU-36	A2P1-NWU-36-1-R	03/02/2000	0	1	Thorium-232	0.99	pCi/g	NV	478018	1348363
A2P1-NWU-36	A2P1-NWU-36-1-R	03/02/2000	0	1	Uranium, Total	8.2	ug/g	NV	478018	1348363
A2P1-NWU-37	A2P1-NWU-37-1-R	03/02/2000	0	1	Radium-226	1.3	pCi/g	NV	478081	1348184
A2P1-NWU-37	A2P1-NWU-37-1-R	03/02/2000	0	1	Radium-228	0.99	pCi/g	NV	478081	1348184
A2P1-NWU-37	A2P1-NWU-37-1-R	03/02/2000	0	1	Thorium-228	0.98	pCi/g	NV	478081	1348184
A2P1-NWU-37	A2P1-NWU-37-1-R	03/02/2000	0	1	Thorium-232	0.99	pCi/g	NV	478081	1348184
A2P1-NWU-37	A2P1-NWU-37-1-R	03/02/2000	0	1	Uranium, Total	16	ug/g	NV	478081	1348184
A2P1-NWU-39	A2P1-NWU-39-2-R	03/29/2000	1	2	Radium-226	0.81	pCi/g	NV	477356	1348256
A2P1-NWU-39	A2P1-NWU-39-2-R	03/29/2000	1	2	Radium-228	0.7	pCi/g	NV	477356	1348256
A2P1-NWU-39	A2P1-NWU-39-2-R	03/29/2000	1	2	Thorium-228	0.69	pCi/g	NV	477356	1348256
A2P1-NWU-39	A2P1-NWU-39-2-R	03/29/2000	1	2	Thorium-232	0.7	pCi/g	NV	477356	1348256
A2P1-NWU-39	A2P1-NWU-39-2-R	03/29/2000	1	2	Uranium, Total	2.5	ug/g	NV	477356	1348256
A2P1-NWU-49	A2P1-NWU-49-1-R	08/02/2000	0	1	Radium-226	1.5	pCi/g	NV	478143	1348188
A2P1-NWU-49	A2P1-NWU-49-1-R	08/02/2000	0	1	Radium-228	1.1	pCi/g	NV	478143	1348188
A2P1-NWU-49	A2P1-NWU-49-1-R	08/02/2000	0	1	Thorium-228	1.1	pCi/g	NV	478143	1348188
A2P1-NWU-49	A2P1-NWU-49-1-R	08/02/2000	0	1	Thorium-232	1.1	pCi/g	NV	478143	1348188
A2P1-NWU-49	A2P1-NWU-49-1-R	08/02/2000	0	1	Uranium, Total	5.4	ug/g	NV	478143	1348188
A2P1-NWU-50	A2P1-NWU-50-1-R	08/02/2000	0	1	Radium-226	1.6	pCi/g	NV	478130	1348343
A2P1-NWU-50	A2P1-NWU-50-1-R	08/02/2000	0	1	Radium-228	1.2	pCi/g	NV	478130	1348343
A2P1-NWU-50	A2P1-NWU-50-1-R	08/02/2000	0	1	Thorium-228	1.2	pCi/g	NV	478130	1348343
A2P1-NWU-50	A2P1-NWU-50-1-R	08/02/2000	0	1	Thorium-232	1.2	pCi/g	NV	478130	1348343
A2P1-NWU-50	A2P1-NWU-50-1-R	08/02/2000	0	1	Uranium, Total	3.2	ug/g	UNV	478130	1348343
A2P1-NWU-51	A2P1-NWU-51-1-R	08/02/2000	0	1	Radium-226	1.6	pCi/g	NV	478218	1348436
A2P1-NWU-51	A2P1-NWU-51-1-R	08/02/2000	0	1	Radium-228	1.3	pCi/g	NV	478218	1348436
A2P1-NWU-51	A2P1-NWU-51-1-R	08/02/2000	0	1	Thorium-228	1.3	pCi/g	NV	478218	1348436
A2P1-NWU-51	A2P1-NWU-51-1-R	08/02/2000	0	1	Thorium-232	1.3	pCi/g	NV	478218	1348436
A2P1-NWU-51	A2P1-NWU-51-1-R	08/02/2000	0	1	Uranium, Total	3.4	ug/g	NV	478218	1348436
A2P2-PT1-1	A2P2-PT1-1-1-R	03/09/2000	0	1	Radium-226	1.41	pCi/g	-	478141	1348022
A2P2-PT1-1	A2P2-PT1-1-1-R	03/09/2000	0	1	Radium-228	1.112	pCi/g	-	478141	1348022

000221

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT1-1	A2P2-PT1-1-1-R	03/09/2000	0	1	Thorium-228	1.095	pCi/g	-	478141	1348022
A2P2-PT1-1	A2P2-PT1-1-1-R	03/09/2000	0	1	Thorium-232	1.112	pCi/g	-	478141	1348022
A2P2-PT1-1	A2P2-PT1-1-1-R	03/09/2000	0	1	Uranium, Total	6.601	ug/g	-	478141	1348022
A2P2-PT1-10	A2P2-PT1-10-1-R	06/04/2002	0	1	Radium-226	1.2	pCi/g	NV	478228.25	1348017.43
A2P2-PT1-11	A2P2-PT1-11-1-R	06/04/2002	0	1	Radium-226	1.3	pCi/g	NV	478355.74	1347679.82
A2P2-PT1-12	A2P2-PT1-12-1-R	06/04/2002	0	1	Radium-226	1.4	pCi/g	NV	478357.75	1347616.47
A2P2-PT1-15	A2P2-PT1-15-1-R	06/04/2002	0	1	Radium-226	1.1	pCi/g	NV	478190.12	1348085.92
A2P2-PT1-16	A2P2-PT1-16-1-R	06/04/2002	0	1	Radium-226	1.3	pCi/g	NV	478366.89	1347601.8
A2P2-PT1-17	A2P2-PT1-17-1-R	06/04/2002	0	1	Radium-226	1.5	pCi/g	NV	478316.8	1347783.05
A2P2-PT1-18	A2P2-PT1-18-1-R	06/04/2002	0	1	Radium-226	1.4	pCi/g	NV	478348.39	1347778.96
A2P2-PT1-19	A2P2-PT1-19-1-R	06/04/2002	0	1	Radium-226	1.3	pCi/g	NV	478388.82	1347584
A2P2-PT1-2	A2P2-PT1-2-1-R	03/09/2000	0	1	Radium-226	1.498	pCi/g	-	478193	1347865
A2P2-PT1-2	A2P2-PT1-2-1-R	03/09/2000	0	1	Radium-228	1.183	pCi/g	-	478193	1347865
A2P2-PT1-2	A2P2-PT1-2-1-R	03/09/2000	0	1	Thorium-228	1.116	pCi/g	-	478193	1347865
A2P2-PT1-2	A2P2-PT1-2-1-R	03/09/2000	0	1	Thorium-232	1.183	pCi/g	-	478193	1347865
A2P2-PT1-2	A2P2-PT1-2-1-R	03/09/2000	0	1	Uranium, Total	9.913	ug/g	-	478193	1347865
A2P2-PT1-20	A2P2-PT1-20-1-R	06/04/2002	0	1	Radium-226	1.4	pCi/g	NV	478208.87	1348049.76
A2P2-PT1-3	A2P2-PT1-3-1-R	03/09/2000	0	1	Radium-226	1.46	pCi/g	-	478249	1347705
A2P2-PT1-3	A2P2-PT1-3-1-R	03/09/2000	0	1	Radium-228	1.021	pCi/g	-	478249	1347705
A2P2-PT1-3	A2P2-PT1-3-1-R	03/09/2000	0	1	Thorium-228	1.001	pCi/g	-	478249	1347705
A2P2-PT1-3	A2P2-PT1-3-1-R	03/09/2000	0	1	Thorium-232	1.021	pCi/g	-	478249	1347705
A2P2-PT1-3	A2P2-PT1-3-1-R	03/09/2000	0	1	Uranium, Total	6.086	ug/g	-	478249	1347705
A2P2-PT1-5	A2P2-PT1-5-1-R	11/05/1999	0	1	Radium-226	1.2	pCi/g	-	478227	1348105
A2P2-PT1-5	A2P2-PT1-5-1-R	11/05/1999	0	1	Radium-228	0.98	pCi/g	-	478227	1348105
A2P2-PT1-5	A2P2-PT1-5-1-R	11/05/1999	0	1	Thorium-228	0.92	pCi/g	-	478227	1348105
A2P2-PT1-5	A2P2-PT1-5-1-R	11/05/1999	0	1	Thorium-232	0.98	pCi/g	-	478227	1348105
A2P2-PT1-5	A2P2-PT1-5-1-R	11/05/1999	0	1	Uranium, Total	11	mg/kg	-	478227	1348105
A2P2-PT1-8	A2P2-PT1-8-1-R	07/25/2000	0	1	Radium-226	1.3	pCi/g	NV	478148	1348436
A2P2-PT1-8	A2P2-PT1-8-1-R	07/25/2000	0	1	Radium-228	1	pCi/g	NV	478148	1348436
A2P2-PT1-8	A2P2-PT1-8-1-R	07/25/2000	0	1	Thorium-228	1	pCi/g	NV	478148	1348436
A2P2-PT1-8	A2P2-PT1-8-1-R	07/25/2000	0	1	Thorium-232	1	pCi/g	NV	478148	1348436
A2P2-PT1-8	A2P2-PT1-8-1-R	07/25/2000	0	1	Uranium, Total	6.3	ug/g	NV	478148	1348436
A2P2-PT1-9	A2P2-PT1-9-1-R	06/04/2002	0	1	Radium-226	1.3	pCi/g	NV	478240.13	1347983.56
A2P2-PT2-1	A2P2-PT2-1-1-RM	06/14/2000	0	1	Arsenic	17.3	mg/kg	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-1-RM	06/14/2000	0	1	Radium-226	1.327	pCi/g	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-1-RM	06/14/2000	0	1	Radium-228	1.193	pCi/g	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-1-RM	06/14/2000	0	1	Thorium-228	1.177	pCi/g	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-1-RM	06/14/2000	0	1	Thorium-232	1.193	pCi/g	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-1-RM	06/14/2000	0	1	Uranium, Total	8.5	ug/g	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-2-RM	06/14/2000	1	2	Arsenic	30.4	mg/kg	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-2-RM	06/14/2000	1	2	Radium-226	1.369	pCi/g	-	479915.17	1347209.1

000222

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT2-1	A2P2-PT2-1-2-RM	06/14/2000	1	2	Radium-228	1.089	pCi/g	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-2-RM	06/14/2000	1	2	Thorium-228	1.034	pCi/g	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-2-RM	06/14/2000	1	2	Thorium-232	1.089	pCi/g	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-2-RM	06/14/2000	1	2	Uranium, Total	8.09	ug/g	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-3-RM	06/14/2000	2	3	Arsenic	26.4	mg/kg	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-3-RM	06/14/2000	2	3	Radium-226	1.403	pCi/g	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-3-RM	06/14/2000	2	3	Radium-228	1.1	pCi/g	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-3-RM	06/14/2000	2	3	Thorium-228	1.064	pCi/g	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-3-RM	06/14/2000	2	3	Thorium-232	1.1	pCi/g	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-3-RM	06/14/2000	2	3	Uranium, Total	3.248	ug/g	J	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-4-RM	06/14/2000	3	4	Arsenic	5	mg/kg	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-4-RM	06/14/2000	3	4	Radium-226	1.476	pCi/g	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-4-RM	06/14/2000	3	4	Radium-228	1.245	pCi/g	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-4-RM	06/14/2000	3	4	Thorium-228	1.219	pCi/g	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-4-RM	06/14/2000	3	4	Thorium-232	1.245	pCi/g	-	479915.17	1347209.1
A2P2-PT2-1	A2P2-PT2-1-4-RM	06/14/2000	3	4	Uranium, Total	3.236	ug/g	J	479915.17	1347209.1
A2P2-PT2-10	A2P2-PT2-10-1-R	06/26/2000	0	1	Radium-226	16	pCi/g	NV	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-1-R	06/26/2000	0	1	Radium-228	0.71	pCi/g	NV	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-1-R	06/26/2000	0	1	Thorium-228	0.69	pCi/g	NV	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-1-R	06/26/2000	0	1	Thorium-232	0.71	pCi/g	NV	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-1-R	06/26/2000	0	1	Uranium, Total	24	ug/g	NV	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-2-R	09/13/2000	1	2	Radium-226	4.078	pCi/g	-	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-2-R	09/13/2000	1	2	Radium-228	0.805	pCi/g	-	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-2-R	09/13/2000	1	2	Thorium-228	0.771	pCi/g	-	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-2-R	09/13/2000	1	2	Thorium-232	0.805	pCi/g	-	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-2-R	09/13/2000	1	2	Uranium, Total	33.922	ug/g	-	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-3-R	09/13/2000	2	3	Radium-226	1.538	pCi/g	-	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-3-R	09/13/2000	2	3	Radium-228	0.937	pCi/g	-	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-3-R	09/13/2000	2	3	Thorium-228	0.901	pCi/g	-	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-3-R	09/13/2000	2	3	Thorium-232	0.937	pCi/g	-	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-3-R	09/13/2000	2	3	Uranium, Total	36.808	ug/g	-	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-4-R	09/13/2000	3	4	Radium-226	0.931	pCi/g	-	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-4-R	09/13/2000	3	4	Radium-228	0.507	pCi/g	-	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-4-R	09/13/2000	3	4	Thorium-228	0.492	pCi/g	-	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-4-R	09/13/2000	3	4	Thorium-232	0.507	pCi/g	-	478352.82	1347136.1
A2P2-PT2-10	A2P2-PT2-10-4-R	09/13/2000	3	4	Uranium, Total	2.522	ug/g	J	478352.82	1347136.1
A2P2-PT2-10A	A2P2-PT2-10A-1-R	02/13/2001	0	1	Radium-226	1.9	pCi/g	NV	478361.34	1347130.5
A2P2-PT2-10A	A2P2-PT2-10A-1-R	02/13/2001	0	1	Radium-228	0.97	pCi/g	NV	478361.34	1347130.5
A2P2-PT2-10A	A2P2-PT2-10A-1-R	02/13/2001	0	1	Thorium-228	0.92	pCi/g	NV	478361.34	1347130.5
A2P2-PT2-10A	A2P2-PT2-10A-1-R	02/13/2001	0	1	Thorium-232	0.97	pCi/g	NV	478361.34	1347130.5
A2P2-PT2-10A	A2P2-PT2-10A-1-R	02/13/2001	0	1	Uranium, Total	18	ug/g	NV	478361.34	1347130.5

000223

4328

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT2-10A	A2P2-PT2-10A-2-R	02/13/2001	1	2	Radium-226	1.3	pCi/g	NV	478361.34	1347130.5
A2P2-PT2-10A	A2P2-PT2-10A-2-R	02/13/2001	1	2	Radium-228	1.1	pCi/g	NV	478361.34	1347130.5
A2P2-PT2-10A	A2P2-PT2-10A-2-R	02/13/2001	1	2	Thorium-228	1.1	pCi/g	NV	478361.34	1347130.5
A2P2-PT2-10A	A2P2-PT2-10A-2-R	02/13/2001	1	2	Thorium-232	1.1	pCi/g	NV	478361.34	1347130.5
A2P2-PT2-10A	A2P2-PT2-10A-2-R	02/13/2001	1	2	Uranium, Total	3.4	ug/g	NV	478361.34	1347130.5
A2P2-PT2-10A	A2P2-PT2-10A-3-R	02/13/2001	2	3	Radium-226	0.61	pCi/g	NV	478361.34	1347130.5
A2P2-PT2-10A	A2P2-PT2-10A-3-R	02/13/2001	2	3	Radium-228	0.49	pCi/g	NV	478361.34	1347130.5
A2P2-PT2-10A	A2P2-PT2-10A-3-R	02/13/2001	2	3	Thorium-228	0.47	pCi/g	NV	478361.34	1347130.5
A2P2-PT2-10A	A2P2-PT2-10A-3-R	02/13/2001	2	3	Thorium-232	0.49	pCi/g	NV	478361.34	1347130.5
A2P2-PT2-10A	A2P2-PT2-10A-3-R	02/13/2001	2	3	Uranium, Total	2.2	ug/g	UNV	478361.34	1347130.5
A2P2-PT2-10A	A2P2-PT2-10A-6-R	02/13/2001	5	6	Radium-226	0.8	pCi/g	NV	478361.34	1347130.5
A2P2-PT2-10A	A2P2-PT2-10A-6-R	02/13/2001	5	6	Radium-228	0.65	pCi/g	NV	478361.34	1347130.5
A2P2-PT2-10A	A2P2-PT2-10A-6-R	02/13/2001	5	6	Thorium-228	0.66	pCi/g	NV	478361.34	1347130.5
A2P2-PT2-10A	A2P2-PT2-10A-6-R	02/13/2001	5	6	Thorium-232	0.65	pCi/g	NV	478361.34	1347130.5
A2P2-PT2-10A	A2P2-PT2-10A-6-R	02/13/2001	5	6	Uranium, Total	3.4	ug/g	NV	478361.34	1347130.5
A2P2-PT2-10B	A2P2-PT2-10B-1-R	02/13/2001	0	1	Radium-226	2.8	pCi/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-1-R	02/13/2001	0	1	Radium-228	0.92	pCi/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-1-R	02/13/2001	0	1	Thorium-228	0.89	pCi/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-1-R	02/13/2001	0	1	Thorium-232	0.92	pCi/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-1-R	02/13/2001	0	1	Uranium, Total	37	ug/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-2-R	02/13/2001	1	2	Radium-226	1.3	pCi/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-2-R	02/13/2001	1	2	Radium-228	1.1	pCi/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-2-R	02/13/2001	1	2	Thorium-228	1.1	pCi/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-2-R	02/13/2001	1	2	Thorium-232	1.1	pCi/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-2-R	02/13/2001	1	2	Uranium, Total	6	ug/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-3-R	02/13/2001	2	3	Radium-226	1.2	pCi/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-3-R	02/13/2001	2	3	Radium-228	1	pCi/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-3-R	02/13/2001	2	3	Thorium-228	1	pCi/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-3-R	02/13/2001	2	3	Thorium-232	1	pCi/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-3-R	02/13/2001	2	3	Uranium, Total	2.7	ug/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-6-R	02/13/2001	5	6	Radium-226	0.93	pCi/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-6-R	02/13/2001	5	6	Radium-228	0.67	pCi/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-6-R	02/13/2001	5	6	Thorium-228	0.64	pCi/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-6-R	02/13/2001	5	6	Thorium-232	0.67	pCi/g	NV	478361.51	1347139.83
A2P2-PT2-10B	A2P2-PT2-10B-6-R	02/13/2001	5	6	Uranium, Total	10	ug/g	UNV	478361.51	1347139.83
A2P2-PT2-10C	A2P2-PT2-10C-1-R	02/13/2001	0	1	Radium-226	1.4	pCi/g	NV	478353.88	1347143.72
A2P2-PT2-10C	A2P2-PT2-10C-1-R	02/13/2001	0	1	Radium-228	0.89	pCi/g	NV	478353.88	1347143.72
A2P2-PT2-10C	A2P2-PT2-10C-1-R	02/13/2001	0	1	Thorium-228	0.86	pCi/g	NV	478353.88	1347143.72
A2P2-PT2-10C	A2P2-PT2-10C-1-R	02/13/2001	0	1	Thorium-232	0.89	pCi/g	NV	478353.88	1347143.72
A2P2-PT2-10C	A2P2-PT2-10C-1-R	02/13/2001	0	1	Uranium, Total	19	ug/g	NV	478353.88	1347143.72
A2P2-PT2-10C	A2P2-PT2-10C-2-R	02/13/2001	1	2	Radium-226	1.1	pCi/g	NV	478353.88	1347143.72

000224

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT2-10C	A2P2-PT2-10C-2-R	02/13/2001	1	2	Radium-228	0.98	pCi/g	NV	478353.88	1347143.72
A2P2-PT2-10C	A2P2-PT2-10C-2-R	02/13/2001	1	2	Thorium-228	0.97	pCi/g	NV	478353.88	1347143.72
A2P2-PT2-10C	A2P2-PT2-10C-2-R	02/13/2001	1	2	Thorium-232	0.98	pCi/g	NV	478353.88	1347143.72
A2P2-PT2-10C	A2P2-PT2-10C-2-R	02/13/2001	1	2	Uranium, Total	3.5	ug/g	NV	478353.88	1347143.72
A2P2-PT2-10C	A2P2-PT2-10C-3-R	02/13/2001	2	3	Radium-226	1.3	pCi/g	NV	478353.88	1347143.72
A2P2-PT2-10C	A2P2-PT2-10C-3-R	02/13/2001	2	3	Radium-228	1.1	pCi/g	NV	478353.88	1347143.72
A2P2-PT2-10C	A2P2-PT2-10C-3-R	02/13/2001	2	3	Thorium-228	1.1	pCi/g	NV	478353.88	1347143.72
A2P2-PT2-10C	A2P2-PT2-10C-3-R	02/13/2001	2	3	Thorium-232	1.1	pCi/g	NV	478353.88	1347143.72
A2P2-PT2-10C	A2P2-PT2-10C-3-R	02/13/2001	2	3	Uranium, Total	3.6	ug/g	NV	478353.88	1347143.72
A2P2-PT2-10C	A2P2-PT2-10C-6-R	02/13/2001	5	6	Radium-226	0.73	pCi/g	NV	478353.88	1347143.72
A2P2-PT2-10C	A2P2-PT2-10C-6-R	02/13/2001	5	6	Radium-228	0.42	pCi/g	NV	478353.88	1347143.72
A2P2-PT2-10C	A2P2-PT2-10C-6-R	02/13/2001	5	6	Thorium-228	0.36	pCi/g	NV	478353.88	1347143.72
A2P2-PT2-10C	A2P2-PT2-10C-6-R	02/13/2001	5	6	Thorium-232	0.42	pCi/g	NV	478353.88	1347143.72
A2P2-PT2-10C	A2P2-PT2-10C-6-R	02/13/2001	5	6	Uranium, Total	2.2	ug/g	UNV	478353.88	1347143.72
A2P2-PT2-10D	A2P2-PT2-10D-1-R	02/13/2001	0	1	Radium-226	8.1	pCi/g	NV	478349.05	1347132.4
A2P2-PT2-10D	A2P2-PT2-10D-1-R	02/13/2001	0	1	Radium-228	0.76	pCi/g	NV	478349.05	1347132.4
A2P2-PT2-10D	A2P2-PT2-10D-1-R	02/13/2001	0	1	Thorium-228	0.74	pCi/g	NV	478349.05	1347132.4
A2P2-PT2-10D	A2P2-PT2-10D-1-R	02/13/2001	0	1	Thorium-232	0.76	pCi/g	NV	478349.05	1347132.4
A2P2-PT2-10D	A2P2-PT2-10D-1-R	02/13/2001	0	1	Uranium, Total	36	ug/g	NV	478349.05	1347132.4
A2P2-PT2-10D	A2P2-PT2-10D-2-R	02/13/2001	1	2	Radium-226	0.9	pCi/g	NV	478349.05	1347132.4
A2P2-PT2-10D	A2P2-PT2-10D-2-R	02/13/2001	1	2	Radium-228	0.63	pCi/g	NV	478349.05	1347132.4
A2P2-PT2-10D	A2P2-PT2-10D-2-R	02/13/2001	1	2	Thorium-228	0.6	pCi/g	NV	478349.05	1347132.4
A2P2-PT2-10D	A2P2-PT2-10D-2-R	02/13/2001	1	2	Thorium-232	0.63	pCi/g	NV	478349.05	1347132.4
A2P2-PT2-10D	A2P2-PT2-10D-2-R	02/13/2001	1	2	Uranium, Total	8.8	ug/g	NV	478349.05	1347132.4
A2P2-PT2-10E	A2P2-PT2-10E-1-R	02/13/2001	0	1	Radium-226	0.86	pCi/g	NV	478324.51	1347123.62
A2P2-PT2-10E	A2P2-PT2-10E-1-R	02/13/2001	0	1	Radium-228	0.59	pCi/g	NV	478324.51	1347123.62
A2P2-PT2-10E	A2P2-PT2-10E-1-R	02/13/2001	0	1	Thorium-228	0.58	pCi/g	NV	478324.51	1347123.62
A2P2-PT2-10E	A2P2-PT2-10E-1-R	02/13/2001	0	1	Thorium-232	0.59	pCi/g	NV	478324.51	1347123.62
A2P2-PT2-10E	A2P2-PT2-10E-1-R	02/13/2001	0	1	Uranium, Total	11	ug/g	NV	478324.51	1347123.62
A2P2-PT2-10E	A2P2-PT2-10E-2-R	02/13/2001	1	2	Radium-226	0.74	pCi/g	NV	478324.51	1347123.62
A2P2-PT2-10E	A2P2-PT2-10E-2-R	02/13/2001	1	2	Radium-228	0.55	pCi/g	NV	478324.51	1347123.62
A2P2-PT2-10E	A2P2-PT2-10E-2-R	02/13/2001	1	2	Thorium-228	0.54	pCi/g	NV	478324.51	1347123.62
A2P2-PT2-10E	A2P2-PT2-10E-2-R	02/13/2001	1	2	Thorium-232	0.55	pCi/g	NV	478324.51	1347123.62
A2P2-PT2-10E	A2P2-PT2-10E-2-R	02/13/2001	1	2	Uranium, Total	2.8	ug/g	NV	478324.51	1347123.62
A2P2-PT2-10F	A2P2-PT2-10F-1-R	02/13/2001	0	1	Radium-226	6.7	pCi/g	NV	478324.05	1347112.4
A2P2-PT2-10F	A2P2-PT2-10F-1-R	02/13/2001	0	1	Radium-228	0.74	pCi/g	NV	478324.05	1347112.4
A2P2-PT2-10F	A2P2-PT2-10F-1-R	02/13/2001	0	1	Thorium-228	0.73	pCi/g	NV	478324.05	1347112.4
A2P2-PT2-10F	A2P2-PT2-10F-1-R	02/13/2001	0	1	Thorium-232	0.74	pCi/g	NV	478324.05	1347112.4
A2P2-PT2-10F	A2P2-PT2-10F-1-R	02/13/2001	0	1	Uranium, Total	16	ug/g	NV	478324.05	1347112.4
A2P2-PT2-10F	A2P2-PT2-10F-2-R	02/13/2001	1	2	Radium-226	1.5	pCi/g	NV	478324.05	1347112.4
A2P2-PT2-10F	A2P2-PT2-10F-2-R	02/13/2001	1	2	Radium-228	0.85	pCi/g	NV	478324.05	1347112.4

000225

4328

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT2-10F	A2P2-PT2-10F-2-R	02/13/2001	1	2	Thorium-228	0.86	pCi/g	NV	478324.05	1347112.4
A2P2-PT2-10F	A2P2-PT2-10F-2-R	02/13/2001	1	2	Thorium-232	0.85	pCi/g	NV	478324.05	1347112.4
A2P2-PT2-10F	A2P2-PT2-10F-2-R	02/13/2001	1	2	Uranium, Total	13	ug/g	NV	478324.05	1347112.4
A2P2-PT2-10G	A2P2-PT2-10G-1	05/01/2002	0	1	Radium-226	1.2	pCi/g	NV	478351.5	1347118.47
A2P2-PT2-10H	A2P2-PT2-10H-1	05/01/2002	0	1	Radium-226	8.1	pCi/g	NV	478345.3	1347131.04
A2P2-PT2-10I	A2P2-PT2-10I-1	05/01/2002	0	1	Radium-226	1.8	pCi/g	NV	478339.09	1347142.93
A2P2-PT2-11	A2P2-PT2-11-1-R	06/26/2000	0	1	Radium-226	1.1	pCi/g	NV	478231.59	1347256.9
A2P2-PT2-11	A2P2-PT2-11-1-R	06/26/2000	0	1	Radium-228	0.96	pCi/g	NV	478231.59	1347256.9
A2P2-PT2-11	A2P2-PT2-11-1-R	06/26/2000	0	1	Thorium-228	0.94	pCi/g	NV	478231.59	1347256.9
A2P2-PT2-11	A2P2-PT2-11-1-R	06/26/2000	0	1	Thorium-232	0.96	pCi/g	NV	478231.59	1347256.9
A2P2-PT2-11	A2P2-PT2-11-1-R	06/26/2000	0	1	Uranium, Total	7.5	ug/g	NV	478231.59	1347256.9
A2P2-PT2-12	A2P2-PT2-12-1-R	06/22/2000	0	1	Radium-226	1.3	pCi/g	NV	479309.1	1346719.1
A2P2-PT2-12	A2P2-PT2-12-1-R	06/22/2000	0	1	Radium-228	1.1	pCi/g	NV	479309.1	1346719.1
A2P2-PT2-12	A2P2-PT2-12-1-R	06/22/2000	0	1	Thorium-228	1	pCi/g	NV	479309.1	1346719.1
A2P2-PT2-12	A2P2-PT2-12-1-R	06/22/2000	0	1	Thorium-232	1.1	pCi/g	NV	479309.1	1346719.1
A2P2-PT2-12	A2P2-PT2-12-1-R	06/22/2000	0	1	Uranium, Total	18	ug/g	NV	479309.1	1346719.1
A2P2-PT2-13	A2P2-PT2-13-1-R	06/15/2000	0	0.5	Radium-226	0.95	pCi/g	NV	479408.06	1346946.3
A2P2-PT2-13	A2P2-PT2-13-1-R	06/15/2000	0	0.5	Radium-228	0.6	pCi/g	NV	479408.06	1346946.3
A2P2-PT2-13	A2P2-PT2-13-1-R	06/15/2000	0	0.5	Thorium-228	0.58	pCi/g	NV	479408.06	1346946.3
A2P2-PT2-13	A2P2-PT2-13-1-R	06/15/2000	0	0.5	Thorium-232	0.6	pCi/g	NV	479408.06	1346946.3
A2P2-PT2-13	A2P2-PT2-13-1-R	06/15/2000	0	0.5	Uranium, Total	4.5	ug/g	NV	479408.06	1346946.3
A2P2-PT2-14	A2P2-PT2-14-1-R	06/14/2000	0	1	Radium-226	1.06	pCi/g	-	479875.83	1347450.5
A2P2-PT2-14	A2P2-PT2-14-1-R	06/14/2000	0	1	Radium-228	0.822	pCi/g	-	479875.83	1347450.5
A2P2-PT2-14	A2P2-PT2-14-1-R	06/14/2000	0	1	Thorium-228	0.798	pCi/g	-	479875.83	1347450.5
A2P2-PT2-14	A2P2-PT2-14-1-R	06/14/2000	0	1	Thorium-232	0.822	pCi/g	-	479875.83	1347450.5
A2P2-PT2-14	A2P2-PT2-14-1-R	06/14/2000	0	1	Uranium, Total	24.469	ug/g	-	479875.83	1347450.5
A2P2-PT2-15	A2P2-PT2-15-1-R	06/21/2000	0	1	Radium-226	1.4	pCi/g	NV	479012.61	1347027.5
A2P2-PT2-15	A2P2-PT2-15-1-R	06/21/2000	0	1	Radium-228	0.97	pCi/g	NV	479012.61	1347027.5
A2P2-PT2-15	A2P2-PT2-15-1-R	06/21/2000	0	1	Thorium-228	0.94	pCi/g	NV	479012.61	1347027.5
A2P2-PT2-15	A2P2-PT2-15-1-R	06/21/2000	0	1	Thorium-232	0.97	pCi/g	NV	479012.61	1347027.5
A2P2-PT2-15	A2P2-PT2-15-1-R	06/21/2000	0	1	Uranium, Total	5	ug/g	NV	479012.61	1347027.5
A2P2-PT2-16	A2P2-PT2-16-1-R	07/11/2000	0	1	Radium-226	1.2	pCi/g	NV	478789.41	1348643.2
A2P2-PT2-16	A2P2-PT2-16-1-R	07/11/2000	0	1	Radium-228	0.93	pCi/g	NV	478789.41	1348643.2
A2P2-PT2-16	A2P2-PT2-16-1-R	07/11/2000	0	1	Thorium-228	0.91	pCi/g	NV	478789.41	1348643.2
A2P2-PT2-16	A2P2-PT2-16-1-R	07/11/2000	0	1	Thorium-232	0.93	pCi/g	NV	478789.41	1348643.2
A2P2-PT2-16	A2P2-PT2-16-1-R	07/11/2000	0	1	Uranium, Total	3.4	ug/g	NV	478789.41	1348643.2
A2P2-PT2-17	A2P2-PT2-17-1-R	06/15/2000	0	1	Radium-226	1.4	pCi/g	NV	479884.38	1346903.8
A2P2-PT2-17	A2P2-PT2-17-1-R	06/15/2000	0	1	Radium-228	1.1	pCi/g	NV	479884.38	1346903.8
A2P2-PT2-17	A2P2-PT2-17-1-R	06/15/2000	0	1	Thorium-228	1	pCi/g	NV	479884.38	1346903.8
A2P2-PT2-17	A2P2-PT2-17-1-R	06/15/2000	0	1	Thorium-232	1.1	pCi/g	NV	479884.38	1346903.8
A2P2-PT2-17	A2P2-PT2-17-1-R	06/15/2000	0	1	Uranium, Total	10	ug/g	NV	479884.38	1346903.8

000226

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT2-18	A2P2-PT2-18-1-R	06/20/2000	0	1	Radium-226	0.888	pCi/g	-	479759.78	1346535
A2P2-PT2-18	A2P2-PT2-18-1-R	06/20/2000	0	1	Radium-228	0.726	pCi/g	-	479759.78	1346535
A2P2-PT2-18	A2P2-PT2-18-1-R	06/20/2000	0	1	Thorium-228	0.728	pCi/g	-	479759.78	1346535
A2P2-PT2-18	A2P2-PT2-18-1-R	06/20/2000	0	1	Thorium-232	0.726	pCi/g	-	479759.78	1346535
A2P2-PT2-18	A2P2-PT2-18-1-R	06/20/2000	0	1	Uranium, Total	4.589	ug/g	J	479759.78	1346535
A2P2-PT2-19	A2P2-PT2-19-1-R	06/20/2000	0	1	Radium-226	1.272	pCi/g	-	479557.7	1346769.6
A2P2-PT2-19	A2P2-PT2-19-1-R	06/20/2000	0	1	Radium-228	0.969	pCi/g	-	479557.7	1346769.6
A2P2-PT2-19	A2P2-PT2-19-1-R	06/20/2000	0	1	Thorium-228	0.954	pCi/g	-	479557.7	1346769.6
A2P2-PT2-19	A2P2-PT2-19-1-R	06/20/2000	0	1	Thorium-232	0.969	pCi/g	-	479557.7	1346769.6
A2P2-PT2-19	A2P2-PT2-19-1-R	06/20/2000	0	1	Uranium, Total	21.676	ug/g	-	479557.7	1346769.6
A2P2-PT2-1A	A2P2-PT2-1A-1-RM	06/14/2000	0	1	Arsenic	24.4	mg/kg	-	479910.39	1347204.1
A2P2-PT2-1A	A2P2-PT2-1A-1-RM	06/14/2000	0	1	Radium-226	1.353	pCi/g	-	479910.39	1347204.1
A2P2-PT2-1A	A2P2-PT2-1A-1-RM	06/14/2000	0	1	Radium-228	1.076	pCi/g	-	479910.39	1347204.1
A2P2-PT2-1A	A2P2-PT2-1A-1-RM	06/14/2000	0	1	Thorium-228	1.058	pCi/g	-	479910.39	1347204.1
A2P2-PT2-1A	A2P2-PT2-1A-1-RM	06/14/2000	0	1	Thorium-232	1.076	pCi/g	-	479910.39	1347204.1
A2P2-PT2-1A	A2P2-PT2-1A-1-RM	06/14/2000	0	1	Uranium, Total	12.097	ug/g	-	479910.39	1347204.1
A2P2-PT2-1A	A2P2-PT2-1A-3-RM	06/14/2000	2	3	Arsenic	24.6	mg/kg	-	479910.39	1347204.1
A2P2-PT2-1A	A2P2-PT2-1A-3-RM	06/14/2000	2	3	Radium-226	1.186	pCi/g	-	479910.39	1347204.1
A2P2-PT2-1A	A2P2-PT2-1A-3-RM	06/14/2000	2	3	Radium-228	1.04	pCi/g	-	479910.39	1347204.1
A2P2-PT2-1A	A2P2-PT2-1A-3-RM	06/14/2000	2	3	Thorium-228	1.02	pCi/g	-	479910.39	1347204.1
A2P2-PT2-1A	A2P2-PT2-1A-3-RM	06/14/2000	2	3	Thorium-232	1.04	pCi/g	-	479910.39	1347204.1
A2P2-PT2-1A	A2P2-PT2-1A-3-RM	06/14/2000	2	3	Uranium, Total	3.4	ug/g	J	479910.39	1347204.1
A2P2-PT2-1A	A2P2-PT2-1A-4-M	04/30/2001	3	4	Arsenic	13.2	mg/kg	J	479910.39	1347204.1
A2P2-PT2-1A	A2P2-PT2-1A-5-M	04/30/2001	4	5	Arsenic	13.4	mg/kg	J	479910.39	1347204.1
A2P2-PT2-1A	A2P2-PT2-1A-6-M	04/30/2001	5	6	Arsenic	3.83	mg/kg	J	479910.39	1347204.1
A2P2-PT2-1AA	A2P2-PT2-1AA-1-M	08/13/2001	0	1	Arsenic	11.2	mg/kg	NV	479958.93	1347252.65
A2P2-PT2-1AA	A2P2-PT2-1AA-2-M	08/13/2001	1	2	Arsenic	16.6	mg/kg	NV	479958.93	1347252.65
A2P2-PT2-1AA	A2P2-PT2-1AA-3-M	08/13/2001	2	3	Arsenic	21.5	mg/kg	NV	479958.93	1347252.65
A2P2-PT2-1AA	A2P2-PT2-1AA-4-M	08/13/2001	3	4	Arsenic	15.2	mg/kg	NV	479958.93	1347252.65
A2P2-PT2-1AA	A2P2-PT2-1AA-5-M	08/13/2001	4	5	Arsenic	3.45	mg/kg	NV	479958.93	1347252.65
A2P2-PT2-1AA	A2P2-PT2-1AA-6-M	08/13/2001	5	6	Arsenic	0.82	mg/kg	UNV	479958.93	1347252.65
A2P2-PT2-1AB	A2P2-PT2-1AB-1-M	01/17/2002	0	1	Arsenic	2.25	mg/kg	UNV	480001.6	1347146
A2P2-PT2-1AB	A2P2-PT2-1AB-2-M	01/17/2002	1	2	Arsenic	9.58	mg/kg	NV	480001.6	1347146
A2P2-PT2-1AB	A2P2-PT2-1AB-3-M	01/17/2002	2	3	Arsenic	15.4	mg/kg	NV	480001.6	1347146
A2P2-PT2-1AB	A2P2-PT2-1AB-4-M	01/17/2002	3	4	Arsenic	6.77	mg/kg	NV	480001.6	1347146
A2P2-PT2-1AB	A2P2-PT2-1AB-5-M	01/17/2002	4	5	Arsenic	7.93	mg/kg	NV	480001.6	1347146
A2P2-PT2-1AB	A2P2-PT2-1AB-6-M	01/17/2002	5	6	Arsenic	2.19	mg/kg	UNV	480001.6	1347146
A2P2-PT2-1AC	A2P2-PT2-1AC-1-M	01/17/2002	0	1	Arsenic	11.4	mg/kg	NV	479914.6	1347064
A2P2-PT2-1AC	A2P2-PT2-1AC-2-M	01/17/2002	1	2	Arsenic	12	mg/kg	NV	479914.6	1347064
A2P2-PT2-1AC	A2P2-PT2-1AC-3-M	01/17/2002	2	3	Arsenic	9.67	mg/kg	NV	479914.6	1347064
A2P2-PT2-1AC	A2P2-PT2-1AC-4-M	01/17/2002	3	4	Arsenic	10.1	mg/kg	NV	479914.6	1347064

000227

4328

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT2-1AC	A2P2-PT2-1AC-5-M	01/17/2002	4	5	Arsenic	10.8	mg/kg	NV	479914.6	1347064
A2P2-PT2-1AC	A2P2-PT2-1AC-6-M	01/17/2002	5	6	Arsenic	5.43	mg/kg	NV	479914.6	1347064
A2P2-PT2-1AD	A2P2-PT2-1AD-1-M	01/21/2002	0	1	Arsenic	4.68	mg/kg	NV	479880	1347066
A2P2-PT2-1AD	A2P2-PT2-1AD-2-M	01/21/2002	1	2	Arsenic	8.89	mg/kg	NV	479880	1347066
A2P2-PT2-1AD	A2P2-PT2-1AD-3-M	01/21/2002	2	3	Arsenic	5.79	mg/kg	NV	479880	1347066
A2P2-PT2-1AD	A2P2-PT2-1AD-4-M	01/21/2002	3	4	Arsenic	12.8	mg/kg	NV	479880	1347066
A2P2-PT2-1AD	A2P2-PT2-1AD-5-M	01/21/2002	4	5	Arsenic	10.4	mg/kg	NV	479880	1347066
A2P2-PT2-1AD	A2P2-PT2-1AD-6-M	01/21/2002	5	6	Arsenic	7.18	mg/kg	NV	479880	1347066
A2P2-PT2-1AE	A2P2-PT2-1AE-1-M	01/21/2002	0	1	Arsenic	2.97	mg/kg	NV	479782	1347075
A2P2-PT2-1AE	A2P2-PT2-1AE-2-M	01/21/2002	1	2	Arsenic	5.75	mg/kg	NV	479782	1347075
A2P2-PT2-1AE	A2P2-PT2-1AE-3-M	01/21/2002	2	3	Arsenic	8.14	mg/kg	NV	479782	1347075
A2P2-PT2-1AE	A2P2-PT2-1AE-4-M	01/21/2002	3	4	Arsenic	3.91	mg/kg	NV	479782	1347075
A2P2-PT2-1AE	A2P2-PT2-1AE-5-M	01/21/2002	4	5	Arsenic	7.49	mg/kg	NV	479782	1347075
A2P2-PT2-1AE	A2P2-PT2-1AE-6-M	01/21/2002	5	6	Arsenic	3.96	mg/kg	NV	479782	1347075
A2P2-PT2-1AF	A2P2-PT2-1AF-1-M	01/17/2002	0	1	Arsenic	7.1	mg/kg	NV	479784.5	1347167
A2P2-PT2-1AF	A2P2-PT2-1AF-2-M	01/17/2002	1	2	Arsenic	9.4	mg/kg	NV	479784.5	1347167
A2P2-PT2-1AF	A2P2-PT2-1AF-3-M	01/17/2002	2	3	Arsenic	13.8	mg/kg	NV	479784.5	1347167
A2P2-PT2-1AF	A2P2-PT2-1AF-4-M	01/17/2002	3	4	Arsenic	35.7	mg/kg	NV	479784.5	1347167
A2P2-PT2-1AF	A2P2-PT2-1AF-5-M	01/17/2002	4	5	Arsenic	26.4	mg/kg	NV	479784.5	1347167
A2P2-PT2-1AF	A2P2-PT2-1AF-6-M	01/17/2002	5	6	Arsenic	6.88	mg/kg	NV	479784.5	1347167
A2P2-PT2-1AG	A2P2-PT2-1AG-1-M	01/21/2002	0	1	Arsenic	8.25	mg/kg	NV	479790.83	1347236.11
A2P2-PT2-1AG	A2P2-PT2-1AG-2-M	01/21/2002	1	2	Arsenic	4.46	mg/kg	NV	479790.83	1347236.11
A2P2-PT2-1AG	A2P2-PT2-1AG-3-M	01/21/2002	2	3	Arsenic	2.14	mg/kg	UNV	479790.83	1347236.11
A2P2-PT2-1AG	A2P2-PT2-1AG-4-M	01/21/2002	3	4	Arsenic	7.34	mg/kg	NV	479790.83	1347236.11
A2P2-PT2-1AG	A2P2-PT2-1AG-5-M	01/21/2002	4	5	Arsenic	2.56	mg/kg	NV	479790.83	1347236.11
A2P2-PT2-1AG	A2P2-PT2-1AG-6-M	01/21/2002	5	6	Arsenic	3.35	mg/kg	NV	479790.83	1347236.11
A2P2-PT2-1AH	A2P2-PT2-1AH-1-M	02/04/2002	0	1	Arsenic	3.31	mg/kg	UNV	480015.74	1347132.29
A2P2-PT2-1AH	A2P2-PT2-1AH-2-M	02/04/2002	1	2	Arsenic	8.28	mg/kg	NV	480015.74	1347132.29
A2P2-PT2-1AH	A2P2-PT2-1AH-3-M	02/04/2002	2	3	Arsenic	16.2	mg/kg	NV	480015.74	1347132.29
A2P2-PT2-1AH	A2P2-PT2-1AH-4-M	02/04/2002	3	4	Arsenic	14	mg/kg	NV	480015.74	1347132.29
A2P2-PT2-1AH	A2P2-PT2-1AH-5-M	02/04/2002	4	5	Arsenic	9.83	mg/kg	NV	480015.74	1347132.29
A2P2-PT2-1AH	A2P2-PT2-1AH-6-M	02/04/2002	5	6	Arsenic	3.85	mg/kg	NV	480015.74	1347132.29
A2P2-PT2-1AI	A2P2-PT2-1AI-1-M	02/04/2002	0	1	Arsenic	4.44	mg/kg	NV	479878.85	1347046.53
A2P2-PT2-1AI	A2P2-PT2-1AI-2-M	02/04/2002	1	2	Arsenic	12.6	mg/kg	NV	479878.85	1347046.53
A2P2-PT2-1AI	A2P2-PT2-1AI-3-M	02/04/2002	2	3	Arsenic	12.2	mg/kg	NV	479878.85	1347046.53
A2P2-PT2-1AI	A2P2-PT2-1AI-4-M	02/04/2002	3	4	Arsenic	16	mg/kg	NV	479878.85	1347046.53
A2P2-PT2-1AI	A2P2-PT2-1AI-5-M	02/04/2002	4	5	Arsenic	6.24	mg/kg	NV	479878.85	1347046.53
A2P2-PT2-1AI	A2P2-PT2-1AI-6-M	02/04/2002	5	6	Arsenic	11.2	mg/kg	NV	479878.85	1347046.53
A2P2-PT2-1AJ	A2P2-PT2-1AJ-1-M	02/04/2002	0	1	Arsenic	10.1	mg/kg	NV	479754.2	1347166.89
A2P2-PT2-1AJ	A2P2-PT2-1AJ-2-M	02/04/2002	1	2	Arsenic	7.51	mg/kg	NV	479754.2	1347166.89
A2P2-PT2-1AJ	A2P2-PT2-1AJ-3-M	02/04/2002	2	3	Arsenic	14.2	mg/kg	NV	479754.2	1347166.89

000228

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT2-1AJ	A2P2-PT2-1AJ-4-M	02/04/2002	3	4	Arsenic	10.6	mg/kg	NV	479754.2	1347166.89
A2P2-PT2-1AJ	A2P2-PT2-1AJ-5-M	02/04/2002	4	5	Arsenic	15.7	mg/kg	NV	479754.2	1347166.89
A2P2-PT2-1AJ	A2P2-PT2-1AJ-6-M	02/04/2002	5	6	Arsenic	12.6	mg/kg	NV	479754.2	1347166.89
A2P2-PT2-1AJ	A2P2-PT2-1AJ-7-M	02/04/2002	6	7	Arsenic	2.39	mg/kg	UNV	479754.2	1347166.89
A2P2-PT2-1AJ	A2P2-PT2-1AJ-8-M	02/04/2002	7	8	Arsenic	2.49	mg/kg	UNV	479754.2	1347166.89
A2P2-PT2-1AK	A2P2-PT2-1AK-1-M	04/09/2002	0	1	Arsenic	7.61	mg/kg	-	480029.92	1347117.96
A2P2-PT2-1AK	A2P2-PT2-1AK-2-M	04/09/2002	1	2	Arsenic	8.34	mg/kg	-	480029.92	1347117.96
A2P2-PT2-1AK	A2P2-PT2-1AK-3-M	04/09/2002	2	3	Arsenic	18.4	mg/kg	-	480029.92	1347117.96
A2P2-PT2-1AK	A2P2-PT2-1AK-4-M	04/09/2002	3	4	Arsenic	16.8	mg/kg	-	480029.92	1347117.96
A2P2-PT2-1AK	A2P2-PT2-1AK-5-M	04/09/2002	4	5	Arsenic	10.3	mg/kg	-	480029.92	1347117.96
A2P2-PT2-1AK	A2P2-PT2-1AK-6-M	04/09/2002	5	6	Arsenic	6.13	mg/kg	-	480029.92	1347117.96
A2P2-PT2-1AL	A2P2-PT2-1AL-1-M	04/09/2002	0	1	Arsenic	7.87	mg/kg	-	479879	1347026.61
A2P2-PT2-1AL	A2P2-PT2-1AL-2-M	04/09/2002	1	2	Arsenic	10.2	mg/kg	-	479879	1347026.61
A2P2-PT2-1AL	A2P2-PT2-1AL-3-M	04/09/2002	2	3	Arsenic	12.2	mg/kg	-	479879	1347026.61
A2P2-PT2-1AL	A2P2-PT2-1AL-4-M	04/09/2002	3	4	Arsenic	10.1	mg/kg	-	479879	1347026.61
A2P2-PT2-1AL	A2P2-PT2-1AL-5-M	04/09/2002	4	5	Arsenic	5.33	mg/kg	-	479879	1347026.61
A2P2-PT2-1AL	A2P2-PT2-1AL-6-M	04/09/2002	5	6	Arsenic	3.45	mg/kg	-	479879	1347026.61
A2P2-PT2-1AM	A2P2-PT2-1AM-1-M	04/09/2002	0	1	Arsenic	9.74	mg/kg	-	479734.27	1347167.22
A2P2-PT2-1AM	A2P2-PT2-1AM-2-M	04/09/2002	1	2	Arsenic	9.72	mg/kg	-	479734.27	1347167.22
A2P2-PT2-1AM	A2P2-PT2-1AM-3-M	04/09/2002	2	3	Arsenic	9.04	mg/kg	-	479734.27	1347167.22
A2P2-PT2-1AM	A2P2-PT2-1AM-4-M	04/09/2002	3	4	Arsenic	14.7	mg/kg	-	479734.27	1347167.22
A2P2-PT2-1AM	A2P2-PT2-1AM-5-M	04/09/2002	4	5	Arsenic	7.1	mg/kg	-	479734.27	1347167.22
A2P2-PT2-1AM	A2P2-PT2-1AM-6-M	04/09/2002	5	6	Arsenic	6.82	mg/kg	-	479734.27	1347167.22
A2P2-PT2-1B	A2P2-PT2-1B-1-RM	06/14/2000	0	1	Arsenic	33.1	mg/kg	-	479910.52	1347214.3
A2P2-PT2-1B	A2P2-PT2-1B-1-RM	06/14/2000	0	1	Radium-226	1.409	pCi/g	-	479910.52	1347214.3
A2P2-PT2-1B	A2P2-PT2-1B-1-RM	06/14/2000	0	1	Radium-228	1.082	pCi/g	-	479910.52	1347214.3
A2P2-PT2-1B	A2P2-PT2-1B-1-RM	06/14/2000	0	1	Thorium-228	1.048	pCi/g	-	479910.52	1347214.3
A2P2-PT2-1B	A2P2-PT2-1B-1-RM	06/14/2000	0	1	Thorium-232	1.082	pCi/g	-	479910.52	1347214.3
A2P2-PT2-1B	A2P2-PT2-1B-1-RM	06/14/2000	0	1	Uranium, Total	6.515	ug/g	-	479910.52	1347214.3
A2P2-PT2-1B	A2P2-PT2-1B-3-RM	06/14/2000	2	3	Arsenic	23.7	mg/kg	-	479910.52	1347214.3
A2P2-PT2-1B	A2P2-PT2-1B-3-RM	06/14/2000	2	3	Radium-226	1.559	pCi/g	-	479910.52	1347214.3
A2P2-PT2-1B	A2P2-PT2-1B-3-RM	06/14/2000	2	3	Radium-228	1.119	pCi/g	-	479910.52	1347214.3
A2P2-PT2-1B	A2P2-PT2-1B-3-RM	06/14/2000	2	3	Thorium-228	1.1	pCi/g	-	479910.52	1347214.3
A2P2-PT2-1B	A2P2-PT2-1B-3-RM	06/14/2000	2	3	Thorium-232	1.119	pCi/g	-	479910.52	1347214.3
A2P2-PT2-1B	A2P2-PT2-1B-3-RM	06/14/2000	2	3	Uranium, Total	2.835	ug/g	U	479910.52	1347214.3
A2P2-PT2-1BB	A2P2-PT2-1BB-1-M	08/14/2001	0	1	Arsenic	7.44	mg/kg	NV	479914.92	1347164.09
A2P2-PT2-1BB	A2P2-PT2-1BB-2-M	08/14/2001	1	2	Arsenic	12.9	mg/kg	NV	479914.92	1347164.09
A2P2-PT2-1BB	A2P2-PT2-1BB-3-M	08/14/2001	2	3	Arsenic	12.9	mg/kg	NV	479914.92	1347164.09
A2P2-PT2-1BB	A2P2-PT2-1BB-4-M	08/14/2001	3	4	Arsenic	9.22	mg/kg	NV	479914.92	1347164.09
A2P2-PT2-1BB	A2P2-PT2-1BB-5-M	08/14/2001	4	5	Arsenic	4	mg/kg	NV	479914.92	1347164.09
A2P2-PT2-1BB	A2P2-PT2-1BB-6-M	08/14/2001	5	6	Arsenic	3.56	mg/kg	NV	479914.92	1347164.09

000229

4328

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT2-1C	A2P2-PT2-1C-1-RM	06/14/2000	0	1	Arsenic	23.3	mg/kg	-	479915.58	1347204
A2P2-PT2-1C	A2P2-PT2-1C-1-RM	06/14/2000	0	1	Radium-226	1.386	pCi/g	-	479915.58	1347204
A2P2-PT2-1C	A2P2-PT2-1C-1-RM	06/14/2000	0	1	Radium-228	1.175	pCi/g	-	479915.58	1347204
A2P2-PT2-1C	A2P2-PT2-1C-1-RM	06/14/2000	0	1	Thorium-228	1.127	pCi/g	-	479915.58	1347204
A2P2-PT2-1C	A2P2-PT2-1C-1-RM	06/14/2000	0	1	Thorium-232	1.175	pCi/g	-	479915.58	1347204
A2P2-PT2-1C	A2P2-PT2-1C-1-RM	06/14/2000	0	1	Uranium, Total	15.521	ug/g	-	479915.58	1347204
A2P2-PT2-1C	A2P2-PT2-1C-3-RM	06/14/2000	2	3	Arsenic	23.1	mg/kg	-	479915.58	1347204
A2P2-PT2-1C	A2P2-PT2-1C-3-RM	06/14/2000	2	3	Radium-226	1.173	pCi/g	-	479915.58	1347204
A2P2-PT2-1C	A2P2-PT2-1C-3-RM	06/14/2000	2	3	Radium-228	0.952	pCi/g	-	479915.58	1347204
A2P2-PT2-1C	A2P2-PT2-1C-3-RM	06/14/2000	2	3	Thorium-228	0.928	pCi/g	-	479915.58	1347204
A2P2-PT2-1C	A2P2-PT2-1C-3-RM	06/14/2000	2	3	Thorium-232	0.952	pCi/g	-	479915.58	1347204
A2P2-PT2-1C	A2P2-PT2-1C-3-RM	06/14/2000	2	3	Uranium, Total	2.373	ug/g	U	479915.58	1347204
A2P2-PT2-1CC	A2P2-PT2-1CC-1-M	08/14/2001	0	1	Arsenic	9.2	mg/kg	NV	479866.39	1347158.53
A2P2-PT2-1CC	A2P2-PT2-1CC-2-M	08/14/2001	1	2	Arsenic	19.3	mg/kg	NV	479866.39	1347158.53
A2P2-PT2-1CC	A2P2-PT2-1CC-3-M	08/14/2001	2	3	Arsenic	19.5	mg/kg	NV	479866.39	1347158.53
A2P2-PT2-1CC	A2P2-PT2-1CC-4-M	08/14/2001	3	4	Arsenic	15.7	mg/kg	NV	479866.39	1347158.53
A2P2-PT2-1CC	A2P2-PT2-1CC-5-M	08/14/2001	4	5	Arsenic	18.5	mg/kg	NV	479866.39	1347158.53
A2P2-PT2-1CC	A2P2-PT2-1CC-6-M	08/14/2001	5	6	Arsenic	2.96	mg/kg	NV	479866.39	1347158.53
A2P2-PT2-1D	A2P2-PT2-1D-1-RM	06/14/2000	0	1	Arsenic	23	mg/kg	-	479915.69	1347214.2
A2P2-PT2-1D	A2P2-PT2-1D-1-RM	06/14/2000	0	1	Radium-226	1.403	pCi/g	-	479915.69	1347214.2
A2P2-PT2-1D	A2P2-PT2-1D-1-RM	06/14/2000	0	1	Radium-228	1.128	pCi/g	-	479915.69	1347214.2
A2P2-PT2-1D	A2P2-PT2-1D-1-RM	06/14/2000	0	1	Thorium-228	1.114	pCi/g	-	479915.69	1347214.2
A2P2-PT2-1D	A2P2-PT2-1D-1-RM	06/14/2000	0	1	Thorium-232	1.128	pCi/g	-	479915.69	1347214.2
A2P2-PT2-1D	A2P2-PT2-1D-1-RM	06/14/2000	0	1	Uranium, Total	9.379	ug/g	-	479915.69	1347214.2
A2P2-PT2-1D	A2P2-PT2-1D-3-RM	06/14/2000	2	3	Arsenic	14.8	mg/kg	-	479915.69	1347214.2
A2P2-PT2-1D	A2P2-PT2-1D-3-RM	06/14/2000	2	3	Radium-226	1.429	pCi/g	-	479915.69	1347214.2
A2P2-PT2-1D	A2P2-PT2-1D-3-RM	06/14/2000	2	3	Radium-228	1.139	pCi/g	-	479915.69	1347214.2
A2P2-PT2-1D	A2P2-PT2-1D-3-RM	06/14/2000	2	3	Thorium-228	1.093	pCi/g	-	479915.69	1347214.2
A2P2-PT2-1D	A2P2-PT2-1D-3-RM	06/14/2000	2	3	Thorium-232	1.139	pCi/g	-	479915.69	1347214.2
A2P2-PT2-1D	A2P2-PT2-1D-3-RM	06/14/2000	2	3	Uranium, Total	4.111	ug/g	-	479915.69	1347214.2
A2P2-PT2-1D	A2P2-PT2-1D-4-M	11/21/2000	3	4	Arsenic	12.6	mg/kg	-	479915.69	1347214.2
A2P2-PT2-1D	A2P2-PT2-1D-5-M	11/21/2000	4	5	Arsenic	10.1	mg/kg	-	479915.69	1347214.2
A2P2-PT2-1D	A2P2-PT2-1D-6-M	11/21/2000	5	6	Arsenic	4.76	mg/kg	U	479915.69	1347214.2
A2P2-PT2-1DD	A2P2-PT2-1DD-1-M	08/13/2001	0	1	Arsenic	11.7	mg/kg	NV	479965.97	1347259.8
A2P2-PT2-1DD	A2P2-PT2-1DD-2-M	08/13/2001	1	2	Arsenic	17.8	mg/kg	NV	479965.97	1347259.8
A2P2-PT2-1DD	A2P2-PT2-1DD-3-M	08/13/2001	2	3	Arsenic	17.9	mg/kg	NV	479965.97	1347259.8
A2P2-PT2-1DD	A2P2-PT2-1DD-4-M	08/13/2001	3	4	Arsenic	12	mg/kg	NV	479965.97	1347259.8
A2P2-PT2-1DD	A2P2-PT2-1DD-5-M	08/13/2001	4	5	Arsenic	9.38	mg/kg	NV	479965.97	1347259.8
A2P2-PT2-1DD	A2P2-PT2-1DD-6-M	08/13/2001	5	6	Arsenic	2.31	mg/kg	NV	479965.97	1347259.8
A2P2-PT2-1E	A2P2-PT2-1E-1-RM	09/07/2000	0	1	Arsenic	18.8	mg/kg	-	479920	1347209
A2P2-PT2-1E	A2P2-PT2-1E-1-RM	09/07/2000	0	1	Radium-226	1.336	pCi/g	-	479920	1347209

000230

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT2-1E	A2P2-PT2-1E-1-RM	09/07/2000	0	1	Radium-228	1.158	pCi/g	-	479920	1347209
A2P2-PT2-1E	A2P2-PT2-1E-1-RM	09/07/2000	0	1	Thorium-228	1.128	pCi/g	-	479920	1347209
A2P2-PT2-1E	A2P2-PT2-1E-1-RM	09/07/2000	0	1	Thorium-232	1.158	pCi/g	-	479920	1347209
A2P2-PT2-1E	A2P2-PT2-1E-1-RM	09/07/2000	0	1	Uranium, Total	4.561	ug/g	-	479920	1347209
A2P2-PT2-1E	A2P2-PT2-1E-3-RM	09/07/2000	2	3	Arsenic	13	mg/kg	-	479920	1347209
A2P2-PT2-1E	A2P2-PT2-1E-3-RM	09/07/2000	2	3	Radium-226	1.26	pCi/g	-	479920	1347209
A2P2-PT2-1E	A2P2-PT2-1E-3-RM	09/07/2000	2	3	Radium-228	0.859	pCi/g	-	479920	1347209
A2P2-PT2-1E	A2P2-PT2-1E-3-RM	09/07/2000	2	3	Thorium-228	0.812	pCi/g	-	479920	1347209
A2P2-PT2-1E	A2P2-PT2-1E-3-RM	09/07/2000	2	3	Thorium-232	0.859	pCi/g	-	479920	1347209
A2P2-PT2-1E	A2P2-PT2-1E-3-RM	09/07/2000	2	3	Uranium, Total	2.611	ug/g	U	479920	1347209
A2P2-PT2-1E	A2P2-PT2-1E-4-RM	09/07/2000	3	4	Arsenic	12.3	mg/kg	-	479920	1347209
A2P2-PT2-1E	A2P2-PT2-1E-4-RM	09/07/2000	3	4	Radium-226	1.531	pCi/g	-	479920	1347209
A2P2-PT2-1E	A2P2-PT2-1E-4-RM	09/07/2000	3	4	Radium-228	1.132	pCi/g	-	479920	1347209
A2P2-PT2-1E	A2P2-PT2-1E-4-RM	09/07/2000	3	4	Thorium-228	1.151	pCi/g	-	479920	1347209
A2P2-PT2-1E	A2P2-PT2-1E-4-RM	09/07/2000	3	4	Thorium-232	1.132	pCi/g	-	479920	1347209
A2P2-PT2-1E	A2P2-PT2-1E-4-RM	09/07/2000	3	4	Uranium, Total	2.764	ug/g	U	479920	1347209
A2P2-PT2-1EE	A2P2-PT2-1EE-1-M	08/14/2001	0	1	Arsenic	6.03	mg/kg	NV	479915	1347144.12
A2P2-PT2-1EE	A2P2-PT2-1EE-2-M	08/14/2001	1	2	Arsenic	11.5	mg/kg	NV	479915	1347144.12
A2P2-PT2-1EE	A2P2-PT2-1EE-3-M	08/14/2001	2	3	Arsenic	11.9	mg/kg	NV	479915	1347144.12
A2P2-PT2-1EE	A2P2-PT2-1EE-4-M	08/14/2001	3	4	Arsenic	11	mg/kg	NV	479915	1347144.12
A2P2-PT2-1EE	A2P2-PT2-1EE-5-M	08/14/2001	4	5	Arsenic	9.66	mg/kg	NV	479915	1347144.12
A2P2-PT2-1EE	A2P2-PT2-1EE-6-M	08/14/2001	5	6	Arsenic	16.7	mg/kg	NV	479915	1347144.12
A2P2-PT2-1EE	A2P2-PT2-1EE-7-M	08/14/2001	6	7	Arsenic	8.08	mg/kg	-	479915	1347144.12
A2P2-PT2-1EE	A2P2-PT2-1EE-8-M	08/14/2001	6	7	Arsenic	4.84	mg/kg	-	479915	1347144.12
A2P2-PT2-1F	A2P2-PT2-1F-1-RM	09/07/2000	0	1	Arsenic	32.6	mg/kg	-	479910	1347209
A2P2-PT2-1F	A2P2-PT2-1F-1-RM	09/07/2000	0	1	Radium-226	1.281	pCi/g	-	479910	1347209
A2P2-PT2-1F	A2P2-PT2-1F-1-RM	09/07/2000	0	1	Radium-228	1.032	pCi/g	-	479910	1347209
A2P2-PT2-1F	A2P2-PT2-1F-1-RM	09/07/2000	0	1	Thorium-228	1.02	pCi/g	-	479910	1347209
A2P2-PT2-1F	A2P2-PT2-1F-1-RM	09/07/2000	0	1	Thorium-232	1.032	pCi/g	-	479910	1347209
A2P2-PT2-1F	A2P2-PT2-1F-1-RM	09/07/2000	0	1	Uranium, Total	8.256	ug/g	-	479910	1347209
A2P2-PT2-1F	A2P2-PT2-1F-3-RM	09/07/2000	2	3	Arsenic	37.4	mg/kg	-	479910	1347209
A2P2-PT2-1F	A2P2-PT2-1F-3-RM	09/07/2000	2	3	Radium-226	1.245	pCi/g	-	479910	1347209
A2P2-PT2-1F	A2P2-PT2-1F-3-RM	09/07/2000	2	3	Radium-228	1.095	pCi/g	-	479910	1347209
A2P2-PT2-1F	A2P2-PT2-1F-3-RM	09/07/2000	2	3	Thorium-228	1.084	pCi/g	-	479910	1347209
A2P2-PT2-1F	A2P2-PT2-1F-3-RM	09/07/2000	2	3	Thorium-232	1.095	pCi/g	-	479910	1347209
A2P2-PT2-1F	A2P2-PT2-1F-3-RM	09/07/2000	2	3	Uranium, Total	5.241	ug/g	-	479910	1347209
A2P2-PT2-1F	A2P2-PT2-1F-4-RM	09/07/2000	3	4	Arsenic	7.82	mg/kg	-	479910	1347209
A2P2-PT2-1F	A2P2-PT2-1F-4-RM	09/07/2000	3	4	Radium-226	1.412	pCi/g	-	479910	1347209
A2P2-PT2-1F	A2P2-PT2-1F-4-RM	09/07/2000	3	4	Radium-228	1.016	pCi/g	-	479910	1347209
A2P2-PT2-1F	A2P2-PT2-1F-4-RM	09/07/2000	3	4	Thorium-228	0.994	pCi/g	-	479910	1347209
A2P2-PT2-1F	A2P2-PT2-1F-4-RM	09/07/2000	3	4	Thorium-232	1.016	pCi/g	-	479910	1347209

000231

43 28

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT2-1F	A2P2-PT2-1F-4-RM	09/07/2000	3	4	Uranium, Total	3.132	ug/g	U	479910	1347209
A2P2-PT2-1FF	A2P2-PT2-1FF-1-M	08/14/2001	0	1	Arsenic	7.25	mg/kg	NV	479852.34	1347144.32
A2P2-PT2-1FF	A2P2-PT2-1FF-2-M	08/14/2001	1	2	Arsenic	12.2	mg/kg	NV	479852.34	1347144.32
A2P2-PT2-1FF	A2P2-PT2-1FF-3-M	08/14/2001	2	3	Arsenic	16.1	mg/kg	NV	479852.34	1347144.32
A2P2-PT2-1FF	A2P2-PT2-1FF-4-M	08/14/2001	3	4	Arsenic	11.2	mg/kg	NV	479852.34	1347144.32
A2P2-PT2-1FF	A2P2-PT2-1FF-5-M	08/14/2001	4	5	Arsenic	13.5	mg/kg	NV	479852.34	1347144.32
A2P2-PT2-1FF	A2P2-PT2-1FF-6-M	08/14/2001	5	6	Arsenic	9.46	mg/kg	NV	479852.34	1347144.32
A2P2-PT2-1G	A2P2-PT2-1G-1-RM	09/07/2000	0	1	Arsenic	9.61	mg/kg	-	479930	1347194
A2P2-PT2-1G	A2P2-PT2-1G-1-RM	09/07/2000	0	1	Radium-226	1.297	pCi/g	-	479930	1347194
A2P2-PT2-1G	A2P2-PT2-1G-1-RM	09/07/2000	0	1	Radium-228	1.085	pCi/g	-	479930	1347194
A2P2-PT2-1G	A2P2-PT2-1G-1-RM	09/07/2000	0	1	Thorium-228	1.09	pCi/g	-	479930	1347194
A2P2-PT2-1G	A2P2-PT2-1G-1-RM	09/07/2000	0	1	Thorium-232	1.085	pCi/g	-	479930	1347194
A2P2-PT2-1G	A2P2-PT2-1G-1-RM	09/07/2000	0	1	Uranium, Total	8.468	ug/g	-	479930	1347194
A2P2-PT2-1G	A2P2-PT2-1G-3-RM	09/07/2000	2	3	Arsenic	11.8	mg/kg	-	479930	1347194
A2P2-PT2-1G	A2P2-PT2-1G-3-RM	09/07/2000	2	3	Radium-226	0.997	pCi/g	-	479930	1347194
A2P2-PT2-1G	A2P2-PT2-1G-3-RM	09/07/2000	2	3	Radium-228	0.819	pCi/g	-	479930	1347194
A2P2-PT2-1G	A2P2-PT2-1G-3-RM	09/07/2000	2	3	Thorium-228	0.799	pCi/g	-	479930	1347194
A2P2-PT2-1G	A2P2-PT2-1G-3-RM	09/07/2000	2	3	Thorium-232	0.819	pCi/g	-	479930	1347194
A2P2-PT2-1G	A2P2-PT2-1G-3-RM	09/07/2000	2	3	Uranium, Total	3.102	ug/g	J	479930	1347194
A2P2-PT2-1G	A2P2-PT2-1G-4-RM	09/07/2000	3	4	Arsenic	10.8	mg/kg	-	479930	1347194
A2P2-PT2-1G	A2P2-PT2-1G-4-RM	09/07/2000	3	4	Radium-226	1.253	pCi/g	-	479930	1347194
A2P2-PT2-1G	A2P2-PT2-1G-4-RM	09/07/2000	3	4	Radium-228	0.967	pCi/g	-	479930	1347194
A2P2-PT2-1G	A2P2-PT2-1G-4-RM	09/07/2000	3	4	Thorium-228	0.939	pCi/g	-	479930	1347194
A2P2-PT2-1G	A2P2-PT2-1G-4-RM	09/07/2000	3	4	Thorium-232	0.967	pCi/g	-	479930	1347194
A2P2-PT2-1G	A2P2-PT2-1G-4-RM	09/07/2000	3	4	Uranium, Total	2.692	ug/g	ERR	479930	1347194
A2P2-PT2-1GG	A2P2-PT2-1GG-1-M	08/13/2001	0	1	Arsenic	8.01	mg/kg	NV	479980.94	1347272.81
A2P2-PT2-1GG	A2P2-PT2-1GG-2-M	08/13/2001	1	2	Arsenic	11	mg/kg	NV	479980.94	1347272.81
A2P2-PT2-1GG	A2P2-PT2-1GG-3-M	08/13/2001	2	3	Arsenic	5.29	mg/kg	NV	479980.94	1347272.81
A2P2-PT2-1GG	A2P2-PT2-1GG-4-M	08/13/2001	3	4	Arsenic	6.88	mg/kg	NV	479980.94	1347272.81
A2P2-PT2-1GG	A2P2-PT2-1GG-5-M	08/13/2001	4	5	Arsenic	4.81	mg/kg	NV	479980.94	1347272.81
A2P2-PT2-1GG	A2P2-PT2-1GG-6-M	08/13/2001	5	6	Arsenic	1.99	mg/kg	NV	479980.94	1347272.81
A2P2-PT2-1H	A2P2-PT2-1H-1-RM	09/07/2000	0	1	Arsenic	28.6	mg/kg	-	479930	1347224
A2P2-PT2-1H	A2P2-PT2-1H-1-RM	09/07/2000	0	1	Radium-226	1.124	pCi/g	-	479930	1347224
A2P2-PT2-1H	A2P2-PT2-1H-1-RM	09/07/2000	0	1	Radium-228	1.029	pCi/g	-	479930	1347224
A2P2-PT2-1H	A2P2-PT2-1H-1-RM	09/07/2000	0	1	Thorium-228	1.013	pCi/g	-	479930	1347224
A2P2-PT2-1H	A2P2-PT2-1H-1-RM	09/07/2000	0	1	Thorium-232	1.029	pCi/g	-	479930	1347224
A2P2-PT2-1H	A2P2-PT2-1H-1-RM	09/07/2000	0	1	Uranium, Total	9.605	ug/g	-	479930	1347224
A2P2-PT2-1H	A2P2-PT2-1H-3-RM	09/07/2000	2	3	Arsenic	10.8	mg/kg	-	479930	1347224
A2P2-PT2-1H	A2P2-PT2-1H-3-RM	09/07/2000	2	3	Radium-226	1.391	pCi/g	-	479930	1347224
A2P2-PT2-1H	A2P2-PT2-1H-3-RM	09/07/2000	2	3	Radium-228	1.135	pCi/g	-	479930	1347224
A2P2-PT2-1H	A2P2-PT2-1H-3-RM	09/07/2000	2	3	Thorium-228	1.107	pCi/g	-	479930	1347224

000232

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT2-1H	A2P2-PT2-1H-3-RM	09/07/2000	2	3	Thorium-232	1.135	pCi/g	-	479930	1347224
A2P2-PT2-1H	A2P2-PT2-1H-3-RM	09/07/2000	2	3	Uranium, Total	3.736	ug/g	J	479930	1347224
A2P2-PT2-1H	A2P2-PT2-1H-4-RM	09/07/2000	3	4	Arsenic	4.64	mg/kg	-	479930	1347224
A2P2-PT2-1H	A2P2-PT2-1H-4-RM	09/07/2000	3	4	Radium-226	1.143	pCi/g	-	479930	1347224
A2P2-PT2-1H	A2P2-PT2-1H-4-RM	09/07/2000	3	4	Radium-228	0.821	pCi/g	-	479930	1347224
A2P2-PT2-1H	A2P2-PT2-1H-4-RM	09/07/2000	3	4	Thorium-228	0.772	pCi/g	-	479930	1347224
A2P2-PT2-1H	A2P2-PT2-1H-4-RM	09/07/2000	3	4	Thorium-232	0.821	pCi/g	-	479930	1347224
A2P2-PT2-1H	A2P2-PT2-1H-4-RM	09/07/2000	3	4	Uranium, Total	3.106	ug/g	U	479930	1347224
A2P2-PT2-1HH	A2P2-PT2-1HH-1-M	09/17/2001	0	1	Arsenic	9.04	mg/kg	NV	479948.94	1347201.11
A2P2-PT2-1HH	A2P2-PT2-1HH-1-M	09/17/2001	0	1	Uranium, Total	6.97	ug/g	NV	479948.94	1347201.11
A2P2-PT2-1HH	A2P2-PT2-1HH-2-M	09/17/2001	1	2	Arsenic	10.9	mg/kg	NV	479948.94	1347201.11
A2P2-PT2-1HH	A2P2-PT2-1HH-3-M	09/17/2001	2	3	Arsenic	10.4	mg/kg	NV	479948.94	1347201.11
A2P2-PT2-1HH	A2P2-PT2-1HH-4-M	09/17/2001	3	4	Arsenic	10.4	mg/kg	NV	479948.94	1347201.11
A2P2-PT2-1HH	A2P2-PT2-1HH-4-M	09/17/2001	3	4	Uranium, Total	1.53	ug/g	NV	479948.94	1347201.11
A2P2-PT2-1HH	A2P2-PT2-1HH-5-M	09/17/2001	4	5	Arsenic	12.4	mg/kg	NV	479948.94	1347201.11
A2P2-PT2-1HH	A2P2-PT2-1HH-6-M	09/17/2001	5	6	Arsenic	7.49	mg/kg	NV	479948.94	1347201.11
A2P2-PT2-1HH	A2P2-PT2-1HH-6-M	09/17/2001	5	6	Uranium, Total	1.54	ug/g	NV	479948.94	1347201.11
A2P2-PT2-1I	A2P2-PT2-1I-1-RM	09/07/2000	0	1	Arsenic	21.6	mg/kg	-	479900	1347224
A2P2-PT2-1I	A2P2-PT2-1I-1-RM	09/07/2000	0	1	Radium-226	1.114	pCi/g	-	479900	1347224
A2P2-PT2-1I	A2P2-PT2-1I-1-RM	09/07/2000	0	1	Radium-228	1.02	pCi/g	-	479900	1347224
A2P2-PT2-1I	A2P2-PT2-1I-1-RM	09/07/2000	0	1	Thorium-228	0.991	pCi/g	-	479900	1347224
A2P2-PT2-1I	A2P2-PT2-1I-1-RM	09/07/2000	0	1	Thorium-232	1.02	pCi/g	-	479900	1347224
A2P2-PT2-1I	A2P2-PT2-1I-1-RM	09/07/2000	0	1	Uranium, Total	7.757	ug/g	-	479900	1347224
A2P2-PT2-1I	A2P2-PT2-1I-3-RM	09/07/2000	2	3	Arsenic	17.3	mg/kg	-	479900	1347224
A2P2-PT2-1I	A2P2-PT2-1I-3-RM	09/07/2000	2	3	Radium-226	1.156	pCi/g	-	479900	1347224
A2P2-PT2-1I	A2P2-PT2-1I-3-RM	09/07/2000	2	3	Radium-228	1.032	pCi/g	-	479900	1347224
A2P2-PT2-1I	A2P2-PT2-1I-3-RM	09/07/2000	2	3	Thorium-228	1.015	pCi/g	-	479900	1347224
A2P2-PT2-1I	A2P2-PT2-1I-3-RM	09/07/2000	2	3	Thorium-232	1.032	pCi/g	-	479900	1347224
A2P2-PT2-1I	A2P2-PT2-1I-3-RM	09/07/2000	2	3	Uranium, Total	2.562	ug/g	U	479900	1347224
A2P2-PT2-1I	A2P2-PT2-1I-4-RM	09/07/2000	3	4	Arsenic	12.4	mg/kg	-	479900	1347224
A2P2-PT2-1I	A2P2-PT2-1I-4-RM	09/07/2000	3	4	Radium-226	1.027	pCi/g	-	479900	1347224
A2P2-PT2-1I	A2P2-PT2-1I-4-RM	09/07/2000	3	4	Radium-228	0.786	pCi/g	-	479900	1347224
A2P2-PT2-1I	A2P2-PT2-1I-4-RM	09/07/2000	3	4	Thorium-228	0.744	pCi/g	-	479900	1347224
A2P2-PT2-1I	A2P2-PT2-1I-4-RM	09/07/2000	3	4	Thorium-232	0.786	pCi/g	-	479900	1347224
A2P2-PT2-1I	A2P2-PT2-1I-4-RM	09/07/2000	3	4	Uranium, Total	2.592	ug/g	U	479900	1347224
A2P2-PT2-1II	A2P2-PT2-1II-1-M	09/17/2001	0	1	Arsenic	4.65	mg/kg	NV	479914.82	1347124.33
A2P2-PT2-1II	A2P2-PT2-1II-1-M	09/17/2001	0	1	Uranium, Total	9.31	ug/g	NV	479914.82	1347124.33
A2P2-PT2-1II	A2P2-PT2-1II-2-M	09/17/2001	1	2	Arsenic	11.8	mg/kg	NV	479914.82	1347124.33
A2P2-PT2-1II	A2P2-PT2-1II-3-M	09/17/2001	2	3	Arsenic	9.02	mg/kg	NV	479914.82	1347124.33
A2P2-PT2-1II	A2P2-PT2-1II-4-M	09/17/2001	3	4	Arsenic	11.4	mg/kg	NV	479914.82	1347124.33
A2P2-PT2-1II	A2P2-PT2-1II-4-M	09/17/2001	3	4	Uranium, Total	1.81	ug/g	NV	479914.82	1347124.33

000233

4328

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT2-1II	A2P2-PT2-1II-5-M	09/17/2001	4	5	Arsenic	15.6	mg/kg	NV	479914.82	1347124.33
A2P2-PT2-1II	A2P2-PT2-1II-6-M	09/17/2001	5	6	Arsenic	7.51	mg/kg	NV	479914.82	1347124.33
A2P2-PT2-1II	A2P2-PT2-1II-6-M	09/17/2001	5	6	Uranium, Total	2.11	ug/g	NV	479914.82	1347124.33
A2P2-PT2-1J	A2P2-PT2-1J-1-RM	09/07/2000	0	1	Arsenic	22.4	mg/kg	-	479900	1347194
A2P2-PT2-1J	A2P2-PT2-1J-1-RM	09/07/2000	0	1	Radium-226	1.217	pCi/g	-	479900	1347194
A2P2-PT2-1J	A2P2-PT2-1J-1-RM	09/07/2000	0	1	Radium-228	1.038	pCi/g	-	479900	1347194
A2P2-PT2-1J	A2P2-PT2-1J-1-RM	09/07/2000	0	1	Thorium-228	1.008	pCi/g	-	479900	1347194
A2P2-PT2-1J	A2P2-PT2-1J-1-RM	09/07/2000	0	1	Thorium-232	1.038	pCi/g	-	479900	1347194
A2P2-PT2-1J	A2P2-PT2-1J-1-RM	09/07/2000	0	1	Uranium, Total	7.575	ug/g	-	479900	1347194
A2P2-PT2-1J	A2P2-PT2-1J-3-RM	09/07/2000	2	3	Arsenic	38.1	mg/kg	-	479900	1347194
A2P2-PT2-1J	A2P2-PT2-1J-3-RM	09/07/2000	2	3	Radium-226	1.038	pCi/g	-	479900	1347194
A2P2-PT2-1J	A2P2-PT2-1J-3-RM	09/07/2000	2	3	Radium-228	0.968	pCi/g	-	479900	1347194
A2P2-PT2-1J	A2P2-PT2-1J-3-RM	09/07/2000	2	3	Thorium-228	0.963	pCi/g	-	479900	1347194
A2P2-PT2-1J	A2P2-PT2-1J-3-RM	09/07/2000	2	3	Thorium-232	0.968	pCi/g	-	479900	1347194
A2P2-PT2-1J	A2P2-PT2-1J-3-RM	09/07/2000	2	3	Uranium, Total	2.586	ug/g	U	479900	1347194
A2P2-PT2-1J	A2P2-PT2-1J-4-RM	09/07/2000	3	4	Arsenic	17.5	mg/kg	-	479900	1347194
A2P2-PT2-1J	A2P2-PT2-1J-4-RM	09/07/2000	3	4	Radium-226	1.369	pCi/g	-	479900	1347194
A2P2-PT2-1J	A2P2-PT2-1J-4-RM	09/07/2000	3	4	Radium-228	1.036	pCi/g	-	479900	1347194
A2P2-PT2-1J	A2P2-PT2-1J-4-RM	09/07/2000	3	4	Thorium-228	1.013	pCi/g	-	479900	1347194
A2P2-PT2-1J	A2P2-PT2-1J-4-RM	09/07/2000	3	4	Thorium-232	1.036	pCi/g	-	479900	1347194
A2P2-PT2-1J	A2P2-PT2-1J-4-RM	09/07/2000	3	4	Uranium, Total	2.964	ug/g	U	479900	1347194
A2P2-PT2-1JJ	A2P2-PT2-1JJ-1-M	09/17/2001	0	1	Arsenic	3.92	mg/kg	NV	479877.5	1347126.3
A2P2-PT2-1JJ	A2P2-PT2-1JJ-1-M	09/17/2001	0	1	Uranium, Total	11.5	ug/g	NV	479877.5	1347126.3
A2P2-PT2-1JJ	A2P2-PT2-1JJ-2-M	09/17/2001	1	2	Arsenic	5.85	mg/kg	NV	479877.5	1347126.3
A2P2-PT2-1JJ	A2P2-PT2-1JJ-3-M	09/17/2001	2	3	Arsenic	20.6	mg/kg	NV	479877.5	1347126.3
A2P2-PT2-1JJ	A2P2-PT2-1JJ-4-M	09/17/2001	3	4	Arsenic	10	mg/kg	NV	479877.5	1347126.3
A2P2-PT2-1JJ	A2P2-PT2-1JJ-4-M	09/17/2001	3	4	Uranium, Total	2.27	ug/g	NV	479877.5	1347126.3
A2P2-PT2-1JJ	A2P2-PT2-1JJ-5-M	09/17/2001	4	5	Arsenic	12.4	mg/kg	NV	479877.5	1347126.3
A2P2-PT2-1JJ	A2P2-PT2-1JJ-6-M	09/17/2001	5	6	Arsenic	8.44	mg/kg	NV	479877.5	1347126.3
A2P2-PT2-1JJ	A2P2-PT2-1JJ-6-M	09/17/2001	5	6	Uranium, Total	1.33	ug/g	NV	479877.5	1347126.3
A2P2-PT2-1K	A2P2-PT2-1K-1-M	11/21/2000	0	1	Arsenic	17.4	mg/kg	-	479893.2	1347186.9
A2P2-PT2-1K	A2P2-PT2-1K-3-M	11/21/2000	2	3	Arsenic	27.2	mg/kg	-	479893.2	1347186.9
A2P2-PT2-1K	A2P2-PT2-1K-4-M	11/21/2000	3	4	Arsenic	22.6	mg/kg	-	479893.2	1347186.9
A2P2-PT2-1K	A2P2-PT2-1K-5-M	11/21/2000	4	5	Arsenic	5.46	mg/kg	U	479893.2	1347186.9
A2P2-PT2-1K	A2P2-PT2-1K-6-M	11/21/2000	5	6	Arsenic	5.56	mg/kg	U	479893.2	1347186.9
A2P2-PT2-1KK	A2P2-PT2-1KK-1-M	09/17/2001	0	1	Arsenic	4.85	mg/kg	J	479837.89	1347129.9
A2P2-PT2-1KK	A2P2-PT2-1KK-1-M	09/17/2001	0	1	Uranium, Total	13.7	ug/g	NV	479837.89	1347129.9
A2P2-PT2-1KK	A2P2-PT2-1KK-2-M	09/17/2001	1	2	Arsenic	13.2	mg/kg	J	479837.89	1347129.9
A2P2-PT2-1KK	A2P2-PT2-1KK-3-M	09/17/2001	2	3	Arsenic	11.4	mg/kg	J	479837.89	1347129.9
A2P2-PT2-1KK	A2P2-PT2-1KK-4-M	09/17/2001	3	4	Arsenic	10.7	mg/kg	J	479837.89	1347129.9
A2P2-PT2-1KK	A2P2-PT2-1KK-4-M	09/17/2001	3	4	Uranium, Total	1.92	ug/g	NV	479837.89	1347129.9

000234

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT2-1KK	A2P2-PT2-1KK-5-M	09/17/2001	4	5	Arsenic	12	mg/kg	J	479837.89	1347129.9
A2P2-PT2-1KK	A2P2-PT2-1KK-6-M	09/17/2001	5	6	Arsenic	7.13	mg/kg	J	479837.89	1347129.9
A2P2-PT2-1KK	A2P2-PT2-1KK-6-M	09/17/2001	5	6	Uranium, Total	1.41	ug/g	NV	479837.89	1347129.9
A2P2-PT2-1L	A2P2-PT2-1L-1-M	11/21/2000	0	1	Arsenic	25.3	mg/kg	-	479913.2	1347224.2
A2P2-PT2-1L	A2P2-PT2-1L-3-M	11/21/2000	2	3	Arsenic	37.9	mg/kg	-	479913.2	1347224.2
A2P2-PT2-1L	A2P2-PT2-1L-4-M	11/21/2000	3	4	Arsenic	13.5	mg/kg	-	479913.2	1347224.2
A2P2-PT2-1L	A2P2-PT2-1L-5-M	11/21/2000	4	5	Arsenic	12.3	mg/kg	-	479913.2	1347224.2
A2P2-PT2-1L	A2P2-PT2-1L-6-M	11/21/2000	5	6	Arsenic	5.23	mg/kg	U	479913.2	1347224.2
A2P2-PT2-1LL	A2P2-PT2-1LL-1-M	09/17/2001	0	1	Arsenic	36.4	mg/kg	J	479837.92	1347204.77
A2P2-PT2-1LL	A2P2-PT2-1LL-1-M	09/17/2001	0	1	Uranium, Total	11.3	ug/g	NV	479837.92	1347204.77
A2P2-PT2-1LL	A2P2-PT2-1LL-2-M	09/17/2001	1	2	Arsenic	63.6	mg/kg	J	479837.92	1347204.77
A2P2-PT2-1LL	A2P2-PT2-1LL-3-M	09/17/2001	2	3	Arsenic	34	mg/kg	J	479837.92	1347204.77
A2P2-PT2-1LL	A2P2-PT2-1LL-4-M	09/17/2001	3	4	Arsenic	12.6	mg/kg	J	479837.92	1347204.77
A2P2-PT2-1LL	A2P2-PT2-1LL-4-M	09/17/2001	3	4	Uranium, Total	1.28	ug/g	NV	479837.92	1347204.77
A2P2-PT2-1LL	A2P2-PT2-1LL-5-M	09/17/2001	4	5	Arsenic	7.15	mg/kg	NV	479837.92	1347204.77
A2P2-PT2-1LL	A2P2-PT2-1LL-6-M	09/17/2001	5	6	Arsenic	2.68	mg/kg	NV	479837.92	1347204.77
A2P2-PT2-1LL	A2P2-PT2-1LL-6-M	09/17/2001	5	6	Uranium, Total	0.959	ug/g	NV	479837.92	1347204.77
A2P2-PT2-1M	A2P2-PT2-1M-1-M	11/21/2000	0	1	Arsenic	19.1	mg/kg	-	479937.3	1347231.2
A2P2-PT2-1M	A2P2-PT2-1M-2-M	11/21/2000	1	2	Arsenic	24.2	mg/kg	-	479937.3	1347231.2
A2P2-PT2-1M	A2P2-PT2-1M-3-M	11/21/2000	2	3	Arsenic	7.58	mg/kg	-	479937.3	1347231.2
A2P2-PT2-1M	A2P2-PT2-1M-4-M	11/21/2000	3	4	Arsenic	6.84	mg/kg	-	479937.3	1347231.2
A2P2-PT2-1M	A2P2-PT2-1M-5-M	11/21/2000	4	5	Arsenic	5.25	mg/kg	U	479937.3	1347231.2
A2P2-PT2-1M	A2P2-PT2-1M-6-M	11/21/2000	5	6	Arsenic	5	mg/kg	U	479937.3	1347231.2
A2P2-PT2-1MM	A2P2-PT2-1MM-1-M	09/17/2001	0	1	Arsenic	13.2	mg/kg	NV	479868.74	1347186.47
A2P2-PT2-1MM	A2P2-PT2-1MM-1-M	09/17/2001	0	1	Uranium, Total	12	ug/g	NV	479868.74	1347186.47
A2P2-PT2-1MM	A2P2-PT2-1MM-2-M	09/17/2001	1	2	Arsenic	24.8	mg/kg	NV	479868.74	1347186.47
A2P2-PT2-1MM	A2P2-PT2-1MM-3-M	09/17/2001	2	3	Arsenic	50.8	mg/kg	NV	479868.74	1347186.47
A2P2-PT2-1MM	A2P2-PT2-1MM-4-M	09/17/2001	3	4	Arsenic	15.3	mg/kg	NV	479868.74	1347186.47
A2P2-PT2-1MM	A2P2-PT2-1MM-4-M	09/17/2001	3	4	Uranium, Total	1.62	ug/g	NV	479868.74	1347186.47
A2P2-PT2-1MM	A2P2-PT2-1MM-5-M	09/17/2001	4	5	Arsenic	18.6	mg/kg	NV	479868.74	1347186.47
A2P2-PT2-1MM	A2P2-PT2-1MM-6-M	09/17/2001	5	6	Arsenic	5.15	mg/kg	NV	479868.74	1347186.47
A2P2-PT2-1MM	A2P2-PT2-1MM-6-M	09/17/2001	5	6	Uranium, Total	1.13	ug/g	NV	479868.74	1347186.47
A2P2-PT2-1NN	A2P2-PT2-1NN-1-M	09/17/2001	0	1	Arsenic	5.83	mg/kg	NV	479438.13	1347252.41
A2P2-PT2-1NN	A2P2-PT2-1NN-1-M	09/17/2001	0	1	Uranium, Total	9.06	ug/g	NV	479438.13	1347252.41
A2P2-PT2-1NN	A2P2-PT2-1NN-2-M	09/17/2001	1	2	Arsenic	2.3	mg/kg	NV	479438.13	1347252.41
A2P2-PT2-1NN	A2P2-PT2-1NN-3-M	09/17/2001	2	3	Arsenic	1.6	mg/kg	NV	479438.13	1347252.41
A2P2-PT2-1NN	A2P2-PT2-1NN-4-M	09/17/2001	3	4	Arsenic	2.58	mg/kg	NV	479438.13	1347252.41
A2P2-PT2-1NN	A2P2-PT2-1NN-4-M	09/17/2001	3	4	Uranium, Total	1.31	ug/g	NV	479438.13	1347252.41
A2P2-PT2-1NN	A2P2-PT2-1NN-5-M	09/17/2001	4	5	Arsenic	2.87	mg/kg	NV	479438.13	1347252.41
A2P2-PT2-1NN	A2P2-PT2-1NN-6-M	09/17/2001	5	6	Arsenic	1.75	mg/kg	NV	479438.13	1347252.41
A2P2-PT2-1NN	A2P2-PT2-1NN-6-M	09/17/2001	5	6	Uranium, Total	1.16	ug/g	NV	479438.13	1347252.41

000235
4328

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT2-1OO	A2P2-PT2-1OO-1-M	10/24/2001	0	1	Arsenic	6.68	mg/kg	J	479963.349	1347186.182
A2P2-PT2-1OO	A2P2-PT2-1OO-2-M	10/24/2001	1	2	Arsenic	13.6	mg/kg	J	479963.349	1347186.182
A2P2-PT2-1OO	A2P2-PT2-1OO-3-M	10/24/2001	2	3	Arsenic	13.6	mg/kg	J	479963.349	1347186.182
A2P2-PT2-1OO	A2P2-PT2-1OO-4-M	10/24/2001	3	4	Arsenic	10.1	mg/kg	J	479963.349	1347186.182
A2P2-PT2-1OO	A2P2-PT2-1OO-5-M	10/24/2001	4	5	Arsenic	10.1	mg/kg	J	479963.349	1347186.182
A2P2-PT2-1OO	A2P2-PT2-1OO-6-M	10/24/2001	5	6	Arsenic	25.2	mg/kg	J	479963.349	1347186.182
A2P2-PT2-1OO	A2P2-PT2-1OO-7-M	10/24/2001	6	7	Arsenic	1.9	mg/kg	NV	479963.349	1347186.182
A2P2-PT2-1OO	A2P2-PT2-1OO-8-M	10/24/2001	7	8	Arsenic	2.32	mg/kg	NV	479963.349	1347186.182
A2P2-PT2-1P	A2P2-PT2-1P-1-M	04/30/2001	0	1	Arsenic	10.5	mg/kg	J	479915.1	1347193.9
A2P2-PT2-1P	A2P2-PT2-1P-4-M	04/30/2001	3	4	Arsenic	14.7	mg/kg	J	479915.1	1347193.9
A2P2-PT2-1P	A2P2-PT2-1P-5-M	04/30/2001	4	5	Arsenic	4.1	mg/kg	J	479915.1	1347193.9
A2P2-PT2-1P	A2P2-PT2-1P-6-M	04/30/2001	5	6	Arsenic	8.35	mg/kg	J	479915.1	1347193.9
A2P2-PT2-1PP	A2P2-PT2-1PP-1-M	10/24/2001	0	1	Arsenic	3.6	mg/kg	-	479915.2	1347104.317
A2P2-PT2-1PP	A2P2-PT2-1PP-2-M	10/24/2001	1	2	Arsenic	11	mg/kg	-	479915.2	1347104.317
A2P2-PT2-1PP	A2P2-PT2-1PP-3-M	10/24/2001	2	3	Arsenic	12.3	mg/kg	-	479915.2	1347104.317
A2P2-PT2-1PP	A2P2-PT2-1PP-4-M	10/24/2001	3	4	Arsenic	7.92	mg/kg	-	479915.2	1347104.317
A2P2-PT2-1PP	A2P2-PT2-1PP-5-M	10/24/2001	4	5	Arsenic	9.49	mg/kg	J	479915.2	1347104.317
A2P2-PT2-1PP	A2P2-PT2-1PP-6-M	10/24/2001	5	6	Arsenic	11	mg/kg	J	479915.2	1347104.317
A2P2-PT2-1Q	A2P2-PT2-1Q-1-M	04/30/2001	0	1	Arsenic	9.72	mg/kg	J	479887	1347180.3
A2P2-PT2-1Q	A2P2-PT2-1Q-4-M	04/30/2001	3	4	Arsenic	20.4	mg/kg	J	479887	1347180.3
A2P2-PT2-1Q	A2P2-PT2-1Q-5-M	04/30/2001	4	5	Arsenic	11.6	mg/kg	J	479887	1347180.3
A2P2-PT2-1Q	A2P2-PT2-1Q-6-M	04/30/2001	5	6	Arsenic	6	mg/kg	J	479887	1347180.3
A2P2-PT2-1QQ	A2P2-PT2-1QQ-1-M	10/24/2001	0	1	Arsenic	4.03	mg/kg	J	479878.48	1347106.522
A2P2-PT2-1QQ	A2P2-PT2-1QQ-2-M	10/24/2001	1	2	Arsenic	9.26	mg/kg	-	479878.48	1347106.522
A2P2-PT2-1QQ	A2P2-PT2-1QQ-3-M	10/24/2001	2	3	Arsenic	16.6	mg/kg	-	479878.48	1347106.522
A2P2-PT2-1QQ	A2P2-PT2-1QQ-4-M	10/24/2001	3	4	Arsenic	6.57	mg/kg	-	479878.48	1347106.522
A2P2-PT2-1QQ	A2P2-PT2-1QQ-5-M	10/24/2001	4	5	Arsenic	9.31	mg/kg	-	479878.48	1347106.522
A2P2-PT2-1QQ	A2P2-PT2-1QQ-6-M	10/24/2001	5	6	Arsenic	9.85	mg/kg	-	479878.48	1347106.522
A2P2-PT2-1R	A2P2-PT2-1R-1-M	04/30/2001	0	1	Arsenic	7	mg/kg	J	479892.8	1347230.9
A2P2-PT2-1R	A2P2-PT2-1R-4-M	04/30/2001	3	4	Arsenic	3.28	mg/kg	J	479892.8	1347230.9
A2P2-PT2-1R	A2P2-PT2-1R-5-M	04/30/2001	4	5	Arsenic	2.94	mg/kg	J	479892.8	1347230.9
A2P2-PT2-1R	A2P2-PT2-1R-6-M	04/30/2001	5	6	Arsenic	1.93	mg/kg	J	479892.8	1347230.9
A2P2-PT2-1RR	A2P2-PT2-1RR-1-M	10/24/2001	0	1	Arsenic	10	mg/kg	-	479823.05	1347114.853
A2P2-PT2-1RR	A2P2-PT2-1RR-2-M	10/24/2001	1	2	Arsenic	12.9	mg/kg	-	479823.05	1347114.853
A2P2-PT2-1RR	A2P2-PT2-1RR-3-M	10/24/2001	2	3	Arsenic	14.4	mg/kg	-	479823.05	1347114.853
A2P2-PT2-1RR	A2P2-PT2-1RR-4-M	10/24/2001	3	4	Arsenic	10.3	mg/kg	-	479823.05	1347114.853
A2P2-PT2-1RR	A2P2-PT2-1RR-5-M	10/24/2001	4	5	Arsenic	10.3	mg/kg	-	479823.05	1347114.853
A2P2-PT2-1RR	A2P2-PT2-1RR-6-M	10/24/2001	5	6	Arsenic	15	mg/kg	-	479823.05	1347114.853
A2P2-PT2-1RR	A2P2-PT2-1RR-7-M	10/24/2001	6	7	Arsenic	3.9	mg/kg	NV	479823.05	1347114.853
A2P2-PT2-1RR	A2P2-PT2-1RR-8-M	10/24/2001	7	8	Arsenic	10.5	mg/kg	NV	479823.05	1347114.853
A2P2-PT2-1S	A2P2-PT2-1S-1-M	04/30/2001	0	1	Arsenic	4.45	mg/kg	J	479915.6	1347238.2

000236

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT2-1S	A2P2-PT2-1S-4-M	04/30/2001	3	4	Arsenic	4.35	mg/kg	J	479915.6	1347238.2
A2P2-PT2-1S	A2P2-PT2-1S-5-M	04/30/2001	4	5	Arsenic	6.99	mg/kg	J	479915.6	1347238.2
A2P2-PT2-1S	A2P2-PT2-1S-6-M	04/30/2001	5	6	Arsenic	4.7	mg/kg	J	479915.6	1347238.2
A2P2-PT2-1SS	A2P2-PT2-1SS-1-M	10/24/2001	0	1	Arsenic	11.2	mg/kg	J	479824.2	1347166.89
A2P2-PT2-1SS	A2P2-PT2-1SS-2-M	10/24/2001	1	2	Arsenic	21.9	mg/kg	J	479824.2	1347166.89
A2P2-PT2-1SS	A2P2-PT2-1SS-3-M	10/24/2001	2	3	Arsenic	19.4	mg/kg	J	479824.2	1347166.89
A2P2-PT2-1SS	A2P2-PT2-1SS-4-M	10/24/2001	3	4	Arsenic	28.2	mg/kg	J	479824.2	1347166.89
A2P2-PT2-1SS	A2P2-PT2-1SS-5-M	10/24/2001	4	5	Arsenic	10.9	mg/kg	J	479824.2	1347166.89
A2P2-PT2-1SS	A2P2-PT2-1SS-6-M	10/24/2001	5	6	Arsenic	15.9	mg/kg	J	479824.2	1347166.89
A2P2-PT2-1SS	A2P2-PT2-1SS-7-M	10/24/2001	6	7	Arsenic	7.36	mg/kg	NV	479824.2	1347166.89
A2P2-PT2-1SS	A2P2-PT2-1SS-8-M	10/24/2001	7	8	Arsenic	3.97	mg/kg	NV	479824.2	1347166.89
A2P2-PT2-1T	A2P2-PT2-1T-1-M	04/30/2001	0	1	Arsenic	30.1	mg/kg	J	479944.5	1347238.2
A2P2-PT2-1T	A2P2-PT2-1T-4-M	04/30/2001	3	4	Arsenic	11.6	mg/kg	-	479944.5	1347238.2
A2P2-PT2-1T	A2P2-PT2-1T-5-M	04/30/2001	4	5	Arsenic	3.21	mg/kg	J	479944.5	1347238.2
A2P2-PT2-1T	A2P2-PT2-1T-6-M	04/30/2001	5	6	Arsenic	1.97	mg/kg	J	479944.5	1347238.2
A2P2-PT2-1TT	A2P2-PT2-1TT-1-M	10/24/2001	0	1	Arsenic	17.4	mg/kg	J	479823.737	1347219.009
A2P2-PT2-1TT	A2P2-PT2-1TT-2-M	10/24/2001	1	2	Arsenic	17.3	mg/kg	J	479823.737	1347219.009
A2P2-PT2-1TT	A2P2-PT2-1TT-3-M	10/24/2001	2	3	Arsenic	10.8	mg/kg	-	479823.737	1347219.009
A2P2-PT2-1TT	A2P2-PT2-1TT-4-M	10/24/2001	3	4	Arsenic	10.5	mg/kg	-	479823.737	1347219.009
A2P2-PT2-1TT	A2P2-PT2-1TT-5-M	10/24/2001	4	5	Arsenic	3.18	mg/kg	-	479823.737	1347219.009
A2P2-PT2-1TT	A2P2-PT2-1TT-6-M	10/24/2001	5	6	Arsenic	1.29	mg/kg	U	479823.737	1347219.009
A2P2-PT2-1UU	A2P2-PT2-1UU-1-M	01/17/2002	0	1	Arsenic	8.5	mg/kg	NV	479981.8	1347167
A2P2-PT2-1UU	A2P2-PT2-1UU-2-M	01/17/2002	1	2	Arsenic	8.98	mg/kg	NV	479981.8	1347167
A2P2-PT2-1UU	A2P2-PT2-1UU-3-M	01/17/2002	2	3	Arsenic	10.1	mg/kg	NV	479981.8	1347167
A2P2-PT2-1UU	A2P2-PT2-1UU-4-M	01/17/2002	3	4	Arsenic	7.91	mg/kg	NV	479981.8	1347167
A2P2-PT2-1UU	A2P2-PT2-1UU-5-M	01/17/2002	4	5	Arsenic	11.5	mg/kg	NV	479981.8	1347167
A2P2-PT2-1UU	A2P2-PT2-1UU-6-M	01/17/2002	5	6	Arsenic	3.73	mg/kg	NV	479981.8	1347167
A2P2-PT2-1V	A2P2-PT2-1V-1-M	06/27/2001	0	1	Arsenic	7.68	mg/kg	J	479915	1347184
A2P2-PT2-1V	A2P2-PT2-1V-2-M	06/27/2001	1	2	Arsenic	10.6	mg/kg	J	479915	1347184
A2P2-PT2-1V	A2P2-PT2-1V-3-M	06/27/2001	2	3	Arsenic	24.7	mg/kg	J	479915	1347184
A2P2-PT2-1V	A2P2-PT2-1V-4-M	06/27/2001	3	4	Arsenic	18.7	mg/kg	J	479915	1347184
A2P2-PT2-1V	A2P2-PT2-1V-5-M	06/27/2001	4	5	Arsenic	10.2	mg/kg	J	479915	1347184
A2P2-PT2-1V	A2P2-PT2-1V-6-M	06/27/2001	5	6	Arsenic	8.97	mg/kg	J	479915	1347184
A2P2-PT2-1VV	A2P2-PT2-1VV-1-M	01/17/2002	0	1	Arsenic	2.28	mg/kg	UNV	479916.3	1347085
A2P2-PT2-1VV	A2P2-PT2-1VV-2-M	01/17/2002	1	2	Arsenic	9.4	mg/kg	NV	479916.3	1347085
A2P2-PT2-1VV	A2P2-PT2-1VV-3-M	01/17/2002	2	3	Arsenic	8.32	mg/kg	NV	479916.3	1347085
A2P2-PT2-1VV	A2P2-PT2-1VV-4-M	01/17/2002	3	4	Arsenic	6.35	mg/kg	NV	479916.3	1347085
A2P2-PT2-1VV	A2P2-PT2-1VV-5-M	01/17/2002	4	5	Arsenic	7.65	mg/kg	NV	479916.3	1347085
A2P2-PT2-1VV	A2P2-PT2-1VV-6-M	01/17/2002	5	6	Arsenic	5.56	mg/kg	NV	479916.3	1347085
A2P2-PT2-1W	A2P2-PT2-1W-1-M	06/27/2001	0	1	Arsenic	9.58	mg/kg	J	479880	1347173.2
A2P2-PT2-1W	A2P2-PT2-1W-2-M	06/27/2001	1	2	Arsenic	28.2	mg/kg	J	479880	1347173.2

000237

4928

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT2-1W	A2P2-PT2-1W-3-M	06/27/2001	2	3	Arsenic	21.4	mg/kg	J	479880	1347173.2
A2P2-PT2-1W	A2P2-PT2-1W-4-M	06/27/2001	3	4	Arsenic	38.8	mg/kg	J	479880	1347173.2
A2P2-PT2-1W	A2P2-PT2-1W-5-M	06/27/2001	4	5	Arsenic	9.43	mg/kg	J	479880	1347173.2
A2P2-PT2-1W	A2P2-PT2-1W-6-M	06/27/2001	5	6	Arsenic	6.8	mg/kg	J	479880	1347173.2
A2P2-PT2-1WW	A2P2-PT2-1WW-1-M	01/17/2002	0	1	Arsenic	5.02	mg/kg	NV	479878.9	1347087
A2P2-PT2-1WW	A2P2-PT2-1WW-2-M	01/17/2002	1	2	Arsenic	13.7	mg/kg	NV	479878.9	1347087
A2P2-PT2-1WW	A2P2-PT2-1WW-3-M	01/17/2002	2	3	Arsenic	13.9	mg/kg	NV	479878.9	1347087
A2P2-PT2-1WW	A2P2-PT2-1WW-4-M	01/17/2002	3	4	Arsenic	7.72	mg/kg	NV	479878.9	1347087
A2P2-PT2-1WW	A2P2-PT2-1WW-5-M	01/17/2002	4	5	Arsenic	9.69	mg/kg	NV	479878.9	1347087
A2P2-PT2-1WW	A2P2-PT2-1WW-6-M	01/17/2002	5	6	Arsenic	5.27	mg/kg	NV	479878.9	1347087
A2P2-PT2-1X	A2P2-PT2-1X-1-M	06/27/2001	0	1	Arsenic	17.2	mg/kg	J	479951.7	1347245.6
A2P2-PT2-1X	A2P2-PT2-1X-2-M	06/27/2001	1	2	Arsenic	21.8	mg/kg	J	479951.7	1347245.6
A2P2-PT2-1X	A2P2-PT2-1X-3-M	06/27/2001	2	3	Arsenic	13	mg/kg	J	479951.7	1347245.6
A2P2-PT2-1X	A2P2-PT2-1X-4-M	06/27/2001	3	4	Arsenic	8.69	mg/kg	J	479951.7	1347245.6
A2P2-PT2-1X	A2P2-PT2-1X-5-M	06/27/2001	4	5	Arsenic	7.72	mg/kg	J	479951.7	1347245.6
A2P2-PT2-1X	A2P2-PT2-1X-6-M	06/27/2001	5	6	Arsenic	5.38	mg/kg	J	479951.7	1347245.6
A2P2-PT2-1XX	A2P2-PT2-1XX-1-M	01/21/2002	0	1	Arsenic	4.24	mg/kg	NV	479802.4	1347094
A2P2-PT2-1XX	A2P2-PT2-1XX-2-M	01/21/2002	1	2	Arsenic	9.14	mg/kg	NV	479802.4	1347094
A2P2-PT2-1XX	A2P2-PT2-1XX-3-M	01/21/2002	2	3	Arsenic	12.2	mg/kg	NV	479802.4	1347094
A2P2-PT2-1XX	A2P2-PT2-1XX-4-M	01/21/2002	3	4	Arsenic	6.17	mg/kg	NV	479802.4	1347094
A2P2-PT2-1XX	A2P2-PT2-1XX-5-M	01/21/2002	4	5	Arsenic	2.28	mg/kg	UNV	479802.4	1347094
A2P2-PT2-1XX	A2P2-PT2-1XX-6-M	01/21/2002	5	6	Arsenic	4.96	mg/kg	NV	479802.4	1347094
A2P2-PT2-1Y	A2P2-PT2-1Y-1-M	08/13/2001	0	1	Arsenic	5.14	mg/kg	NV	479914.92	1347174.09
A2P2-PT2-1Y	A2P2-PT2-1Y-2-M	08/13/2001	1	2	Arsenic	10.8	mg/kg	NV	479914.92	1347174.09
A2P2-PT2-1Y	A2P2-PT2-1Y-3-M	08/13/2001	2	3	Arsenic	12.7	mg/kg	NV	479914.92	1347174.09
A2P2-PT2-1Y	A2P2-PT2-1Y-4-M	08/13/2001	3	4	Arsenic	40.5	mg/kg	NV	479914.92	1347174.09
A2P2-PT2-1Y	A2P2-PT2-1Y-5-M	08/13/2001	4	5	Arsenic	10.9	mg/kg	NV	479914.92	1347174.09
A2P2-PT2-1Y	A2P2-PT2-1Y-6-M	08/13/2001	5	6	Arsenic	4.55	mg/kg	NV	479914.92	1347174.09
A2P2-PT2-1YY	A2P2-PT2-1YY-1-M	01/17/2002	0	1	Arsenic	10.8	mg/kg	NV	479804.2	1347167
A2P2-PT2-1YY	A2P2-PT2-1YY-2-M	01/17/2002	1	2	Arsenic	10.1	mg/kg	NV	479804.2	1347167
A2P2-PT2-1YY	A2P2-PT2-1YY-3-M	01/17/2002	2	3	Arsenic	11.2	mg/kg	NV	479804.2	1347167
A2P2-PT2-1YY	A2P2-PT2-1YY-4-M	01/17/2002	3	4	Arsenic	18.2	mg/kg	NV	479804.2	1347167
A2P2-PT2-1YY	A2P2-PT2-1YY-5-M	01/17/2002	4	5	Arsenic	5.35	mg/kg	NV	479804.2	1347167
A2P2-PT2-1YY	A2P2-PT2-1YY-6-M	01/17/2002	5	6	Arsenic	3.84	mg/kg	NV	479804.2	1347167
A2P2-PT2-1Z	A2P2-PT2-1Z-1-M	08/14/2001	0	1	Arsenic	13.3	mg/kg	NV	479873.25	1347165.81
A2P2-PT2-1Z	A2P2-PT2-1Z-2-M	08/14/2001	1	2	Arsenic	21	mg/kg	NV	479873.25	1347165.81
A2P2-PT2-1Z	A2P2-PT2-1Z-3-M	08/14/2001	2	3	Arsenic	22.1	mg/kg	NV	479873.25	1347165.81
A2P2-PT2-1Z	A2P2-PT2-1Z-4-M	08/14/2001	3	4	Arsenic	23.6	mg/kg	NV	479873.25	1347165.81
A2P2-PT2-1Z	A2P2-PT2-1Z-5-M	08/14/2001	4	5	Arsenic	9.74	mg/kg	NV	479873.25	1347165.81
A2P2-PT2-1Z	A2P2-PT2-1Z-6-M	08/14/2001	5	6	Arsenic	2.46	mg/kg	NV	479873.25	1347165.81
A2P2-PT2-1ZZ	A2P2-PT2-1ZZ-1-M	01/17/2002	0	1	Arsenic	6.17	mg/kg	NV	479787.9	1347223

000238

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT2-1ZZ	A2P2-PT2-1ZZ-2-M	01/17/2002	1	2	Arsenic	11.3	mg/kg	NV	479787.9	1347223
A2P2-PT2-1ZZ	A2P2-PT2-1ZZ-3-M	01/17/2002	2	3	Arsenic	23.9	mg/kg	NV	479787.9	1347223
A2P2-PT2-1ZZ	A2P2-PT2-1ZZ-4-M	01/17/2002	3	4	Arsenic	12.3	mg/kg	NV	479787.9	1347223
A2P2-PT2-1ZZ	A2P2-PT2-1ZZ-5-M	01/17/2002	4	5	Arsenic	2.25	mg/kg	UNV	479787.9	1347223
A2P2-PT2-1ZZ	A2P2-PT2-1ZZ-6-M	01/17/2002	5	6	Arsenic	2.22	mg/kg	UNV	479787.9	1347223
A2P2-PT2-2	A2P2-PT2-2-1-RM	06/13/2000	0	1	Arsenic	3.91	mg/kg	U	479975.51	1346903
A2P2-PT2-2	A2P2-PT2-2-1-RM	06/13/2000	0	1	Radium-226	1.032	pCi/g	-	479975.51	1346903
A2P2-PT2-2	A2P2-PT2-2-1-RM	06/13/2000	0	1	Radium-228	0.892	pCi/g	-	479975.51	1346903
A2P2-PT2-2	A2P2-PT2-2-1-RM	06/13/2000	0	1	Thorium-228	0.88	pCi/g	-	479975.51	1346903
A2P2-PT2-2	A2P2-PT2-2-1-RM	06/13/2000	0	1	Thorium-232	0.892	pCi/g	-	479975.51	1346903
A2P2-PT2-2	A2P2-PT2-2-1-RM	06/13/2000	0	1	Uranium, Total	9.596	ug/g	-	479975.51	1346903
A2P2-PT2-20	A2P2-PT2-20-1-R	06/27/2000	0	1	Radium-226	1.4	pCi/g	NV	478722.07	1346911.2
A2P2-PT2-20	A2P2-PT2-20-1-R	06/27/2000	0	1	Radium-228	0.99	pCi/g	NV	478722.07	1346911.2
A2P2-PT2-20	A2P2-PT2-20-1-R	06/27/2000	0	1	Thorium-228	0.96	pCi/g	NV	478722.07	1346911.2
A2P2-PT2-20	A2P2-PT2-20-1-R	06/27/2000	0	1	Thorium-232	0.99	pCi/g	NV	478722.07	1346911.2
A2P2-PT2-20	A2P2-PT2-20-1-R	06/27/2000	0	1	Uranium, Total	15	ug/g	NV	478722.07	1346911.2
A2P2-PT2-21	A2P2-PT2-21-1-R	06/28/2000	0	1	Radium-226	0.99	pCi/g	NV	478410.55	1346706.4
A2P2-PT2-21	A2P2-PT2-21-1-R	06/28/2000	0	1	Radium-228	0.61	pCi/g	NV	478410.55	1346706.4
A2P2-PT2-21	A2P2-PT2-21-1-R	06/28/2000	0	1	Thorium-228	0.58	pCi/g	NV	478410.55	1346706.4
A2P2-PT2-21	A2P2-PT2-21-1-R	06/28/2000	0	1	Thorium-232	0.61	pCi/g	NV	478410.55	1346706.4
A2P2-PT2-21	A2P2-PT2-21-1-R	06/28/2000	0	1	Uranium, Total	4.9	ug/g	NV	478410.55	1346706.4
A2P2-PT2-22	A2P2-PT2-22-1-R	06/28/2000	0	1	Radium-226	1	pCi/g	NV	478320.96	1346618.5
A2P2-PT2-22	A2P2-PT2-22-1-R	06/28/2000	0	1	Radium-228	0.77	pCi/g	NV	478320.96	1346618.5
A2P2-PT2-22	A2P2-PT2-22-1-R	06/28/2000	0	1	Thorium-228	0.76	pCi/g	NV	478320.96	1346618.5
A2P2-PT2-22	A2P2-PT2-22-1-R	06/28/2000	0	1	Thorium-232	0.77	pCi/g	NV	478320.96	1346618.5
A2P2-PT2-22	A2P2-PT2-22-1-R	06/28/2000	0	1	Uranium, Total	8.7	ug/g	NV	478320.96	1346618.5
A2P2-PT2-23	A2P2-PT2-23-1-R	06/04/2002	0	1	Radium-226	1.4	pCi/g	NV	478658	1347122
A2P2-PT2-24	A2P2-PT2-24-1-R	06/04/2002	0	1	Radium-226	1.2	pCi/g	NV	478841	1347040
A2P2-PT2-25	A2P2-PT2-25-1-R	06/04/2002	0	1	Radium-226	1.4	pCi/g	NV	479900	1347041
A2P2-PT2-26	A2P2-PT2-26-1-R	06/04/2002	0	1	Radium-226	1.2	pCi/g	NV	478614.7	1346930
A2P2-PT2-3	A2P2-PT2-3-1-RM	07/11/2000	0	1	Beryllium	0.17	mg/kg	NV	478279.3	1346581
A2P2-PT2-3	A2P2-PT2-3-1-RM	07/11/2000	0	1	Radium-226	0.93	pCi/g	NV	478279.3	1346581
A2P2-PT2-3	A2P2-PT2-3-1-RM	07/11/2000	0	1	Radium-228	0.26	pCi/g	NV	478279.3	1346581
A2P2-PT2-3	A2P2-PT2-3-1-RM	07/11/2000	0	1	Thorium-228	0.27	pCi/g	NV	478279.3	1346581
A2P2-PT2-3	A2P2-PT2-3-1-RM	07/11/2000	0	1	Thorium-232	0.26	pCi/g	NV	478279.3	1346581
A2P2-PT2-3	A2P2-PT2-3-1-RM	07/11/2000	0	1	Uranium, Total	0	mg/kg	NV	478279.3	1346581
A2P2-PT2-4	A2P2-PT2-4-39-R	06/20/2000	38	39	Radium-226	0.511	pCi/g	-	479570.24	1346539.1
A2P2-PT2-4	A2P2-PT2-4-39-R	06/20/2000	38	39	Radium-228	0.243	pCi/g	-	479570.24	1346539.1
A2P2-PT2-4	A2P2-PT2-4-39-R	06/20/2000	38	39	Thorium-228	0.24	pCi/g	-	479570.24	1346539.1
A2P2-PT2-4	A2P2-PT2-4-39-R	06/20/2000	38	39	Thorium-232	0.243	pCi/g	-	479570.24	1346539.1
A2P2-PT2-4	A2P2-PT2-4-39-R	06/20/2000	38	39	Uranium, Total	2.277	ug/g	U	479570.24	1346539.1

000239

43 28

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT2-4	A2P2-PT2-4-40-R	06/20/2000	39	40	Radium-226	0.565	pCi/g	-	479570.24	1346539.1
A2P2-PT2-4	A2P2-PT2-4-40-R	06/20/2000	39	40	Radium-228	0.252	pCi/g	-	479570.24	1346539.1
A2P2-PT2-4	A2P2-PT2-4-40-R	06/20/2000	39	40	Thorium-228	0.253	pCi/g	-	479570.24	1346539.1
A2P2-PT2-4	A2P2-PT2-4-40-R	06/20/2000	39	40	Thorium-232	0.252	pCi/g	-	479570.24	1346539.1
A2P2-PT2-4	A2P2-PT2-4-40-R	06/20/2000	39	40	Uranium, Total	3.013	ug/g	J	479570.24	1346539.1
A2P2-PT2-5	A2P2-PT2-5-1-R	06/15/2000	0	0.5	Radium-226	1.3	pCi/g	NV	479884.81	1346774.2
A2P2-PT2-5	A2P2-PT2-5-1-R	06/15/2000	0	0.5	Radium-228	0.83	pCi/g	NV	479884.81	1346774.2
A2P2-PT2-5	A2P2-PT2-5-1-R	06/15/2000	0	0.5	Thorium-228	0.84	pCi/g	NV	479884.81	1346774.2
A2P2-PT2-5	A2P2-PT2-5-1-R	06/15/2000	0	0.5	Thorium-232	0.83	pCi/g	NV	479884.81	1346774.2
A2P2-PT2-5	A2P2-PT2-5-1-R	06/15/2000	0	0.5	Uranium, Total	16	ug/g	NV	479884.81	1346774.2
A2P2-PT2-6	A2P2-PT2-6-1-R	06/15/2000	0	0.5	Radium-226	0.8	pCi/g	NV	478301	1348133
A2P2-PT2-6	A2P2-PT2-6-1-R	06/15/2000	0	0.5	Radium-226	0.8	pCi/g	NV	479428.78	1347030.9
A2P2-PT2-6	A2P2-PT2-6-1-R	06/15/2000	0	0.5	Radium-228	0.42	pCi/g	NV	478301	1348133
A2P2-PT2-6	A2P2-PT2-6-1-R	06/15/2000	0	0.5	Radium-228	0.42	pCi/g	NV	479428.78	1347030.9
A2P2-PT2-6	A2P2-PT2-6-1-R	06/15/2000	0	0.5	Thorium-228	0.39	pCi/g	NV	478301	1348133
A2P2-PT2-6	A2P2-PT2-6-1-R	06/15/2000	0	0.5	Thorium-228	0.39	pCi/g	NV	479428.78	1347030.9
A2P2-PT2-6	A2P2-PT2-6-1-R	06/15/2000	0	0.5	Thorium-232	0.42	pCi/g	NV	478301	1348133
A2P2-PT2-6	A2P2-PT2-6-1-R	06/15/2000	0	0.5	Thorium-232	0.42	pCi/g	NV	479428.78	1347030.9
A2P2-PT2-6	A2P2-PT2-6-1-R	06/15/2000	0	0.5	Uranium, Total	3.1	mg/kg	NV	478301	1348133
A2P2-PT2-6	A2P2-PT2-6-1-R	06/15/2000	0	0.5	Uranium, Total	3.1	ug/g	NV	479428.78	1347030.9
A2P2-PT2-7	A2P2-PT2-7-1-R	06/21/2000	0	1	Radium-226	1.2	pCi/g	NV	478301	1348259
A2P2-PT2-7	A2P2-PT2-7-1-R	06/21/2000	0	1	Radium-226	1.2	pCi/g	NV	479322.89	1346872.1
A2P2-PT2-7	A2P2-PT2-7-1-R	06/21/2000	0	1	Radium-228	0.97	pCi/g	NV	478301	1348259
A2P2-PT2-7	A2P2-PT2-7-1-R	06/21/2000	0	1	Radium-228	0.97	pCi/g	NV	479322.89	1346872.1
A2P2-PT2-7	A2P2-PT2-7-1-R	06/21/2000	0	1	Thorium-228	0.97	pCi/g	NV	478301	1348259
A2P2-PT2-7	A2P2-PT2-7-1-R	06/21/2000	0	1	Thorium-228	0.97	pCi/g	NV	479322.89	1346872.1
A2P2-PT2-7	A2P2-PT2-7-1-R	06/21/2000	0	1	Thorium-232	0.97	pCi/g	NV	478301	1348259
A2P2-PT2-7	A2P2-PT2-7-1-R	06/21/2000	0	1	Thorium-232	0.97	pCi/g	NV	479322.89	1346872.1
A2P2-PT2-7	A2P2-PT2-7-1-R	06/21/2000	0	1	Uranium, Total	4	mg/kg	NV	478301	1348259
A2P2-PT2-7	A2P2-PT2-7-1-R	06/21/2000	0	1	Uranium, Total	4	ug/g	NV	479322.89	1346872.1
A2P2-PT2-8	A2P2-PT2-8-1-R	06/22/2000	0	1	Radium-226	1.1	pCi/g	NV	479102.92	1346989.6
A2P2-PT2-8	A2P2-PT2-8-1-R	06/22/2000	0	1	Radium-228	0.82	pCi/g	NV	479102.92	1346989.6
A2P2-PT2-8	A2P2-PT2-8-1-R	06/22/2000	0	1	Thorium-228	0.82	pCi/g	NV	479102.92	1346989.6
A2P2-PT2-8	A2P2-PT2-8-1-R	06/22/2000	0	1	Thorium-232	0.82	pCi/g	NV	479102.92	1346989.6
A2P2-PT2-8	A2P2-PT2-8-1-R	06/22/2000	0	1	Uranium, Total	8.3	ug/g	NV	479102.92	1346989.6
A2P2-PT2-9	A2P2-PT2-9-1-R	06/27/2000	0	1	Radium-226	1.2	pCi/g	NV	478589.63	1346992.4
A2P2-PT2-9	A2P2-PT2-9-1-R	06/27/2000	0	1	Radium-228	0.85	pCi/g	NV	478589.63	1346992.4
A2P2-PT2-9	A2P2-PT2-9-1-R	06/27/2000	0	1	Thorium-228	0.84	pCi/g	NV	478589.63	1346992.4
A2P2-PT2-9	A2P2-PT2-9-1-R	06/27/2000	0	1	Thorium-232	0.85	pCi/g	NV	478589.63	1346992.4
A2P2-PT2-9	A2P2-PT2-9-1-R	06/27/2000	0	1	Uranium, Total	7.2	ug/g	NV	478589.63	1346992.4
A2P2-PT3-1	A2P2-PT3-1-1-R	06/29/2000	0	1	Radium-226	1	pCi/g	NV	478038.28	1348948.1

000240

APPENDIX B
PREDESIGN CHARACTERIZATION DATA

BORING	SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)		PARAMETER	RESULT	UNITS	QUALIFIER	NORTHING	EASTING
			TOP	BOTTOM						
A2P2-PT3-1	A2P2-PT3-1-1-R	06/29/2000	0	1	Radium-228	0.76	pCi/g	NV	478038.28	1348948.1
A2P2-PT3-1	A2P2-PT3-1-1-R	06/29/2000	0	1	Thorium-228	0.76	pCi/g	NV	478038.28	1348948.1
A2P2-PT3-1	A2P2-PT3-1-1-R	06/29/2000	0	1	Thorium-232	0.76	pCi/g	NV	478038.28	1348948.1
A2P2-PT3-1	A2P2-PT3-1-1-R	06/29/2000	0	1	Uranium, Total	3.3	ug/g	NV	478038.28	1348948.1
A2P2-PT3-2	A2P2-PT3-2-1-R	06/29/2000	0	1	Radium-226	1	pCi/g	NV	478192.53	1348916.7
A2P2-PT3-2	A2P2-PT3-2-1-R	06/29/2000	0	1	Radium-228	0.86	pCi/g	NV	478192.53	1348916.7
A2P2-PT3-2	A2P2-PT3-2-1-R	06/29/2000	0	1	Thorium-228	0.81	pCi/g	NV	478192.53	1348916.7
A2P2-PT3-2	A2P2-PT3-2-1-R	06/29/2000	0	1	Thorium-232	0.86	pCi/g	NV	478192.53	1348916.7
A2P2-PT3-2	A2P2-PT3-2-1-R	06/29/2000	0	1	Uranium, Total	4.9	ug/g	NV	478192.53	1348916.7
SF-HR1	SF-HR1-1-R	02/12/2002	0	0.5	Radium-226	1.4	pCi/g	NV	478044.1	1348291.7
SF-HR1	SF-HR1-1-R	02/12/2002	0	0.5	Uranium, Total	25.1	ug/g	NV	478044.1	1348291.7
SF-HR1	SF-HR1-3-R	02/12/2002	1	1.5	Radium-226	1.1	pCi/g	NV	478044.1	1348291.7
SF-HR1	SF-HR1-3-R	02/12/2002	1	1.5	Uranium, Total	9.63	ug/g	NV	478044.1	1348291.7
SF-HR1	SF-HR1-5-R	02/12/2002	2	2.5	Radium-226	0.88	pCi/g	NV	478044.1	1348291.7
SF-HR1	SF-HR1-5-R	02/12/2002	2	2.5	Uranium, Total	7.52	ug/g	NV	478044.1	1348291.7
SF-HR1	SF-HR1-7-R	02/12/2002	3	3.5	Radium-226	1.2	pCi/g	NV	478044.1	1348291.7
SF-HR1	SF-HR1-7-R	02/12/2002	3	3.5	Uranium, Total	4.34	ug/g	NV	478044.1	1348291.7
SF-HR1	SF-HR1-ROOT-RB	02/12/2002	0	0.5	Radium-226	1.5	pCi/g	NV	478044.1	1348291.7
SF-HR1	SF-HR1-ROOT-RB	02/12/2002	0	0.5	Uranium, Total	247	ug/g	NV	478044.1	1348291.7
SF-HR2	SF-HR2-1-R	02/12/2002	0	0.5	Radium-226	1.1	pCi/g	NV	478054.5	1348366.1
SF-HR2	SF-HR2-1-R	02/12/2002	0	0.5	Uranium, Total	1.45	ug/g	NV	478054.5	1348366.1
SF-HR2	SF-HR2-3-R	02/12/2002	1	1.5	Radium-226	1.1	pCi/g	NV	478054.5	1348366.1
SF-HR2	SF-HR2-3-R	02/12/2002	1	1.5	Uranium, Total	1.3	ug/g	NV	478054.5	1348366.1
SF-HR2	SF-HR2-5-R	02/12/2002	2	2.5	Radium-226	0.91	pCi/g	NV	478054.5	1348366.1
SF-HR2	SF-HR2-5-R	02/12/2002	2	2.5	Uranium, Total	1.14	ug/g	NV	478054.5	1348366.1
SF-HR2	SF-HR2-7-R	02/12/2002	3	3.5	Radium-226	1.1	pCi/g	NV	478054.5	1348366.1
SF-HR2	SF-HR2-7-R	02/12/2002	3	3.5	Uranium, Total	1.35	ug/g	NV	478054.5	1348366.1

000241

4328

APPENDIX C

LIST OF TECHNICAL SPECIFICATIONS

APPENDIX C
LIST OF IRDP TECHNICAL SPECIFICATIONS

A2PII Drawings

Drawing Number	Sheet	Title
99X-5500-G-00624	1	Arsenic Removal Excavation Plan
99X-5500-G-00734	2	Infrastructure Remedial Strategy
99X-5500-X-00735	3	Traffic Flow Plan
99X-5500-G-00738	4	Civil Details (Sheet 1)
99X-5500-X-00639	5	Legend and General Notes

Technical Specifications for SDFP Soil Excavation Projects

Section	Title
02150	Traffic Control
02205	Impacted Material Excavation
02206	Earthwork for Remediation
02207	Area Isolation Trenching
02210	Asbestos Containing Material (ACM)
02275	Surface Water Management and Erosion Control for Remediation

Technical Specifications for Arsenic Soil Contamination Area Remedial Action* (Reference Only)

Section	Title	Rev.	Date
02205	Impacted Material Excavation	0	11/20/01
02207	Area Isolation Trenching	0	11/20/01
02210	Asbestos Containing Material (ACM)	0	11/20/01
02275	Surface Water Management and Erosion Control for Remediation	0	11/20/01
02270	Geotextile and Geomembrane	0	11/20/01

*Approved Technical Specifications for Area 3A/4A Site Preparation

Technical Specifications for Radium Hot Spot Area Remedial Action* (Reference Only)

Section	Title	Rev.	Date
02150	Traffic Control	1	4/18/02
02205	Impacted Material Excavation	1	4/18/02
02206	Earthwork for Remediation	1	4/18/02
02210	Asbestos Containing Material (ACM)	1	4/18/02
02275	Surface Water Management and Erosion Control for Remediation	1	4/18/02

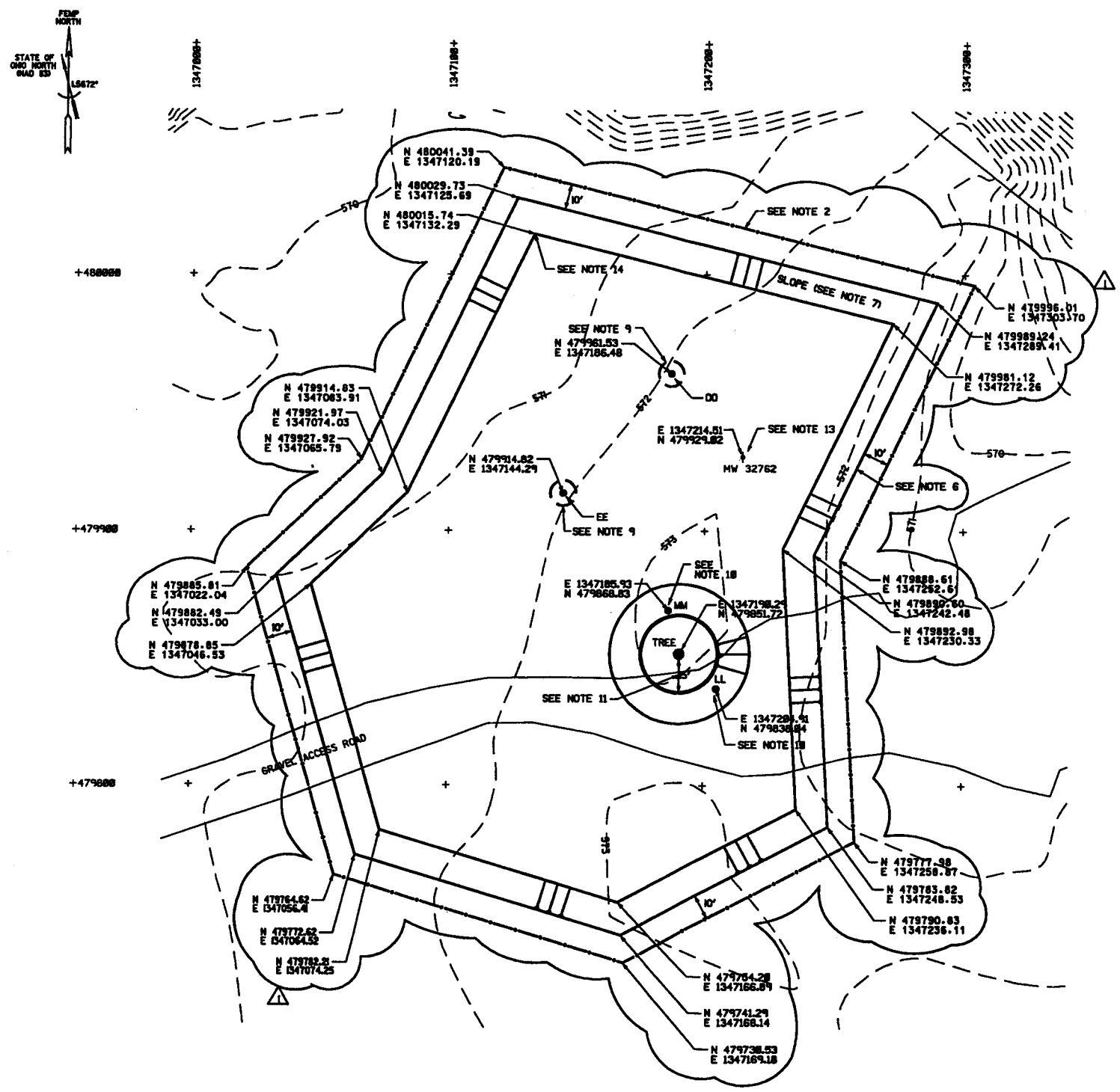
*Approved Technical Specifications for Area 3A/4A Excavation

Technical Specifications for OSDF (Reference Only)

Section	Title	Rev.	Date
02100	Surveying	1	3/13/02
02200	Earthwork	1	3/13/02
02215	Trenching and Backfilling	1	3/13/02
02230	Road Construction	1	3/13/02
02270	Surface Water Management and Erosion Control	1	3/13/02
02714	Geotextiles	1	3/13/02
02930	Vegetation	1	3/13/02

APPENDIX D

DRAWINGS



4328 NOTES

1. CONTRACTOR SHALL PERFORM SCOPE OF WORK SHOWN ON THIS DRAWING AS PER TECHNICAL SPECIFICATIONS FOR FSC-642 UNLESS OTHERWISE NOTED.
2. INSTALL ~~"ELDED WIRE CONSTRUCTION/SAFETY~~ ROPE FENCE AROUND EXCAVATION AREA ~~TO INCLUDE LOCATION "LL"~~ UPON COMPLETION OF EXCAVATION. ~~A ROPE FENCE MAY BE USED DURING CONSTRUCTION.~~ △1
3. INSTALL EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO EARTH DISTURBANCE ACTIVITIES IN ACCORDANCE WITH THE LATEST VERSION OF OHIO DEPARTMENT OF NATURAL RESOURCES (ODNR) RAIN-WATER AND LAND DEVELOPMENT STANDARDS.
4. CLEAR AND GRUB EXCAVATION AREA ~~AND NEW GRAVEL ACCESS ROAD AREA.~~ STOCKPILE CLEARED VEGETATION ~~WITHIN THE VEGETATION STORAGE AREA.~~ AS DIRECTED BY THE CONSTRUCTION MANAGER. REMOVE AS MUCH SOIL AS POSSIBLE FROM ROOT MASS PRIOR TO STOCKPILING. GRUBBED MATERIAL SHALL BE SIZE REDUCED AND THOROUGHLY MIXED WITH IMPACTED MATERIAL AND HAULED TO THE OSDF. THE VOLUME OF ORGANICS PER TRUCKLOAD SHALL BE NO MORE THAN 20 PERCENT, BY VISUAL OBSERVATION. △1
5. ~~CONSTRUCT NEW GRAVEL ACCESS ROAD SOUTH OF LIMIT OF EXCAVATION CONSISTING OF GEOTEXTILE SEPARATOR PER SECTION 0611 AND A MINIMUM OF 6" OF OGDOT ITEM 304 BUILT ON GRADE.~~
6. LIMIT OF EXCAVATION SHOWN IS TOP OF SLOPE.
7. EXCAVATION SIDE SLOPES SHALL BE 2:1 UNLESS OTHERWISE INDICATED.
8. EXCAVATE TO A DEPTH OF 6 FEET WITHIN LIMIT OF EXCAVATION UNLESS OTHERWISE INDICATED.
9. EXCAVATE AT LOCATIONS "EE" AND "DD" 1 FOOT DEEPER THAN SURROUNDING GRADE 5 FEET HORIZONTALLY IN ALL DIRECTIONS TO ELEVATION 565'. △1
10. EXCAVATE AT LOCATIONS "MM" AND "LL" TO A DEPTH OF 6 FEET. SLOPE 1:1 AS EXCAVATION PROGRESSES TOWARDS THE 15-FOOT TREE RADIUS.
11. MINIMIZE DISTURBANCE WITHIN 15 FEET OF TREE INDICATED.
12. ~~EXCAVATE AT LOCATION "LL" 3' x 3' x 1' DEEP. REGRADE ON BANKLINE AS DIRECTED BY THE CONSTRUCTION MANAGER.~~ △1
13. MONITORING WELL 32762 SHALL BE PLUGGED AND ABANDONED BY OTHERS PRIOR TO START OF WORK.
14. FINAL EXCAVATION GRADE SHALL SLOPE/DRAIN TOWARDS LOW POINT AT LOCATION "EE" INDICATED. △1
15. PRIOR TO START OF WORK, A CHEM-HAZ PERMIT BRIEFING SHALL BE CONDUCTED FOR THE WORK FORCE. THE CHEM-HAZ PERMIT WILL BE PROVIDED BY FLUOR FERNALD.
16. PROVIDE AN AS-BUILT SURVEY UPON COMPLETION.

△1 NOTE: SCALE OF DRAWING CHANGED FROM 1"=40' TO 1"=20' FOR ISSUANCE OF REV. 1 DUE TO EXPANSION OF EXCAVATION AREA.

0 10 20 50 100
SCALE IN FEET

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	DATE	REVN. BY	APPR.
1	CFC REVISION PER DCN: 20450-001	5/29/02	RML	CM/GEP
0	ISSUE CERTIFIED FOR CONSTRUCTION	10/25/01	JLE	GEP

DETAILS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR FERNALD, INC.

PROJECT NAME
AREA 2, PHASE 2, SOUTHWESTERN PORTION OF THE FEMP

DRAWING TITLE
ARSENIC REMOVAL EXCAVATION PLAN

APPROVALS

COGNIZANT ENG.			SAFETY ENG.	G.K. JOHNSON	10/25/01
CIVIL & STR.			MAINTENANCE		
ELECTRICAL			FIRE PROTECT.		
ENGINEER	C.R. NEUMANN	10/25/01	WASTE MANAGE		
INSTRUMENT			SECURITY		
MECHANICAL			QA	M.C. ELETON	10/25/01
			CONSTRUCTION	F.L. FLACK	10/25/01
CHECKED	D.R. RUSSELL	10/25/01	CADD SERVICES	G.E. PAUL	10/25/01
APPROVED	U.A. KUMTHEKAR	10/25/01			

DRAWN BY	PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
J.E.	20003/20450	99X-5500-G-00624	1	1
CAD PROJECT NO.	FILENAME 99xp0624.dgn			

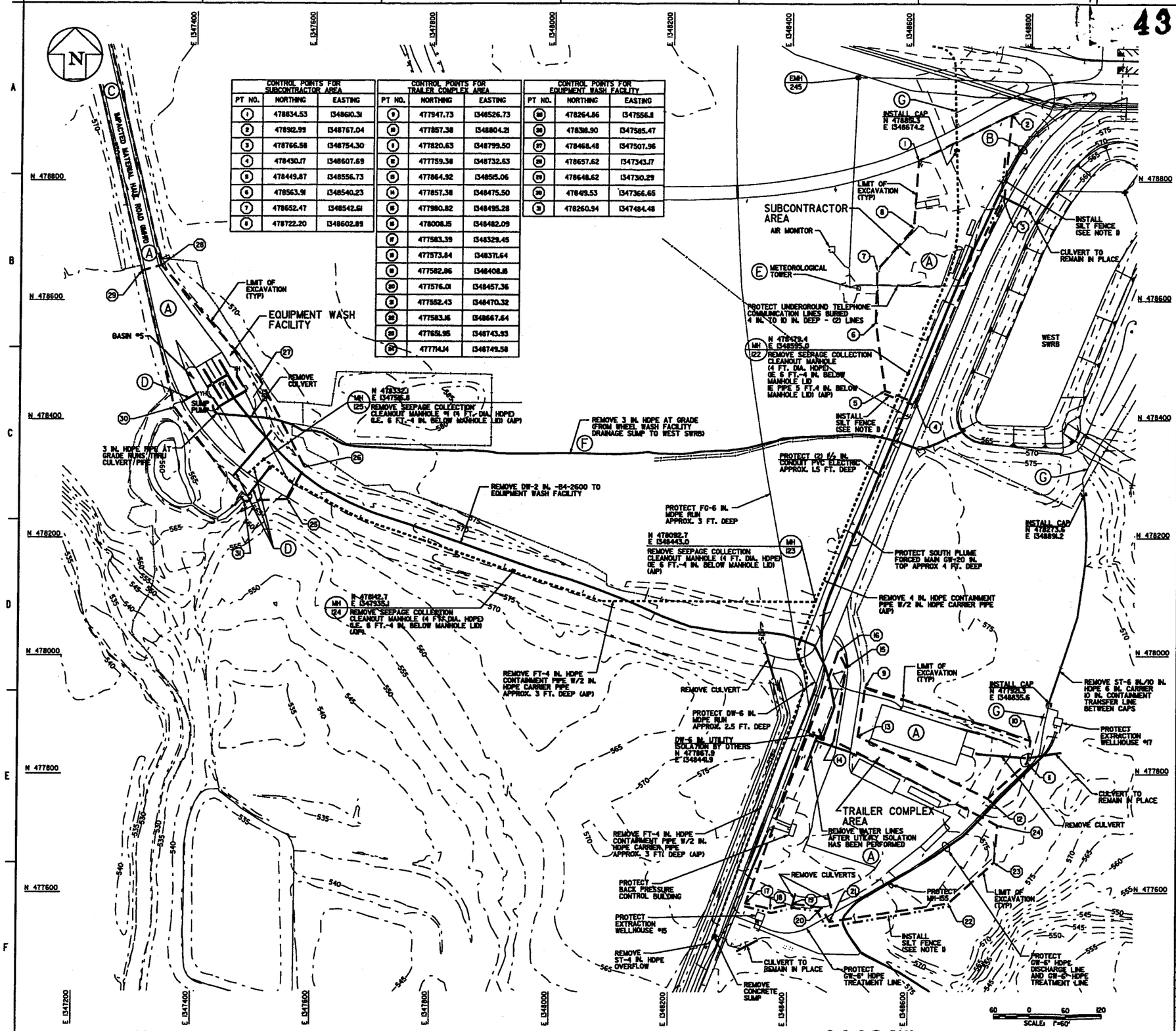
000246

4328

CONTROL POINTS FOR SUBCONTRACTOR AREA		
PT NO.	NORTHING	EASTING
1	478634.53	1348610.31
2	478592.99	1348767.04
3	478766.58	1348754.30
4	478430.17	1348607.69
5	478449.87	1348556.73
6	478563.91	1348540.23
7	478652.47	1348542.61
8	478722.20	1348602.89

CONTROL POINTS FOR TRAILER COMPLEX AREA		
PT NO.	NORTHING	EASTING
9	477947.73	1348526.73
10	477857.38	1348804.21
11	477820.63	1348799.50
12	477759.38	1348732.63
13	477864.92	1348515.06
14	477857.38	1348475.50
15	477980.82	1348495.28
16	478008.15	1348482.09
17	477583.39	1348329.45
18	477573.84	1348371.64
19	477582.96	1348408.18
20	477576.01	1348457.36
21	477552.43	1348470.32
22	477583.16	1348667.64
23	477651.95	1348743.93
24	477714.14	1348749.58

CONTROL POINTS FOR EQUIPMENT WASH FACILITY		
PT NO.	NORTHING	EASTING
25	478264.86	1347556.11
26	478318.90	1347585.47
27	478468.48	1347507.96
28	478657.62	1347343.17
29	478648.62	1347310.29
30	478419.53	1347366.65
31	478260.94	1347484.48



GENERAL NOTES

1. INSTALL SILT FENCE DOWN GRADIENT OF EXCAVATION AREAS PRIOR TO SOIL DISTURBANCE IN ACCORDANCE WITH SECTION 02275.
2. REFER TO DRAWINGS 92X-5900-G-00302, 92X-5900-G-00307, 92X-5900-G-00309 AND 92X-5900-G-00308 FOR ADDITIONAL INFORMATION FOR THE SWU WHEEL WASH FACILITY, WATER LINE, TRANSFER LINE, CLEAN-OUT, AND AIR RELEASE.
3. FOR THE EXISTING UNDERGROUND UTILITY INFORMATION, SEE THE LATEST REVISIONS OF FEMP SITE AND UTILITY GRID DRAWINGS 93X-5900-G-00333 (GRID 60A, 93X-5900-G-00341 (GRID 68), AND FEMP UNDERGROUND UTILITY GRID DRAWING 22A-5500-P-00689 (GRID 30).
4. FOR LEGEND AND GENERAL NOTES, REFER TO DRAWING 99X-5500-X-00639.
5. ABOVE GRADE STRUCTURES WILL BE REMOVED BY OTHERS PRIOR TO BEGINNING REMEDIAL ACTION ACTIVITIES.

KEYED NOTES

(A) EXCAVATE AND REMOVE SURFACE (ASPHALT/CONCRETE/GRAVEL), SUBGRADE AND 6 INCHES OF SOIL AS APPLICABLE WITHIN AREA INDICATED.

(B) PROTECT WATER LINE, GROUND WATER FORCE MAIN AND CONDUITS WITHIN EXCAVATION AREA.

(C) IMPACTED MATERIAL HAUL ROAD REMOVAL CONTINUES NORTH TO THE PILOT PLANT DRAINAGE DITCH SHOWN ON DRAWING 99X-5500-G-00735.

NORTH COORDINATES		
AT PILOT PLANT DRAINAGE DITCH	N 479833.1	N 479882.6
	E 1347713.4	E 1347745.0

THE IMPACTED MATERIAL HAUL ROAD INCLUDES THE FOOTPRINT OF FORMER DEBRIS PILE MTL-HRD-012 SHOWN ON DRAWING 99X-5500-G-00735.

(D) REMOVE CULVERTS AND UTILITIES INDICATED AND BACKFILL SLOPE ALONG SOUTH EDGE OF IMPACTED MATERIAL HAUL ROAD TO DIVERT SURFACE WATER RUNOFF TO BASIN #5 PRIOR TO EXCAVATING SWU EQUIPMENT WASH FACILITY AND ASSOCIATED UTILITIES. THE CONSTRUCTION MANAGER WILL COORDINATE FOR REAL-TIME MONITORING AND SAMPLING PRIOR TO BACKFILL.

(E) PROTECT METEOROLOGICAL TOWER AND GUY WIRES.

(F) BASIN #5 SUMP PUMP AND 3 IN. HDPE PIPELINE TO REMAIN IN PLACE FOR DEWATERING UNTIL COMPLETION OF PRECERTIFICATION.

(G) THE REMAINING SECTIONS WILL BE CAPPED AND REMAIN IN PLACE UNTIL FUTURE REMEDIATION OF THE AREA.

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	DATE	REV. BY	APPR.
B	ISSUED FOR A2PII IRDP AGENCY REVIEW	6/24/02	GDD	
A	ISSUED FOR 90% DESIGN REVIEW	5/3/02	GDD	

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR FERNALD, INC.

PROJECT NAME
SOIL REMEDIATION

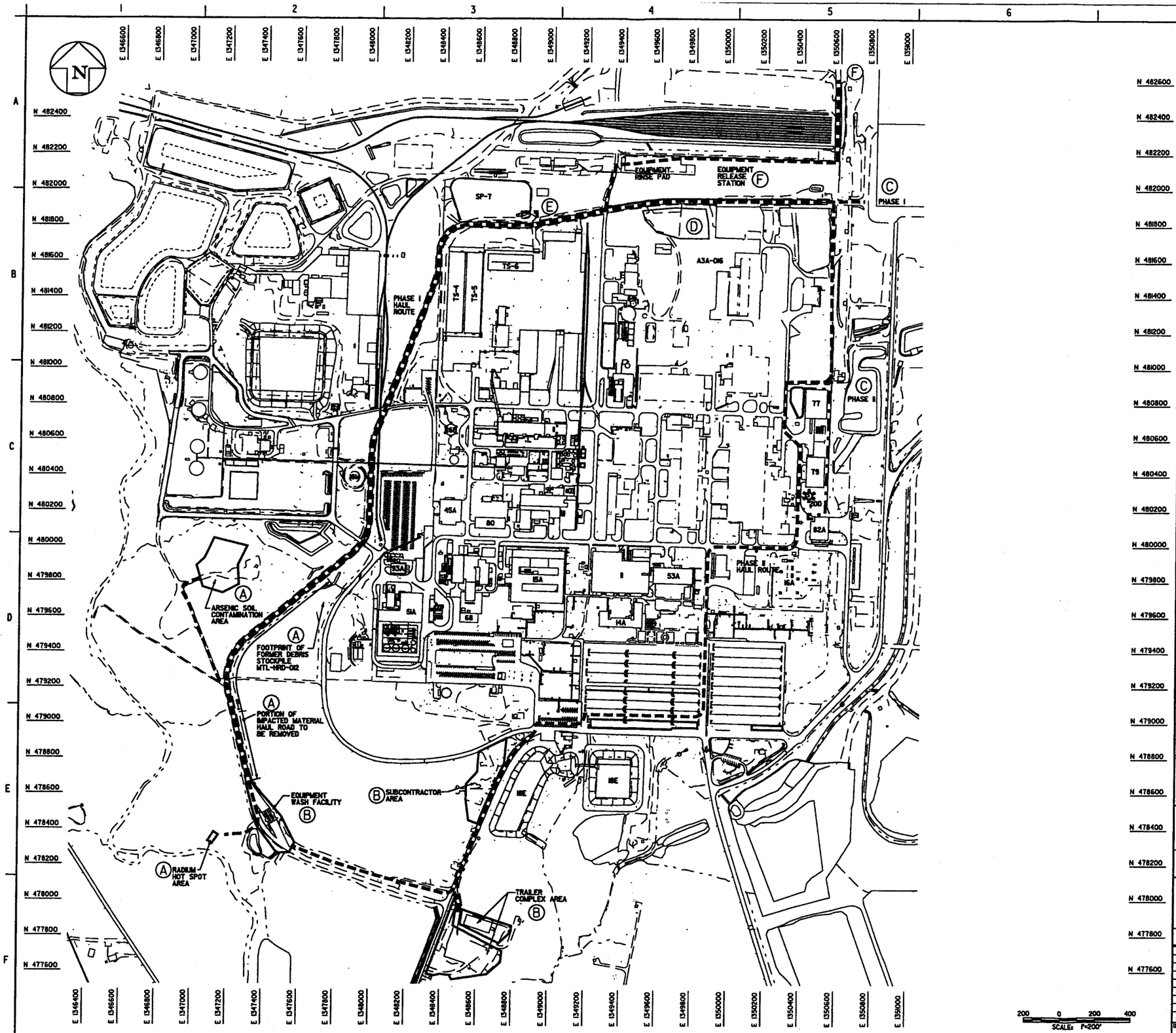
DRAWING TITLE
AREA 2PII
INFRASTRUCTURE
REMEDIAL STRATEGY

APPROVALS

COGNIZANT ENG.			SAFETY ENG.		
CIVIL & STR.			MAINTENANCE		
ELECTRICAL			FIRE PROTECT.		
ENGINEER			WASTE MANAGE		
INSTRUMENT			SECURITY		
MECHANICAL			QA		
			CONSTRUCTION		
CHECKED					
APPROVED					

DRAWN BY	PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
RES PROJECT NO.	FILENAME 99X00734.DGN	99X-5500-G-00734	2	B

000247



GENERAL NOTES

4328

KEYED NOTES

- (A) PHASE I EXCAVATION (TO SP9)
- (B) PHASE II EXCAVATON (TO OSDF)
- (C) OSDF ACCESS
- (D) A3A-016 ACCESS
- (E) SP7 ACCESS
- (F) TO SITE EXIT

LEGEND

- TRAFFIC ROUTE
- CONSTRUCTION ACCESS WALKWAY
- AREAS REQUIRING REMEDIAL ACTION

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	DATE	REV. BY	APPR.
C	ISSUED FOR A2PII IRDP AGENCY REVIEW	6/24/02	GDD	
B	ISSUED FOR 90% DESIGN REVIEW	6/3/02	GDD	
A	ISSUED FOR 30% DESIGN REVIEW	4/11/02	GDD	

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR FERNALD, INC.

PROJECT NAME
SOIL REMEDIATION

DRAWING TITLE
AREA 2PII
TRAFFIC FLOW PLAN

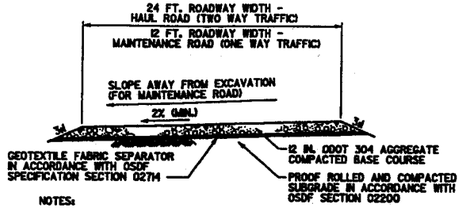
APPROVALS

COGNIZANT ENG.		SAFETY ENG.	
CIVIL & STR.		MAINTENANCE	
ELECTRICAL		FIRE PROTECT.	
ENGINEER		WASTE MANAGE	
INSTRUMENT		SECURITY	
MECHANICAL		QA	
		CONSTRUCTION	
CHECKED			
APPROVED			

DRAWN BY	PROJECT NO. 22080	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
REF. PROJECT NO.	FILENAME 99X00735.DGN	99X-5500-G-00735	3	C

000248

4328

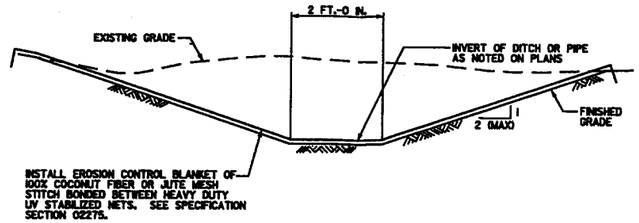


NOTES:

1. SEE SPECIFICATION SECTION 02230 FOR ROAD CONSTRUCTION.
2. SMTA DIMENSIONS AS DIRECTED BY THE CONSTRUCTION MANAGER.

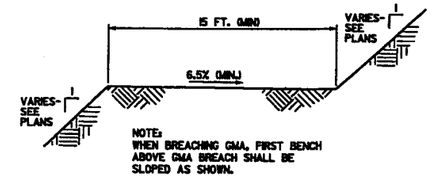
TYPICAL HAUL ROAD/ MAINTENANCE ROAD/SMTA DETAIL

NTS — 99X-5500-G-00730 680 698 718



EROSION BLANKET LINED DITCH DETAIL

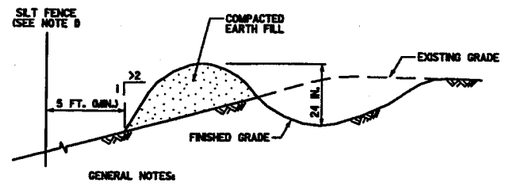
NTS — 99X-5500-G-00730 680 698 718



NOTE:
WHEN BREACHING GMA, FIRST BENCH ABOVE GMA BREACH SHALL BE SLOPED AS SHOWN.

GMA PROTECTION BENCH DETAIL

NTS — 99X-5500-G-00654 655 656 657 658 659 689 690 691

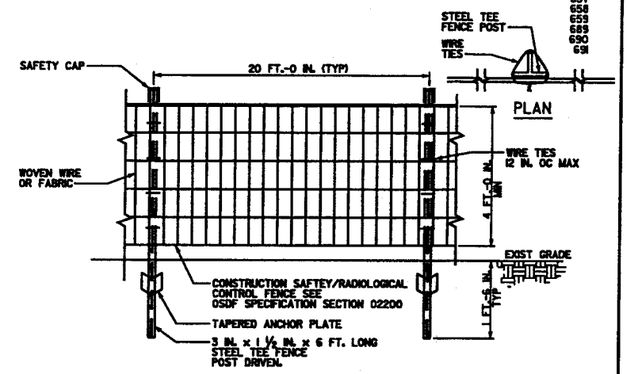


GENERAL NOTES:

1. INSTALL SILT FENCE (SEE SILT FENCE DETAIL THIS DRAWING) ON DOWNGRADIENT SIDE OF DIVERSION PRIOR TO LAND-DISTURBING ACTIVITIES. MAINTAIN SILT FENCE IN ACCORDANCE WITH SPECIFICATION SECTION 02275, UNTIL GRASS HAS BEEN ESTABLISHED ON ENTIRE DIVERSION.
2. SEED AND MULCH ENTIRE DIVERSION SEE OSDF SPECIFICATION SECTION 02930.
3. DIVERSION SLOPES SHALL NOT BE STEEPER THAN 2 HORIZONTAL TO 1 VERTICAL.
4. COMPACTED EARTH FILL SHALL CONSIST OF SOILS EXCAVATED ON SITE AND PLACED AS NECESSARY TO PROVIDE MINIMUM 24 INCH DITCH DEPTH. EARTH FILL SHALL BE COMPACTED BY 4 PASSES OF COMPACTION EQUIPMENT IN 12 INCH LOOSE LIFTS AS APPROVED BY THE CONSTRUCTION MANAGER.

TEMPORARY DIVERSION DETAIL

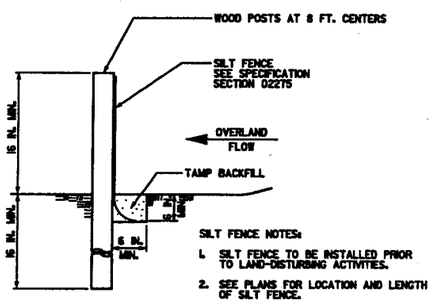
NTS



NOTE:
INSTALL SAFETY CAPS ON T-POSTS THAT PROTRUDE BEYOND THE SURFACE OF THE GROUND LESS THAN 4 FEET.

CONSTRUCTION SAFETY/RADIOLOGICAL CONTROL FENCE DETAIL

99X-5500-G-00728 730 734 653 654 655 656 657 658 659 680 689 690 691 698 706 707 708 71 715 716 717 718 719

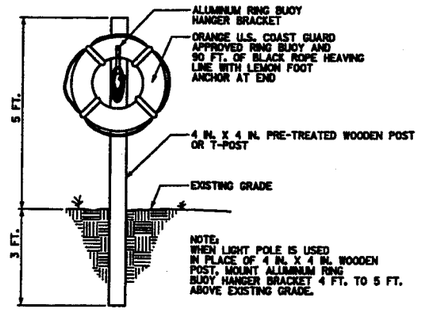


SILT FENCE NOTES:

1. SILT FENCE TO BE INSTALLED PRIOR TO LAND-DISTURBING ACTIVITIES.
2. SEE PLANS FOR LOCATION AND LENGTH OF SILT FENCE.
3. WOOD POSTS SHALL BE 2 IN. X 2 IN. MIN. OF OAK OR SIMILAR HARDWOOD.
4. BACKFILL MATERIAL IN ACCORDANCE WITH SPECIFICATION SECTION 02200.

SILT FENCE DETAIL

99X-5500-G-00728 730 734 653 654 655 656 657 658 659 689 690 691 706 707 708 715 716 717 718 719



NOTE:
WHEN LIGHT POLE IS USED IN PLACE OF 4 IN. X 4 IN. WOODEN POST, MOUNT ALUMINUM RING BUOY HANGER BRACKET 4 FT. TO 5 FT. ABOVE EXISTING GRADE.

RING BUOY STATION DETAIL

NTS — 99X-5500-G-00732 680 698 718

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	DATE	REV. BY	APPR.
C	ISSUED FOR A2PII IRDP AGENCY REVIEW	6/24/02	GDO	
B	ISSUED FOR 90% DESIGN REVIEW (SWL & FTF)	6/7/02	ATG	
A	ISSSUED FOR 90% DESIGN REVIEW	6/3/02	GDO	

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR FERNALD, INC.

PROJECT NAME
SOIL REMEDIATION

DRAWING TITLE
AREAS 2PII, 3B, 4B, 5, SWL & FTF, AND MDC
CIVIL DETAILS (SHEET I)

APPROVALS

COGNIZANT ENG.			SAFETY ENG.		
CIVIL & STR.			MAINTENANCE		
ELECTRICAL			FIRE PROTECT.		
ENGINEER			WASTE MANAGE		
INSTRUMENT			SECURITY		
MECHANICAL			QA		
			CONSTRUCTION		
CHECKED					
APPROVED					

DRAWN BY	PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
ELR	2080	99X-5500-G-00738	4	C
RES PROJECT NO.	FILENAME 99X00073B.DGN			

000249

4328

SYMBOLS LEGEND

EXISTING		PROPOSED
●	MANHOLE	N/A
⊙	CATCH BASIN	○
—→—	STORM SEWER	N/A
— · —	ABOVE-GRADE WATERLINE	N/A
Ø	ELECTRIC POLE	N/A
	ELECTRIC MANHOLE	N/A
	ELECTRIC MANHOLE WITH TELEPHONE MANHOLE	N/A
	GRAVEL ROADWAY	
	PAVED ROADWAY	N/A
	BUILDING SLAB / CONCRETE PAD / TRAILER	■
	CHAIN LINK FENCE	
	TRAFFIC GATE	
—o——o—	CONSTRUCTION SAFETY FENCE	—×—
—o— — —o—	ROPE CONSTRUCTION FENCE	—o— — —o—
N/A	SILT FENCE	
N/A	LIMIT OF EXCAVATION/ LIMIT OF WORK	
N/A	PROTECTED AREA	
B OR P	BENCHMARK	N/A
	LIMIT OF ABOVE-WAC AND RCRA MATERIAL	N/A
	LIMIT OF ABOVE-WAC AND RCRA MATERIAL (CROSS SECTIONS ONLY)	N/A
	PIPE PLUG	
	AIR GAP FOR STORM SEWER	
N/A	FENCE REMOVAL	//////////
— — —	UNDERGROUND UTILITIES BEYOND DESIGN GRADE	N/A
-------	UNDERGROUND UTILITIES ABOVE DESIGN GRADE	N/A
N/A	HAUL ROAD	
N/A	WALKWAY	
—— -584— -	CONTOUR - MINOR	——584——
—— —585— -	CONTOUR - MAJOR	——585——
	CERTIFIED AREA BOUNDARY	
N/A	DEWATERING CHANNEL	
	AREA ISOLATION TRENCH	SEE PLAN

SYMBOLS LEGEND

EXISTING		PROPOSED
	CONCRETE TRENCH	N/A
	POST INDICATOR VALVE (PIV)	N/A
	PIPE PLUG W/ BLOCK	N/A
	OVERHEAD PIPE RACK PEDESTALS	N/A
	RAILROAD TIES	N/A
	RAILROAD	N/A
N/A	GRADING COORDINATE LOCATION	1
	CONTAMINATION PLUME	N/A
	HIGH LEACHABILITY AREA BOUNDARY	N/A
1728	SOIL BORING	N/A
	MONITORING WELL	N/A

ABBREVIATIONS

AIP - ABANDONED IN PLACE
BR - BRINE LINE
BSL - BIODENITRIFICATION SURGE LAGOON
CB - CATCH BASIN
CE - CONTAMINATED EFFLUENT LINES
CI - CAST IRON
CMP - CORRUGATED METAL PIPE
COC - CONSTITUENTS OF CONCERN
CN - STEAM & CONDENSATE LINES
DF - DEIONIZED FEEDLINES
DW - DOMESTIC/POTABLE WATER LINES
EC - EDGE OF CONCRETE
EMH - ELECTRICAL MANHOLE
EP - EDGE OF PAVEMENT
EL - ELECTRICAL LINES
ELEV - ELEVATION
FEMP - FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FG - FUEL GAS LINES
FRL - FINAL REMEDIATION LEVEL
FT - FILTRATE OR EFFLUENT LINES
FTF - FIRE TRAINING FACILITY
FQI - HIGH PRESSURE FIRE PROTECTION LINES
GMA - UNSATURATED SANDS AND GRAVELS OF THE GREAT MIAMI AQUIFER
GW - GROUND WATER LINES
HDPE - HIGH DENSITY POLYETHYLENE
HWMU - HAZARDOUS WASTE MANAGEMENT UNIT
IE - INVERT ELEVATION
LSP - LIME SLUDGE POND
MDPE - MEDIUM DENSITY POLYETHYLENE
MH - MANHOLE
NI - PIPE CLASSIFICATION
NES - NORTHEAST SUMP
OC - ON CENTER
OD - OUTSIDE DIAMETER
OMTA - OSDF MATERIAL TRANSFER AREA
OSDF - ON-SITE DISPOSAL FACILITY
PA - PLANT AIR LINES
PVC - POLYVINYL CHLORIDE
RAD - RADIOLOGICAL
RCP - REINFORCED CONCRETE PIPE
RCRA - RESOURCE CONSERVATION AND RECOVERY ACT
RW - RAW WATER LINES
SA - INSTRUMENT AIR SUPPLY LINES
SD - SUBSURFACE DRAINS
SL - SUMP LIQUOR LINES
SMH - SANITARY MANHOLE
SMTA - SPECIAL MATERIAL TRANSFER AREA
SN - SANITARY SEWER LINES
SP - STOCKPILE / SOIL PILE
ST - STORM SEWER
SWL - SOLID WASTE LANDFILL
SWRB - STORMWATER RETENTION BASIN
TOP - TOP OF PIPE
TYP - TYPICAL
TW - TREATED WATER LINES
UST - UNDERGROUND STORAGE TANK
VCP - VITRIFIED CLAY PIPE
VT - PIPE CLASSIFICATION
WAC - WASTE ACCEPTANCE CRITERIA
WR - WATER RETURN-COOLING LINES
WS - WATER SUPPLY-COOLING LINES
Y - PIPE CLASSIFICATION

GENERAL NOTES

1. [illegible]NG TOPOGRAPHY SHOWN ON DRAWINGS PROVIDED BY FLUOR FERNALD. THESE SOURCES INCLUDE: EXISTING SITE DATA SOURCE (ON-PLANT FILES) FEMP CADD GRID/UTILITY DRAWINGS.
2. HORIZONTAL CONTROL SHOWN ON THE DRAWINGS IS BASED UPON NORTH AMERICAN DATUM 1983 (NAD 83).
3. VERTICAL CONTROL SHOWN ON THE DRAWINGS IS BASED UPON NATIONAL GEODETIC VERTICAL DATUM 1929 (NGVD 29).
4. SILT FENCES SHALL BE INSTALLED AND FUNCTIONAL PRIOR TO UPGRADIENT LAND DISTURBANCES ACTIVITY IN ACCORDANCE WITH THE SPECIFICATION REQUIREMENTS.
5. DESIGN CONTOURS AND GRADES SHOWN REPRESENT THE MINIMUM LIMITS OF EXCAVATION REQUIRED TO CAPTURE CONTAMINATION AND FOUNDATIONS, WHILE MAINTAINING SAFE SLOPE REQUIREMENTS. MINIMAL CHANGES MAY BE PROPOSED IN ACCORDANCE WITH SPECIFICATION SECTION 02205 TO INCORPORATE BREAKS IN CONTOURS, PONDING OF WATER, EQUIPMENT ACCESSIBILITY, ETC. THESE CHANGES SHALL NOT EXCEED 10% OF THE TOTAL DESIGNED EXCAVATION QUANTITY.
6. GEOLOGICAL AND CROSS SECTION INFORMATION TAKEN FROM (FEMP) OU-2 RI, 1995, OU-2 FS, 1995, GEOTECHNICAL REPORTS, AND FEMP 3-D CADD MODEL. ACTUAL GEOLOGICAL CONDITIONS AND DEPTHS SHOWN ON CROSS SECTIONS MAY VARY AND SHALL BE DETERMINED IN THE FIELD DURING EXCAVATION.
7. LOCATION AND DEPTH OF EXISTING UTILITIES AND FOUNDATION STRUCTURES ARE APPROXIMATE. IF UNIDENTIFIED UTILITIES ARE DISCOVERED, PROCEED AS DIRECTED BY THE CONSTRUCTION MANAGER.
8. DIMENSIONS SHOWN ON THE CONSTRUCTION DRAWINGS TAKE PRECEDENCE OVER SCALED DIMENSIONS.
9. FIGURED DIMENSIONS AND/OR ELEVATIONS MARKED THUS (+/-) SHALL BE VERIFIED IN THE FIELD BEFORE START OF REMEDIATION.
10. RESTRICT ACTIVITIES TO THE IMMEDIATE PROJECT AREA DEFINED BY THE "LIMITS OF WORK".
11. MAINTAIN AND PROTECT UTILITY LOCATION MARKINGS OUTSIDE THE EXCAVATION BOUNDARY.
12. PROVIDE TEMPORARY SHORING, BRACING, OR OTHER METHODS AS NECESSARY TO SAFELY SUPPORT EXCAVATION. PROTECTION SHALL BE IN ACCORDANCE WITH OSHA 29 CFR 1926, SUBPART P-EXCAVATIONS, LATEST EDITION.
13. A PENETRATION PERMIT MUST BE OBTAINED BY THE CONSTRUCTION MANAGER FOR EXCAVATION OR PENETRATION INTO THE SOIL DEEPER THAN 6 INCHES.
14. TECHNICAL SPECIFICATIONS GOVERNING THIS PROJECT ARE THE LATEST REVISIONS OF SOIL EXCAVATION TECHNICAL SPECIFICATIONS (DOCUMENT NO. 20000-TS-0000 AND ON-SITE DISPOSAL FACILITY (OSDF) PHASE IV TECHNICAL SPECIFICATIONS (DOCUMENT NO. 20104-TS-0000.

REV. NO.	ISSUE OR REVISION PURPOSE - DESCRIPTION	DATE	REV. BY	APPR.
C	ISSUED FOR A2PII IRDP AGENCY REVIEW	6/24/02	GDD	
B	ISSUED FOR 90% DESIGN REVIEW (SWL & FTF)	6/7/02	ATG	
A	ISSUED FOR 90% DESIGN REVIEW	6/3/02	GDD	

INITIALS AND DATE

UNITED STATES DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

THIS DRAWING PREPARED BY
FLUOR FERNALD, INC.

PROJECT NAME
SOIL REMEDIATION

DRAWING TITLE
AREAS 2PII, 3B, 4B, 5, SWL & FTF, AND MDC
LEGEND AND GENERAL NOTES

APPROVALS

COGNIZANT ENG.			SAFETY ENG.		
CIVIL & STR.			MAINTENANCE		
ELECTRICAL			FIRE PROTECT.		
ENGINEER			WASTE MANAGE		
INSTRUMENT			SECURITY		
MECHANICAL			QA		
			CONSTRUCTION		
CHECKED					
APPROVED					

DRAWN BY	PROJECT NO.	DRAWING INDEX CODE NO.	SHEET NO.	REV. NO.
ILR	20000	99X-5500-X-00639	5	C
RES PROJECT NO.	FILENAME 99X00639.DGN			

000250

4328

FLUOR

Technical Specifications
For
Soil and Disposal Facility Project
Soil Excavation Projects

Document 20300-TS-0001
Revision B

June 2002

PREPARED BY:_____

CHECKED BY:_____

APPROVED BY:_____

U.S. DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Fluor Fernald
P.O. Box 538704
Cincinnati, OH 45253-8704

U.S. DEPARTMENT OF ENERGY

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Soil Excavation Technical Specifications

Technical specifications contained in this document detail requirements for soil excavation projects performed under the Soils and Disposal Facility Project. Technical specifications referenced, but not contained herein, are provided in On-Site Disposal Facility (OSDF) technical specification packages. The Legend and General Notes drawing within each design package will identify the applicable OSDF technical specification package document number.

TABLE OF CONTENTS

SECTION	TITLE	REV.	DATE
02150	Traffic Control	B	6/24/02
02205	Impacted Material Excavation	B	6/24/02
02206	Earthwork for Remediation	B	6/24/02
02207	Area Isolation Trenching	B	6/24/02
02210	Asbestos Containing Material (ACM)	B	6/24/02
02275	Surface Water Management and Erosion Control for Remediation	B	6/24/02
	REFERENCED OSDF SPECIFICATIONS		
02100	Surveying	1	03/13/02
02200	Earthwork	1	03/13/02
02215	Trenching and Backfilling	1	03/13/02
02230	Road Construction	1	03/13/02
02270	Surface Water Management and Erosion Control	1	03/13/02
02930	Vegetation	1	03/13/02

SPECIFICATION REVISION RECORD

Spec. No./Rev.	Description	Approval	Date
02150, Rev.A	Issue for 30% design review	DRR	5/23/02
02150, Rev B	Issue for 90% design review	DRR	6/24/02
02205, Rev.A	Issue for 30% design review	DRR	5/23/02
02205, Rev B	Issue for 90% design review	DRR	6/24/02
02206, Rev.A	Issue for 30% design review	DRR	5/23/02
02206, Rev B	Issue for 90% design review	DRR	6/24/02
02207, Rev.A	Issue for 30% design review	DRR	5/23/02
02207, Rev B	Issue for 90% design review	DRR	6/24/02
02210, Rev.A	Issue for 30% design review	DRR	5/23/02
02210, Rev B	Issue for 90% design review	DRR	6/24/02
02275, Rev.A	Issue for 30% design review	DRR	5/23/02
02275, Rev B	Issue for 90% design review	DRR	6/24/02

SECTION 02150
TRAFFIC CONTROL

PART 1 GENERAL

1.1 SCOPE

A. This Section includes the traffic control requirements for the excavation areas, Special Materials Transfer Area (SMTA), Stockpile 7 (SP-7) and movement between the following: On-Site Disposal Facility (OSDF), OSDF Material Transfer Areas (OMTA), Bulk Material Transfer Area (BMTA), OSDF borrow area, and designated project operational limits. (Requirements for traffic control within the OSDF and OSDF borrow area are contained in the IMPP and the OSDF Borrow Area Management and Restoration Work Plan.)

1.2 RELATED SECTIONS AND DOCUMENTS

A. Section 02200 - Earthwork

B. Section 02205 – Impacted Material Excavation.

C. Section 02206 – Earthwork for Remediation.

1.3 REFERENCES

A. Manual of Uniform Traffic Control Devices (MUTCD) for Streets and Highways, current edition.

B. State of Ohio, Department of Transportation (ODOT): Construction and Material Specifications, current edition.

PART 2 PRODUCTS

2.1 MATERIALS

A. Provide materials for traffic control, including stop and yield signs conforming to MUTCD and ODOT specifications.

B. Provide fencing as specified in Section 02200.

PART 3 EXECUTION

3.1 TRAFFIC CONTROL

A. Supply, install, and maintain traffic control devices.

B. Maintain speed limit of construction vehicles and equipment per postings and specific requirements stated in the Construction Traveler Package.

C. Ensure that haul equipment or other equipment traveling between certified and non-certified areas, remains on roads constructed of certified material. Perform wheel-wash activities and decontamination as necessary. The Construction Manager will arrange for radiological monitoring in accordance with Section 02205.

D. Provide entry points to the excavation area free of interference from non-project operations. Ensure that traffic entering haul roads yields to traffic already on the road.

E. Ensure that traffic routes are acceptable for use (stable) daily and after an event (rain) that may have altered the condition of the route.

F. Routes that cause equipment and/or vehicles to operate on inclines shall be evaluated and operational limits stated.

3.2 IMPACTED MATERIAL HAUL ROAD

A. Control the Impacted Material Haul Road (IMHR) as a contamination area during excavation and hauling of above-WAC materials. The Construction Manager must approve IMHR crossings from controlled areas.

B. The Construction Manager may post or reclassify road crossing intersections with the IMHR during periods of inactivity.

3.3 UTILITY CROSSINGS

A. Protect energized or active utility lines outside of existing paved areas that intersect proposed traffic routes. Use a 1 inch thick steel plate or an equivalent alternative. Provide length and width of steel plates as required to protect the existing utilities.

3.4 EQUIPMENT PARKING

A. OSDF Contractor Administration Area

1. Provide non-contaminated equipment parking areas within the OSDF Contractor Administration Area.
2. Restrict personal vehicles from the equipment parking areas.
3. Provide personnel parking at the OSDF Contractor Administration Area.

B. Contaminated Equipment Parking Area

1. Locate the contaminated equipment parking area as close as possible to the Radiological Control Point Facility.
2. Maintain contaminated equipment parking areas free of mud, debris and standing water.
3. Park contaminated equipment utilized in the SP-7 area, or above-WAC areas at the boundary of the area, in accordance with Section 02205, until decontaminated and released from the area.

C. Parking areas shall be constructed to insure that personnel accessing and servicing the vehicles shall have stable footing. The use of rip rap and other like materials is not acceptable.

END OF SECTION

SECTION 02205
IMPACTED MATERIAL EXCAVATION

PART 1 GENERAL

1.1 SCOPE

A. This Section includes the requirements for excavating, size-reducing, segregating, stockpiling, loading, hauling, and unloading impacted material. Activities include, but are not limited to, the following:

1. Excavation of impacted materials to the design grade.
2. Segregation of impacted materials for disposition or reuse.
3. Size reduction of remaining structures, utilities, and miscellaneous debris.
4. Loading, hauling and unloading of impacted materials to appropriate disposition.
5. Development and maintenance of project stockpiles.
6. Support of site monitoring and sampling activities.
7. Performance of area management activities.
8. Supplemental excavation beyond the design grade.
9. Excavation of utilities below the design grade.

1.2 RELATED SECTIONS AND DOCUMENTS

A. Section 02100 – Surveying.

B. Section 02150 – Traffic Control.

C. Section 02200 – Earthwork.

D. Section 02206 – Earthwork for Remediation.

E. Section 02210 – Asbestos Containing Material (ACM).

F. Section 02230 – Road Construction.

G. Section 02275 – Surface Water Management and Erosion Control for Remediation.

H. Section 02930 – Vegetation.

I. Impacted Materials Placement Plan (IMPP), On Site Disposal Facility (OSDF), 20100-PL-007, current revision.

1.3 REFERENCES

A. Title 29, Code of Federal Regulations (CFR): 29 CFR 1926 Subpart P – Excavation, current edition.

B. Waste Acceptance Criteria (WAC) Attainment Plan for On Site Disposal Facility (OSDF), 20100-PL-0014, current revision.

1.4 DEFINITIONS

A. Active Stockpile: A stockpile specifically designed to operate for longer than 45 calendar days. This includes interim stockpiles that are older that 45 days and existing stockpiles shown on the Construction Drawings.

B. Debris: Impacted material that is generated during the excavation and removal of building structures, utilities, miscellaneous man-made materials, and natural materials. These materials include floor slabs; foundation walls; foundations; piers; footings; hydraulic ram casings; structural steel and miscellaneous metal; electrical duct-bank, manholes, electrical wiring, and power poles; remaining equipment and miscellaneous mechanical items; chain link and other fencing; agricultural drain tiles; and rock, asphaltic pavement, and other aggregate materials not defined as Special Materials.

C. Design Grade: Grade created by excavation of impacted material to the lines and grades shown on Construction Drawings.

D. Final Remediation Levels (FRLs): The permissible concentration of contaminants that may remain in site soil and sediment following completion of remedial actions.

E. Impacted Material: Soil with contamination levels above the established FRLs or man-made materials. Impacted materials associated with soil excavation projects are presented in Table 02205-1.

F. Interim Stockpile: An impacted material project stockpile that is intended to be dispositioned in less than 45 calendar days.

G. Process Piping: Piping that is more likely to contain contaminated residue based on process knowledge of previous excavation activities (i.e. sanitary, effluent, or sump liquor lines).

H. Real-time Monitoring: Consists of several alternative methods of utilizing in-situ gamma spectroscopy, to analyze contaminant levels on the excavation surface.

I. Special Materials: Impacted material requiring special handling as specified in this Section and presented in Table 02205-1.

J. Supplemental Excavation: Removal of impacted material encountered beyond design grade.

K. Underground Storage Tank (UST): Tank that was used to contain an accumulation of a regulated substance, of which the volume was 10 percent or more beneath the ground surface.

L. WAC: Waste acceptance criteria (WAC) for disposition of material at the OSDF as defined by the WAC Attainment Plan. This WAC includes radiological/chemical criteria for soil, physical criteria for debris, and criteria for ancillary remediation waste (i.e., analytical sample returns, PPE).

1.5 SUBMITTALS

A. Maintain a daily record of underground utilities that have been excavated from below the design grade, in the form of a redline drawing mark-up, for review by the Project Engineer every 30 days following the start of excavation beyond the design grade.

B. Submit calculations certified by a registered Professional Engineer ensuring slope stability when using equipment having a gross weight greater than the specified Caterpillar CAT 350L within the excavation area, as necessary.

1.6 VERIFICATION OF THE EXISTING CONDITIONS

A. Verify existing conditions as specified in Section 02100.

PART 2 PRODUCTS

2.1 MATERIALS

A. Provide 20-mil sheets of Herculite or equal for use in buffer areas.

B. Provide 3/8-inch yellow nylon rope fence. Posts shall be in accordance with Section 02200.

2.2 EQUIPMENT

A. Furnish and maintain equipment to perform required operations in accordance with this section.

B. Equipment used to haul impacted material over the existing paved IMHR, shall be equal to or less than the gross vehicle weight and axle loading for a Caterpillar CAT D300E haul truck (gross vehicle weight of 120,000 pounds and maximum axle width of 9-feet 10-inches). Pavement width of the existing two-way IMHR is 24-feet. Select equipment and equipment width to ensure safe operation on this road.

C. Equipment used within the excavation area shall be equal or less than the gross weight for a Caterpillar CAT 350L track hoe (112,500 pounds). Heavier equipment may be approved for use in this area pending submittal and approval of calculations certified by a registered Professional Engineer, that ensure slope stability.

D. Equipment used to excavate, load, haul, and unload impacted materials shall have enclosed cabs. Enclosed cab is defined as an equipment cab isolated from outside environment (intact windows, doors, panels and floors surrounding driver with windows and doors shut) which provides a barrier from intrusion of outside airborne particles. Heating, ventilating, or air conditioning units associated with the equipment cab must not provide a direct path for outside air to enter (air conditioner on air recirculate mode) unless the air is first passed through a high efficiency particulate air filter pulled directly from outside the cab.

E. Furnish placards, placard carriers and 3-inch nominal diameter mounted sealable polyvinyl-chloride (PVC) tubes to serve as manifest carriers on haul trucks. Install at locations as directed by the Construction Manager.

F. Assign equipment used to haul material to the OSDF with unique alpha-numeric identifiers. This identifier shall be placed on both sides of the truck cab and shall be visible from 10 feet.

G. Equip trucks used for hauling impacted material with automatic load cover tops or employ Best Available Technology (BAT) methods to ensure that no airborne materials are emitted from the haul truck bed or load, whether empty or full.

H. Provide water tank trucks, water wagons, hydroseeders, portable tanks, pressure distributors, piping, sprinklers or other equipment designed to apply water and/or dust suppressant and crusting agent uniformly and in controlled quantities to variable surface widths to provide fugitive dust control.

I. Provide pressure wash or comparable equipment necessary to clean visible process residue and soil from piping and debris for placement in the OSDF.

J. Provide portable wash equipment to wash vehicle tires and vehicle exteriors as necessary.

K. Equipment used for size reducing concrete and asphalt materials for use as temporary aggregate surfaces.

PART 3 EXECUTION

3.1 GENERAL EXCAVATION

A. Prior to performing any excavation activities, satisfy the following requirements:

1. Complete preliminary survey and layout work in accordance with Section 02100.
2. Establish dust control methods in accordance with site procedures.
3. Install and manage surface water management and erosion and sediment control measures in accordance with Section 02275.
4. Install, modify, and manage construction safety and radiological-control fence, including installation of construction area signs. Install posts at spacing recommended by the manufacturer's installation procedures and as required to prevent sagging. Posts with less than 4 feet remaining above the ground after installation shall have safety caps installed.
5. Obtain survey and red line markup of area isolation trench, where applicable, to verify completeness.

B. Perform excavation activities in compliance with 29 CFR Part 1926.650 through 1926.652.

C. Unless otherwise noted on the Construction Drawings, the following slope stability requirements shall apply during excavation activities:

1. Excavation slopes with depths less than 20-feet shall be performed in accordance

with applicable Occupational Safety and Health Administration (OSHA) guidelines.

2. Temporary excavation slopes with depths less than 20-feet shall be no steeper than 1.5H:1V with a maximum height of 13 feet between 15 foot benches. Sloped excavations greater than 20 feet in depth shall be designed by a Registered Professional Engineer (RPE) with registration in the state of Ohio.
3. Design slopes and slopes created by supplemental excavation shall be no steeper than 2H:1V with a maximum height of 13 feet between 15 foot benches.

D. Install and manage traffic control devices in accordance with Section 02150.

E. Blasting, including use of explosives or explosive devices, is not permitted.

F. As necessary, establish and manage Special Materials Transfer Area(s) (SMTA) as follows:

1. Establish the SMTA on an existing building slab, paved parking area, or new aggregate surface adjacent to the project boundary, accessible from the excavation area and the Former Production Area.
2. Construct ingress/egress to the SMTA, including access roads, ramps, and drainage improvements as required.
3. Install new aggregate surface SMTA in accordance with the Construction Drawings and Section 02230, and provide positive drainage.
4. The SMTA shall not be used as a laydown area.
5. The SMTA shall be controlled as a radiological buffer area in accordance with this Section.

G. Establish controls for removal of ACM in accordance with Section 02210.

H. At a minimum, excavate surface material within the limits of excavation to a depth of 2 feet, unless otherwise noted on the Construction Drawings.

I. Excavate fractured materials concurrent with the adjacent Above-WAC or Below-WAC material. Fracturing of at-grade concrete slabs may continue concurrently with Above-WAC soil removal, but concrete outside of Above-WAC areas shall not be removed until Above-WAC soil removal has been completed, unless otherwise approved by the Construction Manager.

J. Stockpile concrete materials as necessary to facilitate the generation of Category 1 material in accordance with this Section.

K. Excavate and load material in such a manner that enables visual observation of excavation and loading operations as required to accurately manifest material for disposition.

L. Excavations shall generally proceed in an up-gradient to down-gradient pattern to the lines and grades shown on the Construction Drawings.

M. Keep excavation equipment in contaminated areas to prevent recontamination of areas excavated to final grade. Excavate an area by methods that prevent drainage of surface water into the area.

N. Unless otherwise noted on the Construction Drawings or directed by the Construction Manager, excavate material from known Above-WAC areas in accordance with this Section, prior to excavating Below-WAC material.

O. Survey and stake excavation areas as shown on the Construction Drawings, in accordance with Section 02100. Perform intermediate and final surveys as specified in Section 02100 for measurement and to confirm attainment of the design grade.

P. Remove material adjacent to structures that extend above the excavation surface, as well as the structures themselves, in a safe manner to ensure that an unstable condition is not created.

Q. Prior to excavating previously trenched and backfilled isolation trenches, physical sampling is required in locations where sanitary and process lines were cut during trenching. Allow 10 working days for physical sampling and analysis.

R. Excavate known utilities as indicated on the Construction Drawings. Prior to removal, cap, drain, purge and/or plug utility lines to be excavated to prevent release of material into surrounding soil. If fluids or hold-up material is encountered in utility lines, stop work and notify the Construction Manager. Plug sanitary and process lines when liquid flow is detected. Material released from sanitary or process lines will be excavated and dispositioned as directed by the Construction Manager.

S. If unidentified utilities or underground structures are encountered, notify the Construction Manager, and proceed in accordance with the approved Penetration Permit.

T. Process piping that is deformed, closed or otherwise hinders visual inspection shall be managed as Above-WAC debris based on it's area of origin.

U. If a utility is suspected of containing ACM, notify the Construction Manager and Industrial Hygiene and manage in accordance with Section 02210.

V. Excavate, size-reduce, and handle piping and debris in such a manner to minimize the generation of Above-WAC debris or friable asbestos.

W. Design contours and grades shown on the Construction Drawings represent the minimum limits of excavation required to capture contamination and foundations, while maintaining safe slope requirements. Minimal changes may be submitted to incorporate breaks in contours, ponding of water, equipment accessibility, etc. These changes shall not exceed 10% of the total designed excavation quantity.

X. In the event a historic, prehistoric, or archeological site, feature, or object is discovered, stop excavation in the area and immediately notify the Construction Manager.

Y. Continuously observe excavations for Special Materials or change in materials. In the event a Special Material or change in materials is encountered, stop excavation in the area and immediately notify the Construction Manager. Dispose of Special Materials in accordance with Table 02205-1.

Z. In the event solvent saturated soils are encountered, stop excavation in the area and immediately notify the Construction Manager. Excavate, load, and haul the material as directed by the Construction Manager.

AA. Prevent damage to adjacent structures, materials, and equipment, including utilities that are to remain, or those installed for performance of this work. Repair damage that occurs due to execution of this scope.

BB. Dispose of impacted material in accordance with this Section. Table 02205-1 provides guidance for the disposition of materials that may be encountered which will be disposed at the 3 destinations identified in this Section. Notify the Construction Manager in the event that materials are discovered that do not appear to be represented in Table 02205-1.

CC. Pending coordination between the projects, material designated for SP-7 disposition may be hauled directly to WPRAP. Material hauled directly to WPRAP must comply with SP-7 waste acceptance criteria presented in this Section except that material shall be less than 10 inches in at least one dimension and no longer than 6 feet in any dimension..

DD. OSDF disposition requires the following:

1. Compliance with requirements stated in the WAC Attainment Plan and the IMPP.
2. Piping and debris shall be cleaned of process-related residue in accordance with this Section. Notify the Construction Manager of residue that is not readily removed and manage the debris as directed.
3. Compliance with criteria identified in Table 02205-1 for management of Special Materials for disposition at the OSDF.
4. ACM shall be removed, packaged, loaded and hauled in accordance with Section 02210.

DD. SP-7 disposition requires the following:

1. Soil, piping and debris exceeds the requirements for OSDF disposition as outlined in Table 02205-1.
2. Piping and debris shall be less than 10 inches in at least one dimension, and no longer than 8 feet in any dimension.

EE. SMTA disposition requires the following:

1. Soil, piping and debris exceeds the requirements for OSDF and SP-7 disposition as outlined in Table 02205-1.
2. Materials shall be containerized as directed by the Construction Manager.
3. Loaded containers shall be placed in the SMTA in a manner that protects the containers from damage. Do not stack containers.

3.2 EXCAVATIONS APPROACHING THE GMA

A. Stop excavation activities in the immediate area and immediately notify the Construction Manager if sands and gravel are encountered, even if the design grade has not been reached.

B. Use caution when excavations encroach on the 5-feet protective cover over the unsaturated sands and gravel of the GMA. Approximate GMA elevations are shown on the Construction Drawings.

C. Prior to initiating work activities which will encroach on the 5-feet protective cover but not extend within 2-feet of the GMA, proceed as follows:

1. Excavate to achieve design grades shown on the Construction Drawings or to remove Above-FRL material.
2. Allow 24 hours for coordination of the following: examination of the excavation bottom to determine if GMA sediments are present, real-time monitoring and/or physical sampling of the area to be backfilled, and identification of necessary pumping requirements for ponded water.
3. Immediately following monitoring and sampling, initiate backfilling to protect the GMA in accordance with Section 02206.

D. Prior to initiating work activities which will encroach within 2 feet of or breach the GMA, obtain approval and direction from the Construction Manager. Proceed as follows:

1. Excavate to achieve design grades shown on the Construction Drawings or to remove Above-FRL material.
2. Allow for real-time monitoring and physical sampling in the area prior to backfilling.
3. Immediately following monitoring and sampling collection, initiate backfilling to protect the GMA in accordance with Section 02206.

3.3 ABOVE-WAC EXCAVATIONS

A. Establish excavation boundary and buffer area controls for Above-WAC areas as follows:

1. Establish excavation area boundaries at surveyed and staked locations, in accordance with this Section.
2. Install T-posts and rope fence at the excavation boundary.
3. Establish the buffer area adjacent to the excavation area to serve as a controlled loading area between the excavation area and the surrounding radiological controlled area.
4. Grade the buffer area to drain into the excavation.
5. Install T-posts and rope fence around the buffer area.
6. Cover the buffer area with a 20-mil sheet of Herculite, or equivalent.
7. Collect water encountered during excavation and pump as specified in Section 02275.
8. Keep the buffer area clean and free of dirt and mud.
9. Remove spillage before releasing haul equipment from the buffer area.

B. Dedicate and restrict equipment required to excavate, load, haul and place Above-WAC material, as well as soil requiring treatment, to that specific use until decontamination

rinsing has been completed and approved by the Construction Manager. Upon approval by the Construction Manager that no visible material is present on exterior equipment surfaces, or in haul truck beds, equipment may be used elsewhere.

C. Load haul equipment by reaching over the excavation area boundary and dumping directly into haul equipment located in the buffer area. Load haul equipment in a manner that prevents spillage and accumulation of material on the wheels and exterior of the haul equipment. Remove visible material that accumulates on the truck exterior. Multiple loading areas may be established within the buffer area.

D. Wash haul equipment within the buffer area as necessary (using low volume, high-pressure washer or approved equivalent) to remove Above-WAC contamination from the exterior of equipment.

E. Remove debris (concrete, asphalt, and miscellaneous structures) from Above-WAC areas and pressure wash the debris to remove soil/residue. The Construction Manager will visually monitor washing operations to ensure that debris is free of soil/residue and approved for loading and hauling to the OSDF.

F. Debris from Above-WAC areas not approved for disposal at the OSDF shall be dispositioned at SP-7 in accordance with this Section.

G. Excavate Above-WAC soil/gravel in 3+/-1 foot lifts to the design grade, as shown on the Construction Drawings. Load and haul Above-WAC soil/gravel to SP-7 in accordance with this Section.

H. The Construction Manager will arrange for real-time monitoring on excavated side slopes after each lift is removed and on the excavation floor upon achieving the Above-WAC contamination limits shown on the Construction Drawings. In Above-WAC areas contaminated with Tc-99, as shown on the Construction Drawings, the Construction Manager will arrange for physical sampling at the design depth. Allow 10 working days for sampling and analysis. Do not proceed with further excavation in this area until directed by the Construction Manager.

I. If initial depth of Above-WAC material is below the existing surface, excavate Below-WAC material in 2+/-1 foot lifts until Above-WAC material has been reached, then proceed in 3+/-1 foot lifts.

J. Pending results of monitoring or analysis, perform supplemental Above-WAC excavation beyond design limits shown on the Construction Drawings or in areas not shown on the Construction Drawings, as directed by the Construction Manager.

3.4 UST EXCAVATIONS

Excavate USTs and areas that previously contained USTs shown on the Construction Drawings, as well as USTs discovered during excavation, as follows:

A. Excavate to expose the top of the tank (UST) to allow the Construction Manager to assess the tank's condition.

B. The Construction Manager and Industrial Hygiene will inspect the tank for the presence of liquid or non-soil residue.

C. If the tank contains liquid or non-soil residue, as determined by the Construction Manager, proceed as follows:

1. Pump remaining tank contents into drums provided by the Construction Manager.
2. Move filled drums from the excavation area to the SMTA.
3. Drums will be removed from the SMTA by others for appropriate disposition.

D. Upon confirmation from the Construction Manager that the tank is empty, excavate the tank. Ensure that water does not accumulate in the tank from the surrounding excavation.

E. During excavation, stage the tank, soil excavated from around the UST, and soil excavated from areas that previously contained USTs separate from other excavated materials.

F. Upon confirmation from the Construction Manager that the tank is free of visible process residue, size-reduce the tank to meet physical WAC and dispose of it in the OSDF as a discrete waste stream.

G. If the tank cannot be cleaned of visible process residue, size-reduce the tank for disposition in accordance with this Section.

H. Over-excavate soil surrounding UST excavations and from areas that previously contained USTs to remove visible stains. Transport this soil as directed by the Construction Manager.

3.5 HWMU EXCAVATIONS

Excavate material from the HWMU to the limits shown on the Drawings as follows:

A. Remove debris (concrete, asphalt, and miscellaneous structures) from the HWMU and haul to the OSDF as a discrete waste stream. If the HWMU is considered an Above-WAC area, load and haul the debris to SP-7, or containerize it as directed by the Construction Manager.

B. The Construction Manager will arrange for physical sampling upon confirmation that all HWMU material has been removed. Allow 10 working days for sampling and analysis required to close out the HWMU. Do not proceed with further excavation in this area until directed by the Construction Manager.

C. Perform additional excavations within the HWMU if monitoring and analysis identifies additional HWMU material beyond the limits shown on the Drawings.

3.6 BELOW-WAC EXCAVATIONS

Excavate Below-WAC material to the limits shown on the Construction Drawings as follows:

A. Remove slabs, concrete pads, asphalt, gravel, base and sub-base to sub-grade soil within Below-WAC areas. Load and haul this material to the OMTA-Bulk Debris or OSDF. The Construction Manager will arrange for real-time monitoring prior to subsequent excavation in the Below-WAC area.

B. Excavate Below-WAC areas to the design grade shown on Construction Drawings. Load and haul this material to the OSDF in accordance with this Section.

C. In Below-WAC excavations driven by contamination rather than removal of underground structures, as shown on Construction Drawings, excavate in 3+/-1 foot lifts to the design grade shown on Construction Drawings. The Construction Manager will arrange for real-time monitoring upon removal of each lift. Do not proceed with further excavation in these areas until directed by the Construction Manager.

D. Over-excavate a minimum of 6 inches in areas where impacted material was stockpiled or pushed for load-out during excavation to allow for visual inspection and disposition of debris that may have been tracked into the soil.

E. Coordinate real-time monitoring as necessary to minimize delays.

F. Upon reaching the design grade, notify the Construction Manager for real-time monitoring.

3.7 MATERIAL SEGREGATION

A. During excavation, segregate materials by the impacted material categories as defined in the IMPP. Maximize the volume of Category 1 material.

B. Segregate Below-WAC material to support construction of the four zones of each OSDF cell (protective layer, select impacted material layer, impacted material layer, and contouring layer).

C. Segregate existing surface aggregate material and size-reduced concrete and asphalt materials for use as temporary aggregate material.

3.8 SIZE REDUCTION

A. Size-reduce remaining structures (i.e., building foundations, slabs, sumps, hydraulic ram casings) located above the design grade to meet the physical WAC for OSDF.

B. Size-reduce concrete and asphalt structures (i.e., building slabs, concrete/asphalt pads, roads, parking areas) to maximize the generation of material for temporary aggregate surfaces.

C. Size-reduce piping and debris to meet the physical WAC for OSDF in accordance with the IMPP, or size requirements for SP-7 in accordance with this Section.

D. Size-reduce metal materials (i.e., structural steel, piping, equipment, miscellaneous metal) in accordance with the IMPP. Load metal components in bulk and haul to the OSDF or OMTA.

E. Size-reduction shall be by mechanical means, not by flame or torch cutting.

3.9 GENERAL LOADING AND HAULING

A. Use paved haul roads designated on the Construction Drawings for hauling. Upon entering the paved haul roads with haul equipment, do not exit except to the excavation area, SP-7, OMTA Bulk Debris Area, and/or the OSDF, without approval by the Construction Manager.

B. Maintain equipment within the excavation area during periods of non-work (evenings, weekends, and holidays) unless equipment decontamination has been completed. Complete decontamination activities and request a radiological survey of the equipment prior to moving equipment out of radiological contamination areas.

C. When hauling materials to the SMTA, enter the SMTA from the excavation area only.

D. Load haul equipment in a fashion to minimize load shifting and to prevent spillage during transit.

E. Extend automatic covers on suitably equipped haul equipment, whether full or empty, during equipment movement.

F. Keep equipment cab closed and stay within the equipment cab when inside posted contamination area without appropriate PPE except in emergency situations.

G. Provide material tracking information in accordance with the Material Tracking Plan shown on Construction Drawings.

H. Prior to loading and hauling, material designated for the OSDF shall be void of free liquid.

I. Prohibit tracked equipment from hauling, operating, or tracking over the Impacted Material Haul Road (IMHR) or other paved roadways, unless otherwise approved by the Construction Manager.

3.10 STOCKPILING

A. Install construction safety fence around active stockpiles in accordance with Section 02200.

B. Install appropriate signage around the boundary of active stockpiles in accordance with stockpile procedures, as directed by the Construction Manager.

C. Install erosion control measures around active stockpile in accordance with Section 02275.

D. Maintain fencing, signage, and erosion control measures for the duration of the active stockpile's existence.

E. Repair damage to active stockpile support structures (i.e., silt fence, perimeter fence) inflicted during performance of this project to their original condition within 24 hours of damage discovery.

F. Apply crusting agent as specified in Section 02930 within 7 calendar days upon completion of the active soil stockpile or if the active soil stockpile is to be inactive for more than 45 calendar days.

G. Compact/seal the surface of the stockpile in use at the close of each work-day to prevent fugitive dust and erosion.

H. Construct stockpiles with maximum slopes of 3H:1V and a maximum height-to-base ratio 0.2.

I. Locate interim stockpiles within the limit of excavation upon approval from the Construction Manager. Remove interim stockpiles within 45 calendar days.

J. Establish a separate stockpile for solvent saturated soils, as encountered. Manage the stockpile material to avoid cross-contamination with adjacent soil, and to control surface water and dust.

K. Stockpile excavated surface aggregate materials and size-reduced concrete and asphalt as necessary for use as temporary aggregate material.

L. Stockpiles shall not be located within 30 feet of an excavation top-of-slope.

M. In addition to general stockpiling requirements, the following requirements shall apply to the management of Above-WAC stockpiles:

1. Use dedicated equipment for the preparation and management of the stockpiles.
2. Maintain ingress/egress to the stockpiles, including access roads, ramps, and drainage features.
3. Maintain unloading areas that prevent haul equipment tires from coming in contact with stockpiles material.
4. Locate the stockpiles as directed by the Construction Manager.
5. Decontaminate tools and equipment used to place and manage material withing these stockpiles prior to requesting release. Following decontamination, the Construction Manager will arrange for a radiological survey to release tools and equipment.

N. Cover or lock down soil or debris containing non-friable ACM at the end of the day in accordance with Section 02210.

3.11 MONITORING AND SAMPLING

A. The Construction Manager will arrange for real-time monitoring of Below-WAC areas following removal of surface aggregate, concrete and asphalt slabs, pads, roads and parking areas, and between each lift in contaminated areas until the design grade has been achieved, including the design grade.

B. The Construction Manager will arrange for real-time monitoring between excavation lifts for Above-WAC materials.

C. The Construction Manager will arrange for radiological monitoring before equipment is released from a buffer area. Working in rain and/or wet weather increases scanning time.

D. The Construction Manager will perform visual monitoring during excavation for Special Materials that are not permitted in the OSDF or that will require additional processing to meet WAC. If Special Materials are found, real-time monitoring may be performed to verify removal and determine appropriate disposition of the material.

E. The Construction Manager will visually monitor piping and debris to ensure no visible process residue remains, in order to be placed in the OSDF.

F. The Construction Manager will arrange for real-time monitoring to verify that the excavation area has met the requirements for precertification.

G. When real-time monitoring or sampling is required, excavate in an alternate location within the excavation area while awaiting the results. Excavate alternate locations a minimum of 50 feet from the area being monitored. Allow up to 2 working days for monitoring after area is ready for monitoring. Extend duration for monitoring at least 1 working day for each day precipitation occurs.

H. The Construction Manager and regulatory agencies may collect samples from the excavation, haul equipment and the OSDF at any time during the project.

I. The Construction Manager will monitor water collected in suspect VOC areasfor the presence of volatile organic compounds (VOCs). If VOCs are detected, the water will be sampled and analyzed to determine disposition.

J. The Construction Manager will arrange for magnetometer surveys to verify removal of ferrous debris from areas where former underground utilities and structures were excavated.

3.12 PRECERTIFICATION AND SUPPLEMENTAL EXCAVATION

A. The Construction Manager will arrange for real-time monitoring to pre-certify an area as having attained FRL requirements.

B. Perform supplemental excavations beyond the design grade if either of the following conditions exist:

1. Real-time monitoring and/or physical sampling identifies material beyond the design grade that does not meet FRL requirements.
2. Utilities or other impacted materials identified beyond the design grade.

C. Install rope fencing and appropriate signage around the pre-certified area perimeter after precertification has been achieved.

3.13 AREA MANAGEMENT

A. Maintain construction safety fence, radiological-control fence, and stockpile fence as specified in this section, Section 02200, and as shown on the Construction Drawings.

B. Management of excavation water shall be as specified in Section 02275.

C. Perform stabilization of the excavated areas using crusting agent and temporary seeding in accordance with Sections 02275 and 02930.

D. Notify the Construction Manager prior to removing sediment and debris from ditches, drains and erosion control devices. The Construction Manager will arrange for sampling and analysis of sediment for WAC compliance. Remove and de-water sediment in accordance with the following:

1. Notify the Construction Manager two (2) days prior to removing sediment from ditches, drains and erosion and sediment control devices to arrange for sampling and analysis of the sediment for disposition.
2. Remove accumulated sediment from ditches, drains and erosion and sediment control devices as directed by the Construction Manager. In no case shall sediment reduce the available depth of the associated feature to less than two-thirds the depth shown on Construction Drawings.
3. De-water sediment removed from Above-WAC areas within the associated Above-WAC area.
4. De-water sediment removed from ditches, drains and erosion and sediment control devices adjacent to and up-gradient of the associated feature as necessary to allow water to drain immediately back into the feature.
5. Disposition de-watered sediment to the OSDF unless otherwise directed by the Construction Manager.
6. Place sediments accumulated in Above-WAC stockpile surface water control devices in the associated stockpile.

E. Implement seasonal closure methods at the end of each construction season and maintain seasonal closure through winter shutdown. Seasonal shutdown requirements include, but are not limited to:

1. Maintain surface water management and erosion and sediment controls.
2. Maintain dust control, as required.
3. Perform equipment decontamination, as required.
4. Remove water from excavation during seasonal closure, when water depth exceeds 1-foot. Pump water out of the excavations in a manner that maintains the integrity of the 2H:1V side slopes, (i.e., no rapid draw down) and prevents an overflow condition. The pumping priority for open excavations is as follows:
   a. Open excavation areas containing impacted material that are located up-gradient of remediated areas,
   b. Completed excavations, and
   c. Other uncompleted excavations.
5. Remove sediment and debris from sediment control basins and ditches in accordance with this Section.
6. Seed/stabilize stockpiles.

3.14 UTILITY REMOVAL BELOW THE DESIGN GRADE

A. Prior to excavating utilities below the design grade, satisfy the following conditions:

1. Complete the intermediate survey, as specified in Section 02100.
2. Obtain Construction Manager approval that real-time monitoring of the design grade is complete.

B. Excavate and remove utilities in accordance with this Section and details shown on Construction Drawings.

C. Backfill utilities located below the design grade in accordance with the details shown on Construction Drawings and Section 02206.

D. If visual monitoring identifies Special Materials during excavation of utilities below the design grade, perform supplemental excavation in accordance with this Section.

E. Excavate miscellaneous debris encountered below the design grade and disposition in accordance with this Section.

F. Maintain a daily record of underground utilities excavated from below the design grade.

END OF SECTION

Table 02205-1

The table should be interpreted to read that material in column 1 may be dispositioned at the appropriate destination in columns 2-4 if the corresponding criteria are met.

MATERIAL	DESTINATION *		
	OSDF	SP-7 (1)	SMTA (2)
Soil – from general excavation/UST	• Meets WAC	• Above-WAC	• Not applicable
Debris – from general excavation/UST	• Meets WAC	• Above-WAC • Visible residue cannot be removed	• Not applicable
Debris – from Above-WAC excavations	• Meets WAC if free of visible soil/residue	• Visible soil/residue cannot be removed	• Not applicable
Asbestos (3)	• Meets WAC and passes visual inspection by CM	• Above-WAC and non-friable • Visible soil/residue cannot be removed and non-friable	• Friable and fails visual inspection by CM
Non-pressurized Containers (3)	• Meets WAC, free of visible soil/residue, and contains no free liquid, product, etc	• Above-WAC and contains no free liquid, product, etc. • Visible soil/residue cannot be removed and contains no free liquid, product, etc. • Has been crushed	• Contains free liquid, residue, etc • Has been crushed
Piping/Pumps (3)	• Meets WAC, free of visible soil/residue, and contains no free liquid	• Interior not visible and contains no free liquid • Visible soil/residue cannot be removed and contains no free liquid	• Not applicable
Transformers/Electrical Equipment (3)	• Meets WAC and free of visible soil/residue	• Visible soil/residue cannot be removed and drained of all fluid	• Contains fluid
Brick including Acid Brick (3)	• No acid brick (4)	• Acid brick (4)	• Not applicable
Lead Acid Batteries (3) Medical Infectious Waste (3) Non-soil Residue (3) Pressurized Containers (3) Tires (3) Uranium Metal (3) Sealed radiological calibration sources	• Prohibited	• Prohibited	• Containerize

(1) Must meet SP-7 size requirements per this Section (2) SMTA materials must be containerized. (3) Special Material per this Section.
* These are final destinations beyond which the project bears no responsibility for material movement. The OMTAs are staging areas prior to OSDF disposition.

000274

4328

SECTION 02206
EARTHWORK FOR REMEDIATION

PART 1 GENERAL

1.1 SCOPE

A. This Section includes requirements for earthwork associated with remediation of the former production area to include, but is not limited to:

1. Excavation of fill material.
2. Excavation and placement of materials for ditches and berms.
3. Placement of fill material in trenches excavated for utility removal in areas below design grade.
4. Placement of plug material over the unsaturated sands and gravels of the Great Miami Aquifer (GMA).
5. Interim grading for drainage and road preparation.
6. Final grading.

1.2 RELATED SECTIONS AND DOCUMENTS

A. Section 02100 – Surveying.

B. Section 02150 – Traffic Control.

C. Section 02205 – Impacted Material Excavation.

D. Section 02230 – Road Construction.

E. Section 02275 – Surface Water Management and Erosion Control for Remediation.

F. Section 02930 – Vegetation.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1.	ASTM C150	Specification for Portland Cement, current edition.
2.	ASTM D698	Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft), current edition.
3.	ASTM D2216	Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock, current edition.
4.	ASTM D2487	Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System), current edition.

5.	ASTM D2922	Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
6.	ASTM D3017	Standard Test Methods for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
7.	ASTM D4643	Test Method for Determination of Water (Moisture) Content of Soil by Microwave Oven Method.

1.4 DEFINITIONS

A. Fill Material: Non-impacted soil obtained from within the excavation area, below the design grades, following pre-certification, or from a designated borrow area.

B. Design Grade: Grade created by excavation of impacted material to the lines and grades shown on Construction Drawings.

C. GMA Plug: Non-impacted gray clay material from the certified Borrow Area used to maintain a minimum protective cover thickness over, and seal breaches into, the GMA unsaturated sands and gravels.

D. Clay Plug: Same material as specified for GMA Plug used to create a protective cover thickness over pilings to be cut off and left in place as shown on the Construction Drawings.

1.5 SUBMITTALS

A. Submit for approval, name, address, and qualifications of an independent soil testing laboratory and resume(s) of field technician(s).

B. Within seven (7) calendar days of obtaining samples and performing field tests, provide copies of lab and field tests performed by the soil testing laboratory and Contractor performing field tests. Soil test results shall include Standard Proctor moisture density tests, sieve analysis, density tests, and Proctor curves for each type of material to be used prior to its use. Field test results shall include a map depicting locations and depth/lift.

C. Submit specification sheet and MSDS for sodium bentonite grout.

D. Submit specification sheet and MSDS for Portland cement.

E. Submit as-built survey to verify completion of design excavation in accordance with Section 02100, Surveying.

F. Documentation of nuclear density gauge calibration in accordance with manufacturer's requirements.

1.6 EXISTING CONDITIONS

A. Verify existing conditions as specified in Section 02100.

PART 2 PRODUCTS

2.1 MATERIALS

A. Fill material shall be free of debris, foreign objects, large rock fragments (maximum dimension of 6 inches), organic, and other deleterious materials.

B. GMA plug material shall be fill material conforming to CL classification according to United Soil Classification System in accordance with ASTM D2487.

C. Use the designated certified borrow area as the source for GMA plug material.

D. Material used to backfill utility trenches located below the design grade and areas where grout plugs are installed into air-gapped storm sewers shall be surrounding soils following pre-certification.

E. Use below-FRL material from the excavation area, following pre-certification, as a source of fill material for supplemental excavations.

F. Portland cement per ASTM C150, normal – Type 1.

G. Sodium bentonite grout.

H. Safety signs around ponds shall be exterior quality signs with minimum 4 inch high letter and shall state, "Life jackets required when working within 5 feet of edge of ponds, use of buddy system required". Hand written signs are unacceptable.

2.2 EQUIPMENT

A. Furnish and maintain equipment to perform required operations in conformance with the requirements of these specifications.

B. Furnish equipment to perform required operations in conformance with this Section. Equipment that results in waste or damage of material, inaccurate work, or is otherwise objectionable shall be promptly replaced.

C. Equipment used to haul non-impacted material over the existing paved Impacted Material Haul Road (IMHR), shall be equal to or less than the gross weight and axle loading for a Caterpillar CAT D300E haul truck (gross vehicle weight of 120,000 pounds and maximum axle width of 9-feet 10-inches). Pavement width of the existing two-way IMHR is 24-feet. Select equipment and equipment width to ensure safe operation on this road.

D. Equipment used within the excavation area shall be in accordance with Section 02205.

E. Furnish compaction equipment, as needed.

PART 3 EXECUTION

3.1 GENERAL

A. Perform intermediate surveys in accordance with Section 02100, to confirm attainment of design grade prior to initiating earthwork activities below the design grade.

B. Stop excavation activities and immediately notify the Construction Manager upon discovery of unexpected cultural resources suspected to be historic, prehistoric, or archeological site, feature or object.

C. Excavate soil below the design grade with equipment free of visible above-FRL soil.

D. Use material from the immediate excavation area or a designated borrow area to meet fill material requirements for trenches and supplemental excavations.

E. Perform construction activities such that surface water runoff from non-certified construction areas does not flow into pre-certified areas, in accordance with Section 02275.

F. Maintain slope stability outside of utility trenches created by excavating utilities below the design grade, in accordance with Section 02205.

G. After certification, perform final grading in accordance with this Section.

3.2 BACKFILL

A. Obtain fill material from areas approved by the Construction Manager. In high-leachability areas shown on the Construction Drawings, obtain fill material from precertified or certified areas meeting the 20 mg/kg total Uranium FRL.

B. Maintain a minimum 5-feet protective cover over the unsaturated sands and gravel of the GMA in accordance with the following. GMA elevations are shown on the Construction Drawings.

1. Following excavation activities that encroach on the 5-feet protective cover but do not extend within 2-feet of the GMA, install GMA plug as follows:

   a. Immediately following monitoring and sampling activities specified in Section 02205, survey the excavation and initiate filling.
   b. Backfill using GMA plug material meeting the requirements of this Section. Complete backfilling within 5 days following sampling.
   c. Backfill GMA plug material in 8-inch +/- 1-inch loose lifts until protective cover is returned to a minimum thickness of 5-feet.
   d. Compact fill material in each 8-inch loose lift to at least 95% Standard Proctor dry density (ASTM D698) within 0 to +3% of optimum moisture content.

2. Following excavation activities that encroach within 2 feet of or breach the GMA, install GMA plug as follows:

   a. Immediately following monitoring and sampling activities specified in Section 02205, survey the excavation and initiate backfilling.
   b. Backfill using GMA Plug material meeting the requirements of this Section.
   c. If precipitation is likely within the next 24 hours, immediately place a minimum fresh compacted thickness of 2 feet. Otherwise, place the 2 feet of compacted cover within 24 hours of excavating to within 2 feet or breaching the GMA.
   d. Place the first lift of GMA plug material in an approximate 18-inch loose lift. Compact the first lift using 4 passes of compaction equipment approved by the Construction Manager.
   e. Backfill the remaining lifts in 8-inch +/- 1-inch loose lifts until the ~~protective cover is returned to~~ a minimum of 5 feet. Compact GMA plug material in each 8-inch loose lift to at least 95% Standard Proctor dry density (ASTM D698) within 0 to +3% of optimum moisture content. These lifts must be continuous over the entire breached area.

D. Install clay plug in locations shown on the Construction Drawings in accordance with the following:

   1. Backfill using clay plug material meeting the requirements of this Section.
   2. Place clay plug material in 8-inch +/- 1-inch loose lifts as necessary to achieve a total compacted thickness of 2-feet.
   3. Compact each lift with four (4) passes of compaction equipment approved by the Construction Manager.
   4. If clay plug is placed over an open pile, seal void spaces within the pile with sodium bentonite grout and cap the top 2 feet of the pile with Type 1 Portland cement ASTM C150 prior to placing the clay plug. Sodium bentonite grout shall be mixed at a water ratio of 2.1 pounds of sodium bentonite per gallon of water, and have a minimum density of 9.4 lbs./gallon. Grout viscosity shall be field checked periodically to assure proper viscosity of 70 +/- 6 seconds using the Marsh funnel viscometer. Tremie the grout into the open pile to eliminate void space.

E. Excavate, remove utilities, and backfill trenches below the design grade in accordance with the following:

   1. Remove utilities located below the design grade in accordance with Section 02205 and details presented on Construction Drawings.
   2. Remove water collected in trenches to sump areas and pump it to the appropriate sediment control basin as specified in Section 02275.
   3. Backfill utility trenches located below design grade in accordance with the Construction Drawings.

3.3 FIELD QUALITY CONTROL

A. In-place density testing will be performed in accordance with ASTM D2922. Nuclear density gauge (ASTM D2922) will be calibrated in accordance with the manufacturer's requirements. Documentation of this calibration will be provided to the Construction Manager. Register nuclear or radiological sources brought on site.

B. Perform in-place moisture tests in accordance with ASTM D3017, or ASTM D4643 as applicable.

C. Determine moisture-density curves in accordance with ASTM D698 (Standard Proctor). Test results must be reviewed and approved by the Construction Manager.

D. If in-place density and/or moisture tests indicate that work does not meet specified requirements, remove work and replace or re-compact to specified requirements.

E. Perform soil classification in accordance with ASTM D2487.

F. Frequency of Tests: Frequency of in-place density and moisture testing shall be whichever of the following requires the greatest number of test:

1. Once each day when compacting GMA plug material.
2. Once each compacted lift of GMA plug material.
3. Once every 3,000 sq. ft. of compacted GMA plug material.

G. Notify the Construction Manager of activities requiring testing/inspection a minimum of 24 hours prior to the start of such activities.

3.4 EARTHEN BERMS

A. Install earthen berms at locations shown on the Construction Drawings using soils from surrounding area following pre-certification by Fluor Fernald.

B. Place material in 8-inch loose lifts.

C. Compact each lift of berm with 4 passes of compaction equipment approved by the Construction Manager.

3.5 INTERIM GRADING

A. When the design grade has been achieved, perform interim grading as follows:

1. Correct washouts or other similar irregularities to maintain the design grade slopes of 2H:1V or less.
2. Grade to maintain smooth continuous slopes.
3. Finish ditches so they drain readily.
4. Perform temporary seeding in accordance with Section 02930.
5. Repair damage within 3 working days.

3.6 FINAL GRADING

A. Obtain verification that the area to be graded has been certified.

B. Provide, maintain and operate temporary drains, ditches, pumps, drainage lines or other equipment to intercept, divert, or remove water from excavations.

C. Provide and maintain stormwater management measures that assure isolation of stormwater between certified and non-certified areas.

D. Regrade within the certified area by cutting back the 2H:1V grades to achieve grades no steeper than 5H:1V. As the 5H:1V excavation proceeds, the cut material shall be placed in the bottom of existing excavations and graded level.

E. Final grading shall be achieved with minimum 5 foot radii at contour direction changes, and smooth transitions between grade breaks and depressions.

F. Perform permanent seeding in accordance with Section 02930.

G. Stabilize 2H:1V slopes along excavation boundary with erosion control blankets in accordance with Section 02275.

3.7 SURFACE WATER MANAGEMENT

A. Manage surface water in accordance with Section 02275.

B. Perform excavation in a manner that promotes positive drainage.

C. Install earthen berms as shown on Construction Drawings. Apply temporary seed and fertilizer on earthen berms in accordance with Section 02930.

3.8 SEASONAL SHUTDOWN

A. Perform seasonal shutdown activities in accordance with Section 02205.

END OF SECTION

SECTION 02207
AREA ISOLATION TRENCHING

PART 1 GENERAL

1.1 SCOPE

A. This Section includes the requirements for trenching and backfilling an isolation trench around the project excavation limits, as shown on the Construction Drawings.

1.2 RELATED SECTIONS AND DOCUMENTS

A. Section 02205 – Impacted Material Excavation.

B. Section 02275 –Surface Water Management and Erosion Control for Remediation.

1.3 REFERENCES

A. Title 29, Code of Federal Regulations (CFR): 29 CFR 1926 Subpart P – Excavation, current edition.

B. RM-0021, "Safety Performance Requirements Manual".

C. RM-0047, "Fugitive Dust Control Requirements".

D. SPR 3-5, "Barricades".

1.4 DEFINITIONS

A. Special Materials: Impacted material requiring special handling as specified in Section 02205 and presented in Table 02205-1.

B. Trencher: Specific equipment used in trenching around the area excavation limits.

PART 2 PRODUCTS

2.1 MATERIALS

A. Provide rope fence consisting of 3/8-inch yellow nylon rope as shown on the Construction Drawings.

B. Provide T-posts in accordance with Section 02200.

C. Provide construction area signage in accordance with SPR 3-5.

D. Provide crusting agent as specified in Section 02275.

2.2 EQUIPMENT

A. Furnish and maintain trencher equipment, manufactured by Vermeer or an approved equivalent, to perform trenching in accordance with this Section. The trencher must meet the following requirements:

1. Trencher must be capable of cutting to a minimum depth of 12 feet, with a tolerance of 0 to 6 inches.
2. Trencher must be capable of cutting a trench no greater than 30 inches wide.
3. Trencher must be capable of maintaining a trench centerline lateral tolerance of +/- 1 foot over the entire trench depth.
4. Trencher digging mechanism must be capable of being removed for turnover to Fluor Fernald at the completion of the project.

B. Furnish and maintain equipment to perform trench backfilling in accordance with this Section.

C. Equipment used within the trenching exclusion zone shall have enclosed cabs. Enclosed cab is defined as an equipment cab isolated from the outside environment (intact windows, doors, panels and floors surrounding driver with windows and doors shut) which provides a barrier from intrusion of outside airborne particles. Heating, ventilating, or air conditioning units associated with the equipment cab must not provide a direct path for outside air to enter (air conditioner on air recirculate mode) unless the air is first passed through a high efficiency particulate air filter pulled directly from outside the cab.

D. Furnish and maintain equipment to perform compaction in accordance with this Section.

E. Provide water tank trucks, water wagons, hydroseeders, portable tanks, pressure distributors, piping, sprinklers or other equipment designed to apply water and/or dust suppressant and crusting agent uniformly and in controlled quantities to variable surface widths to provide fugitive dust control.

F. Furnish and maintain portable wash equipment to wash vehicle tires and vehicle exteriors as necessary.

PART 3 EXECUTION

3.1 GENERAL

A. Survey and layout the isolation trench centerline as shown on Construction Drawings. Remove or relocate surface obstructions that may impede trencher operations prior to trenching, as approved by the Construction Manager.

B. Prior to trenching activities, install and manage rope fence and appropriate signage to establish safe distances around the trench and excavations during equipment operation and while the trench remains open.

C. Install radiological-control signs as required.

D. Install and maintain surface water management and erosion and sediment control measures in accordance with Section 02275.

E. Trench and backfill in accordance with the Construction Drawings and this Section.

F. Blasting, including use of explosives or explosive devices, is not permitted.

G. Maintain equipment in a safe condition within the trenching/excavation area during periods of non-work (evening, weekends, and holidays).

H. Prohibit tracked equipment from hauling, operating, or tracking over or on the Impacted Material Haul Road (IMHR) or other paved roadways unless otherwise approved by the Construction Manager.

I. In the event a historic, prehistoric, or archeological site, feature, or object is discovered, stop work immediately in the area and immediately notify the Construction Manager.

J. Excavation performed in support of trenching activities shall be in accordance with Section 02205.

3.2 TRENCHING

A. Trench at locations, as shown on the Construction Drawings, using approved trencher equipment. Trenches shall be cut to a minimum depth of 12 feet, with a tolerance of 0 to 6 inches. Trench centerline shall have a lateral tolerance of +/- 1-foot. Deviation beyond the +/- 1-foot lateral tolerance requires prior review and approval by the Construction Manager, Project Engineer, and Utility Engineer to evaluate potential impacts to surrounding structures and utilities.

B. Trench in such a manner that enables the Construction Manager to visually observe trenching activities.

C. In areas inaccessible to the trencher, excavate around utilities and structures as directed by the Construction Manager, to verify no active utilities are present. Air gap active utilities found in areas inaccessible to the trencher using methods and equipment as approved by the Construction Manager, in accordance with the Construction Drawings. Dispose of pipe sections removed during air-gapping in accordance with Section 02205.

D. Stop trenching and immediately notify the Construction Manager if unidentified utilities are encountered.

E. Continuously observe trenching for the presence of Special Materials or change in materials. Stop trenching in the area and immediately notify the Construction Manager if Special Materials are encountered. Dispose of Special Materials in accordance with Section 02205.

F. Stop trenching operations and notify the Construction Manager if fluid is detected flowing into the trench from a utility line cut during the trenching operations. The Construction Manager will note the location of the leakage for future remediation of the trenching corridor by others.

G. Perform trenching activities in such a manner as to minimize water accumulation in the trench.

H. Backfill trenches and excavations daily unless otherwise approved by the Construction Manager. Trenches or excavations remaining open after working hours shall be barricaded in accordance with requirements stated in the approved Construction Traveler(s).

I. Verify and record "as-built" trench locations and depths every 50 feet, and at intersections, along the trench centerline.

3.3 BACKFILL

A. Backfill trenches and excavations using material removed during trenching and excavation activities. The final 24 inches of backfill placed shall be free of debris, foreign objects, large rock fragments (maximum dimension of 6 inches), organic matter, and other deleterious materials so as to obtain adequate compaction. Spread these materials within the adjacent excavation area.

B. Backfill trenches to within 24 inches of grade. Backfill and compact the remaining 24 inches in 8-inch lifts compacted by four passes of compaction equipment suitable for use in the trench.

C. Use remaining material removed during trenching to construct a diversion berm along the trench centerline as shown on the Construction Drawings. Construct diversion berm in 8-inch lifts compacted by four passes of equipment approved by the Construction Manager. Obtain supplemental material to construct the diversion berm as necessary from the surrounding areas as directed by the Construction Manager. Spread excess material in place.

D. After completion of backfilling and diversion berm construction activities, install and modify rope fence to locations as shown on the Construction Drawings unless otherwise directed by the Construction Manager.

E. Upon completion of trenching, backfilling and diversion berm construction, stabilize the disturbed area using crusting agent in accordance with Section 02275.

END OF SECTION

This Section specifies standard site requirements for handling, packaging, loading, hauling and unloading friable and non-friable ACM. The Construction Manager will direct the implementation of these requirements based on project scope and materials encountered in the field.

SECTION 02210
ASBESTOS CONTAINING MATERIALS (ACM)

PART 1 GENERAL

1.1 SCOPE

This Section includes the following requirements for asbestos containing materials (ACM), but is not limited to:

A. Handling, packaging, loading, hauling, and unloading friable and non-friable asbestos containing material (ACM).

B. Removal of at- or below-grade ACM, which may include the following:

1. Pipes coated with thermal system insulation.
2. Electrical cable insulated with ACM.
3. Fireproofing tape in electric manholes.
4. Piping containing gasket material.
5. Piping coated with construction mastic.
6. ACM embedded in concrete.
7. Buried ACM not associated with underground utilities.

C. Placement at the On-Site Disposal Facility (OSDF).

1.2 DEFINITIONS

A. Asbestos: Chrysotile, amosite, crocidolite, tremolite asbestos, anthophylite asbestos, actinolite asbestos, and any of these minerals that has been chemically treated and/or altered. For purposes of this specification, asbestos includes presumed asbestos containing material (PACM), as defined herein.

B. ACM: Any material containing more than 1 percent asbestos. For purposes of this specification, the term ACM includes PACM, as defined below.

C. PACM: Thermal system insulation (TSI) and surfacing material found in buildings constructed no later than 1980. The designation of material as "PACM" may be rebutted by performance of bulk sampling and analysis demonstrating that the PACM does not contain more than 1 percent asbestos, as described in 29 CFR 1926.1101(k)(5).

D. Active Asbestos Waste Disposal: Unloading of asbestos waste and placement at the OSDF is considered active asbestos waste disposal as termed in the referenced administrative code and federal regulations.

E. Class I Asbestos Work: Activities involving the removal of TSI and surfacing ACM and ACM. For purposes of this specification, includes, but is not limited to, the first time removal of at- or below-grade TSI associated with utilities.

F. Class II Asbestos Work: Activities involving the removal of ACM which is not TSI or surfacing material. For purposes of this specification, includes but is not limited to, first time removal of at- or below-grade ACM other than TSI and surfacing material that is associated with utilities.

G. Renovation: Altering in any way one or more facility components. Operations in which load-supporting structural members are wrecked or taken out are excluded from this definition. Removal of ACM related to at- or below-grade utilities is considered a renovation activity for purposes of the referenced administrative code and federal regulations.

H. Inactive Asbestos Waste Disposal Site: Any disposal site or portion of it where additional asbestos-containing waste material has not been deposited for 1 year and where the surface is not disturbed by vehicular traffic. For purposes of this specification, includes locations where ACM that was previously removed from a building or structure, or excess ACM building materials, was buried for disposal.

I. Removal of transite or other non-friable ACM from an inactive asbestos landfill does not fall under a certain "class" of work as defined by OSHA. Requirements will be established using best available technology and best management practices to minimize worker exposure.

J. Asbestos Competent Person: A person capable of identifying asbestos hazards in the work place, selecting appropriate control strategies for the asbestos exposure, and prompt corrective action. Person has the forty-hour asbestos contractor/supervisor training and holds the Asbestos Hazard Abatement Specialist Certification from the Ohio Department of Health (ODOH).

1.3 RELATED DOCUMENTS

A. Section 02205 – Impacted Material Excavation.

B. Impacted Materials Placement Plan (IMPP), On Site Disposal Facility (OSDF), 20100-PL-007, current revision.

1.4 REFERENCES

A. Ohio Administrative Code (OAC), Chapter 3745-20, Asbestos Emission Control.

B. Ohio Administrative Code (OAC), Chapter 3701-34, Asbestos Hazards Abatement Rules.

C. Title 29, Code of Federal Regulations (CFR), Part 1926.1101, Asbestos.

D. United States Environmental Protection Agency (U.S. EPA) 40 CFR 61, Subpart M, (NESHAPS).

1.5 SUBMITTALS

A. Submit an ACM Removal and Handling Work Plan, prepared by an Asbestos Project Designer certified by the ODOH and in compliance with all applicable federal (CFR) and state (OAC) requirements.

PART 2 PRODUCTS

2.1 MATERIALS

A. Disposal Bags: Clear polyethylene a minimum of 6 mils thick.

B. Sheeting: Clear polyethene a minimum of 6 mils thick

C. Surfactants: Childers - CP-225 CHIL-SORB or approved equal.

D. Encapsulants:

1. Childers - CP-240 CHIL-LOCK.
2. Certified Technologies - Certane 2050.
3. Eppert Environmental Products - Eppco #1.
4. International Protection Coatings Corp - Serpiloc.
5. Or approved equal.

E. Lockdowns:

1. Certane - 1050 – Clearcoat.
2. Eppert - Fiber-Seal.
3. International Protection Coatings Corp - Serpiloc.
4. Or approved equal.

F. Other materials required for handling and packaging of ACM including, but not limited to, asbestos warning tape and signs, tape, knives, and garden sprayer.

G. Glovebags made of 6-mil plastic, seamless at the bottom, designed for asbestos work.

2.2 EQUIPMENT

A. For glovebags, a HEPA filtered vacuum system may be used to provide negative air pressure in accordance with the requirements of 29 CFR 1926.1101.

B. HEPA filtered vacuum for cleanup.

C. Cable pulling equipment.

D. Any and all equipment required to implement the removal as defined by ACM Removal and Handling Work Plan.

PART 3 EXECUTION

3.1 GENERAL

A. At least 10 working days prior to start of removal of regulated ACM, the Asbestos Competent Person shall notify the Environmental Compliance Officer to ensure Ohio EPA Notification is made.

B. Prior to the initiation of ACM work, the Construction Manager or his designee shall:

1. Forward the names of all personnel assigned to the asbestos removal tasks of the project to Project Industrial Hygienist and Medical Services.
2. Assure workers that will be performing Class I, Class II, or Class III asbestos work are identified as asbestos workers for purposes of medical evaluation.
3. Forward copies of asbestos training certificates for asbestos workers and contractor/supervisor to training records.
4. Forward the State of Ohio certification for all personnel as required by law (for friable asbestos work) to the Project Industrial Hygienist.
5. Contact Industrial Hygiene for issue of an Asbestos Work Permit.

C. Excavate and remove underground utilities in such a manner that mitigates the generation of friable asbestos material. Friable asbestos material created by these work activities shall be removed and handled in accordance with this Section.

D. The Asbestos Competent Person shall:

1. Comply with work practices and procedures set forth in all applicable Federal, State, and local codes, regulations, and standards.
2. Ensure workers, supervisors, and project designer performing asbestos work have necessary ODOH certifications, as required, for friable asbestos removal.
3. Ensure workers have been assessed by medical and physician's written opinions have been documented for asbestos work and respirator use.
4. Ensure that an employee exposure assessment is completed for the asbestos work.
5. Ensure that an Asbestos Work Permit has been obtained.
6. Take precautions to prevent creation of friable ACM during handling.
7. Ensure employees are informed of the presence of ACM in the project work areas in accordance with 29 CFR 1926.1101(d) and OAC 3745-20-06(B)(4).
8. Establish a restricted work area at the OSDF that is adequate to deter entry of unauthorized personnel within 100 feet of the ACM work areas during unloading, deposition, burial, and initial compaction of asbestos containing waste materials, in accordance with OAC 3745-20-06(B)(4).
9. Establish an asbestos regulated area for Class I, II, and III asbestos work, or where airborne concentrations of asbestos exceed, or there is a reasonable possibility to exceed a PEL, in accordance with 29 CFR 1926.1101 (e). The regulated area shall be marked to minimize the number of persons within the area and protect persons outside the regulated area from exposure to airborne asbestos. Access to regulated areas shall be limited to authorized persons.
10. Obtain and conform to required training.
11. Ensure a pre-job briefing is conducted.

12. Supervise the asbestos work project including:
    a. Setting up the enclosure/work area.
    b. Ensuring the integrity of the enclosure/work area.
    c. Controlling entry and exit from the enclosure/work area
    d. Ensuring employee exposure monitoring is performed, when required by safety and health.
    e. Ensure that workers wear the appropriate PPE as specified on the PPE Requirements page.
    f. Ensure that workers are trained in the use of PPE, work practices, and engineering controls required for the work.
    g. Ensure that workers use the hygiene facilities when required by the class of asbestos work.
    h. Ensure that engineering controls are functioning properly.
    i. Notify Industrial Hygiene of any changes in work site conditions since permit issuance.
    j. Contact Industrial Hygiene after completion of asbestos work to verify the work area has been cleaned of all asbestos contamination.
    k. Ensure asbestos warning barriers are maintained until removal is authorized by Industrial Hygiene.

13. Complete Asbestos Daily Job Site Inspection Forms daily and keep them in the project files to be forwarded to ECDC at the completion of the project.

E. Materials to be used as encapsulants and surfactants shall be in original, new, and unopened packages and containers bearing manufacturer's name, label and the following information:

1. Name of material.
2. Manufacturer's stock number and date of manufacture.
3. Manufacturer's name.
4. Thinning instructions.
5. Application instructions.
6. Material Safety Data Sheets (MSDSs).

3.2 APPLICATION

A. Use wet methods, or wetting agents, and other work practices and engineering controls to prevent creation of visible asbestos emissions during abatement and handling of ACM.

B. Perform personal air monitoring in accordance with 29 CFR 1926.1101(f) including sampling necessary to complete initial exposure assessments.

C. Ensure an Asbestos Competent Person is within the ACM area anytime ACM is disturbed, removed, packaged, excavated, handled, loaded, hauled, or unloaded.

D. The Asbestos Competent Person shall perform documented inspections of the ACM work areas and adjacent areas daily during disturbance, excavation, handling, hauling, loading, unloading or placement of ACM waste. If there is visual evidence of asbestos contamination (e.g. spills of ACM waste) outside the demarcated ACM waste handling work areas, take immediate action to abate the hazard, as described in the ACM Removal

and Handling Work Plan. The incident shall be reported immediately Industrial Hygiene and the AEDO.

3.3 REMOVAL

A. Removal Procedures of ACM TSI:

1. Wet all ACM to be removed, or components or sections to be removed with ACM in place, with amended water solution and maintain wet until placed into disposal containers, double-bag in disposal bags, or sealed in 2 layers of sheeting.
2. Wrap large components removed intact in 2 layers of sheeting, secure with tape and properly label in accordance with OAC 3745-20-05(C)(1) and 29 CFR 1926.1101.
3. All piping (less than 12 inches in diameter) insulated with ACM may be removed with ACM in place. Wrap the piping in manageable sections with 2 layers of plastic sheeting, maintaining wet until wrapped. Use glovebags to remove ACM from each end of the section of pipe to be cut. Seal the exposed ACM with plastic and tape. Wet-brush and sponge, or clean the pipe by an equivalent method, the surfaces from which ACM has been removed. Double bag and seal. After the glove bag is removed, cut the pipe in the area that has been stripped of asbestos. Label the section of pipe that is wrapped, yet containing ACM, and the bag containing the glove bagged ACM in accordance with OAC 3745-20-05(C)(1) and 29 CFR 1926.1101.
4. Remove ACM from pipes that are larger than 12 inches in diameter by stripping of ACM in glove bags or mini-containments. Double bag the glove bag and contents; seal and label the bags in accordance with OAC 3745-20-05(C)(1) and 29 CFR 1926.1101. Size reduce the stripped piping as required.
5. Handle ACM with sharp-edged components as specified in this Section.
6. To remove any remaining ACM from stripped pipes or components, wet-brush and sponge, or clean by an equivalent method, the surfaces from which ACM has been removed in order to remove all visible ACM residue.
7. Pipes that exceed the WAC for the OSDF shall be cut into lengths as directed by the Construction Manager.
8. Pipes that are meet the WAC for the OSDF shall be size reduced into lengths to meet the requirements of the IMPP.
9. Industrial Hygiene will inspect the work area at the completion of work for any visible debris.

B. Removal of 13.2 kV Power Feeder Cables (includes fireproofing tape in manholes and cable):

1. Confined space entry will be required for removal of feeder cables within manholes.
2. Use wetting agents to ensure there are no visible emissions of asbestos fibers.
3. Wrap the fireproofed feeder cable in 2 layers of sheeting and secure with tape.
4. Remove friable ACM located at each end of the cable located within the electric manholes using a glove bag. Leave a length of cable exposed in the manhole so that the remaining cable can be pulled out of the conduit using the exposed end.
5. Cut the feeder cable and remove from the manhole.
6. Remove wrapped or bagged ACM from the manhole.

7. Clean the manhole using a HEPA vacuum to remove any remaining asbestos debris.
8. Industrial Hygiene and Radiological Control will inspect the wrapped section to ensure the integrity of the wrap and the absence of radiological contamination.
9. Label wrapped sections in accordance with OAC 3745-20-05(C)(1) and 29 CFR 1926.1101.
10. Industrial Hygiene will visually inspect the manhole to ensure that all asbestos containing debris has been removed.
11. Using wet methods or amended water, remove the remaining feeder cable by use of pulling equipment.
12. Wrap the feeder cable in plastic shrink film or sheeting and then place into designated container.
13. Label wrapped sections in accordance with 29 CFR 1926.1101.
14. Clean the pulling area and manhole using a HEPA vacuum.
15. After the cable has been removed, Industrial Hygiene will perform an inspection of the work area for visible debris.

C. Removal of Below-grade Piping Containing Asbestos Gaskets:

1. When possible, do not expose gasket by breaking or cutting the flange.
2. If a gasket becomes exposed by breaking or cutting the flange at the gasket, is visibly deteriorated, and is unlikely to be removed intact, perform glove bag removal as described in 29 CFR 1926.1101 (g)(5)(ii).
3. If a gasket becomes exposed by breaking or cutting the flange at the gasket is able to be removed intact, remove the gasket and immediately place in a disposal container. Scrape any residue using wet methods.
4. Lock down any visible gasket material by saturating the material with lockdown, applied with a garden sprayer or equivalent method.
5. If size reduction is necessary and gasket material is exposed, seal the flange area with 2 layers of sheeting and duct tape.
6. Size reduce piping at lengths so that the flange where the gasket material is located is undisturbed.

    a. Size reduce into lengths as directed by the Construction Manager when the piping exceeds the waste acceptance criteria (WAC).
    b. Size reduce into lengths less as specified in the IMPP when piping meets WAC.
    c. Size reduce if piping exceeds the maximum diameter accepted at the OSDF as described in the IMPP.
    d. Size reduce perpendicular to the run of pipe without breaking or cutting the gasket.

7. At the completion of work, Industrial Hygiene will inspect the work area for any visible/exposed debris.

D. Removal of Asbestos Containing Mastic-coated Piping:

1. Remove mastic-coated piping in accordance with OSHA requirements for Class II work.
2. Thoroughly wet mastic with amended water.

3. Size reduce the piping inside of the excavation using equipment that will minimize generation of airborne fibers.

   a. If piping is Above WAC, size reduce and dispose in accordance with Section 02205.
   b. If piping meets WAC, size reduce in accordance with the IMPP.

4. Size reduce pipes that are greater than 12 inches in diameter to meet the OSDF WAC using methodology to prevent generation of friable asbestos fibers.
5. Encapsulate both ends of each section of piping and all other locations where damage to the mastic is visible.
6. Double bag and seal any ACM mastic that becomes dislodged from the piping in 6-mil asbestos bags.
7. Label according to OSHA 29 CFR 1926.1101.
8. At the completion of work, Industrial Hygiene will inspect the work area for any visible debris.

E. Removal of Concrete Encased Transite (transite conduit):

1. Removal of transite encased in concrete is generally OSHA Class II work, with the following exceptions.

   a. Class I work practices may be applicable if the condition of the material is friable, or;
   b. if the method used for removal causes material to become friable.

2. Thoroughly wet concrete/transite material with amended water.
3. Remove electrical cable, if present, using a cable puller.
4. Remove and size reduce concrete/transite material to meet OSDF WAC using methodology to minimize or prevent generation of friable asbestos.
5. Encapsulate both of the open ends of the transite.
6. Transite protruding beyond the concrete shall be double wrapped and sealed with sheeting.
7. Industrial Hygiene will inspect the work area at the completion of work for visible debris.

F. Use the following methods for excavation of previously removed ACM that was buried for disposal:

1. The Asbestos Competent Person shall walk the work area and identify ACM visible at the surface before excavation, at least once a day during excavation and/or placement, and at the end of the shift. The walks shall be documented on the Asbestos Daily Job Site Inspection form.
2. Wet methods or wetting agents shall be used during handling, packaging, and loading of ACM, or soil or debris containing ACM.
3. Care shall be taken so that the friable ACM does not break or crumble during handling and so that non-friable ACM is not handled in such a manner that it becomes friable.
4. Encapsulate the exposed surfaces of broken transite panels that are segregated from the soil or debris and stacked on pallets.

5. Apply surfactants or encapsulants during size reducing of any large pieces of ACM to meet the OSDF WAC physical size criteria.
6. Do not leave ACM exposed at the surface of the stockpile or OSDF at the end of the work day.
7. Exposed ACM during excavation shall be covered with soil at the end of the work day. Exposed ACM during excavation may be locked down in lieu of covering with soil if work will resume in that area within 36 hours.
8. Friable ACM that was previously removed and then buried for disposal shall be handled as follows:

    a. Wet with amended water (water mixed with surfactant) or encapsulate, and separate from the impacted material.
    b. Wrap friable ACM components meeting the OSDF WAC physical size criteria and large pieces removed intact in 2 layers of sheeting, secured with duct tape, and labeled in accordance with OAC 3745-20-05(C)(1) and OSHA 29 CFR 1926.1101. Multiple pieces may be grouped together before wrapping, provided WAC physical size criteria is still met.
    c. Double bag and seal pieces of friable ACM not conducive to wrapping in a 6-mil polyethylene bag. Label in accordance with OAC 3745-20-05(C)(1) and OSHA 29 CFR 1926.1101.
    d. Handle friable ACM with sharp-edged components (e.g. nails, screws, metal lath, tin sheeting) capable of tearing the polyethylene bags or sheeting in one of the following ways:
    e. Pad or wrap and secure the sharp-edge components in a manner to prevent tearing of the polyethylene, then wrap or bag in accordance with this Section.
    f. Place into polyethylene-lined containers (i.e. fiberboard boxes or drums). Metal containers are not allowed.
    g. The polyethylene liner shall be sealed prior to sealing the container. The container shall be labeled in accordance with OAC 3745-20-05(C)(1) and 29 CFR 1926.1101.
    h. Segregate wrapped, bagged, or containerized, friable ACM, from other excavated material and accumulate at the Special Materials Transfer Area. When a full, segregated load is accumulated, it shall be loaded and hauled to the OSDF. Loads shall be prepared and secured to prevent any visible emissions, load loss, and spillage or leakage of liquids.

9. Handle non-friable ACM as follows:

    a. Wet transite or other non-friable ACM with amended water to reduce potential for release of fibers.
    b. Manually (by hand) remove pieces of transite or other non-friable ACM larger than 1 foot in any direction.
    c. Stack large, intact pieces of transite or other non-friable ACM on pallets and wrap the entire stack in 2 layers of sheeting.
    d. Double bag smaller pieces of transite or other non-friable ACM not conducive to wrapping.
    e. Incidental pieces of transite or other non-friable ACM less than 12 inches in maximum dimension contained in soil and soil-like material or debris

can be placed in the OSDF as Category 1 (soil and soil-like) or Category 2 material without segregation.

f. Avoid excessive breakage of the transite or other non-friable ACM during manual removal or during use of heavy equipment in the area.

g. Cover soil or debris containing non-friable ACM, which is temporarily staged in a stockpile, with 6 inches of soil that is visually free of ACM at the end of the day.

10. Industrial Hygiene will inspect the area at the completion of work for visible debris.

END OF SECTION

SECTION 02275
SURFACE WATER MANAGEMENT AND EROSION CONTROL FOR REMEDIATION

PART 1 GENERAL

1.1 SCOPE

A. This Section includes, but is not limited to, the following:

1. Installation of erosion and sediment control measures.
2. Maintenance of existing and new erosion and sediment control measures installed under this activity, including removal of temporary erosion control facilities.
3. Management of excavation water in excavation areas, including pumping water to the appropriate sediment basin during general excavation and management of volatile organic compound (VOC)-contaminated water.
4. Modification of existing storm sewer system.
5. Installation and maintenance of runon/runoff controls along the perimeter of the project boundary.
6. Protection of the unsaturated sands and gravels of the Great Miami Aquifer (GMA) from runon within the excavation areas, including installation and maintenance of runon controls.
7. Management of area for precertification.
8. Stabilization of disturbed excavation areas or stockpiles.
9. Inspection requirements.

1.2 RELATED SECTIONS AND DOCUMENTS

A. Section 02100 – Surveying.

B. Section 02205 – Impacted Material Excavation.

C. Section 02206 – Earthwork for Remediation.

D. Section 02270 – Surface Water Management and Erosion Control

E. Section 02930 – Vegetation.

1.3 REFERENCES

A. State of Ohio, Department of Natural Resources (ODNR), Rainwater and Land Development, Ohio's Standard for Stormwater Management Land Development and Urban Stream Protection, current edition.

B. State of Ohio, Department of Transportation (ODOT), Construction and Material Specifications, current edition.

C. Surface Water Management Plan (SWMP) for the applicable soil excavation project.

1.4 DEFINITIONS

A. Excavation Water: The combination of surface water and perched water that collects in the excavation.

1.5 SUBMITTALS

A. For each product proposed for use, submit the following:

1. Manufacturer's product data and recommended methods of installation and maintenance.
2. Certification from manufacturer that the product meets the material requirements of this Section, including test results.
3. Material Safety Data Sheet (MSDS), if applicable.

B. Records of inspection of erosion and sediment control measures as specified herein shall be submitted monthly upon completion of the inspection report.

PART 2 PRODUCTS

2.1 MATERIALS

A. Furnish silt fence in accordance with ODNR, composed of, at a minimum, strong rot-proof polymeric fibers formed into a woven fabric having fabric and fence post properties as shown on the Construction Drawings.

B. Furnish woven yarn blanket-like erosion mat that will resist degredation for a minimum 6-month period after installation, having a permissible velocity of 7 feet per second, with the following material properties:

1. Yarn content: 100 percent jute or coconut fiber.
2. Weight: minimum 11.5 ounces per square yard.
3. Open Area: maximum 65 percent.
4. Mesh Opening: minimum 0.5 inches.

C. Furnish metal staples specifically made to anchor erosion control blankets. Anchors will be 11 gauge wire formed into a staple shape with minimum dimensions of 6 inches by 1 inch by 6 inches.

D. Furnish dust suppression/crusting agent in accordance with Section 02930.

E. Furnish backfill in accordance Section 02206.

2.2 EQUIPMENT

A. Furnish portable tank (minimum 3,000 gal.), as needed to hold water contaminated with volatile organic compounds (VOCs).

B. Furnish pumps, filters, hoses and other appurtences required to execute work specified in this Section.

PART 3 EXECUTION

3.1 GENERAL

A. Construct and maintain erosion and sediment control measures as specified in this Section and shown on Construction Drawings. Maintain existing erosion and sediment control facilities and measures in accordance with this Section.

B. Minimize runon into disturbed excavation areas by grading the surrounding area away from the disturbed area and/or by constructing temporary diversions as shown on Construction Drawings.

C. As the excavation progresses, excavate sumps at resulting low points used for water collection of excavation water. Do not penetrate to within 5 feet of the GMA with sump excavations.

D. Dewater excavations in accordance with the Construction Drawings. Excavation water collected from a 10-yr, 24-hr or lesser storm event (precipitation not to exceed 4.1 inches of rainfall) within active excavations and below design grade utility removal shall be pumped to the appropriate sediment control basin as shown on Construction Drawings. Collected water shall be pumped down to a depth of less than one foot remaining in the bottom of the excavation within 3 days of the last rainfall.

E. The Construction Manager will arrange for sampling and analysis of excavation water present in suspect VOC areas prior to a discharge event. Following sampling and analysis, pump collected VOC-contaminated water to the appropriate treatment and/or disposition.

F. Plug storm sewers at the excavation boundary prior to removal of storm sewer piping located within the excavation area. Plug storm sewer system in such a manner to minimize water collected in abandoned portions of the system.

G. Remove erosion and sediment control measures after the disturbed excavation areas are stabilized as specified in Section 02930.

3.2 SILT FENCES

A. Install silt fence at locations down-gradient of areas to be disturbed until drainage and erosion control structures have been established as shown on the Construction Drawings. Remove and dispose accumulated sediment as specified in Section 02205.

B. Install breaks and overlaps in silt fence as necessary to allow equipment access to construction areas.

3.3 EROSION CONTROL BLANKETS

A. Install and maintain erosion control blankets in accordance with manufacturer's recommendations. Install additional staples as necessary to maintain erosion control blankets taut to the ground surface.

3.4 SEDIMENT BASINS AND DITCHES

A. Remove accumulated sediment and debris from sediment basins and ditches. In no case shall sediment build up to a depth greater than 10 inches in the sediment basin or to a depth greater than one-half the constructed depth of the ditch.

B. Dispose of sediment and debris as specified in Section 02205.

3.5 GMA PROTECTION

A. When possible, limit excavations within 5 feet of the GMA to periods of dry weather.

B. Slope bench terrace directly above the GMA toward the excavated slope as shown on the Construction Drawings. Grade the bench terrace to a sump for pumping to prevent runon into the GMA.

C. Size and locate pumps for sumps along benches above the GMA such that no water within the excavation area shall overflow into the GMA from a 10-yr, 24-hr or lesser storm event. Proposed pump locations and sizes are found in the project-specific surface water management plans (SWMPs) . Sump bottoms shall not extend to within 5 feet of the GMA.

D. For excavations extending to within 5-feet of the GMA elevation shown on the Construction Drawings, maintain less than one foot of standing water in the excavations by pumping excavation water to a sediment basin or an adjacent excavation, as necessary.

E. Backfill over the GMA in accordance with Section 02206.

F. In areas where 2 feet of compacted cover has been recently restored following excavation which has extended to within 2 feet of or breached the GMA, pump ponded water from the affected excavation as soon as practical (but within 24 hours or by the direction of the Construction Manager) following a precipitation event.

3.6 PRECERTIFICATION

A. Pipes that daylight at the excavation face shall be plugged at the excavation face prior to precertification in accordance with Section 02205 and the Construction Drawings.

B. Install run-on controls along perimeter of precertification boundary, as shown on the Construction Drawings, to prevent surface water from non-certified areas from flowing into precertified areas.

C. During precertification, direct drainage from precertified areas to the sediment basin. Routing of surface water pump lines must be approved by the Construction Manager.

D. Maintain surface water management within the area to be precertified in accordance with this Section until precertification is complete.

3.7 INSPECTION

A. Inspect erosion and sediment control measures in accordance with Section 02270.

B. File records of inspections in accordance with Section 02270. In addition, the records of inspection shall include destination of pumping ponded water, estimated quantity of ponded water and corrective action measures, as required. The records of inspection shall indicate if areas are not in compliance or contain a certification that control measures are effective and in compliance with this Section and Section 02270.

END OF SECTION

4328

FLUOR GLOBAL SERVICES

Technical Specifications
For
Area 3A/4A Site Preparation

Project No. 20801

November 2001

PREPARED BY: _____ 11/20/01

CHECKED BY: _____ 11-20-01

APPROVED BY: _____ for Uday Kondaker 11/20/01

U.S. DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Fluor Fernald
P.O. Box 538704
Cincinnati, OH 45253-8704

U.S. DEPARTMENT OF ENERGY

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Project No. 20801
Area 3A/4A Site Preparation
Technical Specifications

TABLE OF CONTENTS

SECTION	TITLE	REV.	DATE
02205	Impacted Material Excavation	0	11/20/01
02207	Area Isolation Trenching	0	11/20/01
02210	Asbestos Containing Material (ACM)	0	11/20/01
02275	Surface Water Management and Erosion Control for Remediation	0	11/20/01
02770	Geotextile and Geomembrane	0	11/20/01

SPECIFICATION COVER SHEET

SPECIFICATION SECTION: 02205 **TITLE:** Impacted Material Excavation

Specifications By: (Engineer)
Signature [signature] Date 11/20/01
Printed Name and Title: Dave Russell, Project Engineer

Scope and Format Checked By: (Checker)
Signature [signature] Date 11-20-01
Printed Name and Title: Christopher R. Neumann, Project Engineer

Detailed Requirements Checked by: (Checker)
Signature [signature] Date 11-20-01
Printed Name and Title: Christopher R. Neumann, Project Engineer

Overall Review By:
Signature [signature] Date 11-20-01
Printed Name and Title: Christopher R. Neumann, Project Engineer

Approved by:
Signature [signature] Date 11-20-01
Printed Name and Title: for Uday Kumthekar, P.E., SDFP Engineering Manager

Record of Revision (Number and initial all revisions)

Rev. No.	Reason	Date	By	Checked	Approval
0	Certified for Construction	11/20/01	DR	CN	CV

SECTION 02205

IMPACTED MATERIAL EXCAVATION

PART 1 GENERAL

1.1 SCOPE

A. This Section includes the requirements for excavating, size-reducing, segregating, stockpiling, loading, hauling, and unloading impacted material. Activities include, but are not limited to, the following:

1. Excavation of impacted materials to the design excavation limits shown on Construction Drawings.
2. Segregation of impacted materials for disposition or reuse.
3. Size reduction of structures, utilities, and miscellaneous debris within the design excavation limits.
4. Loading, hauling and unloading of impacted materials to the appropriate disposition locations.
5. Development and maintenance of impacted material stockpiles.
6. Sampling and monitoring by the Construction Manager.
7. Performance of area management activities.
8. Excavation of supplemental materials located beyond the design excavation limits shown on Construction Drawings.

1.2 RELATED SECTIONS AND DOCUMENTS

A. Section 02207 – Area Isolation Trenching.

B. Section 02210 – Asbestos Containing Material (ACM).

C. Section 02275 – Surface Water Management and Erosion Control for Remediation.

D. Approved Construction Traveler(s) for this project.

1.3 REFERENCES

A. Title 29, Code of Federal Regulations (CFR): 29 CFR 1926 Subpart P – Excavation, current edition.

B. RM-0021, "Safety Performance Requirements Manual".

C. RM-0047, "Fugitive Dust Control Requirements".

1.4 DEFINITIONS

A. Active Stockpile: A stockpile specifically developed to operate for longer than 45 calendar days. This includes interim stockpiles that have been in existence more than 45 calendar days and existing stockpiles as shown on the Construction Drawings.

B. Debris: Impacted material, excluding soil and fine aggregate, that is generated during the excavation and removal of building structures, utilities, miscellaneous man-made materials, and natural materials. These materials include floor slabs; foundation walls; foundations; piers; footings; hydraulic ram casings; structural steel and miscellaneous metal; electrical duct-bank, manholes, electrical wiring, and power poles; remaining equipment and miscellaneous mechanical items; chain link and other fencing; agricultural drain tiles; and rock, asphaltic pavement, and other coarse aggregate materials not defined as Special Materials.

C. Design Excavation Limits: Excavated surface created when the Contractor excavates impacted material to the lines and grades shown on the Construction Drawings.

D. Final Remediation Levels (FRLs): The permissible concentration of contaminants that may remain in site soil and sediment following completion of remedial actions.

E. Impacted Material: Man-made material, or soil with contamination levels above the established FRLs. Impacted materials are summarized in Table 02205-1.

F. Interim Stockpile: An impacted material stockpile within the project boundary, that is intended to be dispositioned in less than 45 calendar days.

G. Real-time Monitoring: Fluor Fernald will conduct real-time monitoring, utilizing alternative methods of *in situ* gamma spectroscopy, to analyze contaminant levels on the excavation surface.

H. Special Materials: Impacted material requiring special handling as specified in this Section and presented in Table 02205-1.

I. Supplemental Excavation: Removal of impacted material encountered beyond the design excavation limits.

J. Underground Storage Tank (UST): A tank that was used to contain an accumulation of a regulated substance, of which the volume was 10 percent or more beneath the surface of the ground.

K. WAC: Waste acceptance criteria (WAC) for disposition of material at the OSDF as defined by the WAC Attainment Plan. This WAC includes radiological/chemical criteria for soil and debris, physical criteria for debris, and criteria for ancillary remediation waste (i.e., analytical sample returns, PPE).

1.5 VERIFICATION OF THE EXISTING CONDITIONS

A. Verify existing conditions as shown on the Construction Drawings. Notify the Construction Manager of any discrepancies noted.

1.6 HEALTH AND SAFETY REQUIREMENTS

A. Environmental Health and Safety, and Training requirements shall be as stated in the approved Construction Traveler(s).

B. Contractor shall follow RM-0021 and other applicable Fernald Environmental Management Project Health and Safety requirements during the execution of this work.

PART 2 PRODUCTS

2.1 MATERIALS

A. Provide construction/safety fence at locations shown on Construction Drawings consisting of galvanized steel welded wire fabric, 2 inch by 4 inch mesh, 4 feet in height, 12-1/2 gauge, or equivalent approved by the Construction Manager.

B. Provide rope fence at locations shown on Construction Drawings consisting of 3/8-inch yellow nylon rope fence.

C. Posts for rope and construction/safety fence shall be T-shaped (T-post), 1-1/2 inch by 1-1/2 inch, 3/16 inch thick by 6 feet long, and made of steel or as approved by the Construction Manager.

D. Provide dust supression/crusting agent in accordance with Section 02275

2.2 EQUIPMENT

A. Furnish and maintain equipment to perform scope specified in this Section.

B. Equipment used to haul impacted material over the existing paved Impacted Material Haul Road (IMHR), shall be equal to or less than the gross vehicle weight and axle loading for a Caterpillar CAT D300E haul truck (gross vehicle weight of 120,000 pounds and

maximum axle width of 9-feet 10-inches). Pavement width of the existing two-way IMHR is 24-feet. Select equipment and equipment width to ensure safe operation on this road.

C. Equipment used within the excavation area shall be equal to or less than the gross weight for a Caterpillar CAT 350L track hoe (112,500 pounds). However, the Construction Manager may approve the use of heavier equipment in this area provided the Contractor submits calculations certified by a registered Professional Engineer that ensure slope stability within the excavation and adjacent areas.

D. Equipment used to excavate, load, haul, and unload impacted materials shall have enclosed cabs. Enclosed cab is defined as an equipment cab isolated from outside environment (intact windows, doors, panels and floors surrounding driver with all windows and doors shut) which provides a barrier from intrusion of outside airborne particles. Any heating, ventilating, or air conditioning units associated with the equipment cab must not provide a direct path for outside air to enter (air conditioner on air recirculate mode) unless the air is first passed through a high efficiency particulate air filter pulled directly from outside the cab.

E. Equip trucks used for hauling of the impacted material with automatic load cover tops or employ Best Available Technology (BAT) methods to ensure that no airborne materials are emitted from the haul truck bed or load, whether empty or full.

F. Provide water tank trucks, water wagons, hydroseeders, portable tanks, pressure distributors, piping, sprinklers or other equipment designed to apply water and/or dust suppressant and crusting agent uniformly and in controlled quantities to variable surface widths to provide fugitive dust control in accordance with RM-0047, "Fugitive Dust Control Requirements".

G. Provide pressure wash or comparable equipment as approved by the Construction Manager to clean visible process residue and soil from piping and debris to permit future placement in the OSDF by others.

H. Provide portable wash equipment to wash vehicle tires and vehicle exteriors as necessary.

PART 3 EXECUTION

3.1 GENERAL

A. Prior to performing excavation activities, complete the following:
1. Complete preliminary survey and layout and verification of existing conditions.
2. Establish dust control methods in accordance with RM-0047, "Fugitive Dust Control Requirements".
3. Install and manage surface water management and erosion and sediment control

measures in accordance with Section 02275.

4. Install, modify, and manage construction/safety and radiological-control fence, including installation of construction area signs, as shown on the Construction Drawings. Install posts at spacing recommended by the manufacturer's installation procedures and as required to prevent sagging. Posts with less than 4 feet remaining above the ground after installation shall have safety caps installed.

B. Perform excavation activities in compliance with 29 CFR Part 1926.650 through 1926.652.

C. Radiological-control signs will be furnished and installed by the Construction Manager.

D. Install and manage traffic control signs and devices as directed by the Construction Manager.

E. As necessary, construct and manage a Special Materials Transfer Area (SMTA) as follows:
   1. Establish the SMTA adjacent to the project boundary so that it is accessible from the excavation area and the Former Production Area. Use an existing building slab, paved parking area, or new aggregate surface as approved by the Construction Manager.
   2. Construct ingress/egress to the SMTA, including access roads, ramps, and drainage improvements as required.
   3. The SMTA shall not be used as a Contractor laydown area.
   4. The SMTA shall be controlled as a radiological buffer area in accordance with this Section.

F. Excavate fractured concrete and metal debris concurrent with the adjacent Above-WAC or Below-WAC material.

G. Establish controls for removal of asbestos containing material (ACM) in accordance with Section 02210.

H. Blasting, including use of explosives or explosive devices, is not permitted.

I. Unless otherwise noted on the Construction Drawings, the following slope stability requirements shall apply during excavation activities:
   1. Excavation slopes with depths less than 20-feet shall be performed in accordance with applicable Occupational Safety and Health Administration (OSHA) guidelines.
   2. Temporary excavation slopes with depths greater than 20-feet shall be no steeper than 1.5H:1V with a maximum height of 13 feet between 15 foot benches. Sloped excavations greater than 20 feet in depth shall be designed and certified by a Registered Professional Engineer (RPE) with registration in the state of Ohio. A copy of the stamped design shall be provided to Fluor Fernald Health and Safety personnel and a copy shall be maintained at the work site.

3. Design slopes and slopes created by supplemental excavation shall be no steeper than 2H:1V with a maximum height of 13 feet between 15 foot benches.

J. Remove material adjacent to structures that extend above the design excavation limits, as well as the structures themselves, in a safe manner to ensure that an unstable condition is not created.

K. The following additional requirements shall apply to equipment used for excavation, loading, hauling, and unloading:
   1. Dedicate and restrict equipment required to excavate, load, haul and place Above-WAC and Resource Conservation and Recovery Act (RCRA) material to that specific use until decontamination rinsing has been completed and approved by the Construction Manager. Upon approval by the Construction Manager that no visible material is present on exterior equipment surfaces, or in haul truck beds, equipment may be used elsewhere.
   2. Prohibit tracked equipment from hauling, operating, or tracking over the Impacted Material Haul Road (IMHR) or other paved roadways, unless otherwise approved by the Construction Manager.
   3. Maintain equipment within the excavation area during periods of non-work (evenings, weekends, and holidays) unless equipment decontamination has been completed and the Construction Manager has approved the equipment removal.
   4. Complete decontamination activities and request a radiological survey of the equipment by the Construction Manager prior to moving equipment out of radiological contamination areas.

L. Perform intermediate and final surveys to confirm attainment of the design excavation limits.

3.2 GENERAL EXCAVATION

A. Excavate and load material in such a manner that enables the Construction Manager to visually observe excavation and loading operations as required to accurately direct disposition.

B. Excavations shall generally proceed in an up-gradient to down-gradient pattern to the lines and grades shown on the Construction Drawings, unless otherwise directed by the Construction Manager.

C. Unless otherwise noted on the Construction Drawings or directed by the Construction Manager, excavate material from Above-WAC and RCRA areas in accordance with this Section, prior to excavating Below-WAC material.

D. Survey and stake design excavation limits and Above-WAC and RCRA areas as shown on the Construction Drawings.

E. Excavate known utilities as indicated on the Construction Drawings. Prior to removal, cap, drain, purge and/or plug utility lines to be excavated as directed by the Construction Manager. Prevent release of material into surrounding soil. If fluids or hold-up material is encountered in utility lines, stop work and notify the Construction Manager. Plug sanitary and process lines when liquid flow is detected. Any material released from the sanitary or process lines will be excavated and dispositioned as directed by the Construction Manager.

F. If unidentified utilities or underground structures (tanks) are encountered, notify the Construction Manager, and proceed in accordance with the approved Penetration Permit.

G. Piping that is deformed, closed or otherwise hinders visual inspection shall be managed as Above-WAC or RCRA debris, depending on the area of origin.

H. If a utility is suspected of containing ACM, notify the Construction Manager and Fluor Fernald Health and Safety and manage in accordance with Section 02210.

I. Excavate, size-reduce, and handle piping and debris in such a manner to minimize the generation of Above-WAC or RCRA debris or friable asbestos.

J. In the event a historic, prehistoric, or archeological site, feature, or object is discovered, stop excavation in the area and immediately notify the Construction Manager.

K. Continuously observe excavations for Special Materials or change in materials. In the event a Special Material or change in materials is encountered, stop excavation in the area and immediately notify the Construction Manager. Dispose of Special Materials as directed by the Construction Manager.

L. In the event solvent saturated soils are encountered, stop excavation in the area and immediately notify the Construction Manager. Excavate, load, and haul the material to B60-001 (Soil Staging Area) as directed by the Construction Manager.

M. In the event active monitoring wells are encountered, stop excavation in the area and immediately notify the Construction Manager.

N. Prevent damage to any adjacent structures, materials, and equipment, including utilities that are to remain, or those installed for performance of this work.

O. Dispose of impacted material in accordance with this Section. Table 02205-1 provides guidance for the ultimate disposition of impacted materials. Notify the Construction Manager in the event that materials are discovered that do not appear to be represented in Table 02205-1. The Construction Manager will ensure compliance with this Section.

P. Piping and debris to be placed in existing stockpile SP7 shown on Construction Drawings shall be less than 10 inches in at least one dimension, and no longer than 8 feet in any dimension.

Q. Size-reduction shall be by mechanical means and not by flame or torch cutting.

R. A Fluor Fernald Waste Acceptance Organization (WAO) representative must be present for field observation and material tracking during active excavation, or movement of material into or out of any stockpile, including the Soil Staging Area.

3.3 EXCAVATIONS APPROACHING THE GMA

A. Stop excavation activities in the immediate area and immediately notify the Construction Manager if sands and gravel are encountered, even if the design excavation limits have not been reached.

B. Use caution when excavations encroach on the 5-feet protective cover over the unsaturated sands and gravel of the GMA. Approximate GMA elevations are shown on the Construction Drawings.

C. Prior to initiating work activities which will encroach on the 5-feet protective cover but not extend within 2-feet of the GMA, coordinate with the Construction Manager as follows:
   1. Excavate to achieve design excavation limits shown on Construction Drawings or to remove Above-FRL material as directed by the Construction Manager.
   2. Allow the Construction Manager 24 hours to examine the nature of the material in the bottom of the excavation to determine if GMA sediments are present, perform real-time monitoring, collect physical samples in the area to be backfilled, and identify any necessary pumping requirements for ponded water.
   3. Immediately following monitoring and sampling collection by the Construction Manager, initiate backfilling to protect the GMA as directed by the Construction Manager.

D. Prior to initiating work activities which will encroach within 2 feet of or breach the GMA, obtain written approval and direction from the Construction Manager. Proceed as follows:
   1. Excavate to achieve design grades shown on the Construction Drawings or to remove Above-FRL material as directed by the Construction Manager.
   2. Allow the Construction Manager to perform real-time monitoring and collect physical samples in the area prior to backfilling.
   3. Immediately following monitoring and sampling collection by the Construction Manager, initiate backfilling to protect the GMA as directed by the Construction Manager.

3.4 ABOVE-WAC AND RCRA EXCAVATIONS

A. Establish excavation boundary and buffer area controls for Above-WAC and RCRA excavations. The Construction Manager will administratively maintain buffer areas.
   1. Establish excavation area limits at surveyed and staked locations, in accordance with this Section, unless otherwise directed by the Construction Manager.
   2. Install T-posts and rope fence at the excavation boundary.
   3. Establish the buffer area adjacent to the excavation area to serve as a controlled loading area between the excavation area and the surrounding radiological controlled area.
   4. Grade the buffer area to drain into the excavation.
   5. Install T-posts and rope fence around the buffer area.
   6. Collect water encountered during excavation and pump as specified in Section 02275.
   7. Keep the buffer area clean and free of dirt and mud.
   8. Remove spillage before releasing haul equipment from the buffer area.

B. Load haul equipment by reaching over the excavation area limit and dumping directly into haul equipment located in the buffer area. Load haul equipment in a manner that prevents spillage and accumulation of material on the wheels and components of the haul equipment. Remove visible material that accumulates on the exterior of the truck. Multiple loading areas may be established within the buffer area, as approved by the Construction Manager.

C. If the Construction Manager identifies Above-WAC or RCRA contamination on the exterior of haul equipment, wash the equipment within the buffer area (with low volume, high-pressure washer or approved equivalent).

D. Remove debris (concrete, asphalt, and miscellaneous structures) from Above-WAC and RCRA areas and pressure wash the debris to remove any soil/residue. The Construction Manager will visually monitor washing operations to ensure that debris is free of all soil/residue and approved for future disposition at the OSDF by others. The Construction Manager may require additional washing as necessary to satisfy visual inspection.

E. Debris from Above-WAC and RCRA areas that cannot be cleaned to meet Construction Manager approval for future OSDF disposition shall be dispositioned at SP7, AR6-003, or the Soil Staging Area in accordance with this Section.

F. Excavate Above-WAC and RCRA soil in 3+/-1 foot lifts, or as directed by the Construction Manager, to the design excavation limits, as shown on the Construction Drawings. Excavate, load and haul the material to stockpiles SP7, AR6-003, or the Soil Staging Area as shown on the Construction Drawings and in accordance with this Section.

G. The Construction Manager will arrange for real-time monitoring on excavated side slopes after each lift is removed and on the excavation floor upon achieving the Above-WAC or

RCRA contamination limits shown on the Construction Drawings. The Construction Manager will arrange for physical sampling at the design depth. Allow 10 working days for sampling and analysis. Do not proceed with further excavation in this area until directed by the Construction Manager.

H. If initial depth of Above-WAC or RCRA material is below the existing surface, excavate Below-WAC material in 2+/-1 foot lifts until Above-WAC material has been reached, then proceed in 3+/-1 foot lifts.

I. Perform supplemental Above-WAC and RCRA excavations, as directed by the Construction Manager, if monitoring or analysis identifies additional material beyond the design excavation limits shown on the Construction Drawings or in areas not shown on the Construction Drawings.

3.5 UST EXCAVATIONS

If a UST is discovered during excavation, proceed as follows:

A. Excavate to expose the top of tank to allow the Construction Manager to assess the tank's condition.

B. The Construction Manager will inspect the tank for the presence of liquid or non-soil residue.

C. If the tank contains liquid or non-soil residue, as determined by the Construction Manager, proceed as follows:
   1. Pump remaining tank contents into drums provided by the Construction Manager.
   2. Move filled drums from the excavation area to the SMTA as directed by the Construction Manager.
   3. The Construction Manager will remove the drums from the SMTA for appropriate disposition.

D. Excavate the tank upon confirmation from the Construction Manager that the tank is empty. Ensure that water does not accumulate in the tank from the surrounding excavation.

E. During excavation, stage the tank, soil excavated from around the UST, and soil excavated from areas that previously contained USTs separate from the other excavated materials.

F. Upon confirmation from the Construction Manager that the tank is free of visible process residue, size-reduce the tank to meet physical WAC and handle it as a discrete waste stream, as directed by the Construction Manager.

G. If the tank cannot be cleaned of visible process residue, as determined by the Construction Manager, size-reduce the tank as specified in this Section for disposition as directed.

H. Over-excavate soil surrounding UST excavations and from areas that previously contained USTs to remove any visible stains, as directed by the Construction Manager.

3.6 BELOW-WAC EXCAVATIONS

Excavate Below-WAC material to the design excavation limits shown on the Construction Drawings as follows:

A. Remove slabs, concrete pads, asphalt, gravel, base and sub-base to sub-grade soil within Below-WAC areas. Manage Below-WAC materials as shown on the Construction Drawings and as directed by the Construction Manager. Notify the Construction Manager for real-time monitoring prior to subsequent excavation in the Below-WAC area.

B. Perform subsequent excavations in 3+/-1 foot lifts, or as directed by the Construction Manager, to achieve the design excavation limits shown on the Construction Drawings. Stockpile Below-WAC material within the work area, as directed by the Construction Manager, for future loading and hauling to the OSDF by others.

C. In Below-WAC excavation driven by contamination rather than removal of underground structures, the Construction Manager will perform real-time monitoring upon removal of each lift and upon achieving design excavation limits shown on the Construction Drawings. Do not continue excavation in the area until directed by the Construction Manager.

D. Coordinate real-time monitoring with the Construction Manager as necessary to maintain progress in other areas while real-time monitoring is being conducted.

E. Upon reaching the design excavation limits, notify the Construction Manager for real-time monitoring.

3.7 LOADING AND HAULING

A. Use paved haul roads shown on the Construction Drawings. Upon entering the paved haul roads with haul equipment, do not exit except to the excavation area, stockpiles SP7 and AR6-003, or Soil Staging Area without the approval of the Construction Manager.

B. Load haul equipment in a fashion to minimize load shifting and to prevent spillage during transit.

C. Extend automatic covers on suitably equipped haul equipment, whether full or empty, during periods of equipment movement.

D. Keep equipment cab closed and stay within the equipment cab when inside any posted contamination area without appropriate PPE except in emergency situations.

E. Provide material tracking information as directed by the Construction Manager.

F. Prior to loading and hauling, material shall be void of free liquid.

3.8 STOCKPILING

A3A-013 (E-G)
A3A-D14 (MWAC)

A. Install construction/safety fence around active stockpiles in accordance with this Section.

B. Install appropriate signage, provided by the Construction Manager, around the limits of active stockpiles.

C. Install erosion control measures around active stockpile in accordance with Section 02275.

D. Maintain fencing, signage, and erosion control measures for the duration of the active stockpile's existence.

E. Repair contractor-inflicted damage to active stockpile support structures, including construction/safety fence and signage, to their original condition within 24 hours of damage discovery.

F. Apply crusting agent within 7 calendar days upon completion of the active soil stockpile or if the active soil stockpile is to be inactive for more than 45 calendar days.

G. Roll or seal with crusting agent the surface of the stockpile in use at the close of each work-day to prevent fugitive dust and erosion.

H. Construct stockpiles with maximum slopes of 3H:1V and a maximum height to base ratio 0.2.

I. Locate interim stockpiles within the work area upon approval of the Construction Manager. Remove interim stockpiles within 45 calendar days.

J. Stockpiles shall not be located within 20 feet of an excavation top-of-slope.

K. The following additional requirements shall apply to the management of stockpiles SP7, AR6-003, and the Soil Staging Area:
   1. Use dedicated equipment for the preparation and management of the stockpile.
   2. Maintain ingress/egress to the stockpile, including access roads, ramps, and drainage features.

3. Maintain the unloading area that prevents haul equipment tires from coming in contact with the Above-WAC or RCRA material.
4. Place Above-WAC and RCRA material in locations designated by the Construction Manager.
5. Decontaminate tools and equipment used to place and manage Above-WAC and RCRA material within the stockpile prior to requesting release. Following decontamination, the Construction Manager will perform a radiological survey to release tools and equipment.

M. At the end of the day, cover soil or debris containing non-friable ACM with approximately 6 inches of soil that is visually free of ACM and approved by the Construction Manager.

3.9 MONITORING AND SAMPLING

A. The Construction Manager will arrange for real-time monitoring of all Below-WAC areas following removal of surface aggregate; concrete and asphalt slabs, pads, roads and parking areas, and between each lift until the design excavation limits has been achieved, including the design excavation limits.

B. The Construction Manager will arrange for real-time monitoring between excavation lifts for Above-WAC materials.

C. The Construction Manager will arrange for radiological monitoring before equipment is released from a buffer area. Working in rain and/or wet weather will increase scanning time.

D. The Construction Manager will perform visual monitoring for Special Materials during excavation. If Special Materials are found, real-time monitoring may be performed to verify removal and determine appropriate disposition of the material.

E. The Construction Manager will visually monitor all piping and debris to ensure no visible process residue remains.

F. When real-time monitoring or sampling is required, excavate in an alternate location while awaiting the results, as directed by the Construction Manager. Excavate alternate locations a minimum of 50 feet from the area being monitored. Allow up to 2 working days for monitoring after area is ready for monitoring. Extend duration for monitoring at least 1 working day for each day precipitation occurs.

G. The Construction Manager and regulatory agencies may collect samples from the excavation and haul equipment at any time during the project at no additional cost to Fluor Fernald.

H. The Construction Manager will monitor water collected in Above-WAC and RCRA excavations for the presence of VOCs. If VOCs are detected, the water will be sampled

and analyzed to determine disposition.

3.10 AREA MANAGEMENT

A. Maintain construction/safety fence and rope fence as specified in this Section, and as shown on the Construction Drawings.

B. Water management shall be as specified in Section 02275.

C. Perform stabilization of the excavated areas using crusting agent in accordance with Section 02275.

D. Notify the Construction Manager prior to removing sediment and debris from ditches, drains and erosion control devices. The Construction Manager will sample and test sediment for WAC compliance. Remove and de-water sediment in accordance with the following:
   1. Notify the Construction Manager two (2) days prior to removing sediment from ditches, drains and erosion and sediment control devices for sampling and analysis of the sediment for disposition.
   2. Remove accumulated sediment from ditches, drains and erosion and sediment control devices as directed by the Construction Manager. In no case shall sediment reduce the available depth of the associated feature to less than two-thirds the depth shown on Construction Drawings.
   3. De-water sediment removed from Above-WAC or RCRA areas within the associated Above-WAC or RCRA area.
   4. De-water sediment removed from ditches, drains and erosion and sediment control devices adjacent to and up-gradient of the associated feature as necessary to allow water to drain immediately back into the feature.
   5. Pending approval from the Construction Manager, disposition de-watered sediment as directed by the Construction Manager.
   6. Excavate, collect and place sediments accumulated in stockpile surface water control devices in their appropriate stockpile.

Table 02205-1 – Summary of Impacted Material

The table should be interpreted to read that material in column 1 may be dispositioned at the appropriate destination in columns 2-4 if the corresponding criteria are met.

MATERIAL	DISPOSAL DESTINATION*		
	OSDF	SLZ	SAFA
Soil from Below-WAC, Above-WAC and UST excavations	• Meets WAC	• Above-WAC	• Not applicable
Soil from RCRA excavations	• Prohibited	• Prohibited	• Containerize or place at Soil Staging Area
Soil from areas containing organics	• Prohibited pending treatment and direction by the Construction Manager	• Prohibited pending treatment and direction by the Construction Manager	• Fails treatment
Debris from Below-WAC and UST excavations	• Meets WAC	• Above-WAC • Visible residue cannot be removed	• Not applicable
Debris from Above-WAC excavations	• Meets WAC and free of visible soil/residue	• Visible soil/residue cannot be removed	• Not applicable
Debris from RCRA excavations	• Meets WAC and free of visible soil/residue	• Above-WAC and free of visible soil/residue	• Visible soil/residue cannot be removed
ACM (3)	• Meets WAC and passes visual inspection by CM	• Above-WAC and non-friable • Visible soil/residue cannot be removed and non-friable	• Friable and fails visual inspection by CM
Non-pressurized Containers (3)	• Meets WAC, free of visible soil/residue, and contains no free liquid, product, etc	• Above-WAC and contains no free liquid, product, etc. • Visible soil/residue cannot be removed and contains no free liquid, product, etc.	• Contains free liquid, residue, etc
Piping/Pumps (3)	• Meets WAC, free of visible soil/residue, and contains no free liquid	• Interior not visible and contains no free liquid • Visible soil/residue cannot be removed and contains no free liquid	• Above-WAC/HWMU and visible soil/residue cannot be removed • Above-WAC/RCRA and visible soil/residue cannot be removed
Transformers/Electrical Equipment (3)	• Meets WAC and free of visible soil/residue	• Visible soil/residue cannot be removed and drained of all fluid	• Contains fluid • Above-WAC/HWMU and visible soil/residue cannot be removed • Above-WAC/RCRA and visible soil/residue cannot be removed
Brick including Acid Brick (3)	• No acid brick (4)	• Acid brick (4)	• Not applicable
Lead Acid Batteries (3) Medical Infectious Waste (3) Non-soil Residue (3) Pressurized Containers (3) Tires (3) Uranium Metal (3) Sealed radiological calibration sources	• Prohibited	• Prohibited	• Containerize

(1) Must meet SP7 size requirements per this Section (2) SMTA materials must be containerized. (3) Special Material per this Section. (4) Acid brick is red or reddish-brown brick and fragments.

* These are final disposal destinations beyond which the contractor bears no responsibility for material movement. The OMTA area is a handoff to the OSDF. The Soil Staging Area is an interim holding area prior to disposition at a final destination

END OF SECTION

000319
4328

SPECIFICATION COVER SHEET

SPECIFICATION SECTION: 02207 **TITLE:** Area Isolation Trenching

Specifications By: (Engineer)
Signature _____ Date 11/20/01
Printed Name and Title: Dave Russell, Project Engineer

Scope and Format Checked By: (Checker)
Signature _____ Date 11-20-01
Printed Name and Title: Christopher R. Neumann, Project Engineer

Detailed Requirements Checked by: (Checker)
Signature _____ Date 11-20-01
Printed Name and Title: Christopher R. Neumann, Project Engineer

Overall Review By:
Signature _____ Date 11-20-01
Printed Name and Title: Christopher R. Neumann, Project Engineer

Approved by:
Signature _____ Date 11-20-01
Printed Name and Title: For Uday Kumthekar, P.E., SDFP Engineering Manager

Record of Revision (Number and initial all revisions)

Rev. No.	Reason	Date	By	Checked	Approval
0	Certified for Construction	11/20/01	DR	CRN	OK

SECTION 02207

AREA ISOLATION TRENCHING

PART 1 GENERAL

1.1 SCOPE

A. This Section includes the requirements for trenching and backfilling an isolation trench around the project excavation limits, as shown on the Construction Drawings.

1.2 RELATED SECTIONS AND DOCUMENTS

A. Section 02205 – Impacted Material Excavation.

B. Section 02275 –Surface Water Management and Erosion Control for Remediation.

C. Approved Construction Traveler(s) for this project.

1.3 REFERENCES

A. Title 29, Code of Federal Regulations (CFR): 29 CFR 1926 Subpart P – Excavation, current edition.

B. RM-0021, "Safety Performance Requirements Manual".

C. RM-0047, "Fugitive Dust Control Requirements".

D. SPR 3-5, "Barricades".

1.4 DEFINITIONS

A. Special Materials: Impacted material requiring special handling as specified in Section 02205 and presented in Table 02205-1.

B. Trencher: Specific equipment used in trenching around the area excavation limits.

1.5 HEALTH AND SAFETY REQUIREMENTS

A. Environmental Health and Safety, and Training requirements shall be as required in the approved Construction Traveler(s).

B. Contractor shall follow RM-0021 and other applicable Fernald Environmental Management

Project Health and Safety requirements during the execution of this work.

PART 2 PRODUCTS

2.1 MATERIALS

A. Provide rope fence consisting of 3/8-inch yellow nylon rope as shown on the Construction Drawings.

B. Provide T-posts in accordance with Section 02205.

C. Provide construction area signage in accordance with the approved Construction Traveler Package and SPR 3-5.

D. Provide crusting agent as specified in Section 02275.

2.2 EQUIPMENT

A. Furnish and maintain trencher equipment, manufactured by Vermeer or an approved equivalent, to perform trenching in accordance with this Section and in accordance with the approved Construction Traveler Package. The trencher must meet the following requirements:

1. Trencher must be capable of cutting to a minimum depth of 12 feet, with a tolerance of 0 to 6 inches.
2. Trencher must be capable of cutting a trench no greater than 30 inches wide.
3. Trencher must be capable of maintaining a trench centerline lateral tolerance of +/- 1 foot over the entire trench depth.
4. Trencher digging mechanism must be capable of being removed for turnover to Fluor Fernald at the completion of the project.

B. Furnish and maintain equipment to perform trench backfilling in accordance with this Section and in accordance with the approved Construction Traveler Package.

C. Equipment used within the trenching exclusion zone specified in the approved Construction Traveler Package shall have enclosed cabs. Enclosed cab is defined as an equipment cab isolated from the outside environment (intact windows, doors, panels and floors surrounding driver with all windows and doors shut) which provides a barrier from intrusion of outside airborne particles. Any heating, ventilating, or air conditioning units associated with the equipment cab must not provide a direct path for outside air to enter (air conditioner on air recirculate mode) unless the air is first passed through a high efficiency particulate air filter pulled directly from outside the cab.

D. Furnish and maintain equipment to perform compaction in accordance with this Section.

E. Furnish and maintain water tank trucks, water wagons, portable tanks, pressure distributors, piping, sprinklers or other equipment designed to apply water and/or dust suppressant and crusting agent uniformly and in controlled quantities to variable surface widths to provide fugitive dust control in accordance with RM-0047, "Fugitive Dust Control Requirements".

F. Furnish and maintain portable wash equipment to wash vehicle tires and vehicle exteriors as necessary.

PART 3 EXECUTION

3.1 GENERAL

A. Survey and layout the isolation trench centerline as shown on the Construction Drawings. Remove or relocate surface obstructions that may impede trencher operations, prior to trenching, with approval from the Construction Manager.

B. Prior to any trenching activities, install rope fence and signage as specified in the approved Construction Traveler(s), and as approved by the Construction Manager, to establish safe distances around the trench and excavations during operation of the equipment, and while the trench remains open.

C. Install, modify, and manage rope fence for trenching activities as directed by the Construction Manager. Radiological-control signs will be furnished and installed by the Construction Manager.

D. Install and maintain surface water management and erosion and sediment control measures in accordance with Section 02275.

E. Trench and backfill in accordance with the Construction Drawings, this Section and the approved Construction Traveler(s).

F. Blasting, including use of explosives or explosive devices, is not permitted.

G. Maintain equipment in a safe condition within the trenching/excavation area during periods of non-work (evening, weekends, and holidays).

H. Prohibit tracked equipment from hauling, operating, or tracking over or on the Impacted Material Haul Road (IMHR) or other paved roadways unless otherwise approved by the Construction Manager.

I. In the event a historic, prehistoric, or archeological site, feature, or object is discovered, stop all work immediately in the area and immediately notify the Construction Manager.

J. Excavation performed in support of trenching activities shall be as specified in Section 02205.

K. Maintain "E" Street access to buildings 64 and 65 as shown on the Construction Drawings.

3.2 TRENCHING

A. Trench at locations, as shown on the Construction Drawings, using approved trencher equipment. Trenches shall be cut to a minimum depth of 12 feet, with a tolerance of 0 to 6 inches. Trench centerline shall have a lateral tolerance of +/- 1-foot.

B. Trench in such a manner that enables the Construction Manager to visually observe trenching activities.

C. In areas inaccessible to the trencher, excavate around utilities and structures as directed by the Construction Manager, to verify no active utilities are present. Air gap active utilities found in areas inaccessible to the trencher in using methods and equipment as approved by the Construction Manager, in accordance with the Construction Drawings. Remove and dispose of pipe sections removed during air-gapping in accordance with Section 02205.

D. Stop trenching and immediately notify the Construction Manager if unidentified utilities are encountered.

E. Continuously observe trenching for the presence of Special Materials or change in materials. Stop trenching in the area and immediately notify the Construction Manager if any Special Materials are encountered. Dispose of Special Materials in accordance with Section 02205.

F. Stop trenching operations and notify the Construction Manager if fluid is detected flowing into the trench from a utility line cut during the trenching operations. The Construction Manager will note the location of the leakage for future remediation of the trenching corridor by others.

G. Perform trenching activities in such a manner as to minimize water accumulation in the trench.

H. Backfill trenches and excavations daily unless otherwise approved by the Construction Manager. Trenches or excavations remaining open after working hours shall be barricaded in accordance with requirements stated in the approved Construction Traveler(s).

I. Verify and record "as-built" trench locations and depths every 50 feet, and at intersections, along the trench centerline.

3.3 BACKFILL

A. Backfill trenches and excavations using material removed during trenching and excavation activities. The final 24 inches of backfill placed shall be free of debris, foreign objects, large rock fragments (maximum dimension of 6 inches), organic matter, and other deleterious materials so as to obtain adequate compaction. Spread these materials within the adjacent excavation area.

B. Backfill trenches to within 24 inches of grade. Backfill and compact the remaining 24 inches in 8-inch lifts compacted by four passes of compaction equipment suitable for use in the trench.

C. Use remaining material removed during trenching to construct a diversion berm along the trench centerline as shown on the Construction Drawings. Construct diversion berm in 8-inch lifts compacted by four passes of equipment approved by the Construction Manager. Obtain supplemental material to construct the diversion berm as necessary from the surrounding areas as directed by the Construction Manager. Spread excess material in place.

D. After completion of backfilling and diversion berm construction activities, install and modify rope fence to locations as shown on the Construction Drawings unless otherwise directed by the Construction Manager.

E. Upon completion of trenching, backfilling and diversion berm construction, stabilize the disturbed area using crusting agent in accordance with Section 02275

END OF SECTION

SPECIFICATION COVER SHEET

SPECIFICATION SECTION: 02210 **TITLE:** Axbestos Containing Material

Specifications By: (Engineer)
Signature [signature] Date 11/26/01
Printed Name and Title Dave Russell, Project Engineer

Scope and Format Checked By: (Checker)
Signature [signature] Date 11-20-01
Printed Name and Title Christopher R. Neumann, Project Engineer

Detailed Requirements Checked by: (Checker)
Signature Debra Grant Date 11-20-01
Printed Name and Title Debra Grant, Industrial Hygiene Representative

Overall Review By:
Signature Debra Grant Date 11-20-01
Printed Name and Title Debra Grant, Industrial Hygiene Representative

Approved by:
Signature [signature] Date 11-20-01
Printed Name and Title For Uday Kumthekar, P.E., SDFP Engineering Manager

Record of Revision (Number and initial all revisions)

Rev. No.	Reason	Date	By	Checked	Approval
0	Certified for Construction	11/26/01	DR	CL	W

This Section specifies standard site requirements for handling, packaging, loading, hauling and unloading friable and non-friable ACM. The Construction Manager will direct the implementation of these requirements based on project scope and materials encountered in the field.

SECTION 02210

ASBESTOS CONTAINING MATERIALS (ACM)

PART 1 GENERAL

1.1 SCOPE

This Section includes the following requirements for asbestos containing materials (ACM), but is not limited to:

A. Handling, packaging, loading, hauling, and unloading friable and non-friable asbestos containing material (ACM).

B. Removal of at- or below-grade ACM, which may include the following:
   1. Pipes coated with thermal system insulation.
   2. Electrical cable insulated with ACM.
   3. Fireproofing tape in electric manholes.
   4. Piping containing gasket material.
   5. Piping coated with construction mastic.
   6. ACM embedded in concrete.
   7. Buried ACM not associated with underground utilities.

C. Placement at the On-Site Disposal Facility (OSDF).

1.2 DEFINITIONS

A. Asbestos: Chrysotile, amosite, crocidolite, tremolite asbestos, anthophylite asbestos, actinolite asbestos, and any of these minerals that has been chemically treated and/or altered. For purposes of this specification, asbestos includes presumed asbestos containing material (PACM), as defined herein.

B. ACM: Any material containing more than 1 percent asbestos. For purposes of this specification, the term ACM includes PACM, as defined below.

C. PACM: Thermal system insulation (TSI) and surfacing material found in buildings constructed no later than 1980. The designation of material as "PACM" may be rebutted by performance of bulk sampling and analysis demonstrating that the PACM does not contain more than 1 percent asbestos, as described in 29 CFR 1926.1101(k)(5).

D. Active Asbestos Waste Disposal: Unloading of asbestos waste and placement at the OSDF is considered active asbestos waste disposal as termed in the referenced administrative code and federal regulations.

E. Class I Asbestos Work: Activities involving the removal of TSI and surfacing ACM and ACM. For purposes of this specification, includes, but is not limited to, the first time removal of at- or below-grade TSI associated with utilities.

F. Class II Asbestos Work: Activities involving the removal of ACM which is not TSI or surfacing material. For purposes of this specification, includes but is not limited to, first time removal of at- or below-grade ACM other than TSI and surfacing material that is associated with utilities.

G. Renovation: Altering in any way one or more facility components. Operations in which load-supporting structural members are wrecked or taken out are excluded from this definition. Removal of ACM related to at- or below-grade utilities is considered a renovation activity for purposes of the referenced administrative code and federal regulations.

H. Inactive Asbestos Waste Disposal Site: Any disposal site or portion of it where additional asbestos-containing waste material has not been deposited for 1 year and where the surface is not disturbed by vehicular traffic. For purposes of this specification, includes locations where ACM that was previously removed from a building or structure, or excess ACM building materials, was buried for disposal.

I. Removal of transite or other non-friable ACM from an inactive asbestos landfill does not fall under a certain "class" of work as defined by OSHA. Requirements will be established using best available technology and best management practices to minimize worker exposure.

J. Asbestos Competent Person: A person capable of identifying asbestos hazards in the work place, selecting appropriate control strategies for the asbestos exposure, and prompt corrective action. Person has the forty-hour asbestos contractor/supervisor training and holds the Asbestos Hazard Abatement Specialist Certification from the Ohio Department of Health (ODOH).

1.3 RELATED SECTIONS AND DOCUMENTS

A. Section 02205 – Impacted Material Excavation.

B. Approved Construction Traveler(s) for this project.

1.4 REFERENCES

A. Ohio Administrative Code (OAC), Chapter 3745-20, Asbestos Emission Control.

B. Ohio Administrative Code (OAC), Chapter 3701-34, Asbestos Hazards Abatement Rules.

C. Title 29, Code of Federal Regulations (CFR), Part 1926.1101, Asbestos.

D. United States Environmental Protection Agency (U.S. EPA) 40 CFR 61, Subpart M, (NESHAPS).

E. RM-0021, "Safety Performance Requirements Manual".

1.5 HEALTH AND SAFETY REQUIREMENTS

A. Environmental Health and Safety, and Training requirements shall be as required in the approved Construction Traveler(s).

B. Contractor shall follow RM-0021 and other applicable Fernald Environmental Management Project Health and Safety requirements during the execution of this work.

1.6 SUBMITTALS

A. Submit an ACM Removal and Handling Work Plan, prepared by an Asbestos Project Designer certified by the ODOH and in compliance with all applicable federal (CFR) and state (OAC) requirements in accordance with Part 8 of this Contract.

B. Submit the following documentation prior to initiation of ACM work:
   1. Names of all personnel assigned to the asbestos removal tasks of the Project.
   2. Copies of asbestos training certificates for asbestos workers, project designer, contractor/supervisor.
   3. Documentation, in the form of a physician's written opinion, that each worker performing Class I, Class II, or Class III asbestos removal tasks are physically fit to perform asbestos work.
   4. Documentation, in the form of a physician's written opinion, that each worker involved in asbestos removal work is physically fit to wear a respirator.

5. Documentation of quantitative respirator fit-test.
6. Documentation of respirator training.
7. Employee exposure assessments (if available).
8. Documentation of current certification as a licensed asbestos abatement contractor by the State of Ohio, as required for Class I work.
9. State of Ohio certification for all personnel as required by law (for friable asbestos work).
10. State of Ohio certification for the Asbestos Project Designer.
11. Copy of required notifications and applicable fees to ODOH.

C. Submit completed Asbestos Daily Job Site Inspection forms, monthly, following the start of ACM removal or handling.

PART 2 PRODUCTS

2.1 MATERIALS

A. Disposal Bags: Clear polyethylene a minimum of 6 mils thick.

B. Sheeting: Clear polyethene a minimum of 6 mils thick

C. Surfactants: Childers - CP-225 CHIL-SORB or approved equal.

D. Encapsulants:
1. Childers - CP-240 CHIL-LOCK.
2. Certified Technologies - Certane 2050.
3. Eppert Environmental Products - Eppco #1.
4. International Protection Coatings Corp - Serpiloc.
5. Or approved equal.

E. Lockdowns:
1. Certane - 1050 – Clearcoat.
2. Eppert - Fiber-Seal.
3. International Protection Coatings Corp - Serpiloc.
4. Or approved equal.

F. Other materials required by the Contractor for handling and packaging of ACM including, but not limited to, asbestos warning tape and signs, tape, knives, and garden sprayer.

G. Glovebags made of 6-mil plastic, seamless at the bottom, designed for asbestos work.

2.2 EQUIPMENT

A. For glovebags, a HEPA filtered vacuum system may be used to provide negative air pressure in accordance with the requirements of 29 CFR 1926.1101.

B. HEPA filtered vacuum for cleanup.

C. Cable pulling equipment.

D. Any and all equipment required to implement the removal as defined for the Contractor ACM Removal and Handling Work Plan.

PART 3 EXECUTION

3.1 GENERAL

A. The Contractor shall make the required notifications and pay applicable fees to the ODOH and provide a copy of all documentation to the Construction Manager.

B. At least 10 working days prior to issuing notification to the ODOH, the Contractor shall meet with the Construction Manager and Environmental Compliance Officer to ensure that the Contractor's Ohio Department of Health Notification and Construction Manager's Ohio EPA Notification are consistent.

C. Excavate and remove underground utilities in such a manner that mitigates the generation of friable asbestos material. Friable asbestos material created by Contractor work activities shall be removed and handled by the Contractor at no additional cost to Fluor Fernald.

D. The Contractor shall:
   1. Comply with work practices and procedures set forth in all applicable Federal, State, and local codes, regulations, and standards.
   2. Obtain ODOH certification as a licensed asbestos abatement contractor by the State of Ohio, as required, for friable asbestos removal.
   3. Ensure workers, supervisors, and project designer performing asbestos work have necessary ODOH certifications, as required, for friable asbestos removal.
   4. Ensure workers have been assessed by medical and physician's written opinions have been documented for asbestos work and respirator use.
   5. Take precautions to prevent creation of friable ACM during handling.
   6. Ensure Contractor's (inclusive of Subcontractor) employees are informed of the presence of ACM in the project work areas in accordance with 29 CFR 1926.1101(d) and OAC 3745-20-06(B)(4).

7. Establish a restricted work area at the OSDF that is adequate to deter entry of unauthorized personnel within 100 feet of the ACM work areas during unloading, deposition, burial, and initial compaction of asbestos containing waste materials, in accordance with OAC 3745-20-06(B)(4).
8. Establish an asbestos regulated area for Class I, II, and III asbestos work, or where airborne concentrations of asbestos exceed, or there is a reasonable possibility to exceed a PEL, in accordance with 29 CFR 1926.1101 (e). The regulated area shall be marked to minimize the number of persons within the area and protect persons outside the regulated area from exposure to airborne asbestos. Access to regulated areas shall be limited to authorized persons.
9. Obtain and conform to required training in accordance with Part 8.

E. Materials to be used as encapsulants and surfactants shall be in original, new, and unopened packages and containers bearing manufacturer's name, label and the following information:
1. Name of material.
2. Manufacturer's stock number and date of manufacture.
3. Manufacturer's name.
4. Thinning instructions.
5. Application instructions.
6. Material Safety Data Sheets (MSDSs).

3.2 APPLICATION

A. Use wet methods, or wetting agents, and other work practices and engineering controls to prevent creation of visible asbestos emissions during abatement and handling of ACM.

B. Perform personal air monitoring in accordance with 29 CFR 1926.1101(f) including sampling necessary to complete initial exposure assessments.

C. The Contractor shall ensure an Asbestos Competent Person is within the ACM area anytime ACM is disturbed, removed, packaged, excavated, handled, loaded, hauled, or unloaded.

D. The Contractor's Asbestos Competent Person shall perform documented inspections of the ACM work areas and adjacent areas daily during disturbance, excavation, handling, hauling, loading, unloading or placement of ACM waste. If there is visual evidence of asbestos contamination (e.g. spills of ACM waste) outside the demarcated ACM waste handling work areas, the Contractor shall take immediate action to abate the hazard, as described in the Contractor's ACM Removal and Handling Work Plan. The incident shall be reported immediately to the Construction Manager.

3.3 REMOVAL

A. Removal Procedures of ACM TSI:

1. Wet all ACM to be removed, or components or sections to be removed with ACM in place, with amended water solution and maintain wet until placed into disposal containers, double-bag in disposal bags, or sealed in 2 layers of sheeting.
2. Wrap large components removed intact in 2 layers of sheeting, secure with tape and properly label in accordance with OAC 3745-20-05(C)(1) and 29 CFR 1926.1101.
3. All piping (less than 12 inches in diameter) insulated with ACM may be removed with ACM in place. Wrap the piping in manageable sections with 2 layers of plastic sheeting, maintaining wet until wrapped. Use glovebags to remove ACM from each end of the section of pipe to be cut. Seal the exposed ACM with plastic and tape. Wet-brush and sponge, or clean the pipe by an equivalent method, the surfaces from which ACM has been removed. Double bag and seal. After the glove bag is removed, cut the pipe in the area that has been stripped of asbestos. Label the section of pipe that is wrapped, yet containing ACM, and the bag containing the glove bagged ACM in accordance with OAC 3745-20-05(C)(1) and 29 CFR 1926.1101.
4. Remove ACM from pipes that are larger than 12 inches in diameter by stripping of ACM in glove bags or mini-containments. Double bag the glove bag and contents; seal and label the bags in accordance with OAC 3745-20-05(C)(1) and 29 CFR 1926.1101. Size reduce the stripped piping as required.
5. Handle ACM with sharp-edged components as specified in this Section.
6. To remove any remaining ACM from stripped pipes or components, wet-brush and sponge, or clean by an equivalent method, the surfaces from which ACM has been removed in order to remove all visible ACM residue.
7. Pipes that exceed the WAC for the OSDF shall be cut into lengths as directed by the Construction Manager.
8. Pipes that are meet the WAC for the OSDF shall be size reduced into lengths to meet the requirements of the IMPP.
9. The Construction Manager will inspect the work area at the completion of work for any visible debris.

B. Removal of 13.2 kV Power Feeder Cables (includes fireproofing tape in manholes and cable):

1. Confined space entry will be required for removal of feeder cables within manholes and requirements are stated in Part 8 of this Contract.
2. Use wetting agents to ensure there are no visible emissions of asbestos fibers.
3. Wrap the fireproofed feeder cable in 2 layers of sheeting and secure with tape.
4. Remove friable ACM located at each end of the cable located within the electric manholes using a glove bag. Leave a length of cable exposed in the manhole so that the remaining cable can be pulled out of the conduit using the exposed end.

5. Cut the feeder cable and remove from the manhole.
6. Remove wrapped or bagged ACM from the manhole.
7. Clean the manhole using a HEPA vacuum to remove any remaining asbestos debris.
8. The Construction Manager will inspect the wrapped section to ensure the integrity of the wrap and the absence of radiological contamination.
9. Label wrapped sections in accordance with OAC 3745-20-05(C)(1) and 29 CFR 1926.1101.
10. The Construction Manager will visually inspect the manhole to ensure that all asbestos containing debris has been removed.
11. Using wet methods or amended water, remove the remaining feeder cable by use of pulling equipment.
12. Wrap the feeder cable in plastic shrink film or sheeting and then place into designated container.
13. Label wrapped sections in accordance with 29 CFR 1926.1101.
14. Clean the pulling area and manhole using a HEPA vacuum.
15. After the cable has been removed, the Construction Manager will perform an inspection of the work area for visible debris.

C. Removal of Below-grade Piping Containing Asbestos Gaskets:
1. When possible, do not expose gasket by breaking or cutting the flange.
2. If a gasket becomes exposed by breaking or cutting the flange at the gasket, is visibly deteriorated, and is unlikely to be removed intact, perform glove bag removal as described in 29 CFR 1926.1101 (g)(5)(ii).
3. If a gasket becomes exposed by breaking or cutting the flange at the gasket is able to be removed intact, remove the gasket and immediately place in a disposal container. Scrape any residue using wet methods.
4. Lock down any visible gasket material by saturating the material with lockdown, applied with a garden sprayer or equivalent method.
5. If size reduction is necessary and gasket material is exposed, seal the flange area with 2 layers of sheeting and duct tape.
6. Size reduce piping at lengths so that the flange where the gasket material is located is undisturbed.
   a. Size reduce into lengths as directed by the Construction Manager when the piping exceeds the waste acceptance criteria (WAC).
   b. Size reduce into lengths less as specified in the IMPP when piping meets WAC.
   c. Size reduce if piping exceeds the maximum diameter accepted at the OSDF as described in the IMPP.
   d. Size reduce perpendicular to the run of pipe without breaking or cutting the gasket.

7. At the completion of work, the Construction Manager will inspect the work area for any visible/exposed debris.

D. Removal of Asbestos Containing Mastic-coated Piping:
1. Remove mastic-coated piping in accordance with OSHA requirements for Class II work.
2. Thoroughly wet mastic with amended water.
3. Size reduce the piping inside of the excavation using equipment that will minimize generation of airborne fibers.
   a. If piping is Above WAC, size reduce and dispose in accordance with Section 02205.
   b. If piping meets WAC, size reduce in accordance with the IMPP.
4. Size reduce pipes that are greater than 12 inches in diameter to meet the OSDF WAC using methodology to prevent generation of friable asbestos fibers.
5. Encapsulate both ends of each section of piping and all other locations where damage to the mastic is visible.
6. Double bag and seal any ACM mastic that becomes dislodged from the piping in 6-mil asbestos bags.
7. Label according to OSHA 29 CFR 1926.1101.
8. At the completion of work, the Construction Manager will inspect the work area for any visible debris.

E. Removal of Concrete Encased Transite (transite conduit):
1. Removal of transite encased in concrete is generally OSHA Class II work, with the following exceptions.
   a. Class I work practices may be applicable if the condition of the material is friable, or;
   b. if the method used for removal causes material to become friable.
2. Thoroughly wet concrete/transite material with amended water.
3. Remove electrical cable, if present, using a cable puller.
4. Remove and size reduce concrete/transite material to meet OSDF WAC using methodology to minimize or prevent generation of friable asbestos.
5. Encapsulate both of the open ends of the transite.
6. Transite protruding beyond the concrete shall be double wrapped and sealed with sheeting.
7. The Construction Manager will inspect the work area at the completion of work for visible debris.

F. The Contractor shall use the following methods for excavation of previously removed ACM that was buried for disposal:
1. The Contractor's Asbestos Competent Person shall walk the work area and identify ACM visible at the surface before excavation, at least once a day during

excavation and/or placement, and at the end of the shift. The walks shall be documented on the Asbestos Daily Job Site Inspection form.

2. Wet methods or wetting agents shall be used during handling, packaging, and loading of ACM, or soil or debris containing ACM.
3. Care shall be taken so that the friable ACM does not break or crumble during handling and so that non-friable ACM is not handled in such a manner that it becomes friable.
4. Encapsulate the exposed surfaces of broken transite panels that are segregated from the soil or debris and stacked on pallets.
5. Apply surfactants or encapsulants during size reducing of any large pieces of ACM to meet the OSDF WAC physical size criteria.
6. Do not leave ACM exposed at the surface of the stockpile or OSDF at the end of the work day.
7. Exposed ACM during excavation shall be covered with soil at the end of the work day. Exposed ACM during excavation may be locked down in lieu of covering with soil if work will resume in that area within 36 hours.
8. Friable ACM that was previously removed and then buried for disposal shall be handled as follows:
   a. Wet with amended water (water mixed with surfactant) or encapsulate, and separate from the impacted material.
   b. Wrap friable ACM components meeting the OSDF WAC physical size criteria and large pieces removed intact in 2 layers of sheeting, secured with duct tape, and labeled in accordance with OAC 3745-20-05(C)(1) and OSHA 29 CFR 1926.1101. Multiple pieces may be grouped together before wrapping, provided WAC physical size criteria is still met.
   c. Double bag and seal pieces of friable ACM not conducive to wrapping in a 6-mil polyethylene bag. Label in accordance with OAC 3745-20-05(C)(1) and OSHA 29 CFR 1926.1101.
   d. Handle friable ACM with sharp-edged components (e.g. nails, screws, metal lath, tin sheeting) capable of tearing the polyethylene bags or sheeting in one of the following ways:
   e. Pad or wrap and secure the sharp-edge components in a manner to prevent tearing of the polyethylene, then wrap or bag in accordance with this Section.
   f. Place into polyethylene-lined containers (i.e. fiberboard boxes or drums). Metal containers are not allowed.
   g. The polyethylene liner shall be sealed prior to sealing the container. The container shall be labeled in accordance with OAC 3745-20-05(C)(1) and 29 CFR 1926.1101.
   h. Segregate wrapped, bagged, or containerized, friable ACM, from other excavated material and accumulate at the Special Materials Transfer Area. When a full, segregated load is accumulated, it shall be loaded and hauled to

the OSDF. Loads shall be prepared and secured to prevent any visible emissions, load loss, and spillage or leakage of liquids.

9. Handle non-friable ACM as follows:
   a. Wet transite or other non-friable ACM with amended water to reduce potential for release of fibers.
   b. Manually (by hand) remove pieces of transite or other non-friable ACM larger than 1 foot in any direction.
   c. Stack large, intact pieces of transite or other non-friable ACM on pallets and wrap the entire stack in 2 layers of sheeting.
   d. Double bag smaller pieces of transite or other non-friable ACM not conducive to wrapping.
   e. Incidental pieces of transite or other non-friable ACM less than 12 inches in maximum dimension contained in soil and soil-like material or debris can be placed in the OSDF as Category 1 (soil and soil-like) or Category 2 material without segregation.
   f. Avoid excessive breakage of the transite or other non-friable ACM during manual removal or during use of heavy equipment in the area.
   g. Cover soil or debris containing non-friable ACM, which is temporarily staged in a stockpile, with 6 inches of soil that is visually free of ACM at the end of the day.
10. The Construction Manager will inspect the area at the completion of work for visible debris.

END OF SECTION

SPECIFICATION COVER SHEET

SPECIFICATION SECTION: 02275 **TITLE:** Surface Water Management and Erosion Control for Remediation

Specifications By: (Engineer)
Signature [signature] Date 11/20/01
Printed Name and Title: Dave Russell, Project Engineer

Scope and Format Checked By: (Checker)
Signature [signature] Date 11-20-01
Printed Name and Title: Christopher R. Neumann, Project Engineer

Detailed Requirements Checked by: (Checker)
Signature [signature] Date 11-20-01
Printed Name and Title: Christopher R. Neumann, Project Engineer

Overall Review By:
Signature [signature] Date 11-20-01
Printed Name and Title: Christopher R. Neumann, Project Engineer

Approved by:
Signature [signature] Date 11-20-01
Printed Name and Title: for Uday Kumthekar, P.E., SDFP Engineering Manager

Record of Revision (Number and initial all revisions)

Rev. No.	Reason	Date	By	Checked	Approval
0	Certified for Construction	11/20/01	[initials]	[initials]	[initials]

SECTION 02275

SURFACE WATER MANAGEMENT AND EROSION CONTROL FOR REMEDIATION

PART 1 GENERAL

1.1 SCOPE

A. This Section includes, but is not limited to, the following:
1. Maintenance of existing and new erosion and sediment control measures including removal of all temporary erosion control facilities.
2. Management of surface water in construction and excavation areas, including management of volatile organic compound (VOC)-contaminated water.
3. Installation and maintenance of runon/runoff controls.
4. Protection of the unsaturated sands and gravels of the Great Miami Aquifer (GMA) from runon within the excavation areas, including installation and maintenance of runon controls.
5. Stabilization of disturbed excavation areas or stockpiles.
6. Inspection requirements.

1.2 RELATED SECTIONS AND DOCUMENTS

A. Section 02205 – Impacted Material Excavation.

B. Section 02207 – Area Isolation Trenching.

C. Approved Construction Traveler(s) for this project.

1.3 REFERENCES

A. State of Ohio, Department of Natural Resources (ODNR), Rainwater and Land Development, Ohio's Standard for Stormwater Management Land Development and Urban Stream Protection, current edition.

B. State of Ohio, Department of Transportation (ODOT), Construction and Material Specifications, current edition.

C. RM-0021, "Safety Performance Requirements Manual".

1.4 SUBMITTALS

A. Records of inspection of erosion and sediment control measures as specified herein shall be submitted monthly upon completion of the inspection report.

B. For each product proposed for use, submit the following:
   1. Manufacturer's product data and recommended methods of installation and maintenance.
   2. Material Safety Data Sheet (MSDS), if applicable.

1.5 HEALTH AND SAFETY REQUIREMENTS

A. Environmental health and safety, and training requirements shall be as required in the approved Construction Traveler(s).

B. Contractor shall follow RM-0021 and other applicable Fernald Environmental Management Project Health and Safety requirements during the execution of this work.

PART 2 PRODUCTS

2.1 MATERIALS

A. Furnish silt fence in accordance with ODNR, composed of, at a minimum, strong rot-proof polymeric fibers formed into a woven fabric, for placement around stockpiles to remain after project completion.

B. Provide dust supression/crusting agent meeting the following criteria:
   1. pine sap emulsion comprised of a 100 percent organic emulsion produced from naturally occurring resins (pine sap); or a mixture of Conwed Fiber's Enviroblend hydraulic mulch and Finn Corporation's A-500 Hydro-Stik tacking agent (mulch binder); or an approved equal;
   2. not comprised of chloride, lignosulfonate, petroleum, or asphaltic-type emulsions;
   3. provide dust suppression and surface stability for exposed soils, both disturbed and undisturbed soils, and exposed coal fired ash (fly ash);
   4. compatible with application via a hydro seeder, and must not require intense cleaning of equipment after application;
   5. non-tracking (i.e., will not stick to boots or tires) once cured;
   6. not have hazardous characteristics of ignitability, corrosivity, reactivity, or toxicity as defined in 40 CFR Part 261, Subpart C, for a hazardous waste in either its pre-applied or cured states;
   7. have a flash point greater than 200 °F;
   8. be neither a flammable nor combustible liquid per DOT definition; and

9. not be susceptible to significant deterioration from exposure to the elements, including sunlight.

C. GMA plug material shall be soil free of debris, foreign objects, large rock fragments (maximum dimension of 6 inches), organic, and other deleterious material, obtained from a certified borrow area. GMA plug material must conform to CL classification according to United Soil Classification System in accordance with ASTM D2487.

D. Provide Cherne or approved equivalent aluminum gripper plugs for the appropriate pipe diameter as shown on the Construction Drawings.

E. Provide non-shrink grout for storm sewer air gaps as shown on the Construction Drawings.

2.2 EQUIPMENT

A. Furnish pumps, filters, hoses and other appurtences for dewatering excavation areas and other equipment required to execute work as specified in this Section.

PART 3 EXECUTION

3.1 GENERAL

A. Construct and maintain erosion and sediment control measures as specified in this Section and as shown on the Construction Drawings. Maintain existing erosion and sediment control facilities and measures in accordance with this Section.

B. Minimize runon into disturbed excavation areas by grading the surrounding area away from the disturbed area.

C. Dewater excavations as directed by the Construction Manager. Water collected from a 10-yr, 24-hr or lesser storm event (rainfall not to exceed 4.1 inches) within active excavations shall be pumped to the Tank Farm Settling Basin or a location designated by the Construction Manager. Water shall be pumped down to a depth of less than one foot remaining in the bottom of the excavation within 3 days of the last rainfall.

D. The Construction Manager will sample and analyze excavation water present in suspect VOC areas prior to discharge. Following sampling and analysis, collect VOC-contaminated water and transport to the AWWT as directed by the Construction Manager. The Construction Manager will oversee delivery of the VOC-contaminated water to the AWWT.

E. Plug or air gap storm sewers at the excavation boundary, as shown on the Construction Drawings, prior to digging the area isolation trench in accordance with Section 02207.

Plug or air gap storm sewer system in such a manner to minimize water collected in an abandoned system.

F. Remove erosion and sediment control measures after the disturbed excavation areas are stabilized as specified in this Section.

3.2 SILT FENCES

A. Install silt fence at locations down-gradient of areas to be disturbed and around stockpiles to remain after project completion. Remove and dispose accumulated sediment as specified in Section 02205 for placement around stockpiles to remain after project completion.

B. Install breaks and overlaps in silt fence to allow equipment access to construction areas.

3.3 GMA PROTECTION

A. Limit excavations within 5 feet of the GMA, as shown on the Construction Drawings, to periods of dry weather.

B. Slope bench terrace directly above the GMA toward the excavated slope. Grade the bench terrace to a sump for pumping to prevent runon into the GMA.

C. Size and locate pumps for sumps along benches above the GMA such that no water from within the excavation area shall overflow into the GMA from a 10-yr, 24-hr or lesser storm event. The bottom of the sump will not extend to within 5 feet of the GMA. Contractor will have additional pumps available when the excavations approach the GMA.

D. For excavations extending to within 5-feet of the GMA elevation shown on the Construction Drawings, maintain less than one foot of standing water in the excavations at all times by pumping water to the Tank Farm Settling Basin or an adjacent area designated by the Construction Manager.

E. Backfill over the GMA as directed by the Construction Manager.

F. In areas where 2 feet of compacted cover has been recently restored following excavation which has extended to within 2 feet of or breached the GMA, pump ponded water from the affected excavation as soon as practical (but within 24 hours or by the direction of the Construction Manager) following a precipitation event.

3.4 STABILIZATION

A. Stabilization of disturbed areas by use of a crusting agent shall be performed at completion of excavation and stockpiles or within 7 calendar days of knowing a disturbed area will be

idle for more than 45 calendar days, whichever is sooner. Apply crusting agent as follows:

1. Apply crusting agent in accordance with manufacturer's directions.
2. Unless otherwise specified by the manufacturer, dilute concentrated pine sap emulsion to ratio of 4 parts water to 1 part concentrate. Apply diluted pine sap emulsion at a rate of 2,500 gallons per acre.
3. Apply a mixture of Conwed Fiber's Enviroblend hydraulic mulch and Finn Corporation's A-500 Hydro-Stik mulch binder, using the hydroseeder, at the rate of 1,000 lbs/acre on flat surfaces; and 1,125 lbs/acre on slopes greater than 3H:1V. The mixture rate for each product shall be 20 lbs/acre on flat surfaces and 30 lbs/acre on greater than 3H:1V slopes for the hydraulic mulch; and 20 lbs/acre on flat surfaces and 30 lbs/acre on slopes greater than 3H:1V for the Hydro-Stik mulch binder.
4. Maintain areas with a crusting agent to ensure proper erosion control. The crusting agent shall be reapplied to eroded and bare areas as necessary.

3.5 INSPECTION

A. Inspect erosion and sediment control measures to evaluate their effectiveness and need for maintenance. Any required repairs to the surface-water management and erosion control measures and existing sedimentation basins shall be initiated upon discovery, but no later than 24 hours after discovery. Inspection shall occur, at a minimum, at the following frequencies:

1. weekly;
2. daily after each rain event exceeding 0.5 inches; and
3. at least daily during prolonged rainfall events.

B. Records of inspection shall include the following:

1. summary of the scope of the inspection;
2. name of inspector;
3. inspection date;
4. inspection location;
5. purpose of inspection;
6. observations relative to performance of surface-water management and erosion control measures;
7. any necessary corrective actions;
8. corrective action completed and their performance; and
9. quantity and destination of ponded water pumped.

END OF SECTION

SPECIFICATION COVER SHEET

SPECIFICATION SECTION: 02770 **TITLE:** Geotextile and Geomembrane

Specifications By: (Engineer)
Signature _____ Date 11-20-01
Printed Name and Title: Christopher R. Neumann, Project Engineer

Scope and Format Checked By: (Checker)
Signature _____ Date 11/20/01
Printed Name and Title: Dave Russell, Project Engineer

Detailed Requirements Checked by: (Checker)
Signature _____ Date 11/20/01
Printed Name and Title: Chuck Van Arsedale, P.E., SDFP Title I & II Engineer

Overall Review By:
Signature _____ Date 11/20/01
Printed Name and Title: Chuck Van Arsedale, P.E., SDFP Title I & II Engineer

Approved by:
Signature _____ Date 11/20/01
Printed Name and Title: for Uday Kumthekar, P.E., SDFP Engineering Manager

Record of Revision (Number and initial all revisions)

Rev. No.	Reason	Date	By	Checked	Approval
0	Certified for Construction	11/20/01			

SECTION 02770

GEOTEXTILE AND GEOMEMBRANE

PART 1 GENERAL

1.1 SCOPE

A. This Section includes materials and installation for geotextile and geomembrane for gravel access roads, the AR6-003 stockpile liner system and cap system, and the Wash Pad.

1.2 RELATED SECTIONS AND PLANS

A. Approved Construction Traveler(s) for this project.

1.3 REFERENCES

A. Latest version of the American Society for Testing and Materials (ASTM) Standards:

1. ASTM D 638. Standard Test Method for Tensile Properties of Plastics.
2. ASTM D 746. Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.
3. ASTM D 1004. Standard Test Method of Initial Tear Resistance of Plastic Film and Sheeting.
4. ASTM D 1204. Standard Plastics Test Method for Linear Dimensional Changes of Non Rigid Thermoplastic Sheeting or Film at Elevated Temperature.
5. ASTM D 1238. Standard Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer.
6. ASTM D 1505. Standard Test Methods for Density of Plastics by Density-Gradient Technique.
7. ASTM D 1603. Standard Test Method for Carbon Black in Olefin Plastics.
8. ASTM D 4437. Practice for Determining the Integrity of Field Seams Used in Joining Flexible Polymeric Sheet Geomembranes.
9. ASTM D 4833. Standard Test Method for Index Puncture-Resistance of Geotextiles, Geomembranes, and Related Products.
10. ASTM D 5397. Standard Test Method for Evaluation of Stress Crack-Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test.
11. ASTM D 5596. Recommended Practice for Microscopical Examination of the Dispersion of Carbon Black in Polyolefin Geosynthetics.

12. ASTM D 5994. Standard Test Method for Measuring Core Thickness of Textured Geomembrane.

B. Latest version of the Geosynthetic Institute (GSI) Test Procedures:
   1. GSI GM 12 Standard Test Method for Asperity Measurement of Textured Geomembranes Using a Depth Gauge.

C. Latest version of National Sanitation Foundation (NSF) 54, Flexible Membrane Liners, Annex A.

D. Federal Standard No. 75la - Stitches, Seams, and Stitching.

E. RM-0021, "Safety Performance Requirements Manual".

1.4 SUBMITTALS

A. Submit to the Construction Manager for review the following information from the Installer prior to mobilization of the Installer to the site.
   1. Layout drawings showing the installation layout, identifying geomembrane panel configurations, dimensions, details, locations of seams, as well as any variance or additional details which deviate from the Construction Drawings. The layout drawings shall be adequate for use as a construction plan and shall include dimensions, details, etc. The layout drawings, as modified and/or approved by the Construction Manager, shall become part of the Contract.
   2. Installation schedule.
   3. Copy of Installer's letter of approval or license by the Manufacturer.
   4. List of equipment proposed for this project to be furnished by the Installer.
   5. List of equipment required for this project to be furnished by Fluor Fernald.

B. Submit to the Construction Manager for review prior to geomembrane placement, a Certificate of Calibration less than 12 months old for the field tensiometer. Tensiometer shall be calibrated within one year of date of test. Calibration shall be traceable to national or industry recognized standards where possible.

C. Submit to the Construction Manager for review subgrade acceptance certificates, signed by the Installer, for each area to be covered by the geomembrane prior to that area being covered by geomembrane.

1.5 HEALTH AND SAFETY REQUIREMENTS

A. Environmental Health and Safety, and Training requirements shall be as stated in the approved Construction Traveler(s).

B. Contractor shall follow RM-0021 and other applicable Fernald Environmental Management Project Health and Safety requirements during the execution of this work.

1.6 CONTRACTOR'S QUALITY ASSURANCE

A. Contractor's quality assurance requirements shall be in accordance with the following:

1. Procedures for geotextile and geomembrane installation comply with the requirements of this section; and
2. work procedures implement basic housekeeping and tool control requirements to protect the geotextile and geomembrane from potential damage.
3. Minimum housekeeping requirements shall include, but shall not be limited to:
   a. the liner shall be maintained to be clean and free of debris, scraps of material, dirt, mud from boots or shoes, bentonite spills, sand, or other deleterious materials;
   b. sandbags shall be maintained on a daily basis to repair or replace leaking sandbags;
   c. before start of work each day, the liner surface shall be inspected by the Installer's QC personnel and Fluor Fernald Quality Control and cleaned as needed to maintain a clean liner surface;
   d. cleaning of the geomembrane shall be with an electric powered leaf blower, a stream of water, vacuum cleaner, or other means approved by the Construction Manager; a broom shall not be used for cleaning the geomembrane unless specifically approved by the Construction Manager; and
   e. throughout the workday personnel shall inspect boots or shoes and clean off stones, mud, or other materials prior to stepping from areas not covered, onto the geomembrane. As required, at every access location to the geomembrane, the Contractor shall provide clean-off area for boots or shoes.

4. Minimum tool control requirements shall include, but shall not be limited to:
   a. tools shall be carried in a manner to avoid potential damage to the geotextile and geomembrane such as on a properly constructed tool belt not hanging onto clothing or placed in pockets of clothing; and
   b. positive tool control custody procedures shall be implemented to ensure that only personnel needing specific tools would carry them while on the geomembrane liner and then only when performing work activities requiring the tools.
   c. Sewing machine needles shall be centrally controlled to ensure that broken or lost needles are not left on the geotextile and geomembrane. The person controlling the needles shall require the broken or dull needle in exchange for a new needle.

5. All welders shall have an assistant when actively welding. The duties of the assistants shall be defined to include activities to ensure an acceptable weld and to protect the geomembrane from damage. Duties of the assistant shall include, but shall not be limited to, the following:
   a. cleaning the two geomembrane surfaces to be welded;
   b. controlling the length and positioning of the extrusion welding rods to ensure the rod does not become contaminated with sweat, mud, body oil, or other materials that could impact the strength of the weld; and
   c. moving and positioning equipment or supplies in a manner to protect the geomembrane.

6. Markings on the geomembrane shall be controlled by assigning a different color to each organization authorized to mark on the geomembrane. Frivolous marking on the geomembrane shall not be allowed.
7. Areas of geomembrane that have satisfactorily passed performance testing shall be restricted. Restricted areas shall be delineated by use of traffic cones and signage or by other means approved by the Construction Manager. Personnel authorized by the Construction Manager shall be allowed entry into the restricted area. When areas are re-opened for installation of geotextile cushion, strict tool control shall be implemented.

PART 2 PRODUCTS

2.1 GEOTEXTILE

A. Geotextile will be furnished by Fluor Fernald and meeting the following properties:
   1. Type: Nonwoven needlepunched; and
   2. Polymer Composition: Minimum 95% polypropylene or polyester by weight; and
   3. Mass per Unit Area: Minimum 10 oz/yd^2.

2.2 RESIN

A. Geomembrane will be furnished by Fluor Fernald and manufactured from new, first-quality polyethylene resin. No reclaimed polymer will be added to the resin. The use of polymer recycled during the manufacturing process is permitted if performed with appropriate cleanliness and if the recycled polymer during the manufacturing process does not exceed 2 percent by weight of the total polymer.

B. High-density polyethylene (HDPE) resin will have the following properties:
   1. Density: 0.934 g/cm^3 minimum (ASTM D 1505); and
   2. Melt Flow Index: 1.0 g/10 min., maximum (ASTM D 1238 Condition E).

C. Extrudate welding material shall be delivered in original sealed containers. Each container will have a label bearing the brand name, Manufacturer's lot number and directions as to proper storage.

2.3 GEOMEMBRANE PROPERTIES

A. HDPE textured geomembrane shall have properties that meet or exceed the required property values specified in Table 02770-1.

B. In addition, geomembrane will:
1. contain a maximum of 1 percent by weight of additives, fillers, or extenders, not including carbon black; and
2. not have striations, pinholes, bubbles, blisters, nodules, undispersed raw materials, or any sign of contamination by foreign matter on the surface or in the interior.

2.4 LABELING

A. Each geomembrane roll shall be labeled with the following information:
1. thickness of material;
2. length and width of the roll;
3. name of Manufacturer;
4. product identification;
5. lot number; and
6. roll number.

B. Geomembrane rolls not labeled in accordance with this Section or on which labels are illegible shall be rejected and replaced. Notify the Construction Manager of any missing or illegible labels and protect labels until rolls are incorporated.

2.5 ACCEPTANCE, HANDLING, AND STORAGE

A. Upon delivery to the project site, inspect and inventory the geomembrane materials and the manner in which they are stored.

B. Protection and preservation of geomembrane material shall include, but not be limited to:
1. handling and storage of the geomembrane at the site;
2. protection of the geomembrane from excessive heat or cold, dirt, puncture, cutting, or other damaging or deleterious conditions; and
3. storage of geomembrane rolls on pallets or other elevated structures off the ground surface and not more than 3 rolls high.

C. Unload, handle, and store geotextile and geomembrane material. Handling shall be performed such that damage to geotextile and geomembrane materials does not occur.

D. Geotextile rolls will be wrapped in relatively impermeable and opaque protective covers. Covers which become torn or damaged shall be repaired with similar materials.

2.6 EQUIPMENT

A. Furnish equipment for acceptance, handling, storage, and installation of geotextile and geomembrane specified in this Section.

PART 3 EXECUTION

3.1 GEOMEMBRANE PLACEMENT

A. General:
1. Do not place geomembrane until the layout drawings are approved by the Construction Manager.
2. Do not place a geomembrane panel in an area until the Construction Manager has been provided with a certificate that the surface on which the geomembrane will be placed is acceptable.
3. Place each geomembrane panel in accordance with the approved layout drawings.

B. Field Panel Identification:
1. Give each field panel an identification code (number or letter-number). This identification code shall be agreed upon by Fluor Fernald Quality Control and the Installer.
2. A geomembrane field panel is a roll or a portion of roll cut in the field.

C. Field Panel Placement:
1. Place one geomembrane panel at a time and seam each panel immediately after its placement.
2. Use temporary rub-sheets as required to prevent displacement or damage to underlying layers.
3. Do not place geomembrane panels when the ambient temperature is below 40° Fahrenheit (°F) or above 104°F, unless authorized in writing by the Construction Manager. For placement below 40°F or above 104°F, use the installation methods recommended by the geomembrane Manufacturer and approved in writing by the Construction Manager.
4. Do not place geomembrane in areas of ponded water or in the presence of high wind which make geomembrane placement unsafe.
5. Verify that:
   a. No vehicular traffic is driven directly on the geomembrane.

b. Equipment used does not damage the geomembrane by handling, trafficking, or leakage of hydrocarbons (i.e., fuels).
c. Personnel working on the geomembrane do not smoke, bring glass onto the geomembrane, or engage in other activities that could damage the geomembrane.
d. The method used to unroll the panels does not scratch or crimp the geomembrane and does not damage underlying layers.
e. The method used to place the panels minimizes wrinkles (especially differential wrinkles between adjacent panels). Adjust or repair any area of geomembrane wrinkles where the wrinkle height, measured perpendicular to the slope during the hottest portion of the day, is more than 4 inches;
f. The method used to place the panels does not cause the panels to lift up or trampoline during the coolest portion of the day.
g. The geomembrane is anchored or weighted with sandbags, or the equivalent, to prevent damage or uplift from wind. Install sufficient anchoring or weighting to prevent uplift and maintain such system until overlying material is placed.

6. Replace any field panel or portion thereof that becomes damaged (torn, twisted, or crimped). Remove from the work area damaged panels or portions of damaged panels.

D. Do not install geomembrane between one hour before sunset and one hour after sunrise unless approved in writing by the Construction Manager.

3.2 GEOMEMBRANE SEAMING

A. Personnel shall be experienced as specified in this Section. Do not perform seaming unless the Installation Consultant and the Fluor Fernald Quality Control personnel are on-site.

B. Do not install horizontal seams on slopes steeper than 10 horizontal to 1 vertical (10H:1V). Orient seams parallel to the line of maximum slope (i.e., oriented down, not across, the slope). Minimize the number of seams in corners and at odd-shaped geometric locations. No horizontal seam shall be less than 10 feet from the toe of the slope, except where approved in writing by the Construction Manager. Do not locate seams at an area of potential stress concentration.

C. Seams shall be shingled in the downward direction of the slope.

D. Weather Conditions for Seaming:
1. Do not seam geomembrane at ambient temperatures below 40°F or above 104°F. For seaming below 40°F or above 104°F, use the seaming method recommended

by the geomembrane Manufacturer and approved in writing by the Construction Manager.

2. Measure ambient temperatures at 6 inches above the geomembrane surface.
3. In all cases, the geomembrane seam areas shall be dry and protected from wind.

E. Overlapping and Temporary Bonding:
1. Sufficiently overlap geomembrane panels for welding and to allow peel tests to be performed on the seam as specified in this Section. Any seams that cannot be destructively tested because of insufficient overlap are failing seams.
2. Control the temperature of the air at the nozzle of heat bonding apparatus such that the geomembrane is not damaged.

F. Seam Preparation:
1. Prior to seaming, clean the seam area and ensure that area to be bonded is free of moisture, dust, dirt, debris of any kind, and foreign material.
2. If seam overlap grinding is required, complete the process according to the Manufacturer's instructions within 20 minutes of the seaming operation. Do not grind to a depth that exceeds ten percent of the geomembrane thickness. Grinding marks shall not appear beyond 0.25 inch of the extrudate after it is placed.
3. Align seams with the fewest possible number of wrinkles and "fishmouths".

G. General Seaming Requirements:
1. Extend seams to the outside edge of panels to be placed in the anchor trench.
2. If required, place a firm substrate such as a flat board or similar hard surface directly under the seam overlap to achieve proper support.
3. Cut fishmouths or wrinkles at the seam overlaps along the ridge of the wrinkle to achieve a flat overlap. Seam the cut fishmouths or wrinkles and patch any portion where the overlap is less than 6 inches with an oval or round patch of geomembrane that extends a minimum of 6 inches beyond the cut in all directions.
4. Place the electric generator used for power supply to the welding machines outside the area to be lined, or mount it on soft tires, or place on a rub sheet such that no damage occurs to the geomembrane. Properly ground the electric generator. Place a smooth insulating plate or fabric beneath the hot welding apparatus after use.

H. Seaming Process:
1. Approved processes for field seaming are extrusion welding and fusion welding. Use only geomembrane Manufacturer-approved equipment.
2. Extrusion Equipment and Procedures:
   a. Maintain at least one spare operable seaming apparatus on site.
   b. Equip extrusion welding apparatus with gauges giving the temperature in the apparatus and at the nozzle.

c. Prior to beginning a seam, purge the extruder until all heat-degraded extrudate has been removed from the barrel. Whenever the extruder is stopped, purge the barrel of all heat-degraded extrudate.

3. Fusion Equipment and Procedures:
   a. Maintain at least one spare operable seaming apparatus on site.
      i. Fusion-welding apparatus shall be automated self-propelled devices equipped with gauges giving the applicable temperatures and travel speed.
   b. Fusion-welding apparatus shall produce a double-track seam.
   c. Abrade the edges of cross seams to a smooth incline (top and bottom) prior to extrusion welding.

I. Trial Seams:
   1. Make trial seams on excess pieces of geomembrane to verify that seaming conditions are adequate. Conduct trial seams on the same material to be installed and under similar field conditions as production seams. Conduct trial seaming at the beginning of each seaming period, and at least once each four hours, for each seaming apparatus used that day prior to seaming. Also, each seamer shall make at least one trial seam each day, for each day that seaming is performed by that seamer. Conduct trial seaming under the same conditions as the actual seaming. Prepare trial seams that are approximately 15 feet long by 1 foot wide (after seaming), with the seam centered lengthwise for fusion equipment and at least 3 feet long by 1 foot wide for extrusion equipment. Prepare seam overlap as specified in this Section.
   2. Cut four specimens, each 1.0 inch wide, from the trial seam sample. Test two specimens in shear and two in peel, using a field tensiometer. The test specimens shall not fail in the seam. Seams shall meet properties detailed in Table 02770-2. If a specimen fails, repeat the entire operation. If the additional specimen fails, do not accept the seaming apparatus or seamer until the deficiencies are corrected and two consecutive successful trial seams are achieved. A seamer may start production seaming prior to testing of the trial seams. In the event the trial seam fails, all production seams by the seamer are failed seams.

J. Nondestructive Seam Continuity Testing:
   1. Nondestructively test for continuity field seams over their full length. Perform continuity testing as the seaming work progresses, not at the completion of field seaming. Complete any required repairs in accordance with this Section. Apply the following procedures:
      a. Use vacuum testing for extrusion welds.
      b. Use air pressure testing for double-track fusion seams.
   3. Vacuum Testing:
      a. Use the following equipment:

i. A vacuum box assembly consisting of a stiff housing, a transparent viewing window, a soft neoprene gasket attached to the bottom, port hole or valve assembly, and a vacuum gauge.
ii. A system for applying 5 pounds per square inch (psi) gauge suction to the box.
iii. A bucket of soapy solution and applicator.

b. Follow these procedures:
i. Energize the vacuum pump and reduce the tank pressure to 5 ±1 psi gauge.
ii. Wet an area of the geomembrane seam larger than the vacuum box with the soapy solution.
iii. Place the box over the wetted area.
iv. Close the bleed valve and open the vacuum valve.
v. Ensure that a leak tight seal is created.
vi. Examine the geomembrane through the viewing window for the presence of soap bubbles for not less than 20 seconds.
vii. If no bubbles appear after 20 seconds, close the vacuum valve and open the bleed valve, move the box over the next adjoining area with a minimum 3 inch overlap, and repeat the process.
viii. Mark all areas where soap bubbles appear with a marker that will not damage the geomembrane and repair in accordance with this Section.

4. Air Pressure Testing:
a. Use the following equipment:
i. An air pump (manual or motor driven) or air reservoir, equipped with a pressure gauge, capable of generating and sustaining a pressure between 25 and 30 pounds per square inch.
ii. A rubber hose with fittings and connections.
iii. A hollow needle, or other approved pressure feed device.

b. Follow these procedures:
i. Seal both ends of the seam to be tested.
ii. Insert needle, or other approved pressure feed device, into the tunnel created by the fusion weld.
iii. Insert a protective cushion between the air pump and the geomembrane.
iv. Energize the air pump to a pressure between 25 and 30 pounds per square inches, close valve, and sustain the pressure for not less than 5 minutes.
v. If loss of pressure exceeds 3 pounds per square inches, or does not stabilize, locate faulty area and repair in accordance with this Section.
vi. Cut opposite end of air channel from pressure gauge and observe release of pressure to ensure air channel is not blocked.

vii. Remove needle, or other approved pressure feed device, and seal both ends in accordance with the "Defects and Repairs" Article of this Part.

K. Destructive Testing:

1. Perform destructive seam tests to evaluate seam strength and integrity. Perform destructive testing as the seaming work progresses, not at the completion of field seaming.
2. Sampling and Testing:
   a. Collect destructive test samples at a minimum average frequency of one test location per 500 feet of seam length and at additional locations of suspected nonperformance. Fluor Fernald Quality Control will select test locations, including locations with evidence of excess geomembrane crystallinity, contamination, offset seams, or any other evidence of inadequate seaming.
   b. Cut samples at the locations designated by Fluor Fernald Quality Control at the time the locations are designated. Number each sample and identify the sample number and location on the panel layout drawing. Immediately repair holes in the geomembrane resulting from the destructive seam sampling in accordance with the repair procedures described in this Section. Test the continuity of the new seams in the repaired areas according to this Section.
   c. Cut two strips 1 inch wide and 12 inches long with the seam centered parallel to the width from either side of the sample location. Test the two 1-inch wide strips in the field tensiometer in the peel mode. Fluor Fernald Quality Control may request an additional test in the shear mode. If these samples pass the field test, prepare a laboratory sample at least 1 foot wide by 3.5 feet long with the seam centered lengthwise. Cut the laboratory sample into three parts and distribute as follows:
      i. one portion 1 foot long to the Installer;
      ii one portion 1.5 feet long to Fluor Fernald Quality Control for testing; and
      iii one portion 1 foot long to the Construction Manager for archival storage.

3. In the event of failing field or laboratory test results, the Contractor may reconstruct the entire seam between two passing destructive tests; otherwise, Fluor Fernald Quality Control will identify the extent of the nonconforming area. Obtain additional samples for testing as requested by Fluor Fernald Quality Control.

L. Defects and Repairs:

1. Inspect the geomembrane before and after seaming for evidence of defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. The surface of the geomembrane shall be clean at the time of inspection. Sweep or wash the geomembrane surface if surface contamination inhibits inspection.
2. Test each suspect location, both in seam and non-seam areas, using the methods described in this Section. Repair each location that fails nondestructive testing.
3. Cut and re-seam wrinkles not conforming to this Section. Test the re-seams in the same manner as seams described in this Section.
4. Repair Methods:
   a. Repair any portion of the geomembrane exhibiting a flaw, or failing a destructive or nondestructive test. The appropriate repair method shall be agreed upon between the Contractor and the Construction Manager. Use the most appropriate of the available methods:
      i. patching - used to repair large holes, tears, undispersed raw materials, and contamination by foreign matter;
      ii. abrading and re-seaming - used to repair small sections of extruded seams;
      iii. spot seaming - used to repair minor, localized flaws;
      iv. capping - used to repair long lengths of failed seams;
      v. topping - used to repair areas of inadequate seams, which have an exposed edge less than 4 inches in length; and
      vi. removing bad seam and replacing with a strip of new material seamed into place (used with long lengths of fusion seams).
   b. When making repairs, satisfy the following:
      i. abrade surfaces of the geomembrane that are to be repaired no more than 20 minutes prior to the repair;
      ii. clean and dry all geomembrane surfaces immediately prior to repair;
      iii. only use approved seaming equipment;
      iv. extend patches or caps at least 6 inches beyond the edge of the defect, and round corners of patches to a radius of at least 3 inches; and
      v. cut the geomembrane below large caps to avoid potential for water or gas collection between the two sheets.
5. Repair Verification:
   a. Test each repair using the methods described in this Section. Repairs that pass the nondestructive test are adequate unless Fluor Fernald Quality Control elects to also perform destructive tests. Re-repair and retest failed tests.

3.3 GEOTEXTILE SEAMS AND OVERLAPS

A. Continuously overlap a minimum of 6 inches and sew geotextile cushions using a "single prayer" seam. Sew seams using Stitch Type 401 as per Federal Standard No. 751a. Spot sewing will not be allowed.

B. Do not install horizontal seams on slopes that are steeper than 10 horizontal to 1 vertical (10H:1V). Seams shall be along, not across, the slopes.

C. Repair holes or tears in the geotextiles using a patch made from the same geotextile material. Extend geotextile patches a minimum of 1 foot beyond the damaged area. Sew geotextile patches into place no closer than 1 inch from panel edge. Should tear exceed 50 percent of the width of the panel, cut across the entire width of the panel and seam as an end seam. For slope areas steeper than 10H:1V, tears exceeding 50 percent of the width of the panel shall be removed and replaced.

3.4 CREST ANCHOR SYSTEM

A. Temporarily anchor each geomembrane panel in the anchor trench at the crest of the slope as soon as the panel is deployed or positioned.

B. Do not entrap soil, sand bags, or other materials below or between the geosynthetic layers.

C. Do not backfill the anchor trench until all geosynthetic layers are installed in the anchor trench. Do not place geotextile or geomembrane in anchor trench if standing water is present.

D. Do not damage any geosynthetic layer when backfilling the anchor trench.

3.5 MATERIALS IN CONTACT WITH THE GEOMEMBRANE

A. Take necessary precautions to prevent damage to the geomembrane and its texturing during the installation of other components of the liner system or cap system or Wash Pad.

B. Do not drive equipment directly on the geomembrane. Only use equipment above the geomembrane that meets the following ground pressure requirements:

Maximum Allowable Equipment Ground Pressure (pounds per square inches)	Minimum Thickness of Overlying Fill or Aggregate Materials (inches)
less than 5	12
less than 10	18
less than 20	24
greater than 20	36

3.6 CONSTRUCTION QUALITY REQUIREMENTS

A. Fluor Fernald Quality Control will test geomembrane destructive seam samples to confirm compliance with seam performance requirements specified in this Section.

B. Fluor Fernald Quality Control will monitor geomembrane installation in accordance with this Section.

3.7 SURVEY CONTROL

A. Perform record survey on location of geomembrane liner and cap.

TABLE 02770-1
REQUIRED HDPE TEXTURED GEOMEMBRANE PROPERTIES

Properties	Qualifiers	Units[1]	Specified Property Values Liner	Specified Property Values Cap & Wash Pad	Test Method
Physical Properties					
Thickness	average	mils	>80	>60	ASTM D 5994
	minimum	mils	76	58	ASTM D 5994
Density	minimum	g/cm³	0.94	0.94	ASTM D 1505
Carbon Black Content	range	%	2-3	2-3	ASTM D 1603
Carbon Black Dispersion	N/A	none	Cat. 1 or 2	Cat. 1 or 2	ASTM D 5596
Asperity Height	minimum	mils	7	7	GRI-GM12
Mechanical Properties					
Tensile Properties (each direction)					
1. Force Per Unit Width at Yield	minimum	lb/in.	168	126	ASTM D 638 Type IV
2. Tensile Strength (force per unit width at break)	minimum	lb/in.	120	90	ASTM D 638 Type IV
3. Elongation at Yield	minimum	%	12	12	ASTM D 638 Type IV
4. Elongation at Break	minimum	%	100	100	ASTM D 638 Type IV
Tear Resistance	minimum	lb	56	42	ASTM D 1004 Die C Puncture
Puncture Resistance	minimum	lb	120	90	ASTM D 4833
Environmental Properties					
Low Temperature Brittleness	maximum	°C	-60	-60	ASTM D 746 Procedure B
Dimensional Stability (each direction)	maximum change	%	±2	±2	ASTM D 1204 212°F, 15 min.
Environmental Stress Crack Resistance					
1. Notched Constant Tensile Load	minimum	hrs	500[2]	500[2]	ASTM D 5397

Notes:

1. % = percent, g = grams, min = minutes, lb/in. = pounds per inch, lb = pound, °C = degrees Celsius, hrs = hours
2. Time-to-failure at a tensile stress of 30% of the tensile yield strength. Test is conducted on smooth geomembrane from the same lot (batch) as the textured geomembrane furnished.

TABLE 02770-2

REQUIRED HDPE TEXTURED GEOMEMBRANE SEAM PROPERTIES

Properties	Qualifiers	Units[3]	Specified Property Values Liner 80 mil	Cap and Wash Pad 60 mil	Test Method[4]
Shear Strength[1]					
Fusion	minimum	lb/in.	151	113	ASTM D 4437
Extrusion	minimum	lb/in.	151	113	ASTM D 4437
Peel Adhesion					
FTB[2]					
Fusion	minimum	lb/in.	115	88	ASTM D 4437
Extrusion	minimum	lb/in.	84	63	ASTM D 4437

Notes:
1. Also called "Bonded Seam Strength". Value is at material yield point.
2. FTB = Film Tear Bond. (Maximum 10 percent seam separation).
3. lb/in. = pounds per inch.
4. Conditioning of test samples shall be minimum one hour at standard laboratory atmosphere.

END OF SECTION

FLUOR GLOBAL SERVICES

Technical Specifications
For
Soil and Disposal Facility Project
Area 3A/4A Excavation

Document 20800-TS-0002
Revision 1

Project No. 20800
Construction Contract No. FSC 653

April 2002

PREPARED BY: _____ 04/18/02

CHECKED BY: _____ 4/18/02

APPROVED BY: R.C. Smith 04/18/02

U.S. DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Fluor Fernald
P.O. Box 538704
Cincinnati, OH 45253-8704

U.S. DEPARTMENT OF ENERGY

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Project No. 20800
Area 3A/4A Excavation
Technical Specifications

TABLE OF CONTENTS

SECTION	TITLE	REV.	DATE
02150	Traffic Control	1	04/18/02
02205	Impacted Material Excavation	1	04/18/02
02206	Earthwork for Remediation	1	04/18/02
02210	Asbestos Containing Material (ACM)	1	04/18/02
~~02216~~	~~Waste Containerization~~	~~0~~	~~08/20/01~~
02275	Surface Water Management and Erosion Control for Remediation	1	04/18/02

Specification Revision Record

Spec. No./Rev.	Description	Approval	Date
02150, Rev.1	Incorporate DCN-001	DRR	04/18/02
02205, Rev.1	Incorporate DCN-001	DRR	04/18/02
02206, Rev.1	Incorporate DCN-001	DRR	04/18/02
02210, Rev.1	Incorporate DCN-001	DRR	04/18/02
02275, Rev.1	Incorporate DCN-001	DRR	04/18/02

SECTION 02150
TRAFFIC CONTROL

PART 1 GENERAL

1.1 SCOPE

A. This Section includes the traffic control requirements for the excavation areas, Special Materials Transfer Area (SMTA), Stockpile 7 (SP7) and movement between the following: On-Site Disposal Facility (OSDF), OSDF Material Transfer Areas (OMTA), Bulk Material Transfer Area (BMTA), OSDF borrow area, and designated project operational limits. (Requirements for traffic control within the OSDF and OSDF borrow area are contained in the IMPP and the OSDF Borrow Area Management and Restoration Work Plan.)

1.2 RELATED SECTIONS AND DOCUMENTS

A. Section 02200 - Earthwork

B. Section 02205 – Impacted Material Excavation.

C. Section 02206 – Earthwork for Remediation.

1.3 REFERENCES

A. Manual of Uniform Traffic Control Devices (MUTCD) for Streets and Highways, current edition.

B. State of Ohio, Department of Transportation (ODOT): Construction and Material Specifications, current edition.

PART 2 PRODUCTS

2.1 MATERIALS

A. Provide materials for traffic control, including stop and yield signs conforming to MUTCD and ODOT specifications.

B. Provide fencing as specified in Section 02200.

PART 3 EXECUTION

3.1 TRAFFIC CONTROL

A. Supply, install, and maintain traffic control devices.

B. Maintain speed limit of construction vehicles and equipment per site requirements.

C. Ensure that haul equipment or other equipment traveling between certified and non-certified

areas, remains on roads constructed of certified material. Perform wheel-wash activities and decontamination as necessary. The Construction Manager will perform radiological monitoring in accordance with Section 02205.

D. Provide entry points to the excavation area free of interference from non-project operations. Ensure that traffic entering haul roads yields to traffic already on the road.

E. Ensure that traffic routes are acceptable for use (stable) daily and after an event (rain) that may have altered the condition of the route.

F. Routes that cause equipment and/or vehicles to operate on inclines shall be evaluated and operational limits stated.

3.2 IMPACTED MATERIAL HAUL ROAD

A. Control the Impacted Material Haul Road (IMHR) as a contamination area during excavation and hauling of above-WAC materials. The Construction Manager must approve IMHR crossings from controlled areas.

B. The Construction Manager may post or reclassify road crossing intersections with the IMHR during periods of inactivity.

3.3 UTILITY CROSSINGS

A. Protect energized or active utility lines outside of existing paved areas that intersect proposed traffic routes. Use a 1 inch thick steel plate or an equivalent alternative. Provide length and width of steel plates as required to protect the existing utilities.

3.4 EQUIPMENT PARKING

A. OSDF Contractor Administration Area

1. Provide non-contaminated equipment parking areas within the OSDF Contractor Administration Area.
2. Restrict personal vehicles from the equipment parking areas.
3. Provide personnel parking at the OSDF Contractor Administration Area.

B. Contaminated Equipment Parking Area

1. Locate the contaminated equipment parking area as close as possible to the Radiological Control Point Facility.
2. Maintain contaminated equipment parking areas free of mud, debris and standing water.
3. Park contaminated equipment utilized in the SP7 area, or above-WAC areas at the boundary of the area, in accordance with Section 02205, until decontaminated and released from the area.

C. Parking areas shall be constructed to insure that personnel accessing and servicing the vehicles shall have stable footing. The use of rip rap and other like materials is not acceptable.

END OF SECTION

SECTION 02205
IMPACTED MATERIAL EXCAVATION

PART 1 GENERAL

1.1 SCOPE

A. This Section includes the requirements for excavating, size-reducing, segregating, stockpiling, loading, hauling, and unloading impacted material. Activities include, but are not limited to, the following:

1. Excavation of impacted materials to the design grade.
2. Segregation of impacted materials for disposition or reuse.
3. Size reduction of remaining structures, utilities, and miscellaneous debris.
4. Loading, hauling and unloading of impacted materials to appropriate disposition.
5. Development and maintenance of project stockpiles.
6. Support of site monitoring and sampling activities.
7. Performance of area management activities.
8. Supplemental excavation beyond the design grade.
9. Excavation of utilities below the design grade.

1.2 RELATED SECTIONS AND DOCUMENTS

A. Section 02100 – Surveying.

B. Section 02150 – Traffic Control.

C. Section 02200 – Earthwork.

D. Section 02206 – Earthwork for Remediation.

E. Section 02210 – Asbestos Containing Material (ACM).

F. Section 02230 – Road Construction.

G. Section 02275 – Surface Water Management and Erosion Control for Remediation.

H. Section 02930 – Vegetation.

I. Impacted Materials Placement Plan (IMPP), On Site Disposal Facility (OSDF), 20100-PL-007, current revision.

1.3 REFERENCES

A. Title 29, Code of Federal Regulations (CFR): 29 CFR 1926 Subpart P – Excavation, current edition.

B. Waste Acceptance Criteria (WAC) Attainment Plan for On Site Disposal Facility (OSDF), 20100-PL-0014, current revision.

1.4 DEFINITIONS

A. Active Stockpile: A stockpile specifically designed to operate for longer than 45 calendar days. This includes interim stockpiles that are older that 45 days and existing stockpiles shown on the Construction Drawings.

B. Debris: Impacted material that is generated during the excavation and removal of building structures, utilities, miscellaneous man-made materials, and natural materials. These materials include floor slabs; foundation walls; foundations; piers; footings; hydraulic ram casings; structural steel and miscellaneous metal; electrical duct-bank, manholes, electrical wiring, and power poles; remaining equipment and miscellaneous mechanical items; chain link and other fencing; agricultural drain tiles; and rock, asphaltic pavement, and other aggregate materials not defined as Special Materials.

C. Design Grade: Grade created by excavation of impacted material to the lines and grades shown on Construction Drawings.

D. Final Remediation Levels (FRLs): The permissible concentration of contaminants that may remain in site soil and sediment following completion of remedial actions.

E. Impacted Material: Soil with contamination levels above the established FRLs or man-made materials. Impacted materials associated with the Project are presented in Table 02205-1.

F. Interim Stockpile: An impacted material project stockpile that is intended to be dispositioned in less than 45 calendar days.

G. Real-time Monitoring: Consists of several alternative methods of utilizing in-situ gamma spectroscopy, to analyze contaminant levels on the excavation surface.

H. Special Materials: Impacted material requiring special handling as specified in this Section and presented in Table 02205-1.

I. Supplemental Excavation: Removal of impacted material encountered beyond design grade.

J. Underground Storage Tank (UST): Tank that was used to contain an accumulation of a regulated substance, of which the volume was 10 percent or more beneath the ground surface.

K. WAC: Waste acceptance criteria (WAC) for disposition of material at the OSDF as defined by the WAC Attainment Plan. This WAC includes radiological/chemical criteria for soil, physical criteria for debris, and criteria for ancillary remediation waste (i.e., analytical sample returns, PPE).

1.5 SUBMITTALS

A. Maintain a daily record of underground utilities that have been excavated from below the design grade, in the form of a redline drawing mark-up, for review by the Project Engineer every 30 days following the start of excavation beyond the design grade.

B. Calculations certified by a registered Professional Engineer ensuring slope stability when using equipment having a gross weight greater than the specified Caterpillar CAT 350L within the excavation area, as necessary.

1.6 VERIFICATION OF THE EXISTING CONDITIONS

A. Verify existing conditions as specified in Section 02100.

PART 2 PRODUCTS

2.1 MATERIALS

A. Provide 20-mil sheets of Herculite or equal for use in buffer areas.

B. Provide 3/8-inch yellow nylon rope fence. Posts shall be in accordance with Section 02200.

2.2 EQUIPMENT

A. Furnish and maintain equipment to perform required operations in accordance with this section.

B. Equipment used to haul impacted material over the existing paved IMHR, shall be equal to or less than the gross vehicle weight and axle loading for a Caterpillar CAT D300E haul truck (gross vehicle weight of 120,000 pounds and maximum axle width of 9-feet 10-inches). Pavement width of the existing two-way IMHR is 24-feet. Select equipment and equipment width to ensure safe operation on this road.

C. Equipment used within the excavation area shall be equal or less than the gross weight for a Caterpillar CAT 350L track hoe (112,500 pounds). Heavier equipment may be approved for use in this area pending submittal and approval of calculations certified by a registered Professional Engineer, that ensure slope stability.

D. Equipment used to excavate, load, haul, and unload impacted materials shall have enclosed cabs. Enclosed cab is defined as an equipment cab isolated from outside environment (intact windows, doors, panels and floors surrounding driver with windows and doors shut) which provides a barrier from intrusion of outside airborne particles. Heating, ventilating, or air conditioning units associated with the equipment cab must not provide a direct path for outside air to enter (air conditioner on air recirculate mode) unless the air is first passed through a high efficiency particulate air filter pulled directly from outside the cab.

E. Furnish placards, placard carriers and 3-inch nominal diameter mounted sealable polyvinyl-chloride (PVC) tubes to serve as manifest carriers on haul trucks. Install at locations as directed by the Construction Manager.

F. Assign equipment used to haul material to the OSDF with unique alpha-numeric identifiers. This identifier shall be placed on both sides of the truck cab and shall be visible from 10 feet.

G. Equip trucks used for hauling impacted material with automatic load cover tops or employ Best Available Technology (BAT) methods to ensure that no airborne materials are emitted from the haul truck bed or load, whether empty or full.

H. Provide water tank trucks, water wagons, hydroseeders, portable tanks, pressure distributors, piping, sprinklers or other equipment designed to apply water and/or dust suppressant and crusting agent uniformly and in controlled quantities to variable surface widths to provide fugitive dust control.

I. Provide pressure wash or comparable equipment necessary to clean visible process residue and soil from piping and debris for placement in the OSDF.

J. Provide portable wash equipment to wash vehicle tires and vehicle exteriors as necessary.

K. Equipment used for size reducing concrete and asphalt materials shall be capable of processing debris to the size requirements of Category 1 material.

PART 3 EXECUTION

3.1 GENERAL EXCAVATION

A. Prior to performing any excavation activities, satisfy the following requirements:

1. Complete preliminary survey and layout work in accordance with Section 02100.
2. Establish dust control methods in accordance with site procedures.
3. Install and manage surface water management and erosion and sediment control measures in accordance with Section 02275.
4. Install, modify, and manage construction safety and radiological-control fence, including installation of construction area signs. Install posts at spacing recommended by the manufacturer's installation procedures and as required to prevent sagging. Posts with less than 4 feet remaining above the ground after installation shall have safety caps installed.
5. Obtain survey and red line markup of area isolation trench to verify completeness.

B. Perform excavation activities in compliance with 29 CFR Part 1926.650 through 1926.652.

C. Unless otherwise noted on the Construction Drawings, the following slope stability requirements shall apply during excavation activities:

1. Excavation slopes with depths less than 20-feet shall be performed in accordance with applicable Occupational Safety and Health Administration (OSHA) guidelines.
2. Temporary excavation slopes with depths less than 20-feet shall be no steeper than 1.5H:1V with a maximum height of 13 feet between 15 foot benches. Sloped excavations greater than 20 feet in depth shall be designed by a Registered

Professional Engineer (RPE) with registration in the state of Ohio.

3. Design slopes and slopes created by supplemental excavation shall be no steeper than 2H:1V with a maximum height of 13 feet between 15 foot benches.

D. Install and manage traffic control devices in accordance with Section 02150.

E. Blasting, including use of explosives or explosive devices, is not permitted.

F. As necessary, establish and manage Special Materials Transfer Area(s) (SMTA) as follows:

1. Establish the SMTA on an existing building slab, paved parking area, or new aggregate surface adjacent to the project boundary so that it is accessible from the excavation area and the Former Production Area.
2. Construct ingress/egress to the SMTA, including access roads, ramps, and drainage improvements as required.
3. Install new aggregate surface SMTA in accordance with the Construction Drawings and Section 02230, and provide positive drainage.
4. The SMTA shall not be used as a laydown area.
5. The SMTA shall be controlled as a radiological buffer area in accordance with this Section.

G. Establish controls for removal of ACM in accordance with Section 02210.

H. At a minimum, excavate surface material within the limits of excavation to a depth of 2 feet, based on preliminary surveys specified in Section 02100.

I. Excavate fractured materials concurrent with the adjacent Above-WAC or Below-WAC material. Fracturing of at-grade concrete slabs may continue concurrently with Above-WAC soil removal, but concrete outside of Above-WAC areas shall not be removed until Above-WAC soil removal has been completed, unless otherwise approved by the Construction Manager.

J. Stockpile concrete materials as necessary to facilitate the generation of Category 1 material in accordance with this Section.

K. Excavate and load material in such a manner that enables visual observation of excavation and loading operations as required to accurately manifest material for disposition.

L. Excavations shall generally proceed in an up-gradient to down-gradient pattern to the lines and grades shown on the Construction Drawings.

M. Keep excavation equipment in contaminated areas to prevent recontamination of areas excavated to final grade. Excavate an area by methods that prevent drainage of surface water into the area.

N. Unless otherwise noted on the Construction Drawings or directed by the Construction Manager, excavate material from known Above-WAC areas in accordance with this Section, prior to excavating Below-WAC material.

O. Survey and stake excavation areas as shown on the Construction Drawings, in accordance with Section 02100. Perform intermediate and final surveys as specified in Section 02100 for measurement and to confirm attainment of the design grade.

P. Remove material adjacent to structures that extend above the excavation surface, as well as the structures themselves, in a safe manner to ensure that an unstable condition is not created.

Q. Prior to excavating previously trenched and backfilled isolation trenches, physical sampling is required in locations where sanitary and process lines were cut during trenching. Allow 10 working days for physical sampling and analysis.

R. Excavate known utilities as indicated on the Construction Drawings. Prior to removal, cap, drain, purge and/or plug utility lines to be excavated to prevent release of material into surrounding soil. If fluids or hold-up material is encountered in utility lines, stop work and notify the Construction Manager. Plug sanitary and process lines when liquid flow is detected. Material released from sanitary or process lines will be excavated and dispositioned as directed by the Construction Manager.

S. If unidentified utilities or underground structures are encountered, notify the Construction Manager, and proceed in accordance with the approved Penetration Permit.

T. Piping that is deformed, closed or otherwise hinders visual inspection shall be managed as Above-WAC debris based on it's area of origin.

U. If a utility is suspected of containing ACM, notify the Construction Manager and Industrial Hygiene and manage in accordance with Section 02210.

V. Excavate, size-reduce, and handle piping and debris in such a manner to minimize the generation of Above-WAC debris or friable asbestos.

W. Design contours and grades shown on the Construction Drawings represent the minimum limits of excavation required to capture contamination and foundations, while maintaining safe slope requirements. Minimal changes may be submitted to incorporate breaks in contours, ponding of water, equipment accessibility, etc. These changes shall not exceed 10% of the total designed excavation quantity.

X. In the event a historic, prehistoric, or archeological site, feature, or object is discovered, stop excavation in the area and immediately notify the Construction Manager.

Y. Continuously observe excavations for Special Materials or change in materials. In the event a Special Material or change in materials is encountered, stop excavation in the area and immediately notify the Construction Manager. Dispose of Special Materials in accordance with Table 02205-1.

Z. In the event solvent saturated soils are encountered, stop excavation in the area and immediately notify the Construction Manager. Excavate, load, and haul the material as directed by the Construction Manager.

AA. Prevent damage to adjacent structures, materials, and equipment, including utilities that are to remain, or those installed for performance of this work. Repair damage that occurs due to execution of this scope.

BB. Dispose of impacted material in accordance with this Section. Table 02205-1 provides guidance for the disposition of materials that may be encountered which will be disposed at the 3 destinations identified in this Section. Notify the Construction Manager in the event that materials are discovered that do not appear to be represented in Table 02205-1.

CC. Pending coordination between the projects and compliance with SP-7 waste acceptance criteria presented in this Section, material designated for SP-7 disposition may be hauled directly to WPRAP.

DD. OSDF disposition requires the following:

1. Compliance with requirements stated in the WAC Attainment Plan and the IMPP.
2. Clean process-related residue from piping and debris in accordance with this Section. Notify the Construction Manager of residue that is not readily removed and manage the debris as directed.
3. Comply with criteria identified in Table 02205-1 for management of Special Materials for disposition at the OSDF.
4. Remove, package, load and haul ACM in accordance with Section 02210.

EE. SP7 disposition requires the following:

1. Soil, piping and debris exceeds the requirements for OSDF disposition as outlined in Table 02205-1.
2. Piping and debris shall be less than 10 inches in at least one dimension, and no longer than 8 feet in any dimension.

FF. SMTA disposition requires the following:

1. Soil, piping and debris exceeds the requirements for OSDF and SP7 disposition as outlined in Table 02205-1.
2. Materials shall be containerized as directed by the Construction Manager.
3. Loaded containers shall be placed in the SMTA in a manner that protects the containers from damage. Do not stack containers.

3.2 EXCAVATIONS APPROACHING THE GMA

A. Stop excavation activities in the immediate area and immediately notify the Construction Manager if sands and gravel are encountered, even if the design grade has not been reached.

B. Use caution when excavations encroach on the 5-feet protective cover over the unsaturated sands and gravel of the GMA. Approximate GMA elevations are shown on the Construction Drawings.

C. Prior to initiating work activities which will encroach on the 5-feet protective cover but not extend within 2-feet of the GMA, proceed as follows:

1. Excavate to achieve design grades shown on the Construction Drawings or to remove Above-FRL material.
2. Allow 24 hours for coordination of the following: examination of the excavation bottom to determine if GMA sediments are present, real-time monitoring and/or physical sampling of the area to be backfilled, and identification of necessary pumping requirements for ponded water.
3. Immediately following monitoring and sampling, initiate backfilling to protect the GMA in accordance with Section 02206.

D. Prior to initiating work activities which will encroach within 2 feet of or breach the GMA, obtain approval and direction from the Construction Manager. Proceed as follows:

1. Excavate to achieve design grades shown on the Construction Drawings or to remove Above-FRL material.
2. Allow for real-time monitoring and physical sampling in the area prior to backfilling.
3. Immediately following monitoring and sampling collection, initiate backfilling to protect the GMA in accordance with Section 02206.

3.3 ABOVE-WAC EXCAVATIONS

A. Establish excavation boundary and buffer area controls for Above-WAC areas as follows:

1. Establish excavation area boundaries at surveyed and staked locations, in accordance with this Section.
2. Install T-posts and rope fence at the excavation boundary.
3. Establish the buffer area adjacent to the excavation area to serve as a controlled loading area between the excavation area and the surrounding radiological controlled area.
4. Grade the buffer area to drain into the excavation.
5. Install T-posts and rope fence around the buffer area.
6. Cover the buffer area with a 20-mil sheet of Herculite, or equivalent.
7. Collect water encountered during excavation and pump as specified in Section 02275.
8. Keep the buffer area clean and free of dirt and mud.
9. Remove spillage before releasing haul equipment from the buffer area.

B. Dedicate and restrict equipment required to excavate, load, haul and place Above-WAC material, as well as soil requiring treatment, to that specific use until decontamination rinsing has been completed and approved by the Construction Manager. Upon approval by the Construction Manager that no visible material is present on exterior equipment surfaces, or in haul truck beds, equipment may be used elsewhere.

C. Load haul equipment by reaching over the excavation area boundary and dumping directly into haul equipment located in the buffer area. Load haul equipment in a manner that prevents spillage and accumulation of material on the wheels and exterior of the haul equipment. Remove visible material that accumulates on the truck exterior. Multiple loading areas may be established within the buffer area.

D. Wash haul equipment within the buffer area as necessary (using low volume, high-pressure washer or approved equivalent) to remove Above-WAC contamination on the exterior of equipment.

E. Remove debris (concrete, asphalt, and miscellaneous structures) from Above-WAC areas and pressure wash the debris to remove soil/residue. The Construction Manager will visually monitor washing operations to ensure that debris is free of soil/residue and approved for loading and hauling to the OSDF.

F. Debris from Above-WAC areas not approved for disposal at the OSDF shall be dispositioned at SP7 in accordance with this Section.

G. Excavate Above-WAC soil/gravel in 3+/-1 foot lifts to the design grade, as shown on the Construction Drawings. Load and haul Above-WAC soil/gravel to SP7 in accordance with this Section.

H. The Construction Manager will arrange for real-time monitoring on excavated side slopes after each lift is removed and on the excavation floor upon achieving the Above-WAC contamination limits shown on the Construction Drawings. In Above-WAC areas shown on the Construction Drawings as contaminated with Tc-99, the Construction Manager will arrange for physical sampling at the design depth. Allow 10 working days for sampling and analysis. Do not proceed with further excavation in this area until directed by the Construction Manager.

I. If initial depth of Above-WAC material is below the existing surface, excavate Below-WAC material in 2+/-1 foot lifts until Above-WAC material has been reached, then proceed in 3+/-1 foot lifts.

J. Pending results of monitoring or analysis, perform supplemental Above-WAC excavation beyond design limits shown on the Construction Drawings or in areas not shown on the Construction Drawings, as directed by the Construction Manager.

3.4 UST EXCAVATIONS

Excavate USTs and areas that previously contained USTs shown on the Construction Drawings, as well as USTs discovered during excavation, as follows:

A. Excavate to expose the top of tank to allow the Construction Manager to assess the tank's condition.

B. The Construction Manager and Industrial Hygiene will inspect the tank for the presence of liquid or non-soil residue.

C. If the tank contains liquid or non-soil residue, as determined by the Construction Manager, proceed as follows:

1. Pump remaining tank contents into drums provided by the Construction Manager.
2. Move filled drums from the excavation area to the SMTA.

3. Drums will be removed from the SMTA by others for appropriate disposition.

D. Excavate the tank upon confirmation from the Construction Manager that the tank is empty. Ensure that water does not accumulate in the tank from the surrounding excavation.

E. During excavation, stage the tank, soil excavated from around the UST, and soil excavated from areas that previously contained USTs separate from other excavated materials.

F. Upon confirmation from the Construction Manager that the tank is free of visible process residue, size-reduce the tank to meet physical WAC and dispose of it in the OSDF as a discrete waste stream.

G. If the tank cannot be cleaned of visible process residue, size-reduce the tank for disposition in accordance with this Section.

H. Over-excavate soil surrounding UST excavations and from areas that previously contained USTs to remove visible stains. Transport this soil as directed by the Construction Manager.

3.5 HWMU EXCAVATIONS

Excavate material from the HWMU to the limits shown on the Drawings as follows:

A. Remove debris (concrete, asphalt, and miscellaneous structures) from the HWMU and haul to the OSDF as a discrete waste stream. If the HWMU is also considered an Above-WAC area, load and haul the debris to SP7.

B. The Construction Manager will arrange for physical sampling upon confirmation that all HWMU material has been removed. Allow 10 working days for sampling and analysis. Do not proceed with further excavation in this area until directed by the Construction Manager.

C. Perform additional excavations within the HWMU if monitoring and analysis identifies additional HWMU material beyond the limits shown on the Drawings.

3.6 BELOW-WAC EXCAVATIONS

Excavate Below-WAC material to the limits shown on the Construction Drawings as follows:

A. Remove slabs, concrete pads, asphalt, gravel, base and sub-base to sub-grade soil within Below-WAC areas. Load and haul this material to the OMTA-Bulk Debris or OSDF. The Construction Manager will arrange for real-time monitoring prior to subsequent excavation in the Below-WAC area.

B. Excavate Below-WAC areas to the design grade shown on Construction Drawings. Load and haul this material to the OSDF in accordance with this Section.

C. In Below-WAC excavations driven by contamination rather than removal of underground structures, as shown on Construction Drawings, excavate in 3+/-1 foot lifts to the design grade shown on Construction Drawings. The Construction Manager will arrange for real-

time monitoring upon removal of each lift. Do not proceed with further excavation in these areas until directed by the Construction Manager.

D. Over-excavate a minimum of 6 inches in areas where impacted material was stockpiled or pushed for load-out during excavation to allow for visual inspection and disposition of debris that may have been tracked into the soil.

E. Coordinate real-time monitoring as necessary to minimize delays.

F. Upon reaching the design grade, notify the Construction Manager for real-time monitoring.

3.7 MATERIAL SEGREGATION

A. During excavation, segregate materials by the impacted material categories as defined in the IMPP. Maximize the volume of Category 1 material.

B. Segregate Below-WAC material to support construction of the four zones of each OSDF cell (protective layer, select impacted material layer, impacted material layer, and contouring layer).

C. Segregate existing surface aggregate material and size-reduced concrete and asphalt materials for use as temporary aggregate material in accordance with the Construction Drawings.

D. Add aggregate material to Category 1, soil and soil-like material, to maximize Category 1 quantities as required for OSDF placement activities.

3.8 SIZE REDUCTION

A. Size-reduce remaining structures (i.e., building foundations, slabs, sumps, hydraulic ram casings) located above the design grade to meet the physical WAC for OSDF.

B. Size-reduce concrete and asphalt structures (i.e., building slabs, concrete/asphalt pads, roads, parking areas) to maximize the generation of material for temporary aggregate surfaces.

C. Size-reduce concrete and asphalt structures (i.e., building slabs, concrete/asphalt pads, roads, parking areas) to generate supplemental Category 1 material as directed by the Construction Manager.

D. Size-reduce piping and debris to meet the physical WAC for OSDF in accordance with the IMPP, or size requirement for SP7 in accordance with this Section.

E. Size-reduce metal materials (i.e., structural steel, piping, equipment, miscellaneous metal) in accordance with the IMPP. Load metal components in bulk and haul to the OSDF or OMTA.

F. Size-reduction shall be by mechanical means and not by flame or torch cutting.

3.9 GENERAL LOADING AND HAULING

A. Use paved haul roads designated on the Construction Drawings for hauling. Upon entering the paved haul roads with haul equipment, do not exit except to the excavation area, SP7, SSA, OMTA Bulk Debris Area, and/or the OSDF, without approval by the Construction Manager.

B. Maintain equipment within the excavation area during periods of non-work (evenings, weekends, and holidays) unless equipment decontamination has been completed. Complete decontamination activities and request a radiological survey of the equipment prior to moving equipment out of radiological contamination areas

C. When hauling materials to the SMTA, enter the SMTA from the excavation area only.

D. Load haul equipment in a fashion to minimize load shifting and to prevent spillage during transit.

E. Extend automatic covers on suitably equipped haul equipment, whether full or empty, during equipment movement.

F. Keep equipment cab closed and stay within the equipment cab when inside posted contamination area without appropriate PPE except in emergency situations.

G. Provide material tracking information in accordance with the Material Tracking Plan located on the Construction Drawings.

H. Prior to loading and hauling, material designated for the OSDF shall be void of free liquid.

I. Prohibit tracked equipment from hauling, operating, or tracking over the Impacted Material Haul Road (IMHR) or other paved roadways, unless otherwise approved by the Construction Manager.

3.10 STOCKPILING

A. Install construction safety fence around active stockpiles in accordance with Section 02200.

B. Install appropriate signage around the boundary of active stockpiles.

C. Install erosion control measures around active stockpile in accordance with Section 02275.

D. Maintain fencing, signage, and erosion control measures for the duration of the active stockpile's existence.

E. Repair damage to active stockpile support structures (i.e., silt fence, perimeter fence) inflicted during performance of this project to their original condition within 24 hours of damage discovery.

F. Apply crusting agent as specified in Section 02930 within 7 calendar days upon completion of the active soil stockpile or if the active soil stockpile is to be inactive for more than 45 calendar days.

G. Compact/seal the surface of the stockpile in use at the close of each work-day to prevent fugitive dust and erosion.

H. Construct stockpiles with maximum slopes of 3H:1V and a maximum height-to-base ratio 0.2.

I. Locate interim stockpiles within the Limit of Excavation upon approval of the Construction Manager. Remove interim stockpiles within 45 calendar days.

J. Establish a separate stockpile for solvent saturated soils, as encountered. Manage the stockpile material to avoid cross-contamination with adjacent soil, and to control surface water and dust.

K. Stockpile excavated surface aggregate materials and size-reduced concrete and asphalt as necessary for use as temporary aggregate material or supplemental Category 1 material.

L. Stockpiles shall not be located within 30 feet of an excavation top-of-slope.

M. In addition to general stockpiling requirements, the following requirements shall apply to the management of Above-WAC stockpiles:

1. Use dedicated equipment for the preparation and management of the stockpiles.
2. Maintain ingress/egress to the stockpiles, including access roads, ramps, and drainage features.
3. Maintain unloading areas that prevent haul equipment tires from coming in contact with stockpiles material.
4. Locate the stockpiles as directed by the Construction Manager.
5. Decontaminate tools and equipment used to place and manage material withing these stockpiles prior to requesting release. Following decontamination, the Construction Manager will arrange for a radiological survey to release tools and equipment.

N. Cover or lock down soil or debris containing non-friable ACM at the end of the day in accordance with Section 02210.

3.11 MONITORING AND SAMPLING

A. The Construction Manager will arrange for real-time monitoring of Below-WAC areas following removal of surface aggregate; concrete and asphalt slabs, pads, roads and parking areas, and between each lift in contaminated areas until the design grade has been achieved, including the design grade.

B. The Construction Manager will arrange for real-time monitoring between excavation lifts for Above-WAC materials.

C. The Construction Manager will arrange for radiological monitoring before equipment is released from a buffer area. Working in rain and/or wet weather increases scanning time.

D. The Construction Manager will perform visual monitoring during excavation for Special Materials that are not permitted in the OSDF or that will require additional processing to meet WAC. If Special Materials are found, real-time monitoring may be performed to verify removal and determine appropriate disposition of the material.

E. The Construction Manager will visually monitor piping and debris to ensure no visible process residue remains, in order to be placed in the OSDF.

F. The Construction Manager will arrange for real-time monitoring to verify that the excavation area has met the requirements for precertification.

G. When real-time monitoring or sampling is required, excavate in an alternate location within the excavation area while awaiting the results. Excavate alternate locations a minimum of 50 feet from the area being monitored. Allow up to 2 working days for monitoring after area is ready for monitoring. Extend duration for monitoring at least 1 working day for each day precipitation occurs.

H. The Construction Manager and regulatory agencies may collect samples from the excavation, haul equipment and the OSDF at any time during the project.

I. The Construction Manager will monitor water collected in Above-WAC excavations for the presence of volatile organic compounds (VOCs). If VOCs are detected, the water will be sampled and analyzed to determine disposition.

J. The Construction Manager will perform magnetometer surveys to verify removal of ferrous debris from areas where former underground utilities and structures were excavated.

3.12 PRECERTIFICATION AND SUPPLEMENTAL EXCAVATION

A. The Construction Manager will arrange for real-time monitoring to pre-certify an area as having attained FRL requirements.

B. Perform supplemental excavations beyond the design grade if either of the following conditions exist:

1. Real-time monitoring and/or physical sampling identifies material beyond the design grade that does not meet FRL requirements.
2. Unidentified utilities or other impacted materials are found beyond the design grade.

C. Install rope fencing and appropriate signage around the pre-certified area perimeter after precertification has been achieved.

3.13 AREA MANAGEMENT

A. Maintain construction safety fence and radiological-control fence as specified in this section, Section 02200, and as shown on the Construction Drawings.

B. Water management shall be as specified in Section 02275.

C. Perform stabilization of the excavated areas using crusting agent and temporary seeding in accordance with Sections 02275 and 02930.

D. Notify the Construction Manager prior to removing sediment and debris from ditches, drains and erosion control devices. The Construction Manager will arrange for sampling and analysis of sediment for WAC compliance. Remove and de-water sediment in accordance with the following:

1. Notify the Construction Manager two (2) days prior to removing sediment from ditches, drains and erosion and sediment control devices for sampling and analysis of the sediment for disposition.
2. Remove accumulated sediment from ditches, drains and erosion and sediment control devices as directed by the Construction Manager. In no case shall sediment reduce the available depth of the associated feature to less than two-thirds the depth shown on Construction Drawings.
3. De-water sediment removed from Above-WAC areas within the associated Above-WAC area.
4. De-water sediment removed from ditches, drains and erosion and sediment control devices adjacent to and up-gradient of the associated feature as necessary to allow water to drain immediately back into the feature.
5. Disposition de-watered sediment to the OSDF unless otherwise directed by the Construction Manager.
6. Place sediments accumulated in Above-WAC stockpile surface water control devices in the associated stockpile.

E. Implement seasonal closure methods at the end of each construction season and maintain seasonal closure through winter shutdown. Seasonal shutdown requirements include, but are not limited to:

1. Maintain surface water management and erosion and sediment controls.
2. Maintain dust control, as required.
3. Perform equipment decontamination, as required.
4. Remove water from excavation during seasonal closure, when water depth exceeds 1-foot. Pump water out of the excavations in a manner that maintains the integrity of the 2H:1V side slopes, (i.e., no rapid draw down) and prevents an overflow condition. The pumping priority for open excavations is as follows:
   a. Open excavation areas containing impacted material that are located up-gradient of remediated areas,
   b. Completed excavations, and
   c. Other uncompleted excavations.
5. Remove sediment and debris from the Tank Farm Settling Basin in accordance with this Section.
6. Seed/stabilize stockpiles

3.14 UTILITY REMOVAL BELOW THE DESIGN GRADE

A. Prior to excavating utilities below the design grade, satisfy the following conditions:

1. Complete the intermediate survey, as specified in Section 02100.
2. Obtain Construction Manager approval that real-time monitoring of the design grade is complete.

B. Excavate and remove utilities in accordance with this Section and details shown on Construction Drawings.

C. Backfill utilities located below the design grade in accordance with the details shown on Construction Drawings and Section 02206.

D. If visual monitoring identifies Special Materials during excavation of utilities below the design grade, perform supplemental excavation in accordance with this Section.

E. Excavate miscellaneous debris encountered below the design grade and disposition in accordance with this Section.

F. Maintain a daily record of underground utilities excavated from below the design grade.

END OF SECTION

Table 02205-1

The table should be interpreted to read that material in column 1 may be dispositioned at the appropriate destination in columns 2-4 if the corresponding criteria are met.

MATERIAL	DESTINATION		
	OSDF	SP7 (1)	SMTA (2)
Soil – from general excavation/UST	• Meets WAC	• Above-WAC	• Not applicable
Debris – from general excavation/UST	• Meets WAC	• Above-WAC • Visible residue cannot be removed	• Not applicable
Debris – from Above-WAC excavations	• Meets WAC if free of visible soil/residue	• Visible soil/residue cannot be removed	• Not applicable
Asbestos (3)	• Meets WAC and passes visual inspection by CM	• Above-WAC and non-friable • Visible soil/residue cannot be removed and non-friable	• Friable and fails visual inspection by CM
Non-pressurized Containers (3)	• Meets WAC, free of visible soil/residue, and contains no free liquid, product, etc	• Above-WAC and contains no free liquid, product, etc. • Visible soil/residue cannot be removed and contains no free liquid, product, etc.	• Contains free liquid, residue, etc
Piping/Pumps (3)	• Meets WAC, free of visible soil/residue, and contains no free liquid	• Interior not visible and contains no free liquid • Visible soil/residue cannot be removed and contains no free liquid	• Not applicable
Transformers/Electrical Equipment (3)	• Meets WAC and free of visible soil/residue	• Visible soil/residue cannot be removed and drained of all fluid	• Contains fluid
Brick including Acid Brick (3)	• No acid brick (4)	• Acid brick (4)	• Not applicable
Lead Acid Batteries (3)	• Prohibited	• Prohibited	• Containerize
Medical Infectious Waste (3)			
Non-soil Residue (3)			
Pressurized Containers (3)			
Tires (3)			
Uranium Metal (3)			
Sealed radiological calibration sources			

(1) Must meet SP7 size requirements per this Section (2) SMTA materials must be containerized. (3) Special Material per this Section. (4) Acid brick is red or reddish-brown brick and fragments.
* These are final destinations beyond which the project bears no responsibility for material movement. The OMTAs are staging areas prior to OSDF disposition.

000382

4328

SECTION 02206
EARTHWORK FOR REMEDIATION

PART 1 GENERAL

1.1 SCOPE

A. This Section includes requirements for earthwork associated with remediation of the former production area to include, but is not limited to:

1. Excavation of fill material.
2. Excavation and placement of materials for ditches and berms.
3. Placement of fill material in trenches excavated for utility removal in areas below design grade.
4. Placement of plug material over the unsaturated sands and gravels of the Great Miami Aquifer (GMA).
5. Interim grading for drainage and road preparation.
6. Final grading.

1.2 RELATED SECTIONS AND DOCUMENTS

A. Section 02100 – Surveying.

B. Section 02150 – Traffic Control.

C. Section 02205 – Impacted Material Excavation.

D. Section 02230 – Road Construction.

E. Section 02275 – Surface Water Management and Erosion Control for Remediation.

F. Section 02930 – Vegetation.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1.	ASTM C150	Specification for Portland Cement, current edition.
2.	ASTM D698	Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft), current edition.
3.	ASTM D2216	Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock, current edition.
4.	ASTM D2487	Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System), current edition.

PART 2 PRODUCTS

2.1 MATERIALS

A. Fill material shall be free of debris, foreign objects, large rock fragments (maximum dimension of 6 inches), organic, and other deleterious materials.

B. GMA plug material shall be fill material conforming to CL classification according to United Soil Classification System in accordance with ASTM D2487.

C. Use the designated certified borrow area as the source for GMA plug material.

D. Material used to backfill utility trenches located below the design grade and areas where grout plugs are installed into air-gapped storm sewers shall be surrounding soils following pre-certification.

E. Use below-FRL material from the excavation area, following pre-certification, as a source of fill material for supplemental excavations.

F. Portland cement per ASTM C150, normal – Type 1.

G. Sodium bentonite grout.

H. Safety signs around ponds shall be exterior quality signs with minimum 4 inch high letter and shall state, "Life jackets required when working within 5 feet of edge of ponds, use of buddy system required". Hand written signs are unacceptable.

2.2 EQUIPMENT

A. Furnish and maintain equipment to perform required operations in conformance with the requirements of these specifications.

B. Furnish equipment to perform required operations in conformance with this Section. Equipment that results in waste or damage of material, inaccurate work, or is otherwise objectionable shall be promptly replaced.

C. Equipment used to haul non-impacted material over the existing paved Impacted Material Haul Road (IMHR), shall be equal to or less than the gross weight and axle loading for a Caterpillar CAT D300E haul truck (gross vehicle weight of 120,000 pounds and maximum axle width of 9-feet 10-inches). Pavement width of the existing two-way IMHR is 24-feet. Select equipment and equipment width to ensure safe operation on this road.

D. Equipment used within the excavation area shall be in accordance with Section 02205.

E. Furnish compaction equipment, as needed.

PART 3 EXECUTION

3.1 GENERAL

A. Perform intermediate surveys in accordance with Section 02100, to confirm attainment of design grade prior to initiating earthwork activities below the design grade.

B. Stop excavation activities and immediately notify the Construction Manager upon discovery of unexpected cultural resources suspected to be historic, prehistoric, or archeological site, feature or object.

C. Excavate soil below the design grade with equipment free of visible above-FRL soil.

D. Use material from the immediate excavation area or a designated borrow area to meet fill material requirements for trenches and supplemental excavations.

E. Perform construction activities such that surface water runoff from non-certified construction areas does not flow into pre-certified areas in accordance with Section 02275.

F. Maintain slope stability outside of utility trenches created by excavating utilities below the design grade, in accordance with Section 02205.

G. After certification, perform final grading in accordance with this Section.

3.2 BACKFILL

A. Obtain fill material from areas approved by the Construction Manager. In high-leachability areas, as shown on the Construction Drawings, obtain fill material from precertified or certified areas meeting the 20 mg/kg total Uranium FRL.

B. Maintain a minimum 5-feet protective cover over the unsaturated sands and gravel of the GMA in accordance with the following. GMA elevations are shown on the Construction Drawings.

1. Following excavation activities that encroach on the 5-feet protective cover but do not extend within 2-feet of the GMA, install GMA plug as follows:

   a. Immediately following monitoring and sampling activities specified in Section 02205, survey the excavation and initiate filling.
   b. Backfill using GMA plug material meeting the requirements of this Section. Complete backfilling within 5 days following sampling.
   c. Backfill GMA plug material in 8-inch +/- 1-inch loose lifts until protective cover is returned to a minimum thickness of 5-feet.

d. Compact fill material in each 8-inch loose lift to at least 95% Standard Proctor dry density (ASTM D698) within 0 to +3% of optimum moisture content.

2. Following excavation activities that encroach within 2 feet of or breach the GMA, install GMA plug as follows:

a. Immediately following monitoring and sampling activities specified in Section 02205, survey the excavation and initiate backfilling.
b. Backfill using GMA Plug material meeting the requirements of this Section.
c. If precipitation is likely within the next 24 hours, immediately place a minimum fresh compacted thickness of 2 feet. Otherwise, place the 2 feet of compacted cover within 24 hours of excavating to within 2 feet or breaching the GMA.
d. Place the first lift of GMA plug material in an approximate 18-inch loose lift. Compact the first lift using 4 passes of compaction equipment approved by the Construction Manager.
e. Backfill the remaining lifts in 8-inch +/- 1-inch loose lifts until the protective cover is returned to a minimum of 5 feet. Compact GMA plug material in each 8-inch loose lift to at least 95% Standard Proctor dry density (ASTM D698) within 0 to +3% of optimum moisture content. These lifts must be continuous over the entire breached area.

D. Install clay plug in locations shown on the Construction Drawings in accordance with the following:

1. Backfill using clay plug material meeting the requirements of this Section.
2. Place clay plug material in 8-inch +/- 1-inch loose lifts as necessary to achieve a total compacted thickness of 2-feet.
3. Compact each lift with four (4) passes of compaction equipment approved by the Construction Manager.
4. If clay plug is placed over an open pile, seal void spaces within the pile with sodium bentonite grout and cap the top 2 feet of the pile with Type 1 Portland cement ASTM C150 prior to placing the clay plug. Sodium bentonite grout shall be mixed at a water ratio of 2.1 pounds of sodium bentonite per gallon of water, and have a minimum density of 9.4 lbs./gallon. Grout viscosity shall be field checked periodically to assure proper viscosity of 70 +/- 6 seconds using the Marsh funnel viscometer. Tremie the grout into the open pile to eliminate void space.

E. Excavate, remove utilities, and backfill trenches below the design grade in accordance with the following:

1. Remove utilities located below the design grade in accordance with Section 02205 and details presented on Construction Drawings.
2. Remove water collected in trenches to sump areas and pump it to the Tank Farm Settling Basin as specified in Section 02275.

3. For utility trenches located below design grade, backfill in accordance with the Construction Drawings.

3.3 FIELD QUALITY CONTROL

A. In-place density testing will be performed in accordance with ASTM D2922. Nuclear density gauge (ASTM D2922) will be calibrated in accordance with the manufacturer's requirements. Documentation of this calibration will be provided to the Construction Manager. Register nuclear or radiological sources brought on site.

B. Perform in-place moisture tests in accordance with ASTM D3017, or ASTM D4643 as applicable.

C. Determine moisture-density curves in accordance with ASTM D698 (Standard Proctor). Test results must be reviewed and approved by the Construction Manager.

D. If in-place density and/or moisture tests indicate that work does not meet specified requirements, remove work and replace or re-compact to specified requirements. If visual inspection indicates that work has not been performed as specified, correct work to comply with the requirements.

E. Perform soil classification in accordance with ASTM D2487.

F. Frequency of Tests: Frequency of in-place density and moisture testing shall be whichever of the following requires the greatest number of test:

1. Once each day when compacting GMA plug material.
2. Once each compacted lift of GMA plug material.
3. Once every 3,000 sq. ft. of compacted GMA plug material.

G. Notify the Construction Manager of activities requiring testing/inspection a minimum of 24 hours prior to the start of such activities.

3.4 EARTHEN BERMS

A. Install earthen berms at locations shown on the Construction Drawings using soils from surrounding area following pre-certification by Fluor Fernald.

B. Place material in 8-inch loose lifts.

C. Compact each lift of berm with 4 passes of compaction equipment approved by the Construction Manager.

3.5 INTERIM GRADING

A. When the design grade has been achieved, perform interim grading as follows:

1. Correct washouts or other similar irregularities to maintain the design grade slopes of 2H:1V or less.
2. Grade to maintain smooth continuous slopes.
3. Finish ditches so they drain readily.
4. Perform temporary seeding in accordance with Section 02930.
5. Repair damage within 3 working days.

3.6 FINAL GRADING

A. Obtain verification that the area to be graded has been certified.

B. Provide, maintain and operate temporary drains, ditches, pumps, drainage lines or other equipment to intercept, divert, or remove water from excavations.

C. Provide and maintain stormwater management measures that assure isolation of stormwater between certified and non-certified areas.

D. Regrade within the certified area by cutting back the 2H:1V grades to achieve grades no steeper than 5H:1V. As the 5H:1V excavation proceeds, the cut material shall be placed in the bottom of existing excavations and graded level.

E. Final grading shall be achieved with minimum 5 foot radii at contour direction changes, and smooth transitions between grade breaks and depressions.

F. Perform permanent seeding in accordance with Section 02930.

G. Stabilize 2H:1V slopes along excavation boundary with erosion control blankets in accordance with Section 02275.

3.7 SURFACE WATER MANAGEMENT

A. Manage surface water in accordance with Section 02275.

B. Perform excavation in a manner that promotes positive drainage.

C. Install earthen berms as shown on Construction Drawings. Apply temporary seed and fertilizer on earthen berms in accordance with Section 02930.

3.8 SEASONAL SHUTDOWN

A. Perform seasonal shutdown activities in accordance with Section 02205.

END OF SECTION

3. For utility trenches located below design grade, backfill in accordance with the Construction Drawings.

3.3 FIELD QUALITY CONTROL

A. In-place density testing will be performed in accordance with ASTM D2922. Nuclear density gauge (ASTM D2922) will be calibrated in accordance with the manufacturer's requirements. Documentation of this calibration will be provided to the Construction Manager. Register nuclear or radiological sources brought on site.

B. Perform in-place moisture tests in accordance with ASTM D3017, or ASTM D4643 as applicable.

C. Determine moisture-density curves in accordance with ASTM D698 (Standard Proctor). Test results must be reviewed and approved by the Construction Manager.

D. If in-place density and/or moisture tests indicate that work does not meet specified requirements, remove work and replace or re-compact to specified requirements. If visual inspection indicates that work has not been performed as specified, correct work to comply with the requirements.

E. Perform soil classification in accordance with ASTM D2487.

F. Frequency of Tests: Frequency of in-place density and moisture testing shall be whichever of the following requires the greatest number of test:

1. Once each day when compacting GMA plug material.
2. Once each compacted lift of GMA plug material.
3. Once every 3,000 sq. ft. of compacted GMA plug material.

G. Notify the Construction Manager of activities requiring testing/inspection a minimum of 24 hours prior to the start of such activities.

3.4 EARTHEN BERMS

A. Install earthen berms at locations shown on the Construction Drawings using soils from surrounding area following pre-certification by Fluor Fernald.

B. Place material in 8-inch loose lifts.

C. Compact each lift of berm with 4 passes of compaction equipment approved by the Construction Manager.

3.5 INTERIM GRADING

A. When the design grade has been achieved, perform interim grading as follows:

1. Correct washouts or other similar irregularities to maintain the design grade slopes of 2H:1V or less.
2. Grade to maintain smooth continuous slopes.
3. Finish ditches so they drain readily.
4. Perform temporary seeding in accordance with Section 02930.
5. Repair damage within 3 working days.

3.6 FINAL GRADING

A. Obtain verification that the area to be graded has been certified.

B. Provide, maintain and operate temporary drains, ditches, pumps, drainage lines or other equipment to intercept, divert, or remove water from excavations.

C. Provide and maintain stormwater management measures that assure isolation of stormwater between certified and non-certified areas.

D. Regrade within the certified area by cutting back the 2H:1V grades to achieve grades no steeper than 5H:1V. As the 5H:1V excavation proceeds, the cut material shall be placed in the bottom of existing excavations and graded level.

E. Final grading shall be achieved with minimum 5 foot radii at contour direction changes, and smooth transitions between grade breaks and depressions.

F. Perform permanent seeding in accordance with Section 02930.

G. Stabilize 2H:1V slopes along excavation boundary with erosion control blankets in accordance with Section 02275.

3.7 SURFACE WATER MANAGEMENT

A. Manage surface water in accordance with Section 02275.

B. Perform excavation in a manner that promotes positive drainage.

C. Install earthen berms as shown on Construction Drawings. Apply temporary seed and fertilizer on earthen berms in accordance with Section 02930.

3.8 SEASONAL SHUTDOWN

A. Perform seasonal shutdown activities in accordance with Section 02205.

END OF SECTION

000396

This Section specifies standard site requirements for handling, packaging, loading, hauling and unloading friable and non-friable ACM. The Construction Manager will direct the implementation of these requirements based on project scope and materials encountered in the field.

SECTION 02210
ASBESTOS CONTAINING MATERIALS (ACM)

PART 1 GENERAL

1.1 SCOPE

This Section includes the following requirements for asbestos containing materials (ACM), but is not limited to:

A. Handling, packaging, loading, hauling, and unloading friable and non-friable asbestos containing material (ACM).

B. Removal of at- or below-grade ACM, which may include the following:

1. Pipes coated with thermal system insulation.
2. Electrical cable insulated with ACM.
3. Fireproofing tape in electric manholes.
4. Piping containing gasket material.
5. Piping coated with construction mastic.
6. ACM embedded in concrete.
7. Buried ACM not associated with underground utilities.

C. Placement at the On-Site Disposal Facility (OSDF).

1.2 DEFINITIONS

A. Asbestos: Chrysotile, amosite, crocidolite, tremolite asbestos, anthophylite asbestos, actinolite asbestos, and any of these minerals that has been chemically treated and/or altered. For purposes of this specification, asbestos includes presumed asbestos containing material (PACM), as defined herein.

B. ACM: Any material containing more than 1 percent asbestos. For purposes of this specification, the term ACM includes PACM, as defined below.

C. PACM: Thermal system insulation (TSI) and surfacing material found in buildings constructed no later than 1980. The designation of material as "PACM" may be rebutted by performance of bulk sampling and analysis demonstrating that the PACM does not contain more than 1 percent asbestos, as described in 29 CFR 1926.1101(k)(5).

D. Active Asbestos Waste Disposal: Unloading of asbestos waste and placement at the OSDF is considered active asbestos waste disposal as termed in the referenced administrative code and federal regulations.

E. Class I Asbestos Work: Activities involving the removal of TSI and surfacing ACM and ACM. For purposes of this specification, includes, but is not limited to, the first time removal of at- or below-grade TSI associated with utilities.

F. Class II Asbestos Work: Activities involving the removal of ACM which is not TSI or surfacing material. For purposes of this specification, includes but is not limited to, first time removal of at- or below-grade ACM other than TSI and surfacing material that is associated with utilities.

G. Renovation: Altering in any way one or more facility components. Operations in which load-supporting structural members are wrecked or taken out are excluded from this definition. Removal of ACM related to at- or below-grade utilities is considered a renovation activity for purposes of the referenced administrative code and federal regulations.

H. Inactive Asbestos Waste Disposal Site: Any disposal site or portion of it where additional asbestos-containing waste material has not been deposited for 1 year and where the surface is not disturbed by vehicular traffic. For purposes of this specification, includes locations where ACM that was previously removed from a building or structure, or excess ACM building materials, was buried for disposal.

I. Removal of transite or other non-friable ACM from an inactive asbestos landfill does not fall under a certain "class" of work as defined by OSHA. Requirements will be established using best available technology and best management practices to minimize worker exposure.

J. Asbestos Competent Person: A person capable of identifying asbestos hazards in the work place, selecting appropriate control strategies for the asbestos exposure, and prompt corrective action. Person has the forty-hour asbestos contractor/supervisor training and holds the Asbestos Hazard Abatement Specialist Certification from the Ohio Department of Health (ODOH).

1.3 RELATED DOCUMENTS

A. Section 02205 – Impacted Material Excavation.

B. Impacted Materials Placement Plan (IMPP), On Site Disposal Facility (OSDF), 20100-PL-007, current revision.

1.4 REFERENCES

A. Ohio Administrative Code (OAC), Chapter 3745-20, Asbestos Emission Control.

B. Ohio Administrative Code (OAC), Chapter 3701-34, Asbestos Hazards Abatement Rules.

C. Title 29, Code of Federal Regulations (CFR), Part 1926.1101, Asbestos.

D. United States Environmental Protection Agency (U.S. EPA) 40 CFR 61, Subpart M, (NESHAPS).

1.5 SUBMITTALS

A. Submit an ACM Removal and Handling Work Plan, prepared by an Asbestos Project Designer certified by the ODOH and in compliance with all applicable federal (CFR) and state (OAC) requirements.

PART 2 PRODUCTS

2.1 MATERIALS

A. Disposal Bags: Clear polyethylene a minimum of 6 mils thick.

B. Sheeting: Clear polyethene a minimum of 6 mils thick

C. Surfactants: Childers - CP-225 CHIL-SORB or approved equal.

D. Encapsulants:

1. Childers - CP-240 CHIL-LOCK.
2. Certified Technologies - Certane 2050.
3. Eppert Environmental Products - Eppco #1.
4. International Protection Coatings Corp - Serpiloc.
5. Or approved equal.

E. Lockdowns:

1. Certane - 1050 – Clearcoat.
2. Eppert - Fiber-Seal.
3. International Protection Coatings Corp - Serpiloc.
4. Or approved equal.

F. Other materials required for handling and packaging of ACM including, but not limited to, asbestos warning tape and signs, tape, knives, and garden sprayer.

G. Glovebags made of 6-mil plastic, seamless at the bottom, designed for asbestos work.

2.2 EQUIPMENT

A. For glovebags, a HEPA filtered vacuum system may be used to provide negative air pressure in accordance with the requirements of 29 CFR 1926.1101.

B. HEPA filtered vacuum for cleanup.

C. Cable pulling equipment.

D. Any and all equipment required to implement the removal as defined by ACM Removal and Handling Work Plan.

PART 3 EXECUTION

3.1 GENERAL

A. At least 10 working days prior to start of removal of regulated ACM, the Asbestos Competent Person shall notify the Environmental Compliance Officer to ensure Ohio EPA Notification is made.

B. Prior to the initiation of ACM work, the Construction Manager or his designee shall:

1. Forward the names of all personnel assigned to the asbestos removal tasks of the project to Project Industrial Hygienist and Medical Services.
2. Assure workers that will be performing Class I, Class II, or Class III asbestos work are identified as asbestos workers for purposes of medical evaluation.
3. Forward copies of asbestos training certificates for asbestos workers and contractor/supervisor to training records.
4. Forward the State of Ohio certification for all personnel as required by law (for friable asbestos work) to the Project Industrial Hygienist.
5. Contact Industrial Hygiene for issue of an Asbestos Work Permit.

C. Excavate and remove underground utilities in such a manner that mitigates the generation of friable asbestos material. Friable asbestos material created by these work activities shall be removed and handled in accordance with this Section.

D. The Asbestos Competent Person shall:

1. Comply with work practices and procedures set forth in all applicable Federal, State, and local codes, regulations, and standards.
2. Ensure workers, supervisors, and project designer performing asbestos work have necessary ODOH certifications, as required, for friable asbestos removal.
3. Ensure workers have been assessed by medical and physician's written opinions have been documented for asbestos work and respirator use.
4. Ensure that an employee exposure assessment is completed for the asbestos work.
5. Ensure that an Asbestos Work Permit has been obtained.
6. Take precautions to prevent creation of friable ACM during handling.
7. Ensure employees are informed of the presence of ACM in the project work areas in accordance with 29 CFR 1926.1101(d) and OAC 3745-20-06(B)(4).
8. Establish a restricted work area at the OSDF that is adequate to deter entry of unauthorized personnel within 100 feet of the ACM work areas during unloading, deposition, burial, and initial compaction of asbestos containing waste materials, in accordance with OAC 3745-20-06(B)(4).
9. Establish an asbestos regulated area for Class I, II, and III asbestos work, or where airborne concentrations of asbestos exceed, or there is a reasonable possibility to exceed a PEL, in accordance with 29 CFR 1926.1101 (e). The regulated area shall be marked to minimize the number of persons within the area and protect persons outside the regulated area from exposure to airborne asbestos. Access to regulated areas shall be limited to authorized persons.
10. Obtain and conform to required training.
11. Ensure a pre-job briefing is conducted.

12. Supervise the asbestos work project including:
    a. Setting up the enclosure/work area.
    b. Ensuring the integrity of the enclosure/work area.
    c. Controlling entry and exit from the enclosure/work area
    d. Ensuring employee exposure monitoring is performed, when required by safety and health.
    e. Ensure that workers wear the appropriate PPE as specified on the PPE Requirements page.
    f. Ensure that workers are trained in the use of PPE, work practices, and engineering controls required for the work.
    g. Ensure that workers use the hygiene facilities when required by the class of asbestos work.
    h. Ensure that engineering controls are functioning properly.
    i. Notify Industrial Hygiene of any changes in work site conditions since permit issuance.
    j. Contact Industrial Hygiene after completion of asbestos work to verify the work area has been cleaned of all asbestos contamination.
    k. Ensure asbestos warning barriers are maintained until removal is authorized by Industrial Hygiene.

13. Complete Asbestos Daily Job Site Inspection Forms daily and keep them in the project files to be forwarded to ECDC at the completion of the project.

E. Materials to be used as encapsulants and surfactants shall be in original, new, and unopened packages and containers bearing manufacturer's name, label and the following information:

1. Name of material.
2. Manufacturer's stock number and date of manufacture.
3. Manufacturer's name.
4. Thinning instructions.
5. Application instructions.
6. Material Safety Data Sheets (MSDSs).

3.2 APPLICATION

A. Use wet methods, or wetting agents, and other work practices and engineering controls to prevent creation of visible asbestos emissions during abatement and handling of ACM.

B. Perform personal air monitoring in accordance with 29 CFR 1926.1101(f) including sampling necessary to complete initial exposure assessments.

C. Ensure an Asbestos Competent Person is within the ACM area anytime ACM is disturbed, removed, packaged, excavated, handled, loaded, hauled, or unloaded.

D. The Asbestos Competent Person shall perform documented inspections of the ACM work areas and adjacent areas daily during disturbance, excavation, handling, hauling, loading, unloading or placement of ACM waste. If there is visual evidence of asbestos contamination (e.g. spills of ACM waste) outside the demarcated ACM waste handling work areas, take immediate action to abate the hazard, as described in the ACM Removal

and Handling Work Plan. The incident shall be reported immediately Industrial Hygiene and the AEDO.

3.3 REMOVAL

A. Removal Procedures of ACM TSI:

1. Wet all ACM to be removed, or components or sections to be removed with ACM in place, with amended water solution and maintain wet until placed into disposal containers, double-bag in disposal bags, or sealed in 2 layers of sheeting.
2. Wrap large components removed intact in 2 layers of sheeting, secure with tape and properly label in accordance with OAC 3745-20-05(C)(1) and 29 CFR 1926.1101.
3. All piping (less than 12 inches in diameter) insulated with ACM may be removed with ACM in place. Wrap the piping in manageable sections with 2 layers of plastic sheeting, maintaining wet until wrapped. Use glovebags to remove ACM from each end of the section of pipe to be cut. Seal the exposed ACM with plastic and tape. Wet-brush and sponge, or clean the pipe by an equivalent method, the surfaces from which ACM has been removed. Double bag and seal. After the glove bag is removed, cut the pipe in the area that has been stripped of asbestos. Label the section of pipe that is wrapped, yet containing ACM, and the bag containing the glove bagged ACM in accordance with OAC 3745-20-05(C)(1) and 29 CFR 1926.1101.
4. Remove ACM from pipes that are larger than 12 inches in diameter by stripping of ACM in glove bags or mini-containments. Double bag the glove bag and contents; seal and label the bags in accordance with OAC 3745-20-05(C)(1) and 29 CFR 1926.1101. Size reduce the stripped piping as required.
5. Handle ACM with sharp-edged components as specified in this Section.
6. To remove any remaining ACM from stripped pipes or components, wet-brush and sponge, or clean by an equivalent method, the surfaces from which ACM has been removed in order to remove all visible ACM residue.
7. Pipes that exceed the WAC for the OSDF shall be cut into lengths as directed by the Construction Manager.
8. Pipes that are meet the WAC for the OSDF shall be size reduced into lengths to meet the requirements of the IMPP.
9. Industrial Hygiene will inspect the work area at the completion of work for any visible debris.

B. Removal of 13.2 kV Power Feeder Cables (includes fireproofing tape in manholes and cable):

1. Confined space entry will be required for removal of feeder cables within manholes.
2. Use wetting agents to ensure there are no visible emissions of asbestos fibers.
3. Wrap the fireproofed feeder cable in 2 layers of sheeting and secure with tape.
4. Remove friable ACM located at each end of the cable located within the electric manholes using a glove bag. Leave a length of cable exposed in the manhole so that the remaining cable can be pulled out of the conduit using the exposed end.
5. Cut the feeder cable and remove from the manhole.
6. Remove wrapped or bagged ACM from the manhole.

7. Clean the manhole using a HEPA vacuum to remove any remaining asbestos debris.
8. Industrial Hygiene and Radiological Control will inspect the wrapped section to ensure the integrity of the wrap and the absence of radiological contamination.
9. Label wrapped sections in accordance with OAC 3745-20-05(C)(1) and 29 CFR 1926.1101.
10. Industrial Hygiene will visually inspect the manhole to ensure that all asbestos containing debris has been removed.
11. Using wet methods or amended water, remove the remaining feeder cable by use of pulling equipment.
12. Wrap the feeder cable in plastic shrink film or sheeting and then place into designated container.
13. Label wrapped sections in accordance with 29 CFR 1926.1101.
14. Clean the pulling area and manhole using a HEPA vacuum.
15. After the cable has been removed, Industrial Hygiene will perform an inspection of the work area for visible debris.

C. Removal of Below-grade Piping Containing Asbestos Gaskets:

1. When possible, do not expose gasket by breaking or cutting the flange.
2. If a gasket becomes exposed by breaking or cutting the flange at the gasket, is visibly deteriorated, and is unlikely to be removed intact, perform glove bag removal as described in 29 CFR 1926.1101 (g)(5)(ii).
3. If a gasket becomes exposed by breaking or cutting the flange at the gasket is able to be removed intact, remove the gasket and immediately place in a disposal container. Scrape any residue using wet methods.
4. Lock down any visible gasket material by saturating the material with lockdown, applied with a garden sprayer or equivalent method.
5. If size reduction is necessary and gasket material is exposed, seal the flange area with 2 layers of sheeting and duct tape.
6. Size reduce piping at lengths so that the flange where the gasket material is located is undisturbed.

   a. Size reduce into lengths as directed by the Construction Manager when the piping exceeds the waste acceptance criteria (WAC).
   b. Size reduce into lengths less as specified in the IMPP when piping meets WAC.
   c. Size reduce if piping exceeds the maximum diameter accepted at the OSDF as described in the IMPP.
   d. Size reduce perpendicular to the run of pipe without breaking or cutting the gasket.

7. At the completion of work, Industrial Hygiene will inspect the work area for any visible/exposed debris.

D. Removal of Asbestos Containing Mastic-coated Piping:

1. Remove mastic-coated piping in accordance with OSHA requirements for Class II work.
2. Thoroughly wet mastic with amended water.

3. Size reduce the piping inside of the excavation using equipment that will minimize generation of airborne fibers.

   a. If piping is Above WAC, size reduce and dispose in accordance with Section 02205.
   b. If piping meets WAC, size reduce in accordance with the IMPP.

4. Size reduce pipes that are greater than 12 inches in diameter to meet the OSDF WAC using methodology to prevent generation of friable asbestos fibers.
5. Encapsulate both ends of each section of piping and all other locations where damage to the mastic is visible.
6. Double bag and seal any ACM mastic that becomes dislodged from the piping in 6-mil asbestos bags.
7. Label according to OSHA 29 CFR 1926.1101.
8. At the completion of work, Industrial Hygiene will inspect the work area for any visible debris.

E. Removal of Concrete Encased Transite (transite conduit):

1. Removal of transite encased in concrete is generally OSHA Class II work, with the following exceptions.

   a. Class I work practices may be applicable if the condition of the material is friable, or;
   b. if the method used for removal causes material to become friable.

2. Thoroughly wet concrete/transite material with amended water.
3. Remove electrical cable, if present, using a cable puller.
4. Remove and size reduce concrete/transite material to meet OSDF WAC using methodology to minimize or prevent generation of friable asbestos.
5. Encapsulate both of the open ends of the transite.
6. Transite protruding beyond the concrete shall be double wrapped and sealed with sheeting.
7. Industrial Hygiene will inspect the work area at the completion of work for visible debris.

F. Use the following methods for excavation of previously removed ACM that was buried for disposal:

1. The Asbestos Competent Person shall walk the work area and identify ACM visible at the surface before excavation, at least once a day during excavation and/or placement, and at the end of the shift. The walks shall be documented on the Asbestos Daily Job Site Inspection form.
2. Wet methods or wetting agents shall be used during handling, packaging, and loading of ACM, or soil or debris containing ACM.
3. Care shall be taken so that the friable ACM does not break or crumble during handling and so that non-friable ACM is not handled in such a manner that it becomes friable.
4. Encapsulate the exposed surfaces of broken transite panels that are segregated from the soil or debris and stacked on pallets.

5. Apply surfactants or encapsulants during size reducing of any large pieces of ACM to meet the OSDF WAC physical size criteria.
6. Do not leave ACM exposed at the surface of the stockpile or OSDF at the end of the work day.
7. Exposed ACM during excavation shall be covered with soil at the end of the work day. Exposed ACM during excavation may be locked down in lieu of covering with soil if work will resume in that area within 36 hours.
8. Friable ACM that was previously removed and then buried for disposal shall be handled as follows:

    a. Wet with amended water (water mixed with surfactant) or encapsulate, and separate from the impacted material.
    b. Wrap friable ACM components meeting the OSDF WAC physical size criteria and large pieces removed intact in 2 layers of sheeting, secured with duct tape, and labeled in accordance with OAC 3745-20-05(C)(1) and OSHA 29 CFR 1926.1101. Multiple pieces may be grouped together before wrapping, provided WAC physical size criteria is still met.
    c. Double bag and seal pieces of friable ACM not conducive to wrapping in a 6-mil polyethylene bag. Label in accordance with OAC 3745-20-05(C)(1) and OSHA 29 CFR 1926.1101.
    d. Handle friable ACM with sharp-edged components (e.g. nails, screws, metal lath, tin sheeting) capable of tearing the polyethylene bags or sheeting in one of the following ways:
    e. Pad or wrap and secure the sharp-edge components in a manner to prevent tearing of the polyethylene, then wrap or bag in accordance with this Section.
    f. Place into polyethylene-lined containers (i.e. fiberboard boxes or drums). Metal containers are not allowed.
    g. The polyethylene liner shall be sealed prior to sealing the container. The container shall be labeled in accordance with OAC 3745-20-05(C)(1) and 29 CFR 1926.1101.
    h. Segregate wrapped, bagged, or containerized, friable ACM, from other excavated material and accumulate at the Special Materials Transfer Area. When a full, segregated load is accumulated, it shall be loaded and hauled to the OSDF. Loads shall be prepared and secured to prevent any visible emissions, load loss, and spillage or leakage of liquids.

9. Handle non-friable ACM as follows:

    a. Wet transite or other non-friable ACM with amended water to reduce potential for release of fibers.
    b. Manually (by hand) remove pieces of transite or other non-friable ACM larger than 1 foot in any direction.
    c. Stack large, intact pieces of transite or other non-friable ACM on pallets and wrap the entire stack in 2 layers of sheeting.
    d. Double bag smaller pieces of transite or other non-friable ACM not conducive to wrapping.
    e. Incidental pieces of transite or other non-friable ACM less than 12 inches in maximum dimension contained in soil and soil-like material or debris

can be placed in the OSDF as Category 1 (soil and soil-like) or Category 2 material without segregation.

f. Avoid excessive breakage of the transite or other non-friable ACM during manual removal or during use of heavy equipment in the area.

g. Cover soil or debris containing non-friable ACM, which is temporarily staged in a stockpile, with 6 inches of soil that is visually free of ACM at the end of the day.

10. Industrial Hygiene will inspect the area at the completion of work for visible debris.

END OF SECTION

SECTION 02275
SURFACE WATER MANAGEMENT AND EROSION CONTROL FOR REMEDIATION

PART 1 GENERAL

1.1 SCOPE

A. This Section includes, but is not limited to, the following:

1. Installation of erosion and sediment control measures.
2. Maintenance of existing and new erosion and sediment control measures installed under this activity, including removal of temporary erosion control facilities.
3. Management of surface water in construction and excavation areas, including pumping of surface water to the Tank Farm Settling Basin during general excavation and management of volatile organic compound (VOC)-contaminated water.
4. Modification of existing storm sewer system.
5. Installation and maintenance of runon/runoff controls along the perimeter of the project boundary.
6. Protection of the unsaturated sands and gravels of the Great Miami Aquifer (GMA) from runon within the excavation areas, including installation and maintenance of runon controls.
7. Management of area for precertification.
8. Stabilization of disturbed excavation areas or stockpiles.
9. Inspection requirements.

1.2 RELATED SECTIONS AND DOCUMENTS

A. Section 02100 – Surveying.

B. Section 02205 – Impacted Material Excavation.

C. Section 02206 – Earthwork for Remediation.

D. Section 02270 – Surface Water Management and Erosion Control

E. Section 02930 – Vegetation.

1.3 REFERENCES

A. State of Ohio, Department of Natural Resources (ODNR), Rainwater and Land Development, Ohio's Standard for Stormwater Management Land Development and Urban Stream Protection, current edition.

B. State of Ohio, Department of Transportation (ODOT), Construction and Material Specifications, current edition.

C. Surface Water Management Plan (SWMP) for the Remediation of Areas 3A and 4A, Document No. 20800-PL-0003, Rev. 0.

1.4 SUBMITTALS

A. For each product proposed for use, submit the following:

1. Manufacturer's product data and recommended methods of installation and maintenance.
2. Certification from manufacturer that the product meets the material requirements of this Section, including test results.
3. Material Safety Data Sheet (MSDS), if applicable.

B. Records of inspection of erosion and sediment control measures as specified herein shall be submitted monthly upon completion of the inspection report.

PART 2 PRODUCTS

2.1 MATERIALS

A. Furnish silt fence in accordance with ODNR, composed of, at a minimum, strong rot-proof polymeric fibers formed into a woven fabric having fabric and fence post properties as shown on the Construction Drawings.

B. Furnish erosion control woven blanket-like material (coir matting) made of biodegradable coir rope containing the following material properties:

1. Coconut fiber content: 100%.
2. Weight: 22 ounces per square yard.
3. Thickness: 0.3 inches.
4. Open Area: 38 percent.
5. Tensile Strength: 1350 lb/ft by 626 lb/ft (length by width).
6. Elongation: 34 percent by 38 percent (length by width).

C. Furnish metal staples specifically made to anchor erosion control blankets. Anchors will be 11 gauge wire formed into a staple shape with minimum dimensions of 6 inches by 1 inch by 6 inches.

D. Furnish dust suppression/crusting agent in accordance with Section 02930.

E. Furnish backfill in accordance Section 02206.

2.2 EQUIPMENT

A. Furnish 3,000 gal. portable tank, as needed, to hold water contaminated with volatile organic compounds (VOCs).

B. Furnish pumps, filters, hoses and other appurtences required to execute work specified in this Section.

PART 3 EXECUTION

3.1 GENERAL

A. Construct and maintain erosion and sediment control measures as specified in this Section and shown on Construction Drawings. Maintain existing erosion and sediment control facilities and measures in accordance with this Section.

B. Minimize runon into disturbed excavation areas by grading the surrounding area away from the disturbed area and/or by temporary diversions as shown on Construction Drawings.

C. As the excavation progresses, excavate sumps at resulting low points used for water collection of perched and/or surface water. Do not penetrate to within 5 feet of the GMA with sump excavations.

D. Dewater excavations in accordance with the Construction Drawings. Water collected from a 10-yr, 24-hr or lesser storm event (precipitation not to exceed 4.1 inches of rainfall) within active excavations and below design grade utility removal shall be pumped to the Tank Farm Settling Basin. Collected water shall be pumped down to a depth of less than one foot remaining in the bottom of the excavation within 3 days of the last rainfall.

E. The Construction Manager will arrange for sampling and analysis of excavation water present in suspect VOC areas prior to a discharge event. Following sampling and analysis, pump collected VOC-contaminated water to the appropriate treatment and/or disposition.

F. Plug storm sewers at the excavation boundary prior to removal of storm sewer piping located within the excavation area. Plug storm sewer system in such a manner to minimize water collected in abandoned portions of the system.

G. Remove erosion and sediment control measures after the disturbed excavation areas are stabilized as specified in Section 02930.

3.2 SILT FENCES

A. Install silt fence at locations down-gradient of areas to be disturbed until drainage and erosion control structures have been established as shown on the Construction Drawings. Remove and dispose accumulated sediment as specified in Section 02205.

B. Install breaks and overlaps in silt fence as necessary to allow equipment access to construction areas.

3.3 EROSION CONTROL BLANKETS

A. Install and maintain erosion control blankets in accordance with manufacturer's recommendations. Install additional staples as necessary to maintain erosion control blankets taut to the ground surface.

3.4 TANK FARM SETTLING BASIN AND DITCHES

A. Remove accumulated sediment and debris from the Tank Farm Settling Basin and ditches. In no case shall sediment build up to a depth greater than 10 inches in the Tank Farm Settling Basin or to a depth greater than one-half the constructed depth of the ditch.

B. Dispose of sediment and debris as specified in Section 02205.

3.5 GMA PROTECTION

A. When possible, limit excavations within 5 feet of the GMA to periods of dry weather.

B. Slope bench terrace directly above the GMA toward the excavated slope as shown on the Construction Drawings. Grade the bench terrace to a sump for pumping to prevent runon into the GMA.

C. Size and locate pumps for sumps along benches above the GMA such that no water within the excavation area shall overflow into the GMA from a 10-yr, 24-hr or lesser storm event. Proposed pump locations and sizes are found in the Surface Water Management Plan (SWMP) for the Remediation of Areas 3A and 4A, Document No. 20800-PL-0003, Rev. 0. Sump bottoms shall not extend to within 5 feet of the GMA. Have additional pumps available when the excavations approach the GMA.

D. For excavations extending to within 5-feet of the GMA elevation shown on the Construction Drawings, maintain less than one foot of standing water in the excavations by pumping water to the Tank Farm Settling Basin or an adjacent area, as necessary.

E. Backfill over the GMA in accordance with Section 02206.

F. In areas where 2 feet of compacted cover has been recently restored following excavation which has extended to within 2 feet of or breached the GMA, pump ponded water from the affected excavation as soon as practical (but within 24 hours or by the direction of the Construction Manager) following a precipitation event.

3.6 PRECERTIFICATION

A. Pipes that daylight at the excavation face shall be plugged at the excavation face prior to precertification in accordance with Section 02205 and the Construction Drawings.

B. Install runon controls along perimeter of precertification boundary, as shown on the Construction Drawings, to prevent surface water from non-certified areas from flowing into precertified areas.

C. During precertification, direct drainage from precertified areas to the Tank Farm Settling Basin. Routing of surface water pump lines must be approved by the Construction Manager.

D. Maintain surface water management within the area to be precertified in accordance with this Section until precertification is complete.

3.7 INSPECTION

A. Inspect erosion and sediment control measures in accordance with Section 02270.

B. File records of inspections in accordance with Section 02270. In addition, the records of inspection shall include destination of pumping ponded water, estimated quantity of ponded water and corrective action measures, as required. The records of inspection shall indicate if areas are not in compliance or contain a certification that control measures are effective and in compliance with this Section and Section 02270.

END OF SECTION

SPECIFICATION COVER SHEET

SPECIFICATION SECTION: 02930 TITLE: Vegetation

Specifications By: (Cognizant Engineer)
Signature _____ Date 17 Aug 01
Printed Name and Title: Michael J. Monteleone, P.E. Associate

Scope and Format Checked By: (Checker)
Signature _____ Date 17 Aug 01
Printed Name and Title: Michael J. Monteleone, P.E. Associate

Detailed Requirements Checked by: (Checker)
Signature _____ Date 17 Aug 01
Printed Name and Title: David K. Phillips Senior Project Engineer

Overall Review By: (PDP)
Signature _____ Date 20 Aug 2001
Printed Name and Title: J.F. Beech, Ph.D., P.E. Principal

Approved by: (DTL)
Signature _____ Date 20 Aug 2001
Printed Name and Title: J.F. Beech, Ph.D., P.E. Principal

Record of Revision (Number and initial all revisions)

Rev. No.	Reason	Date	By	Checked	Approval
0	Certified for Construction	20 August 01	MJM	DKP	JFB
1	Revisions from Phase III DCNs	13 March 02	DKP	DKP	JFB

SPECIFICATION COVER SHEET

SPECIFICATION SECTION: 02100 **TITLE:** SURVEYING

Specifications By: Signature _____ 17 Aug 01
(Cognizant Engineer) Date
Printed Name and Title: Michael J. Monteleone, P.E. Associate

Scope and Format Checked By: Signature _____ 17 Aug 01
(Checker) Date
Printed Name and Title: Michael J. Monteleone, P.E. Associate

Detailed Requirements Checked by: Signature David K Phillips 17 Aug 01
(Checker) Date
Printed Name and Title: David K. Phillips Senior Project Engineer

Overall Review By: Signature _____ 20 Aug 2001
(PDP) Date
Printed Name and Title: J.F. Beech, Ph.D., P.E. Principal

Approved by: Signature _____ 20 Aug 2001
(DTL) Date
Printed Name and Title: J.F. Beech, Ph.D., P.E. Principal

Record of Revision (Number and initial all revisions)

Rev. No.	Reason	Date	By	Checked	Approval
0	Certified for Construction	20 August 01	MJM	DKP	JFB
1	Revisions from Phase III DCNs	13 March 02	DKP	DKP	JFB

SECTION 02100

SURVEYING

PART 1 GENERAL

1.01 SCOPE

A. This Section includes the requirements for surveying. Requirements include, but shall not be limited to:
   1. establishing permanent and temporary survey benchmarks and control points;
   2. establishing a horizontal and vertical project control system based on existing benchmarks;
   3. setting limits and boundaries of construction activities;
   4. performing support surveys and surveys for conformance checks, "red-line" drawings, and sketches, and to determine measurement of quantities for periodic progress payments and final payment;
   5. preparing and furnishing "red-line" drawings and sketches; and
   6. surveys for Excavation Project.

1.02 RELATED SECTIONS AND PLANS

A. Section 02110 - Clearing, Grubbing, and Stripping

B. Section 02200 - Earthwork

C. Section 02205 - Impacted Material Excavation

D. Section 02206 - Earthwork for Remediation

E. Section 02207 - Area Isolation Trenching

F. Section 02215 - Trenching and Backfilling

G. Section 02225 - Compacted Clay Liner and Cap

H. Section 02230 - Road Construction

I. Section 02240 - Non-Impacted Protective and Contouring Layers

J. Section 02250 - Vegetative Soil Layer

K. Section 02270 - Surface-Water Management and Erosion Control

L. Section 02271 - Riprap

M. Section 02275 - Surface Water Management and Erosion Control for Remediation

N. Section 02280 - Biointrusion Barrier

O. Section 02605 - High-Density Polyethylene (HDPE) Pipes and Fittings

P. Section 02710 - Granular Drainage Material

Q. Section 02712 - Granular Filter Material

R. Section 02721 - Culverts

S. Section 02770 - Geomembrane Liner and Cap

T. Section 02831 - Chain-Link Fences and Gates

U. Section 02920 - Topsoil

V. Section 13000 - Borrow Area Management

W. Section 13005 - Liner Penetration Boxes

X. Section 13010 - Impacted Materials Placement

Y. Impacted Materials Placement (IMP) Plan

Z. Part 6 - Statement of Work

AA. Part 8 - Environmental Health & Safety/Training Requirements

BB. Part 9 - Quality Assurance Requirements

1.03 REFERENCES

A. National Geodetic Survey (NGS) Standards.

1.04 QUALIFICATIONS

A. Oversight for the survey work shall be provided and certified by a Land Surveyor licensed in the State of Ohio.

B. Surveying work shall be performed under the direct supervision of a person who has at least 5 years of experience in construction surveying.

C. Work performed in referencing or re-establishment of land or United States survey monuments shall be signed and sealed by a Land Surveyor licensed in the State of Ohio.

1.05 SUBMITTALS

A. Submit a copy of Land Surveyor's license and a résumé of the person supervising the surveys to the Construction Manager within 10 calendar days from Notice to Proceed.

B. For each liner and cap submit two copies of proposed control points on a minimum 50-foot grid for verification of the following surfaces at least 3 days prior to commencement of work:
   1. subgrade for roads, clay liner, and for other locations shown on the construction drawings;
   2. top of compacted clay liner;
   3. top of leak detection system (LDS);
   4. top of leachate collection system (LCS);
   5. top of impacted protective layer and non-impacted protective layer within impacted runoff catchment area and intercell berm;
   6. top of protective clay layer in Area 1;
   7. top of impacted select layers;
   8. top of impacted material placement;
   9. top of select impacted material placement;
   10. top of contouring layer;
   11. top of compacted clay cap;
   12. top of protective clay layer in Area 4;
   13. top of cover drainage layer;
   14. top of biointrusion barrier with choking layer;
   15. top of granular filter;
   16. top of vegetative soil layer; and
   17. top of topsoil layer.

C. Submit electronic files and two hard copies of the survey notes, sketches, and drawings for the following surveys to the Construction Manager within one week of performance:
   1. preliminary surveys;
   2. intermediate surveys;
   3. written statement and surveys for conformance checks and "red-line" drawings;
   4. surveys prior to end of construction season and/or winter shutdown;
   5. survey at completion of impacted material excavation specified in Section 02205 of the following:
      a. above Waste Acceptance Criteria (WAC) material;

b. above Final Remedial Level (FRL) material;
c. Resource Conservation and Recovery Act (RCRA) hazardous waste;
d. underground storage tanks and/or associated soil; and
e. Hazardous Waste Management Units (HWMUs);

6. survey at completion of the Contract;
7. measurement and payment surveys; and
8. final surveys.

D. On request by the Construction Manager, submit documentation verifying accuracy of survey work.

E. Upon completion of the survey work, provide the Construction Manager the original field notes, layout, computations, signed and sealed sketches and drawings in Microstation 95 ".dgn" format or electronic files in other format approved by the Construction Manager.

F. One complete set of final "red-line" drawings, sketches, and survey notes signed and sealed by a Land Surveyor licensed in the State of Ohio shall be submitted to the Construction Manager within 15 days of completion of the Contract. Drawing and sketch format shall be Microstation 95 ".dgn" or electronic files in other format approved by the Construction Manager. Survey notes shall include a point listing with coordinates, elevation, and description.

1.06 PROJECT RECORD DOCUMENTS

A. Maintain on site, a complete, accurate log documenting survey work as it progresses.

B. Maintain on-site, a plan showing survey control points, and benchmarks with coordinates and elevations.

C. Maintain on-site, an accurate and current set of marked-up "red-line" drawings showing "as-built" conditions. "As-built" conditions shall be marked-up on "red-line" drawings within one week of completion of the respective construction activity.

1.07 HEALTH AND SAFETY REQUIREMENTS

A. Environmental health & safety/training requirements shall be in accordance with Part 8 of the Contract Documents.

1.08 CONTRACTOR'S QUALITY ASSURANCE

A. Contractor's quality assurance requirements shall be in accordance with Part 9 of the Contract Documents.

PART 2 PRODUCTS

2.01 MATERIALS AND SURVEY INSTRUMENTS

A. Provide materials as required to properly perform the surveys, including, but not limited to, personal protective equipment, instruments, tapes, rods, measures, mounts and tripods, stakes and hubs, nails, ribbons, other reference markers, and all else as required.

B. The survey instruments used for this work shall be precise and accurate to meet the needs of the project. Survey instruments should be capable of reading to a precision of 0.001 feet and with a setting accuracy of ±8 seconds.

PART 3 EXECUTION

3.01 GENERAL

A. Maintain accurate and complete notes of surveys:
   1. Handwritten survey field notes and information shall be documented. A copy of the numbered, dated, and signed documentation shall be given to the Construction Manager weekly or upon request by the Construction Manager. Survey notes shall be legibly recorded. Notation shall be consistently applied to survey work. The stake marking format and the document notations shall be compatible. Identify survey benchmarks on the field notes, sketches, and drawings.
   2. Electronically collected field survey information shall be stored, for retrieval and submittal if requested by the Construction Manager, during the period of performance of the Contract.
      a. Electronic format for printed output of data collector field survey notes shall be compatible with the approved field notation format.
      b. Electronic format for printed output of data collector survey work shall be compatible with the Contractor's computer equipment and software specified in this Section for verifying and checking the work. A copy of the data disk shall be submitted to the Construction Manager monthly.
   3. Submit electronic file and two hard copies of above information when requested by the Construction Manager

B. During construction, survey notes shall be retained by the Contractor and Land Surveyor.

C. Perform surveys for conformance checks specified in this Section. Contractor shall submit a written statement with conformance surveys certifying compliance of the preceding layer thickness, limits, and grades to the Construction Manager.

D. The precision of horizontal and vertical controls shall meet or exceed Third-Order Class I and Third-Order accuracies, respectively, as defined by NGS Standards.

E. Conformance check surveys for elevation and for horizontal coordinates shall be recorded to the nearest 0.01 feet and for angles shall be to the nearest 20 seconds.

F. Measurement and payment surveys for elevation and for horizontal distances shall be recorded to the nearest 0.1 feet and 0.05 feet, respectively.

G. Final "red-line" drawings and sketches shall be signed and sealed for method and accuracy of work and sealed by the Land Surveyor.

H. Perform construction layout surveys in advance of scheduled construction activities. At completion of a survey, provide a copy of the field notes, drawings, or sketches to the Construction Manager for review. The Contractor shall allow the CQC Consultant and/or Construction Manager three working days for review of conformance surveys. The Contractor shall be responsible for rework and/or construction delays caused by survey or staking errors.

I. Set grade and slope stakes required for construction activities as the work progresses. Staking shall be in accordance with accepted surveying practices, provisions herein, and subject to Construction Manager review. Set fine grade stakes on all surfaces for which the plans show a definite grade line. Grade stakes shall not be permitted on soil layers overlying any geosynthetic material within 12 inches of the geosynthetic material or on the contouring layer and first lift of compacted clay cap.

J. Verify pipe alignment and elevation. The Contractor shall:
   1. check layout and elevation of pipe embedment fill prior to pipe placement;
   2. check pipe alignment during placement and backfill; and
   3. verify alignment and elevation at top of pipe after pipe has been backfilled to top of pipe at a maximum interval of 25 feet.

K. Upon completion of the work, the Contractor shall provide the Construction Manager with original survey field notes, layouts, computations, and electronic files, binders containing electronic file information and one copy each of electronic files specified in this Section.

L Protect benchmarks and survey control points. Replace disturbed survey control points and benchmarks at no additional cost.

M. Establish temporary survey control points to support construction work activities.

N. Survey control points, accuracy, and documentation:
   1. Record the following information in survey notebooks for each control point established:
      a. designation of control point;
      b. coordinates based on State Planar North American Datum (NAD) 1983 Ohio South;
      c. elevations based on National Geodetic Vertical Datum (NGVD);
      d. date of establishment;
      e. description and sketch of the control point location; and
      f. control points referenced to a minimum of three features that can be seen from the control point.
   2. Document survey work in the fieldbooks using the format and procedures described below:
      a. title and consecutive fieldbook number on the front cover;
      b. consecutively numbered pages;
      c. table of contents, indicated by survey task, on the first numbered page;
      d. legend indicating symbols used in survey notes;
      e. names of survey team for each task;
      f. notes on weather, equipment, etc.;
      g. date and time on each page to indicate when work was recorded;
      h. notes in a uniform character such that they can be interpreted and used by anyone with survey knowledge; and
      i. description and/or sketches of the existing survey control used.

O. Provide hardware and software to download data to Fluor Fernald computers as approved by Engineering Manager.

3.02 SUPPORT SURVEYS

A. Preliminary Surveys:
   1. Verification of the Existing Conditions:
      a. Prior to the start of clearing and earthwork activities, verify the accuracy of the existing conditions shown on the Construction Drawings and Reference Drawings. Immediately notify the Construction Manager in writing of deviations from the existing conditions indicated on the Construction Drawings and Reference Drawings that affect construction cost and/or schedule.
   2. Verify the existing benchmarks, structures, utilities, wells, topography, surface-water management and erosion control measures, construction safety and radiological-control fences, sedimentation basins and appurtenances, drainage

features, and existing stockpiles of materials and quantities shown on the Construction Drawings, Reference Drawings, or specified in the Contract. Notify the Construction Manager of any differences or conflicts with work included in this Contract.

3. Verify Mid-Valley Pipeline Easement as shown on the Construction Drawings adjacent to battery limits. Stake western limits of easement at 50-foot intervals.
4. Establish construction limits required for installation of the construction safety fence and radiological-control fence specified in Section 02200.
5. Establish location for the installation of the surface-water management and erosion control measures specified in Sections 02270, 02271, and 02275.
6. Clearing Limit Staking: Stake clearing limits specified in Section 02110.
7. Alignment and Existing Ground Staking: Following clearing operations and before stripping operations begin, preliminary locations of alignments and/or baseline of project features shall be established. Perform topographic surveys to describe original ground features before stripping or excavation begins. The distance between grid points shall not exceed 50 feet, and all breaks shall be noted.
8. Earthwork Staking: Staking for excavation and fill limits shall establish the exterior limits of excavations and fills. The maximum staking interval shall be 50 feet. Stakes shall be prominently noted with description of point, vertical distance to design elevation, and offset distance as applicable.
9. Perform additional surveys required for the layout of other construction activities.
10. Prior to construction activities in remedial excavation areas specified in Sections 02205 and 02207, perform topographic surveys of above-WAC and impacted runoff catchment area (IRCA) stockpiles, staging areas, excavation areas, and concrete crushing support areas at minimum 50-foot intervals with additional points as follows:
    a. grade breaks;
    b. points of horizontal curvature and tangency;
    c. edge and corners of concrete or asphalt pads, slabs, catch basins, and manholes;
    d. above-grade obstructions (e.g., fire hydrants, utility poles, handrails, etc.); and
    e. ditches, channels, and depressions.

    In addition, spot check slab elevations as indicated on applicable building foundation reference drawings. This includes basement, pit, sump, and other below-grade slab elevations.
11. Prior to area isolation trench excavation specified in Section 02207, survey the trench location and stake the centerline of the trenches.
12. Initial limits of excavation specified in Section 02207 shall be surveyed and staked after the completion of excavation of area isolation trenches.

13. The centerline of the completed area isolation trench specified in Section 02207 shall be surveyed with reference to the permanent trench monuments and staked after the completion of trenching. Provide redline mark-ups showing where the trench deviates from the design location by more than the maximum lateral tolerance specified in Section 02207. The Contractor will identify the area isolation trench using a rope boundary. The rope will be a color other than orange, yellow, or magenta.

B. Intermediate Surveys:

1. Perform surveys during progress of the construction activities to verify the accuracy of work and as directed by the Construction Manager. These surveys include, but are not limited to, surveys of the subgrade excavation; compacted clay liner and cap; LDS, LCS, and cover drainage layers; protective layer; contouring layer; biointrusion barrier layer; granular filter; vegetative soil layer; topsoil; LDS and LCS piping; horizontal monitoring wells; select impacted material layer; impacted material layer; and other surveys directed by the Construction Manager.
2. Perform surveys for the impacted material placement and stockpiles as follows:
   a. Survey the locations and surface of impacted material placement when the category of impacted material changes in any given grid. Survey the locations and surface of the previous layers prior to changing impacted material category within the grid.
   b. Survey the locations and surface of completed impacted material lifts in any grid where placement occurs at or near the end of the workday.
   c. Survey the impacted material placed in the OSDF every week and within one working day of the last day of the month. This survey shall include locations, elevations, category of impacted materials, and pertinent information in ASCII format necessary to develop a 3-D topographic computer generated surface.
   d. Perform interim surveys of impacted material stockpiles or other areas designated by the Construction Manager. This survey shall include volume (CY) remaining in the stockpiles or in designated areas.
   e. Survey the impacted material surface in the OSDF, including the cell access ramps, at the completion of the construction season activities.
3. Perform surveys for measurement and periodic progress payment as specified in this Section.
4. Perform surveys during progress of impacted material excavations specified in Section 02205 to confirm limits of the excavation.
5. Perform survey if either the unsaturated sands and gravel of the Great Miami Aquifer (GMA) are encountered or excavation has reached the GMA elevation as indicated on the Construction Drawings.

6. Perform surveys after the installation of the first 2 feet of GMA plug placement to confirm 2 feet thickness.
7. Perform surveys upon restoration of the minimum 5-feet protective cover over the unsaturated sands and gravel of the GMA.
8. Perform surveys when establishing new Special Material Transfer Areas.
9. Prior to obtaining GMA plug material as specified in Section 02206, perform topographic survey and establish work limits of designated borrow areas.
10. Perform survey at the completion of each supplemental excavation.

C. Final Surveys:
1. Final topography shall be surveyed at nominal 50-foot intervals. Additionally, the following points shall be surveyed as applicable:
   a. grade breaks;
   b. points of horizontal curvature and tangency; and
   c. points of stationing equation.
2. Structures: Survey structure centerlines or building lines so that the orientation, position, limits, and foundation elevation(s) are positively identified.
3. Ditches and Channels: Survey ditches, channels, and culverts as specified in Sections 02270, 02275, and 02721.
4. Limits of Final Excavations: Survey limits of final impacted material excavations.
5. Pipes: Utility pipes shall be surveyed at nominal 25-foot intervals at the top of pipe. Surface-water management pipes shall be surveyed at inlet and outlet inverts and along perimeter of riprap protection.

3.03 SURVEYS FOR MEASUREMENT AND PAYMENT

A. Perform surveys for periodic progress payments and final payment to determine quantities of work and percent of completed work. Quantities to be measured and measurements for quantities shall be as specified in Part 6 of the Contract Documents.

B. Calculate and certify quantities of work and submit survey notes and calculations to the Construction Manager for review, evaluation, and payment.

3.04 SURVEYS FOR CONFORMANCE CHECKS AND "RED-LINE" DOCUMENTS

A. Survey the following to verify the locations, lines, and grades achieved during construction for conformance checks and "red-line" documents:
1. for berms, roads, ditches, and other earthwork specified in Sections 02200, 02206, 02230, and 02270:
   a. original grade surface;
   b. compacted surface of cut slopes; and
   c. finished grade surface;

2. for culverts and other surface-water management and erosion control structures specified in Sections 02270 and 02721:
   a. original grade surface;
   b. pipe inverts; and
   c. finished grade surface including riprap protection at inverts;
3. for the subgrade specified in Section 02200:
   a. prepared subgrade surface;
4. for the trenching and backfilling specified in Section 02215;
   a. bottom of the liner system anchor trench and pipe trench and top of finished compacted backfill; and
   b. pipes and culverts;
5. for the compacted clay liner specified in Section 02225:
   a. finished compacted clay liner surface;
6. for the liner penetration boxes specified in Section 13005 and shown on the Construction Drawings:
   a. original grade surface; and
   b. top of liner penetration boxes;
7. for the LDS, LCS, and cover drainage layers, and piping specified in Sections 02605 and 02710:
   a. finished grade surface;
   b. horizontal monitoring wells; and
   c. piping system, including location of each joint;
8. for the granular filter specified in Section 02712:
   a. finished granular filter surface;
9. for the compacted clay cap specified in Section 02225:
   a. prepared top of non-impacted contouring layer surface; and
   b. finished compacted clay cap surface;
10. for the geomembrane liner specified in Section 02770:
    a. anchor trench;
    b. top and bottom of side slopes;
    c. seam intersections;
    d. repairs; and
    e. location of destructive testing;
11. for the non-impacted protective layer specified in Section 02240:
    a. finished protective layer surface;
12. for impacted material placement surface specified in Section 13010:
    a. top of protective layer surface;
    b. top of select impacted material layers (liner and final cover system) surfaces;
    c. top of final impacted material surface (prior to placement of select impacted material layer in final cover system); and

d. Category 5 material placement per specialized placement plans as specified in the IMP Plan.

13. for biointrusion barrier specified in Section 02280:
    a. finished biointrusion barrier surface;
14. for vegetative soil layer specified in Section 02250;
    a. finished vegetative soil layer surface;
15. for topsoil specified in Section 02920;
    a. top of topsoil surface;
16. for chain-link fences and gates specified in Section 02831:
    a. location and alignment;
17. for the borrow area specified in Section 13000;
    a. test pits used for pre-conformance testing; and
    b. finished grades of interim restoration of borrow subareas;
18. centerlines at nominal 50-foot intervals and at points of intersection of area isolation trenches specified in Section 02207.

B. Drawings and sketches for the items described in this Section shall include the following:
1. North arrow, graphical scale, title block, and legend;
2. Northing and Easting grid lines;
3. spot grade location and elevation on plan including list of coordinates with point number, northing, easting, and elevation in table format;
4. 1-foot contour lines;
5. location of structures;
6. labeled components;
7. for geomembrane liner and cap plans:
    a. all seams;
    b. panel identification numbers;
    c. location of top of slope, toe of slope, anchor trench, and limits of geomembrane;
    d. repair location and identifying number; and
    e. destructive testing location and identifying number; and
8. for pipe profiles:
    a. original grades with stationing;
    b. final grades with stationing; and
    c. pipe with inverts, slopes, pipe material, pipe size, and length of pipe.

C. Perform conformance checks and "red-line" surveying immediately upon completion of a given installation or excavation activity to facilitate progress and avoid delaying commencement of the next installation. Provide the following minimum spacings and locations for survey points (additional survey points may be required if field conditions warrant):

1. surfaces with gradients less than 10 percent, survey on a square grid spaced not wider than 50 feet;
2. on slopes greater than 10 percent, a square grid spaced not wider than 50 feet shall be used, but in any case, a line at the crest and toe of the slope shall be taken; if the slope distance is greater than 50 feet, a midpoint slope survey point is required;
3. a line of survey points spaced not more than 50 feet apart shall be taken along any slope break (this will include the inside edge and outside edge of any bench on a slope);
4. a line of survey points spaced not more than 25 feet apart shall be taken at the top of any pipes or other appurtenances; and
5. at the corners and midpoints of the top and bottom of slope breaks for liner penetration areas in cells.

[END OF SECTION]

SPECIFICATION COVER SHEET

SPECIFICATION SECTION: 02200 **TITLE:** Earthwork

Specifications By: Signature _____ 17 Aug 01
(Cognizant Engineer) Date
Printed Name and Title: Michael J. Monteleone, P.E., Associate

Scope and Format Checked By: Signature _____ 17 Aug 01
(Checker) Date
Printed Name and Title: Michael J. Monteleone, P.E., Associate

Detailed Requirements Checked by: Signature _____ 17 Aug 01
(Checker) Date
Printed Name and Title: David K. Phillips, Senior Project Engineer

Overall Review By: Signature _____ 20 Aug 2001
(PDP) Date
Printed Name and Title: J.F. Beech, Ph.D., P.E., Principal

Approved by: Signature _____ 20 Aug 2001
(DTL) Date
Printed Name and Title: J.F. Beech, Ph.D., P.E., Principal

Record of Revision (Number and initial all revisions)

Rev. No.	Reason	Date	By	Checked	Approval
0	Certified for Construction	20 August 01	MJM	DKP	JFB
1	Revisions from Phase III DCNs	13 March 02	DKP	DKP	JFB

SECTION 02200

EARTHWORK

PART 1 GENERAL

1.01 SCOPE

A. This Section includes site preparation including construction safety fence and radiological-control fence, surface-water management and erosion control, excavation, dewatering, stockpiling, subgrade and top of contouring layer preparation, compacted fill, and clayey rockfill.

1.02 RELATED SECTIONS AND PLANS

A. Section 02100 - Surveying

B. Section 02110 - Clearing, Grubbing, and Stripping

C. Section 02150 - Traffic Control

D. Section 02205 - Impacted Material Excavation

E. Section 02206 – Earthwork for Remediation

F. Section 02215 - Trenching and Backfilling

G. Section 02225 - Compacted Clay Liner and Cap

H. Section 02230 - Road Construction

I. Section 02240 - Non-Impacted Protective and Contouring Layers

J. Section 02250 - Vegetative Soil Layer

K. Section 02270 - Surface-Water Management and Erosion Control

L. Section 02271 - Riprap

M. Section 02280 - Biointrusion Barrier

N. Section 02605 - High-Density Polyethylene (HDPE) Pipes and Fittings

O. Section 02710 - Granular Drainage Material

P. Section 02712 - Granular Filter Material

Q. Section 02714 - Geotextiles

R. Section 02721 - Culverts

S. Section 02831 - Chain-Link Fences and Gates

T. Section 02920 - Topsoil

U. Section 02930 - Vegetation

V. Section 13000 - Borrow Area Management

W. Section 13005 - Liner Penetration Boxes

X. Section 13010 - Impacted Materials Placement

Y. Construction Quality Assurance (CQA) Plan

Z. Part 6 - Statement of Work

AA. Part 8 - Environmental Health & Safety/Training Requirements

BB. Part 9 - Quality Assurance Requirements

1.03 REFERENCES

A. Latest version of American Society for Testing and Materials (ASTM) Standards:
   1. ASTM D 698. Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).
   2. ASTM D 2487. Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

B. Reference Reports addressing On-Site Disposal Facility (OSDF) and borrow area site subsurface conditions:
   1. "*Geotechnical Investigation Report, On-Site Disposal Facility*" [Parsons, 1995]. This report contains geotechnical data for the subsurface soils in the OSDF area.
   2. *"Disposal Facility Pre-Design Geotechnical Investigation, Soil Investigation Data Report, CERCLA-RCRA Unit 2"* [Science Applications International Corporation, 1995]. This report presents geotechnical data for the subsurface soils in the OSDF area.

3. *"Geotechnical Data and Evaluation Report for East and South Field Borrow Areas"* [Parsons, 1996]. This report contains geotechnical data for the subsurface soils in the borrow area.

1.04 SUBMITTALS

A. Submit to the Construction Manager for review a Contractor's Earthwork Work Plan within 30 calendar days from Notice to Proceed. The Contractor's Earthwork Work Plan shall include, at a minimum:

1. list of equipment and description of construction methods proposed for the scope specified in this Section and in Sections 02110, 02206, 02215, 02225, 02230, 02240, 02250, 02271, 02280, 02605, 02710, 02712, 02714, 02721, 02831, 02920, 02930, 02940, and 13005;
2. location of equipment service area and fueling station;
3. excavation and trenching dewatering methods and techniques;
4. methods for removal of visible rock particles larger than specified from the material for compacted fill and clayey rockfill specified in this Section and compacted clay liner and cap specified in Section 02225;
5. coordination of survey requirements for the site work;
6. verification of the existing conditions and material stockpiles;
7. stockpile management plan including surface-water management and erosion control, stockpiling by type of material, stockpile maintenance, stockpile removal and relocation, and site grading and stabilization;
8. coordination of earthwork activities with Contractor's Surface-Water Management and Erosion Control Work Plan specified in Section 02270;
9. schedule for site work activities;
10. water supply system including location, type, and size of water tank, water distribution system and equipment for dust control, construction and wheel wash system;
11. plan and measures for cold weather at temperatures below 32 degrees Fahrenheit site work activities;
12. installation and maintenance of construction safety fence and radiological-control fence;
13. coordination with Traffic Control Plan specified in Section 02150;
14. location of construction laydown area(s);
15. locations of stockpiles for material generated from clearing, grubbing, and stripping operations;
16. layout and typical cross sections of roads within the Contractor's work area;
17. construction site access and haul road layout;
18. construction utilities layout including construction power and water;
19. description of methods for installation and removal of trench supports; and

20. coordination with the Contractor's Quality Assurance Work Plan in accordance with Part 9 of the Contract Documents.

1.05 HEALTH AND SAFETY REQUIREMENTS

A. Environmental health & safety/training requirements shall be in accordance with Part 8 of the Contract Documents.

1.06 CONTRACTOR'S QUALITY ASSURANCE

A. Contractor's quality assurance requirements shall be in accordance with Part 9 of the Contract Documents.

PART 2 PRODUCTS

2.01 MATERIALS

A. Obtain fill material for compacted fill from OSDF cell excavation, trenching, and stockpiles approved by the Construction Manager. Obtain additional fill material for compacted fill, if required, from the on-site borrow area indicated on the Construction Drawings. Borrow area management shall be in accordance with Section 13000.

B. Fill material for compacted fill and trench backfill shall be free of debris, foreign objects, large rock fragments, organics, and other deleterious materials. Visible rock particles shall be maximum dimension of 5 inches for 8-inch ±1-inch thick loose lifts and 2 inches for 4-inch ±1-inch thick loose lifts. Material for compacted fill shall conform to GC, SC, SM, ML, CL, or CH according to the Unified Soil Classification System (per ASTM D 2487).

C. Clayey rockfill: The reject material from clay screening operations may be substituted for material for compacted fill below base aggregate elevations in the impacted material haul roads, cell access ramps, access corridor located outside the perimeter berm baseline, and borrow area haul road; for interim restoration in borrow area; and other fill areas outside the OSDF perimeter berm baseline. Use of clayey rockfill as specified in this Section shall be approved by the Construction Manager.

D. Construction water for moisture conditioning compacted fill shall be obtained from the on-site water source shown on the Construction Drawings.

E. Construction safety fence and radiological-control fence for activities with duration less than 30 calendar days shall be orange, high-density polyethylene, 4 feet in height, opening size approximately 4 inches by 1 inch, minimum tensile strength of 2000

pounds per foot of width. Where used to delineate radiologically controlled areas (RCAs), no fencing is required. Contractor shall install posts and Fluor Fernald will provide and install yellow/magenta rope. Posts shall be T-shaped (T-post), 1-1/2 inch by 1-1/2 inch, 3/16 inch thick by 6 feet long, and made of steel or as approved by the Construction Manager.

F. Furnish construction safety fence and radiological-control fence for activities with a duration greater than 30 calendar days made of galvanized steel welded wire fabric, 2 inch by 4 inch mesh, 4 feet in height, 12-1/2 gauge, or equivalent approved by the Construction Manager. Posts for the fence material shall be 6 feet long and made of steel. Install posts at spacing recommended by the Manufacturer's installation procedures and as required to prevent sagging.

G. Contractor shall furnish and install signs for construction safety fence in accordance with Part 8 of the Contract Documents.

H. Signs for radiological-control fence shall be furnished and installed by Fluor Fernald, Inc.

2.02 EQUIPMENT

A. Furnish equipment to perform work specified in this Section.

B. Furnish equipment to achieve required compaction specified in this Section.

C. Furnish hand compaction equipment, such as walk-behind padfoot compactors, hand tampers, or vibratory plate compactors, for compaction in areas inaccessible to large compaction equipment.

D. Furnish water tank trucks, pressure distributors, or other equipment designed to apply water uniformly and in controlled quantities at variable surface widths to provide the required in-place moisture content and to prevent drying of soil surfaces.

E. Furnish equipment such as scarifiers, disks, spring tooth or spike tooth harrows, earth hauling equipment, and other equipment as required for earthwork construction.

PART 3 EXECUTION

3.01 GENERAL

A. Verify existing conditions in accordance with Section 02100.

B. Perform construction activities in such a manner that equipment operating in the RCAs do not operate in non-RCAs. Equipment operating in RCAs shall be washed by the Contractor; and radiologically surveyed and released by Fluor Fernald, Inc. prior to exiting for use in non-RCAs.

C. Install surface-water management and erosion controls in accordance with Section 02270.

D. Dust control shall be in accordance with Part 6 of the Contract Documents.

3.02 SITE PREPARATION

A. Install construction safety fence and radiological-control fence at construction limits and limits of the RCAs in accordance with the Contractor's Earthwork Work Plan and Part 8 of the Contract Documents. Relocate construction safety fence and radiological-control fence as shown on the Construction Drawings or as approved by the Construction Manager. Provide construction safety fence as shown on Construction Drawings. Signs and barricades around trenches, stockpiles, and excavated areas shall be in accordance with Part 8 of the Contract Documents.

B. Maintain and repair construction safety fence and radiological-control fence for the duration of the Contract. Fencing shall be maintained so as to minimize vertical sagging.

C. Install, maintain, and inspect surface-water management and erosion controls in accordance with Section 02270.

D. Prior to earthwork activities, perform clearing, grubbing, and stripping in accordance with Section 02110.

E. Construct impacted material haul roads, cell access ramps, and access corridors in accordance with the Construction Drawings and Section 02230.

F. Locate existing manholes, drop inlet structures, monitoring wells, piezometers, lysimeters, utilities, and other subsurface structures in the work area. Protect structures and utilities during earthwork activities as indicated on the Construction Drawings and approved by the Construction Manager.

3.03 SURFACE-WATER MANAGEMENT AND EROSION CONTROL

A. Install surface-water management and erosion controls in and around work areas in accordance with Section 02270.

3.04 EXCAVATION

A. Excavate designated areas to the subgrade elevations or excavation limits shown on the Construction Drawings. Stockpile excavated material in the designated stockpile area shown on the Construction Drawings or at locations approved by the Construction Manager.

B. Excavate material within the excavation limits, including rock encountered, regardless of type, character, composition, and condition. Remove clay pipe tile subdrain system when encountered in accordance with Section 02205. Place clay pipe subdrain section in the OSDF constructed cells in accordance with Section 13010.

C. Blasting, including use of explosives or explosive devices, shall not be permitted.

D. Remove and relocate impacted material encountered during excavation in accordance with Section 02205. Impacted material meeting OSDF Waste Acceptance Criteria (WAC) shall be placed in accordance with Section 13010. Impacted materials exceeding OSDF WAC shall be disposed of in accordance with Section 02205.

E. Minimize sloughing and caving of excavations. Over-excavate and fill areas of excavations that cave or slough with compacted fill in accordance with this Section.

F. Over-excavate abandoned monitoring wells, borings, utilities, and lysimeters within the OSDF perimeter baseline shown on the Reference Drawings to a depth of 3 feet below subgrade elevation. Well casings, concrete, and grout shall be excavated in accordance with Section 02205 and placed in the OSDF constructed cells in accordance with Section 13010. Before removal of the existing well casings, Construction Managers will verify closure of the existing wells. Fill to subgrade elevation with compacted fill in accordance with this Section.

G. Do not remove soil from the site or dispose of soil included in this Contract except as approved in writing by the Construction Manager.

H. Perform activities in such a manner that hauling equipment transporting non-impacted materials do not operate on roads used to haul impacted material. Equipment driven on roads used to haul impacted material or in an impacted area shall be washed by Contractor, and radiologically surveyed and released by Fluor Fernald, Inc. prior to being used for earthwork activities in non-impacted areas.

I. Perform activities in such a manner that earthwork and hauling equipment working in contamination areas do not cross into certified areas.

J. Remove the existing Rerouted North Entrance and North Entrance Road pavement within the limits shown on the Construction Drawings and haul and place in OSDF constructed cells in accordance with Section 13010. Existing North Entrance Road pavement section consists of 6 inches of asphaltic concrete over 6 inches of crushed rock. Existing rerouted North Entrance Road pavement section consists of 12 inches of asphalt concrete over 8 inches of crushed rock. Existing rerouted North Entrance Road pavement section consists of 12 inches of asphaltic concrete over 8 inches of crushed rock. Excavate 2 feet below bottom of pavement elevation and road shoulder in accordance with Section 02205 and place in accordance with Section 13010, unless otherwise directed by the Construction Manager.

K. Stabilize disturbed areas in accordance with Section 02930.

3.05 EXCAVATION DEWATERING

A. Anticipate seepage of groundwater into and accumulation of surface-water runoff in excavations. Manage groundwater and surface-water runoff in excavations in accordance with this Section and Section 02270.

B. Collect water that accumulates in the excavation in a toe drain, or other suitable sump, and pump to the former production area stormwater drain control system, the leachate transmission system, or other locations as directed by the Construction Manager.

C. Prevent surface-water runon from adjacent areas from entering the excavation in accordance with Section 02270.

3.06 STOCKPILING

A. Stockpile excavated soils in the stockpile areas shown on the Construction Drawings or as directed by the Construction Manager.

B. Construct stockpiles no steeper than 3H:1V (horizontal:vertical), grade to drain, seal by tracking perpendicular to the slope contours with a dozer, and dress daily during periods when material is taken from or added to the stockpile.

C. Install surface-water management and erosion control measures at the stockpile areas in accordance with Section 02270. Stabilize stockpiles in accordance with Section 02930.

3.07 SUBGRADE AND TOP OF CONTOURING LAYER PREPARATION

A. Subgrade and top of contouring layer material shall be free of debris, foreign objects, organics, and other deleterious materials.

B. In the event saturated subgrade is encountered, localized sumps shall be constructed to facilitate removal of water. Manage removed water in accordance with this Section.

C. Perform subgrade and top of contouring layer proofrolling by driving a loaded dump truck with minimum loaded weight of 20 tons and minimum weight of 10 tons per axle or other pneumatic-tired vehicle back and forth across the area to be prepared to confirm the firmness of subgrade and top of contouring layer surface. Overlap the passes such that one set of tires on each pass runs between the two sets of tire tracks from the previous pass. Soils shall not exhibit pumping or develop ruts more than 2 inches in depth. Rutting, larger than 2 inches, shall be scarified in accordance with this Section and regraded with compacted fill material or non-impacted contouring layer material to meet the proposed subgrade or top of contouring layer elevations.

D. Subgrade for the compacted clay liner and top of contouring layer shall be scarified in accordance with Section 02225. At other locations where compacted fill is to be placed, prepare the subgrade by scarifying to a depth of 2 inches using the equipment identified in this Section.

E. In areas where unsuitable soils are encountered, remove and replace the soil to a minimum depth of 1 foot below the proposed subgrade elevation. Remove unsuitable subgrade to an additional depth if necessary to obtain a suitable soil surface for subsequent fill placement. Removal of unsuitable soils to additional depth shall be as approved by the Construction Manager. Suitable soil surface exhibiting pumping or developing ruts more than 2 inches in depth shall be removed to a minimum depth of 1 foot or dried in place by a method approved by the Construction Manager. Fill areas from which subgrade has been removed with compacted fill in accordance with this Section. Compact the fill material to at least 95 percent standard Proctor maximum dry unit weight as determined by ASTM D 698. Compact the uppermost lift of compacted fill beneath road and access corridor alignments to a minimum 98 percent of the standard Proctor maximum dry unit weight as determined by ASTM D 698.

F. In excavations or other areas where water accumulates, implement measures to remove the water in accordance with this Section. Maintain the subgrade surface free of standing water and in a firm condition to meet the proofrolling requirements of this Section. Maintain dewatered areas in this condition until overlying construction is complete.

G. Manage surface-water runon or runoff in accordance with Section 02270.

3.08 COMPACTED FILL

A. Use fill material that meets the material requirements of this Section. Place the fill material to the limits and grades shown on the Construction Drawings.

B. Place fill material on surfaces which are free of debris, branches, vegetation, mud, ice, or other deleterious materials.

C. Place fill material in loose lifts with a thickness of 8 inches ±1 inch. In areas where compaction is to be performed using hand-operated equipment, place the fill material in loose lifts with a thickness of 4 inches ±1 inch.

D. Remove visible rock particles with a maximum dimension larger than 5 inches for 8-inch ±1-inch thick loose lifts. For 4-inch ±1-inch thick loose lifts, the maximum rock particle size shall be 2 inches.

E. Prior to placing a succeeding lift of fill material over a previously compacted lift, thoroughly scarify the previous lift to a depth of 2 inches by discing, raking, or tracking with a dozer. Moisture condition the preceding lift in accordance with this Section if the moisture content of the surface of the preceding lift is not within the range of acceptable moisture contents specified in this Section.

F. The trafficking of scarified surfaces by trucks or other equipment, except compaction equipment, is not permitted.

G. The maximum acceptable soil clod size after processing is 3 inches. Reduce clod size by discing, raking, tracking with a dozer, using a soil stabilizer, or other means approved by the Construction Manager. Soil clumps, consisting of an agglomeration of 3-inch clods, or smaller, will not be considered a clod for purposes of this Section.

H. Compact fill material in each lift to at least 95 percent of its standard Proctor maximum dry unit weight as determined by ASTM D 698. Compact fill at a moisture content within ±3 percentage points of the standard Proctor optimum moisture content as determined by ASTM D 698.

I. Moisture condition the fill material to achieve the compaction requirements of this Section. Use a water spraying system for wetting. During wetting or drying, regularly disc, rake, or otherwise mix the material to thoroughly blend the moisture throughout the lift. Use discing, raking, or other appropriate methods to dry the material as required.

J. Do not place frozen fill nor place fill material on frozen subgrade or previously placed compacted fill.

K. Do not compact fill material at temperatures below 32 degrees Fahrenheit, unless authorized in writing by the Construction Manager.

L. Do not place fill during periods of precipitation. Placement may occur during periods of misting or drizzle, but only if authorized by the Construction Manager.

M. Rework compacted fill that does not meet the required compaction.

3.09 CLAYEY ROCKFILL

A. Visible rock particles with maximum dimension greater than 12 inches shall be removed from the clayey rockfill and stockpiled for future use in areas designated by the Construction Manager. Clayey rockfill shall be placed in maximum 12-inch thick loose lifts and compacted with a minimum of four passes of a Caterpillar 815 compactor or approved equal. Final lift surface of compacted clayey rockfill material shall be proofrolled as specified in this Section. Any compacted clayey rockfill material exhibiting excessive pumping or rutting (ruts greater than 2 inches in depth) due to wet material or insufficient compaction shall be dried and recompacted or removed from the fill. Clayey rockfill shall be used only as specified in this Section unless otherwise approved by the Construction Manager.

3.10 PERFORATIONS

A. Perforations in the compacted fill, subgrade, and top of contouring layer resulting from survey stakes or other activities shall be backfilled with soil or bentonite mix specified in Section 02225. Perforations resulting from nuclear density tests and sand-cone or drive cylinder density tests will be filled by the CQC Consultant in accordance with Section 02225.

3.11 CONSTRUCTION QUALITY REQUIREMENTS

A. CQC Consultant will perform soil conformance testing on compacted fill materials to confirm compliance with this Section. Conformance testing to be performed and minimum testing frequencies shall be in accordance with the Construction Quality Assurance (CQA) Plan. Provide equipment and labor to assist the CQC Consultant in obtaining conformance samples from excavations, stockpiles, and borrow areas. Identify source(s) and quantity of fill material required from each source for Construction Manager's approval at least 15 calendar days prior to use.

B. CQC Consultant will monitor earthwork activities in accordance with this Section and the CQA Plan. CQC Consultant will provide documentation to the Construction Manager for the proofrolling of subgrade, top of contouring layer, and compacted clayey rockfill final lift surface.

C. CQC Consultant will perform performance testing on compacted fill lifts to confirm compliance with this Section. The performance testing to be performed and minimum testing frequencies shall be in accordance with the CQA Plan.

D. If CQC Consultant's tests indicate that any portion of the compacted fill does not meet the requirements of this Section, CQC Consultant will delineate the extent of the nonconforming area. Rework the nonconforming area until it meets the requirements of this Section.

3.12 SURVEY CONTROL

A. Survey the locations, limits and grades of excavations, stockpiles, prepared subgrade, compacted fill, and compacted clayey rockfill in accordance with Section 02100.

3.13 TOLERANCES

A. Perform the earthwork construction to within ±0.3 feet of the grades indicated on the Construction Drawings except for subgrade for the compacted clay liner, top of contouring layer, access corridor, and roads for which earthwork construction shall be within -0.3 to +0.1 feet of the grades indicated.

[END OF SECTION]

SPECIFICATION COVER SHEET

SPECIFICATION SECTION: 02215 **TITLE:** Trenching and Backfilling

Specifications By: Signature _____ Date 17 Aug 01
(Cognizant Engineer)
Printed Name and Title: Michael J. Monteleone, P.E., Associate

Scope and Format Checked By: Signature _____ Date 17 Aug 01
(Checker)
Printed Name and Title: Michael J. Monteleone, P.E., Associate

Detailed Requirements Checked by: Signature _____ Date 17 Aug 01
(Checker)
Printed Name and Title: David K. Phillips, Senior Project Engineer

Overall Review By: Signature _____ Date 20 Aug 2001
(PDP)
Printed Name and Title: J.F. Beech, Ph.D., P.E., Principal

Approved by: Signature _____ Date 20 Aug 2001
(DTL)
Printed Name and Title: J.F. Beech, Ph.D., P.E., Principal

Record of Revision (Number and initial all revisions)

Rev. No.	Reason	Date	By	Checked	Approval
0	Certified for Construction	20 August 01	MJM	DKP	JFB
1	Revisions from Phase III DCNs	13 March 02	DKP	DKP	JFB

SECTION 02215

TRENCHING AND BACKFILLING

PART 1 GENERAL

1.01 SCOPE

A. This Section includes trenching and backfilling, including pipe embedment fill materials and placement.

1.02 RELATED SECTIONS AND PLANS

A. Section 02100 - Surveying

B. Section 02110 - Clearing, Grubbing, and Stripping

C. Section 02200 - Earthwork

D. Section 02225 - Compacted Clay Liner and Cap

E. Section 02605 - High-Density Polyethylene (HDPE) Pipes and Fittings

F. Section 02721 - Culverts

G. Section 13000 - Borrow Area Management

H. Construction Quality Assurance (CQA) Plan

I. Part 6 - Statement of Work

J. Part 8 - Environmental Health & Safety/Training Requirements

K Part 9 - Quality Assurance Requirements

1.03 REFERENCES

A. Latest version of American Society for Testing and Materials (ASTM) Standards:

1. ASTM C 136. Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM D 698. Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

B. Latest version of Ohio Department of Transportation Construction and Material Specifications (Ohio DOT Specifications).

C. Latest version of Occupational Safety and Health Administration (OSHA) Construction Standards.

D. Reference Reports addressing On-Site Disposal Facility (OSDF) and borrow area site subsurface conditions and off-site borrow sources:
   1. "*Geotechnical Investigation Report, On-Site Disposal Facility*" [Parsons, 1995]. This report contains geotechnical data for the subsurface soils in the OSDF area.
   2. *"Disposal Facility Pre-Design Geotechnical Investigation, Soil Investigation Data Report, CERCLA-RCRA Unit 2"* [Science Applications International Corporation, 1995]. This report presents geotechnical data for the subsurface soils in the OSDF area.
   3. "*Geotechnical Data and Evaluation Report for East and South Field Borrow Areas*" [Parsons, 1996]. This report contains geotechnical data for the subsurface soils in the borrow area.
   4. *"Off-Site Borrow Materials Geotechnical Evaluation Report"* [Parsons, 1996]. This report presents geotechnical data for potential off-site borrow sources for OSDF construction materials, including fine concrete aggregates (sand), coarse concrete aggregates (gravel), pea gravel, and riprap.

1.04 SUBMITTALS

A. For each source of pipe embedment fill material, submit the following to the Construction Manager for review within 30 calendar days from Notice to Proceed:
   1. the source of the pipe embedment fill material;
   2. written certification and test results conducted in accordance with ASTM C 136; and
   3. a 50-pound representative sample of the pipe embedment fill for visual examination, and testing, if necessary.

B. Provide a list of equipment, description of construction methods for trenching and backfilling, and other required information for trenching and backfilling in the Contractor's Earthwork Work Plan specified in Section 02200.

1.05 HEALTH AND SAFETY REQUIREMENTS

A. Environmental health and safety/training requirements shall be in accordance with Part 8 of the Contract Documents.

1.06 CONTRACTOR'S QUALITY ASSURANCE

A. Contractor's quality assurance requirements shall be in accordance with Part 9 of the Contract Documents.

PART 2 PRODUCTS

2.01 MATERIALS

A. Furnish natural sand pipe embedment fill material for reinforced concrete pipe (RCP), corrugated metal pipe (CMP), and high-density polyethylene (HDPE) pipe meeting the gradation requirements of Section 703.06 of the Ohio DOT Specifications unless otherwise indicated on the Construction Drawings or specified in this Section. Gradation testing shall be in accordance with ASTM C 136.

B. Furnish trench backfill material for RCP, CMP, HDPE pipe, and electrical conduit that meet the fill material requirements for compacted fill specified in Section 02200. Obtain trench backfill material from OSDF cell excavation, trenching, and stockpiles shown on the Construction Drawings. Obtain additional material for trench backfill, if required, from on-site borrow areas indicated on the Construction Drawings. Borrow area management shall be in accordance with Section 13000.

C. Trench backfill material for liner system anchor trenches shall meet the material requirements for compacted clay liner and cap specified in Section 02225.

D. Construction water for moisture conditioning trench backfill shall be obtained from on-site water source shown on the Construction Drawings.

E. Furnish a minimum 4-inch wide plastic underground marker tape with suitable warning legend to mark HDPE pipes and electrical conduits.

F. Furnish 14-gauge insulated stranded copper wire as shown on the Construction Drawings.

G. Bentonite for soil-bentonite plugs shall be in accordance with Section 02225.

2.02 EQUIPMENT

A. Furnish equipment to perform the work specified in this Section.

B. Furnish hand compaction equipment such as walk-behind pad-foot compactor, hand tamper, or vibratory plate compactors for compaction in areas inaccessible to large compaction equipment.

PART 3 EXECUTION

3.01 GENERAL

A. Verify existing conditions in accordance with Section 02100.

B. Review existing site utility drawings, and identify and stake existing above and below ground utilities in vicinity of trenching. Staking shall be as approved by the Construction Manager.

C. In areas of trenching and backfilling, maintain and protect existing above and below ground utilities.

D. Do not damage or disturb survey benchmarks, finished construction, and existing utilities and structures.

E. Perform clearing, grubbing, and stripping in accordance with Section 02110.

F. Dust control for trenching and backfilling shall be in accordance with Part 6 of the Contract Documents.

3.02 TRENCHING

A. Trench for placement of pipes and for liner system anchor trenches shall be to the depths and dimensions shown on the Construction Drawings. Stockpile excess excavated material from trenching in the stockpile areas shown on the Construction Drawings or as approved by Construction Manager in accordance with Section 02200.

B. Use trench support methods approved by the Construction Manager. Trench support shall satisfy applicable local, state, and federal requirements, including requirements of the OSHA Construction Standards. Provide trench support materials on site prior to the start of trenching. Maintain the safety and stability of slopes and trenches and protect adjacent utilities and structures.

C. Protect and maintain the trench bottom. Remove rock fragments or raveled materials that collect on the trench bottom. Backfill any overexcavation with compacted fill in accordance with Section 02200. Excavate any soft subgrade encountered at the trench bottom and backfill to trench bottom elevation with compacted fill in accordance with Section 02200.

D. Where trenches will be excavated in compacted fill areas, perform trenching only after compacted fill has reached at least 12 inches above proposed elevation of top of the pipe.

E. For pipe installation limit the maximum length of open trench to 200 feet in advance and 200 feet behind pipe unless otherwise approved by the Construction Manager. For anchor trench limit, open trenches to length of proposed daily geosynthetics installation unless otherwise approved by the Construction Manager. Contractor shall provide appropriate non-skid surface walkways, such as wooden boards, for access across open trenches.

F. Continuously dewater trenches. Perform dewatering in accordance with Section 02200.

G. The inside edge of liner system anchor trenches where geosynthetics will be placed shall be cut with a trenching machine to minimize soil raveling and shall be rounded to a minimum 6-inch radius.

3.03 BACKFILLING

A. General:
1. Do not backfill with frozen or saturated material.
2. Do not backfill over frozen, wet, or soft trench bottom or side slopes. Remove materials that are frozen, wet, or soft as specified in this Section.
3. Do not disturb or damage piping or geosynthetics in trench during backfilling.
4. Do not use compaction equipment which exerts greater than 10 pounds per square inch ground pressure over piping that is covered by less than 12 inches of backfill material.

B. Placement of pipe embedment fill for pipes and culverts:
1. Place pipe embedment fill in 7-inch ±1-inch thick loose lifts to the elevation of the bottom of the pipe or culvert.
2. Compact pipe embedment fill with a minimum of 4 passes of a vibratory plate compactor prior to placing pipe.
3. Place pipe or culvert on top of the compacted pipe embedment fill.
4. Install 14-gauge insulated stranded copper wire to top of HDPE pipes as shown on the Construction Drawings. Use cable tie-wraps at 5-feet intervals to tie copper wire to pipe prior to backfilling.
5. For pipes 12 inches in diameter or less, place additional pipe embedment fill on the sides and gently hand tamp the fill around the sides as needed, such that intimate contact between the pipe and the pipe embedment fill is maintained below the spring line of the pipe. Continue placing pipe embedment fill until it is even with the top of the pipe. Compact the pipe embedment fill with a minimum of 4 passes of a walk-behind pad-foot compactor, hand tamper, or vibratory plate compactor, as appropriate. Place pipe embedment fill above the top of pipe to a minimum depth of 12 inches in two 7-inch ±1-inch thick loose lifts. Compact each lift of pipe

embedment fill with a minimum of 4 passes of a walk-behind pad-foot compactor, hand tamper, or vibratory plate compactor, as appropriate.

6. For pipes or culverts greater than 12 inches in diameter, place pipe embedment fill in 7-inch ±1-inch thick loose lifts to the limits shown on the Construction Drawings. Compact each lift with a minimum of 4 passes of a vibratory plate compactor.
7. For horizontal monitoring well pipe trenches and HDPE pipe trenches between each valve house tie-in and the cell outlet, construct a soil-bentonite plug every 50-feet along the length of the trench. Prepare soil-bentonite mixture consisting of embedment fill at its natural moisture content mixed with minimum 10 percent (by dry weight basis) bentonite granules. Thoroughly mix with a portable cement mixer or other suitable method. Place and compact the soil-bentonite mixture in the same manner as specified in this Section for the embedment fill.

C. Placement of trench backfill material for pipes and culverts:
1. After placement and compaction of pipe embedment fill to the limits shown on the Construction Drawings, place the first lift of trench backfill material in a 12-inch thick loose lift. Place subsequent lifts of trench backfill material in 8-inch ±1-inch thick loose lifts.
2. Compact trench backfill material in each lift to at least 95 percent of its standard Proctor maximum dry unit weight and at a moisture content within ±3 percent of the optimum moisture content as determined by ASTM D 698.

D. Placement of trench backfill material for liner system anchor trench:
1. Place the anchor trench backfill material in 8-inch ±1-inch thick loose lifts if compaction equipment operating weight is greater than 2000 pounds, and in 4-inch ±1-inch thick loose lifts if compaction equipment operating weight is less than 2000 pounds.
2. Compact the anchor trench backfill material to the minimum dry unit weight and range of moisture contents required for compacted clay liner and cap material specified in Section 02225.

E. Place underground marker tape in trench backfill 12 inches below finished grade above all HDPE pipes and electrical conduits.

3.04 PERFORATIONS

A. Perforations in the trench backfill resulting from survey stakes or other activities shall be backfilled with trench backfill material. Perforations resulting from nuclear density

tests and sand-cone or drive cylinder density tests will be filled with trench backfill material by the CQC Consultant.

3.05 CONSTRUCTION QUALITY REQUIREMENTS

A. CQC Consultant will perform conformance testing on pipe embedment fill and trench backfill materials to establish compliance with this Section, and Sections 02200 and 02225, as applicable. The conformance testing to be performed and the minimum testing frequencies shall be in accordance with the Construction Quality Assurance (CQA) Plan.

B. CQC Consultant will monitor trenching and backfilling as specified in this Section and the CQA Plan.

C. CQC Consultant will perform performance testing on the backfill materials to establish compliance with this Section. The performance testing to be performed and minimum testing frequencies shall be in accordance with the CQA Plan.

D. CQC Consultant shall review and approve pipe installation as-built elevations prior to backfilling.

3.06 SURVEY CONTROL

A. Survey the locations, limits, and grades of the bottom of the liner system anchor trench and compacted trench backfill in accordance with Section 02100.

B. Survey the locations, limits, and grades of pipes and culverts, including invert elevations, in accordance with Section 02100.

3.07 TOLERANCES

A. Trench bottom shall be within 0.0 to +0.2 feet of the depth indicated on the Construction Drawings.

B. Embedment fill for pipes and culverts shall be placed within 0.0 to +0.2 feet of the depth indicated on the Construction Drawings.

[END OF SECTION]

SPECIFICATION COVER SHEET

SPECIFICATION SECTION: 02230 **TITLE:** Road Construction

Specifications By: Signature _____ 17 Aug 01
(Cognizant Engineer) Date
Printed Name and Title: Michael J. Monteleone, P.E. Associate

Scope and Format Checked By: Signature _____ 17 Aug 01
(Checker) Date
Printed Name and Title: Michael J. Monteleone, P.E. Associate

Detailed Requirements Checked by: Signature _____ 17 Aug 01
(Checker) Date
Printed Name and Title: David K. Phillips Senior Project Engineer

Overall Review By: Signature _____ 20 Aug 2001
(PDP) Date
Printed Name and Title: J.F. Beech, Ph.D., P.E. Principal

Approved by: Signature _____ 20 Aug 2001
(DTL) Date
Printed Name and Title: J.F. Beech, Ph.D., P.E. Principal

Record of Revision (Number and initial all revisions)

Rev. No.	Reason	Date	By	Checked	Approval
0	Certified for Construction	20 August 01	[illegible]	DKP	JFB
1	Revisions from Phase III DCNs	13 March 02	DKP	DKP	JFB

SECTION 02230

ROAD CONSTRUCTION

PART 1 GENERAL

1.01 SCOPE

A. This Section includes impacted material haul roads, cell access ramps, access corridor, the Emergency Access Road, the Special Materials Transfer Area (SMTA), and other roads and areas as shown on the Construction Drawings to be surfaced with base aggregate.

1.02 RELATED SECTIONS AND PLANS

A. Section 02100 - Surveying

B. Section 02110 - Clearing, Grubbing, and Stripping

C. Section 02150 – Traffic Control

D. Section 02200 - Earthwork

E. Section 02270 - Surface-Water Management and Erosion Control

F. Section 02714 - Geotextiles

G. Construction Quality Assurance (CQA) Plan

H. Part 6 - Statement of Work

I. Part 8 - Environmental Health & Safety/Training Requirements

J. Part 9 - Quality Assurance Requirements

1.03 REFERENCE

A. Latest version of Ohio Department of Transportation Construction and Material Specifications (Ohio DOT Specifications).

1.04 SUBMITTALS

A. For each source of base aggregate material, submit the following to the Construction Manager for review within 30 calendar days from Notice to Proceed:
   1. the source of the materials along with written certification from the supplier that the material meets the material requirements of this Section; and
   2. certification shall include test results as required by Ohio DOT Specifications for base aggregate materials demonstrating that it meets the requirements of items from the Ohio DOT Specifications specified in this Section.

B. Provide a list of equipment, description of construction methods, and other required information to perform the construction activities described in this Section with the Contractor's Earthwork Work Plan specified in Section 02200.

1.05 HEALTH AND SAFETY REQUIREMENTS

A. Environmental health & safety/training requirements shall be in accordance with Part 8 of the Contract Documents.

1.06 CONTRACTOR'S QUALITY ASSURANCE

A. Contractor's quality assurance requirements shall be in accordance with Part 9 of the Contract Documents.

PART 2 PRODUCTS

2.01 MATERIALS

A. Furnish base aggregate material consisting of crushed carbonate stone or crushed gravel, free of organic matter and other deleterious materials, which meets the requirements of Items 304.02 and 703.04 (2) of the Ohio DOT Specifications for aggregate base.

B. Furnish a geotextile separator meeting the requirements of Section 02714.

C. Furnish materials for compacted fill or clayey rockfill meeting the requirements of Section 02200.

D. Furnish road signs and other traffic controls in accordance with Section 02150.

2.02 EQUIPMENT

A. Furnish equipment for construction of impacted material haul roads, cell access ramps, access corridors, the Emergency Access Road, the SMTA, and other roads shown on the Construction Drawings in accordance with the requirements of this Section.

PART 3 EXECUTION

3.01 GENERAL

A. Dust control during the performance of road construction activities described in this Section shall be in accordance with Part 6 of the Contract Documents.

B. Install surface-water management and erosion controls in accordance with Section 02270.

C. Perform clearing, grubbing, and stripping to the limits indicated on the Construction Drawings or identified by the Construction Manager, and in accordance with Section 02110 prior to any earthwork activity.

3.02 SUBGRADE PREPARATION

A. Prepare subgrade for the road construction described in this Section in accordance with Section 02200.

3.03 GEOTEXTILE PLACEMENT

A. Install the geotextile separator over the prepared subgrade in accordance with Section 02714.

3.04 BASE AGGREGATE

A. Construct the base aggregate layer to the thickness, grades, and limits indicated on the Construction Drawings.

B. Place the base aggregate material on top of the geotextile separator by end dumping and carefully spread using a track bulldozer. Do not operate equipment directly on the geotextile.

C. Place the base aggregate in accordance with the requirements of Item 304.04 of the Ohio DOT Specifications.

D. Compact the base aggregate in accordance with the requirements of Item 304.05 of the Ohio DOT Specifications.

3.05 CONSTRUCTION QUALITY REQUIREMENTS

A. CQC Consultant will perform conformance testing on materials for compacted fill used for the construction described in this Section to establish compliance with this Section and Section 02200 as applicable. Conformance testing to be performed and minimum testing frequencies shall be in accordance with the Construction Quality Assurance (CQA) Plan.

B. CQC Consultant will monitor road construction in accordance with this Section and the CQA Plan.

C. CQC Consultant will perform performance testing on compacted fill and/or compacted clayey rockfill used for the construction described in this Section to establish compliance with this Section and Section 02200. Performance test requirements and minimum testing frequencies shall be in accordance with the CQA Plan.

3.06 SURVEY CONTROL

A. Survey alignment and grades for roads, ramps, the SMTA, and corridor in accordance with Section 02100.

TOLERANCES

A. Construct the base aggregate to within 0.0 to +0.1 feet of the thickness indicated on the Construction Drawings.

B. Construct the impacted material haul roads, cell access ramps, access corridor, the Emergency Access Road, the SMTA, and other roads shown on the Construction Drawings to within ±0.2 feet of the grades indicated on the Construction Drawings.

[END OF SECTION]

SPECIFICATION COVER SHEET

SPECIFICATION SECTION: 02270 **TITLE:** Surface-Water Management and Erosion Control

Specifications By: Signature _____ 17 Aug 01
(Cognizant Engineer) Date
Printed Name and Title: Michael J. Monteleone, P.E., Associate

Scope and Format Checked By: Signature _____ 17 Aug 01
(Checker) Date
Printed Name and Title: Michael J. Monteleone, P.E., Associate

Detailed Requirements Checked by: Signature _____ 17 Aug 01
(Checker) Date
Printed Name and Title: David K. Phillips, Senior Project Engineer

Overall Review By: Signature _____ 20 Aug 2001
(PDP) Date
Printed Name and Title: J.F. Beech, Ph.D., P.E., Principal

Approved by: Signature _____ 20 Aug 2001
(DTL) Date
Printed Name and Title: J.F. Beech, Ph.D., P.E., Principal

Record of Revision (Number and initial all revisions)

Rev. No.	Reason	Date	By	Checked	Approval
0	Certified for Construction	20 August 01	MJM	DKP	JFB
1	Revisions from Phase III DCNs	13 March 02	DKP	DKP	JFB

SECTION 02270

SURFACE-WATER MANAGEMENT AND EROSION CONTROL

PART 1 GENERAL

1.01 SCOPE

A. This Section includes materials and placement of silt fence, erosion mat, check dams, construction entrances, diversions, ditches, channels, berms, and stabilization; and maintenance of sedimentation basins and surface-water management and erosion control measures.

B. Surface-water management and erosion control for the impacted material placement shall be in accordance with Section 13010.

1.02 RELATED SECTIONS AND PLANS

A. Section 02100 - Surveying

B. Section 02200 - Earthwork

C. Section 02240 - Non-Impacted Protective and Contouring Layers

D. Section 02271 - Riprap

E. Section 02275 – Surface Water Management and Erosion Control For Remediation

F. Section 02721 - Culverts

G. Section 02930 - Vegetation

H. Section 13010 - Impacted Materials Placement

I. Surface-Water Management and Erosion Control (SWMEC) Plan

J. Construction Quality Assurance (CQA) Plan

K. Part 6 - Statement of Work

L. Part 8 - Environmental Health & Safety/Training Requirements

M. Part 9 - Quality Assurance Requirements

1.03 REFERENCES

A. Latest version of Ohio Department of Natural Resources (ODNR) Rainwater and Land Development Standards (ODNR Rainwater and Land Development Standards).

1.04 SUBMITTALS

A. Submit to the Construction Manager for review within 15 calendar days from Notice to Proceed, Contractor's Surface-Water Management and Erosion Control Work Plan that shall be prepared in accordance with this Section, Section 02240, Section 02275, Section 13010, ODNR Rainwater and Land Development Standards, and the Surface-Water Management and Erosion Control (SWMEC) Plan, and shall include but not be limited to the following:
   1. descriptions of the surface-water management and erosion control measures to be implemented throughout the duration of the Contract;
   2. a list of equipment, description of methods, and other required information for installing and maintaining surface-water management and erosion control measures specified in this Section;
   3. drawings showing, in plan view, the location and sequencing of the surface-water management and erosion control measures and other required information for installation of surface-water management and erosion control measures;
   4. drawings showing details of the surface-water management and erosion control measures; and
   5. calculations supporting the selection and use of surface-water management and erosion control measures.

B. Submit the following to the Construction Manager for review within 15 calendar days from Notice to Proceed:
   1. manufacturer's product data and recommended methods of installation for products used for surface-water management and erosion control measures; and
   2. certification from the supplier or Manufacturer that products meet the requirements of this Section.

1.05 HEALTH AND SAFETY REQUIREMENTS

A. Environmental health & safety/training requirements shall be in accordance with Part 8 of the Contract Documents.

1.06 CONTRACTOR'S QUALITY ASSURANCE

A. Contractor's quality assurance requirements shall be in accordance with Part 9 of the Contract Documents.

PART 2 PRODUCTS

2.01 SILT FENCE

A. Furnish silt fence with either woven or nonwoven geotextile conforming to ODNR Rainwater and Land Development standards. Silt fence shall:
   1. be woven geotextile consisting of slit films of polypropylene treated with ultraviolet light stabilizers, or nonwoven geotextile consisting of long chain polymeric filaments or polyester yarns;
   2. be inert to chemicals commonly found in soils and to hydrocarbons;
   3. be resistant to mildew, rot, insects, and rodent attack; and
   4. have geotextile and fence post properties and minimum dimensions in accordance with this Section and ODNR Rainwater and Land Development Standards.

2.02 EROSION MAT

A. Furnish erosion mat which shall be a woven blanket-like fabric made of biodegradable yarn with the following material properties:
   1. Yarn Content: 100 percent jute except as indicated on Construction Drawings;
   2. Weight: Minimum 11.5 ounces per square yard;
   3. Open Area: 55 ±10 percent; and
   4. Minimum Mesh Opening: 0.5 inches.

B. Furnish erosion mat that will resist degradation for a minimum 6-month period after installation.

C. Furnish erosion mat having a permissible velocity of 7 feet per second (fps).

2.03 STABILIZATION

A. Materials for stabilization, including vegetation and crusting agent, shall be in accordance with Section 02930.

2.04 OTHER MATERIALS

A. Riprap shall be in accordance with Section 02271.

B. Culverts shall be in accordance with Section 02721.

C. Materials for berms shall be as specified for compacted fill in Section 02200.

D. Construction entrances shall be in accordance with ODNR Rainwater and Land Development Standards.

E. Diversions and channels shall be in accordance with ODNR Rainwater and Land Development Standards.

F. Materials for other surface-water management and erosion controls, including storm drain inlet protection, shall be in accordance with ODNR Rainwater and Land Development Standards.

2.05 EQUIPMENT

A. Furnish equipment to perform work specified in this Section.

PART 3 EXECUTION

3.01 INSTALLATION

A. Silt Fence
   1. Install silt fence in accordance with ODNR Rainwater and Land Development, and at the locations required by the Contractor's Surface-Water Management and Erosion Control Work Plan.

B. Erosion Mat
   1. Provide erosion mat at the locations indicated on the Construction Drawings and the locations indicated on the Contractor's Surface-Water Management and Erosion Control Work Plan, and those locations resulting from Section 02930 permanent slope stabilization requirements. Begin installation of erosion mat in a specific area within 48 hours after seeding has been completed in that area. Seeding shall be as specified in Section 02930. If seeding coverage in an area is lost due to inclement weather prior to installation of the erosion mat, Contractor shall reseed the previously seeded area.
   2. Place erosion mat on a prepared surface that is free of deleterious vegetation, trash, ruts, and rocks.
   3. Overlap adjacent erosion mats in accordance with the Manufacturer's recommendations.
   4. Install and staple erosion mat in accordance with Manufacturer's recommendations, except staples shall be a minimum 6-inches in length.

C. Install check dams in ditches and channels in accordance with ODNR Rainwater and Land Development Standards.

D. Apply crusting agents in accordance with Section 02930. Areas of crusting agent application shall be approved in advance by the Construction Manager.

E. Stabilize and vegetate disturbed areas in accordance with Section 02930.

F. Install riprap in accordance with Section 02271 and as shown on the Construction Drawings.

G. Construct channels, ditches, and berms as shown on the Construction Drawings and in accordance with the Contractor's Surface-Water Management and Erosion Control Work Plan. Earthwork for channels, ditches, and berms shall be in accordance with Section 02200.

H. Install construction entrances in accordance with the Contractor's Surface-Water Management and Erosion Control Work Plan.

I. Install additional surface-water management and erosion controls in accordance with the Contractor's Surface-Water Management and Erosion Control Work Plan.

J. Install storm drain inlet protection in accordance with ODNR Rainwater and Land Development Standards.

3.02 ADDITIONAL REQUIREMENTS

A. Prevent the runoff of polluting substances such as silt, clay, fuels, oils, and contaminated soils into water supplies and surface waters in accordance with the Contractor's Surface-Water Management and Erosion Control Work Plan.

B. Remove accumulated silt and debris from behind the face of the silt fence when the silt deposits reach approximately one half the height of the fence. Replace silt fence geotextile damaged during maintenance operations. Removed silt and debris shall be placed in the OSDF constructed cells in accordance with Section 13010 or stockpiled in locations approved by the Construction Manager.

3.03 SURVEY CONTROL

A. Survey permanent locations of surface-water management and erosion control measures in accordance with Section 02100.

3.04 MAINTENANCE

A. Clean, maintain, repair, and replace surface-water management and erosion controls for the duration of the Contract in accordance with the Contractor's Surface-Water Management and Erosion Control Work Plan.

B. Maintain erosion control measures and existing sedimentation basins in accordance with Part 6 of the Contract Documents.

C. Sedimentation basins shall be cleaned of silt once per construction season.

3.05 INSPECTIONS

A. Inspect surface-water management and erosion control measures and sedimentation basins to evaluate their effectiveness and need for maintenance. Any required repairs to the surface-water management and erosion control measures and sedimentation basins shall be initiated upon discovery, but no later than 24 hours after discovery. Inspections shall occur, at a minimum, at the following frequencies:
1. weekly;
2. daily after each rain event exceeding 0.5 inches; and
3. at least daily during prolonged rainfall events.

B. Records of inspections shall be kept on file on-site by Contractor and shall be submitted monthly to the Construction Manager. The records of inspection shall include the following:
1. summary of the scope of the inspection;
2. name of inspector;
3. inspection date;
4. inspection location;
5. purpose of the inspection (i.e., regular weekly, following a storm, etc.);
6. observations relative to performance of the surface-water management and erosion control measures;
7. any necessary corrective actions; and
8. corrective actions completed and their performance since the previous inspection.

3.06 CONSTRUCTION QUALITY REQUIREMENTS

A. CQC Consultant will monitor the installation and maintenance of surface-water management and erosion control measures in accordance with this Section and the Construction Quality Assurance (CQA) Plan.

[END OF SECTION]

SPECIFICATION COVER SHEET

SPECIFICATION SECTION: 02714 TITLE: Geotextiles

Specifications By: Signature _____ 17 Aug 01
(Cognizant Engineer) Date
Printed Name and Title: Michael J. Monteleone, P.E. Associate

Scope and Format Checked By: Signature _____ 17 Aug 01
(Checker) Date
Printed Name and Title: Michael J. Monteleone, P.E. Associate

Detailed Requirements Checked by: Signature _____ 17 Aug 01
(Checker) Date
Printed Name and Title: David K. Phillips Senior Project Engineer

Overall Review By: Signature _____ 20 Aug 2001
(PDP) Date
Printed Name and Title: J.F. Beech, Ph.D., P.E. Principal

Approved by: Signature _____ 20 Aug 2001
(DTL) Date
Printed Name and Title: J.F. Beech, Ph.D., P.E. Principal

Record of Revision (Number and initial all revisions)

Rev. No.	Reason	Date	By	Checked	Approval
0	Certified for Construction	20 August 01	MJM	DKP	JFB
1	Revisions from Phase III DCNs	13 May 02	DKP	DKP	JFB

SECTION 02714

GEOTEXTILES

PART 1 GENERAL

1.01 SCOPE

A. This Section includes materials and installation for geotextiles.

B. Quantity of geotextile materials to be furnished by Fluor Fernald, Inc. will be as specified in Part 6 of the Contract Documents. Additional required geotextile materials, shall be furnished by the Contractor.

1.02 RELATED SECTIONS AND PLANS

A. Section 02200 - Earthwork

B. Section 02215 - Trenching and Backfilling

C. Section 02230 - Road Construction

D. Section 02271 - Riprap

E. Construction Quality Assurance (CQA)

F. Part 6 - Statement of Work

G. Part 8 - Environmental Health & Safety/Training Requirements

H. Part 9 - Quality Assurance Requirements

1.03 REFERENCES

A. Latest version of American Society for Testing and Materials (ASTM) Standards:

1. ASTM D 4355. Standard Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-ARC type apparatus).
2. ASTM D 4491 Standard Test Method for Water Permeability of Geotextiles by Permittivity.
3. ASTM D 4533. Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
4. ASTM D 4632. Standard Test Method for Breaking Load and Elongation of Geotextiles (Grab Method).

5.	ASTM D 4751.	Standard Test Method for Determining Apparent Opening Size of a Geotextile.
6.	ASTM D 4833.	Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
7.	ASTM D 4873.	Standard Guide for Identification, Storage, and Handling of Geotextiles.
8.	ASTM D 5261.	Standard Test Method for Measuring Mass Per Unit Area of Geotextiles.
9.	ASTM D 5493.	Standard Test Method for Permittivity of Geotextiles Under Load.
10.	ASTM D 6241.	Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile Related Products Using a 50-mm Probe.

B. Federal Standard No. 75la - Stitches, Seams, and Stitching.

1.04 SUBMITTALS

A. Submit to the Construction Manager a letter of acceptance for the quantity of geotextile materials furnished by Fluor Fernald, Inc. Quantity of geotextile materials stored on site shall be inspected, inventoried, and accepted within 30 calendar days of Notice to Proceed.

B. For geotextiles furnished by Contractor, submit the following to Construction Manager for review within 30 calendar days from Notice to Proceed:
   1. product name;
   2. geotextile manufacturing capabilities, including;
      a. daily production capacity available for this Contract; and
      b. manufacturing quality control procedures;
   3. certification of minimum average roll values 95 percent lower confidence limits and the corresponding test procedures for all geotextile properties listed in Tables 02714-1 to 02714-5;
   4. projected geotextile delivery dates; and
   5. recommended long-term storage requirements and limitations.

C. For geotextiles furnished by Contractor, submit to Construction Manager for review at least 14 calendar days prior to transporting geotextile to the site, manufacturing quality control certificates signed by the quality control manager applicable to each roll of geotextile as specified in this Section. The submittal shall include a list of roll numbers to be shipped indicating which rolls were sampled and tested. The certificates shall state that the geotextiles are continuously inspected and are needle-free. The quality control certificates shall also include:
   1. lot, roll numbers, and other identification;

2. sampling procedures; and
3. results of quality control tests, including descriptions of test methods used (the Manufacturer quality control tests to be performed are specified in this Section).

D. Provide list of equipment, description of installation methods storage methods in accordance with manufacturer's recommendation, and other required information related to the installation of geotextile in the Earthwork Work Plan specified in Section 02200.

1.05 HEALTH AND SAFETY REQUIREMENTS

A. Environmental health & safety/training requirements shall be in accordance with Part 8 of the Contract Documents.

1.06 CONTRACTOR'S QUALITY ASSURANCE

A. Contractor's quality assurance requirements shall be in accordance with Part 9 of the Contract Documents.

PART 2 PRODUCTS

2.01 GEOTEXTILE

A. Geotextile materials furnished by Fluor Fernald, Inc. will meet the following requirements:
1. minimum average roll values with 95 percent lower confidence limits meeting or exceeding the required property values specified in Tables 02714-1 for geotextile filters and sacrificial geotextile filters, 02714-2 for geotextile cushion in final cover system, 02714-3 for geotextile cushion in liner system, 02714-4 for supplemental geotextile cushion in liner and scaraficial geotextile cushion in the final cover systems, and 02714-5 for geotextile separator; and
2. manufactured from first quality polymers, with not more than 20 percent reclaimed polymer used in production.

B. Geotextiles furnished by Contractor shall meet or exceed the required property values specified in Tables 02714-1 through 02714-5. Geotextiles shall be manufactured from first quality polymers with not more than 20 percent reclaimed polymer used in production.

C. Furnish polymeric threads for stitching that are ultra-violet (UV) light stabilized to at least the same requirements as the geotextile to be sewn. Threads shall be polyester or polypropylene threads that have a minimum size of 2,000 denier.

2.02 MANUFACTURING QUALITY CONTROL

A. For geotextile furnished by Contractor, sample and test the geotextile to demonstrate that the material conforms to the requirements of this Section. Do not supply any geotextile roll that does not comply with the manufacturing quality control requirements.

1. Perform manufacturing quality control tests to demonstrate that properties conform to the values specified in Tables 02714-1 to 02714-5. Perform the following manufacturing quality control tests at a maximum interval of one test for each 50,000 square feet manufactured. All tested rolls of material used to certify compliance shall be delivered to the site. Test data for rolls not delivered to the site will not be accepted.

Test	Procedure
Mass per unit area	ASTM D 5261
Grab strength	ASTM D 4632
Tear strength	ASTM D 4533
Puncture strength	ASTM D 4833 or ASTM D 6241

2. Perform additional manufacturing quality control tests on geotextile filter properties only, at a maximum interval of one test for each 100,000 square feet manufactured to demonstrate that its apparent opening size (ASTM D 4751) and permittivity (ASTM D 4491 or ASTM D 5493) conform to the values specified in Table 02714-1. All tested rolls of material used to certify compliance shall be delivered to the site. Test data for rolls not delivered to the site will not be accepted.

B. For geotextile furnished by Contractor, if a geotextile sample fails to meet the quality control requirements of this Section, sample and test rolls manufactured at the same time and in the same lot as the failing roll. Continue to sample and test the rolls until the extent of the failing rolls are bracketed by passing rolls. Do not supply failing rolls.

2.03 PACKAGING

A. Geotextiles rolls will be wrapped in relatively impermeable and opaque protective covers.

B Covers which become torn or damaged shall be repaired by the Contractor with similar materials.

C. Geotextile rolls will be marked or tagged in accordance with ASTM D 4873 with the following information:

1. Manufacturer's name;
2. product identification;
3. lot or batch number;
4. roll number; and
5. roll dimensions.

D. Geotextile rolls not labeled in accordance with this Section or on which labels are illegible shall be rejected and replaced. The Contractor shall notify the Construction Manager of any rolls not labeled in accordance with the Section.

E. The minimum size of each lot for geotextile furnished by the Contractor and delivered to the Site will be 100,000 ft^2.

2.04 SHIPPING

A. Geotextiles furnished by Contractor, shall not be shipped prior to final review and confirmation of compliance of Manufacturer's quality control submittals specified in this Section and conformance testing specified in the CQA Plan and by the Consultant

2.05 ACCEPTANCE, HANDLING, AND STORAGE

A. Upon delivery to the project site, Contractor shall inspect and inventory the geotextile materials and the manner in which they are stored. Contractor shall also inspect geotextile material stockpiled at the OSDF. Contractor shall provide to the Construction Manager with a written letter of acceptance within 30 calendar days if material is acceptable for installation. Contractor shall also notify the Construction Manager in writing within 30 calendar days of any geotextile material that is not acceptable for installation.

B. Protection and preservation of geotextile material shall include, but not be limited to:
   1. protection from sunlight, moisture, excessive heat or cold, puncture, mud, dirt, and dust or other damaging conditions; follow geotextile Manufacturer recommendations for handling and storage; Manufacturer recommendations will be provided by the Construction Manager for geotextile furnished by Fluor Fernald, Inc.; and
   2. storage of rolls on pallets, or other elevated structures; do not store rolls directly on the ground.

C. Contractor shall unload, handle and store geotextile material furnished by Fluor Fernald, Inc. and by Contractor. Handling shall be performed such that damage to geotextile materials does not occur.

2.06 EQUIPMENT

A. Furnish equipment for acceptance, handling, storage, and installation of geotextile.

PART 3 EXECUTION

3.01 PLACEMENT

A. Do not commence geotextile installation until the CQC Consultant completes performance testing and confirmation of compliance of underlying layers, including acceptance of Contractor's survey results for underlying layers.

B. Handle geotextiles so as to ensure they are not damaged.

C. Take precautions to prevent damage to underlying layers.

D. After unwrapping the geotextiles from their opaque covers, do not leave them exposed for a period in excess of 10 calendar days or for the Manufacturer's written recommended exposure period.

E. If white colored geotextiles are used, take appropriate safety precautions against "snowblindness" of personnel.

F. Take care not to entrap stones, excessive dust, or moisture below or in the geotextiles.

G. Examine the geotextile surface after installation to ensure that no potentially harmful foreign objects are present. Remove any such objects and replace any damaged geotextiles.

3.02 SEAMS AND OVERLAPS

A. Continuously overlap a minimum of 6 inches and sew geotextile filters, cushions, and supplemental geotextile cushions using a "single prayer" seam. Sew seams using Stitch Type 401 as per Federal Standard No. 751a. Spot sewing will not be allowed.

B. Do not install horizontal seams on slopes that are steeper than 10 horizontal to 1 vertical (10H:1V). Seams shall be along, not across, the slopes.

C. Overlap geotextile separator a minimum of 12 inches and spot sew at intervals to ensure that the overlap is maintained.

D. Overlap geotextile filter used for riprap construction in Section 02271 a minimum of 12 inches. No seaming is required.

3.03 REPAIR

A. Repair holes or tears in the geotextiles using a patch made from the same geotextile material. Extend geotextile patches a minimum of 1 foot beyond the damaged area. Sew geotextile patches into place no closer than 1 inch from panel edge. Should tear exceed 50 percent of the width of the panel, cut across the entire width of the panel and seam as an end seam. For slope areas steeper than 10H:1V, tears exceeding 50 percent of the width of the panel shall be removed and replaced.

B. Remove any soil or other material that may have penetrated the torn geotextiles. .

3.04 CREST ANCHORAGE SYSTEM

A. Install the geotextile along with the other geosynthetic layers in the anchor trench and wedge at the crest of the slope as shown on the Construction Drawings. Temporarily anchor the geosynthetic layers using sandbags or other means until the commencement of trench backfilling. Do not place geotextiles in anchor trench if standing water is present.

B. Do not entrap soil, sand bags, excessive moisture, or other materials below or between the geosynthetic layers in the anchor trench.

C. Backfill the anchor trench with compacted clay liner once all the geosynthetic layers are installed in the anchor trench. Backfill to the limits shown on the Construction Drawings. Compact backfill in accordance with Section 02215.

D. Do not damage exposed geosynthetic layer when backfilling the anchor trench.

E. Do not place granular drainage material for the leak detection system or leachate collection system on the side slopes until after the anchor trenches are completely backfilled unless authorized in writing by the Construction Manager.

3.05 PLACEMENT OF SOIL AND AGGREGATE MATERIALS

A. Place soil materials on top of geotextiles in such a manner as to ensure that:
   1. the geotextiles and the underlying materials are not damaged; and
   2. slippage does not occur between the geotextile and the underlying layers during placement.

B. Spread soil on top of the geotextile to cause the soil to cascade onto the geotextile rather than be shoved across the geotextile.

C. For geotextile cushions overlying the geomembrane, do not place granular drainage material at ambient temperatures below 40 degrees Fahrenheit (°F) or above 104°F.

For placement of granular drainage material below 40°F and above 104°F, Contractor shall submit placement methods to the Construction Manager for review and approval.

D. Do not drive equipment directly on the geotextile. Only use equipment above a geotextile cushion overlying a geomembrane that meets the following ground pressure requirements:

Maximum Allowable Equipment Ground Pressure (pounds per square inch)	Minimum Thickness of Overlying Fill or Aggregate Layer (inches)
less than 5	12 (see note 1)
less than 10	18
less than 20	24
greater than 20	36

Note 1: Minimum thickness of first loose lift of the clay liner material for the protective clay layer shall be a 10-inch ±1-inch.

E. Place aggregate over geotextile separator as shown on the Construction Drawings prior to trafficking in accordance with Section 02230.

F. Place soil over geotextile filters as shown on the Construction Drawings prior to trafficking.

3.06 CONSTRUCTION QUALITY REQUIREMENTS

A. CQC Consultant will perform conformance testing on the geotextile materials furnished by Contractor to establish compliance with this Section. Conformance testing and minimum frequencies shall be in accordance with the Construction Quality Assurance (CQA) Plan.

B. CQC Consultant will monitor the geotextile installation in accordance with this Section and CQA Plan.

000462

TABLE 02714-1

REQUIRED PROPERTY VALUES FOR GEOTEXTILE FILTER AND SACRIFICIAL GEOTEXTILE FILTER

PROPERTIES	QUALIFIER	UNITS[4]	SPECIFIED[3] PROPERTY VALUES	TEST METHOD
Identification Requirements				
Type	(-)	(-)	Nonwoven needlepunched	(-)
Polymer composition	minimum	%	95 polypropylene or polyester by weight	(-)
Mass per unit area	minimum	oz/yd^2	7	ASTM D 5261
Filter Requirements				
Apparent opening size (O_{95})	maximum	mm	0.212	ASTM D 4751
Permittivity	minimum	sec^{-1}	0.5	ASTM D 4491 or ASTM D 5493
Mechanical Requirements				
Grab strength	minimum	lb	180	ASTM D 4632[1]
Trapezoidal tear strength	minimum	lb	75	ASTM D 4533[2]
Puncture strength	minimum	lb	75	ASTM D 4833
Static puncture strength	minimum	lb	450	ASTM D 6241
Durability Requirements				
Ultraviolet Resistance	minimum	%	70	ASTM D 4355

Notes:

(1) Minimum of values measured in machine and cross machine directions with 1 by 2 inch clamp on Constant Rate of Extension (CRE) machine.

(2) Minimum value measured in machine and cross machine direction.

(3) All values represent minimum average roll values.

(4) mm = millimeter
% = percent
oz/yd^2 = ounce per square yard
sec = second
lb = pound
psi = pound per square inch

TABLE 02714-2

REQUIRED PROPERTY VALUES FOR GEOTEXTILE CUSHION IN FINAL COVER SYSTEM

PROPERTIES	QUALIFIER	UNITS[4]	SPECIFIED[3] PROPERTY VALUES	TEST METHOD
Identification Requirements				
Type	(-)	(-)	Nonwoven needlepunched	(-)
Polymer composition	minimum	%	95 polypropylene or polyester by weight	(-)
Mass per unit area	minimum	oz/yd^2	8	ASTM D 5261
Mechanical Requirements				
Grab strength	minimum	lb	200	ASTM D 4632[1]
Tear strength	minimum	lb	75	ASTM D 4533[2]
Puncture strength	minimum	lb	90	ASTM D 4833
Static puncture strength	minimum	lb	500	ASTM D 6241
Durability Requirements				
Ultraviolet Resistance	minimum	%	70	ASTM D 4355

Notes:

(1) Minimum of values measured in machine and cross machine directions with 1 by 2 inch clamp on Constant Rate of Extension (CRE) machine.
(2) Minimum value measured in machine and cross machine direction.
(3) All values represent minimum average roll values.
(4) mm = millimeter
% = percent
oz/yd^2 = ounce per square yard
sec = second
lb = pound
psi = pound per square inch

000464

TABLE 02714-3

REQUIRED PROPERTY VALUES FOR GEOTEXTILE CUSHION IN LINER SYSTEM

PROPERTIES	QUALIFIER	UNITS[4]	SPECIFIED[3] PROPERTY VALUES	TEST METHOD
Identification Requirements				
Type	(-)	(-)	Nonwoven needlepunched	(-)
Polymer composition	minimum	%	95 polypropylene or polyester by weight	(-)
Mass per unit area	minimum	oz/yd²	10	ASTM D 5261
Mechanical Requirements				
Grab strength	minimum	lb	225	ASTM D 4632[1]
Tear strength	minimum	lb	90	ASTM D 4533[2]
Puncture strength	minimum	lb	120	ASTM D 4833
Static puncture strength	minimum	lb	675	ASTM D 6241
Durability Requirements				
Ultraviolet Resistance	minimum	%	70	ASTM D 4355

Notes:

(1) Minimum of values measured in machine and cross machine directions with 1 by 2 inch clamp on Constant Rate of Extension (CRE) machine.
(2) Minimum value measured in machine and cross machine direction.
(3) All values represent minimum average roll values.
(4) mm = millimeter
% = percent
oz/yd² = ounce per square yard
sec = second
lb = pound
psi = pound per square inch

TABLE 02714-4

REQUIRED PROPERTY VALUES FOR SUPPLEMENTAL AND SACRAFICIAL GEOTEXTILE CUSHION IN LINER SYSTEM AND FINAL COVER SYSTEM

PROPERTIES	QUALIFIER	UNITS[4]	SPECIFIED[3] PROPERTY VALUES	TEST METHOD
Identification Requirements				
Type	(-)	(-)	Nonwoven needlepunched	(-)
Polymer composition	minimum	%	95 polypropylene or polyester by weight	(-)
Mass per unit area	minimum	oz/yd²	16	ASTM D 5261
Mechanical Requirements				
Grab strength	minimum	lb	350	ASTM D 4632[1]
Tear strength	minimum	lb	120	ASTM D 4533[2]
Puncture strength	minimum	lb	180	ASTM D 4833
Static puncture strength	minimum	lb	1,275	ASTM D 6241
Durability Requirements				
Ultraviolet Resistance	minimum	%	70	ASTM D 4355

Notes:

(1) Minimum of values measured in machine and cross machine directions with 1 by 2 inch clamp on Constant Rate of Extension (CRE) machine.
(2) Minimum value measured in machine and cross machine direction.
(3) All values represent minimum average roll values.
(4) mm = millimeter
% = percent
oz/yd² = ounce per square yard
sec = second
lb = pound
psi = pound per square inch

000466

TABLE 02714-5

REQUIRED PROPERTY VALUES FOR GEOTEXTILE SEPARATOR

PROPERTIES	QUALIFIER	UNITS[4]	SPECIFIED[3] PROPERTY VALUES	TEST METHOD
Identification Requirements				
Type	(-)	(-)	Nonwoven needlepunched	(-)
Polymer composition	minimum	%	95 polypropylene or polyester by weight	(-)
Mass per unit area	minimum	oz/yd²	6	ASIM D 5261
Mechanical Requirements				
Grab strength	minimum	lb	180	ASTM D 4632[1]
Tear strength	minimum	lb	75	ASTM D 4533[2]
Puncture strength	minimum	lb	75	ASTM D 4833
Static puncture strength	minimum	lb	450	ASTM D 6241
Durability Requirements				
Ultraviolet Resistance	minimum	%	70	ASTM D 4355

Notes:

(1) Minimum of values measured in machine and cross machine directions with 1 by 2 inch clamp on Constant Rate of Extension (CRE) machine.
(2) Minimum value measured in machine and cross machine direction.
(3) All values represent minimum average roll values.
(4) mm = millimeter
% = percent
oz/yd² = ounce per square yard
sec = second
lb = pound
psi = pound per square inch

[END OF SECTION]

000467

SECTION 02930

VEGETATION

PART 1 GENERAL

1.01 SCOPE

A. This Section includes soil stabilization, which includes application of crusting agent and establishing vegetation by seeding. The work in this Section includes, but is not limited to; soil preparation, interim vegetation, permanent vegetation, application of fertilizer, application of mulches, and application of crusting agent.

1.02 RELATED SECTIONS AND PLANS

A. Section 02200 - Earthwork

B. Section 02270 - Surface-Water Management and Erosion Control

C. Part 6 - Statement of Work

D. Part 8 - Environmental Health & Safety/Training Requirements

E. Part 9 - Quality Assurance Requirements

1.03 REFERENCES

A. Latest version of Ohio Department of Natural Resources (ODNR) Rainwater and Land Development Standards (ODNR Rainwater and Land Development Standards).

B. *"Identification and Listing of Hazardous Waste"*, Title 40, Code of Federal Regulations (CFR), Part 261, Subpart E.C.

C. *"Federal Hazardous Material Transportation Law"*, U.S. Department of Transportation [U.S. DOT, 1994].

1.04 SUBMITTALS

A. Submit the following to the Construction Manager for review within 15 calendar days from Notice to Proceed:

1. proposed mixes and application rates for seed, mulch, fertilizers, and crusting agents;

2. Manufacturer's product data and recommended methods of application for seed, mulches, fertilizer, and crusting agents;
3. product data for fertilizer shall also include chemical analysis including uranium analysis to assure there is no resultant or derived uranium from fertilizer use, unless waived by Construction Manager;
4. material safety data sheet (MSDS) for fertilizer, mulch binder and crusting agent; and
5. inoculant information for the permanent seed mixes.

B. Submit the following to the Construction Manager for review within 30 calendar days before seeding:
1. certificate stating seed mixture, guaranteed percentages of purity, weed content, germination of seed, name of seller, test date for the seed, and the net weight and date of shipment;
2. Manufacturer's certificate stating the available nutrients contained in the proposed fertilizer;
3. Manufacturer's certificate stating that the fiber matrix (wood fibers) meets the requirements of this Section;
4. Manufacturer's certificate stating the mulch binder meets the requirements of this Section;
5. Manufacturer's certificate stating the crusting agent meets the requirements of this Section; and
6. documentation of the straw to be used for mulch; this documentation shall verify that the straw is weed free in accordance with the requirements of this Section.

C. Submit to the Construction Manager for review within 10 calendar days before seeding a plan showing seeding area and a written statement of application rate of seed mix and/or associated materials (i.e., fertilizer, mulch, and mulch binder). Choice of seeding type shall follow the site seeding requirements and as approved by the Construction Manager.

D. Provide a list of equipment, description of construction methods, and other required information for vegetation and application of crusting agent in the Contractor's Earthwork Work Plan specified in Section 02200.

1.05 HEALTH AND SAFETY REQUIREMENTS

A. Environmental health & safety/training requirements shall be in accordance with Part 8 of the Contract Documents.

1.06 CONTRACTOR'S QUALITY ASSURANCE

A. Contractor's quality assurance requirements shall be in accordance with Part 9 of the Contract Documents.

PART 2 PRODUCTS

2.01 MATERIALS

A. Furnish seed labeled in accordance with U.S. Department of Agriculture (USDA) Rules and Regulations under the Federal Seed Act and applicable State seed laws. Furnish seed in sealed bags or containers bearing the date of expiration. Do not use seed after its date of expiration. Each variety of seed shall have a purity of not less than 90 percent by weight, a percentage of germination not less than 80 percent by weight, and a weed to seed content of not more than 0.75 percent by weight and contain no noxious weeds. Furnish seed mixtures having seed proportioned by weight in accordance with Tables 02930-1A, 02930-1B, 02930-1C and 02930-2. Areas requiring permanent seeding during the summer months (June 15 – September 20), excluding the OSDF Cell Final Cover, shall be seeded with 30 lbs/acre of ReGreen as specified in this Section. An alternative to ReGreen, and the only acceptable alternative for summer seeding of the OSDF Cell Final Cover, is stabilizing with a crusting agent as specified in this Section. Stabilization performed during the summer shall be followed by fall application of the appropriate permanent seed mix.

B. Permanent seed mixes shall be treated with fungal (Mycorrhizae) inoculant and bacterial (Rhyzobium) inoculants. The specified legumes must be inoculated with the appropriate Rhizobial strains.

C. Furnish mulch meeting the following requirements:
   1. Mulch shall be straw or wood cellulose fiber, free of clay, stone, foreign substances, and free of weeds.
   2. Straw should not contain sticks larger than ¼-inch diameter or other materials that may prevent matting down during application. Use straw that is free from mold and other objectionable material for placing with mulch blower equipment or other equipment as approved by the Construction Manager. Straw shall be generally 6 inches or more in length.
   3. Straw shall be:
      a. weed free straw from the Minnesota Crop Improvement Association certified weed free straw vendors;
      b. straw that has been inspected and determined to be weed free by Central Ohio Seed Testing;

c. native prairie grass mulch; or
d. equivalent substitute as approved by the Construction Manager.

4. Mulch applied by hydrospraying shall be a bonded fiber matrix containing wood fibers held together with a hydrocolloid-based binder, which upon drying becomes insoluble and non-dispersible. Mulch shall be comprised of 39 parts wood fiber to one part binder by weight. The fibers shall be composed of 100 percent wood or wood by-products and shall be 100 percent biodegradable. Use a bonded fiber matrix containing a green dye that will provide for easy visual inspection for uniformity of slurry spread. The bonded fiber matrix, including dye, shall contain no growth or germination inhibiting properties. The wood cellulose fiber shall be manufactured in such a manner that, after addition and agitation in slurry tanks with water, the fibers in the material become uniformly suspended to form a homogeneous material. When sprayed on the ground, the material shall allow absorption and percolation of moisture. The wood cellulose fiber shall meet the following requirements:

Item	Specification Limit
Particle Length	0.8 inch (maximum)
Particle Thickness	0.047 inch (maximum)
Ph	4.0 to 8.5
Ash Content	1.6% (maximum)
Water Holding Capacity (based on fiber dry weight)	500% (minimum)
Moisture Content	12% ± 4% (by weight)

D. Mulch binder agent shall be as approved by the Construction Manager and shall meet the following requirements:

1. The mulch binder shall be hydrocolloid base (guar gum) and shall not dissolve or disperse upon rewetting.
2. The mulch binder shall not have hazardous characteristics of ignitability, corrosivity, reactivity, or toxicity as defined in 40 CFR Part 261, Subpart C, for a hazardous waste in either its pre-applied or cured states.
3. The mulch binder shall have a flash point greater than 200°F. The mulch binder shall be neither a flammable nor combustible liquid per United States (US) Department of Transportation definition [U. S. DOT, 1994]. The mulch binder must not be susceptible to significant deterioration from exposure to the elements, including sunlight.
4. The mulch binder shall be provided in concentrated solution and prepared so that it will not change in transportation or storage.

E. The crusting agent shall be as approved by the Construction Manager and shall meet the following criteria:
   1. pine sap emulsion comprised of a 100 percent organic emulsion produced from naturally occurring resins (pine sap); or an approved equal;
   2. not comprised of chloride, lignosulfonate, petroleum, or asphaltic-type emulsions;
   3. provide dust suppression and surface stability for exposed soils, both disturbed and undisturbed soils, and exposed coal fired ash (fly ash);
   4. compatible with application via a hydro seeder, and must not require intense cleaning of equipment after application;
   5. non-tracking (i.e., will not stick to boots or tires) once cured;
   6. not have hazardous characteristics of ignitability, corrosivity, reactivity, or toxicity as defined in 40 CFR Part 261, Subpart C, for a hazardous waste in either its pre-applied or cured states;
   7. have a flash point greater than 200 °F;
   8. be neither a flammable nor combustible liquid per DOT definition; and
   9. not be susceptible to significant deterioration from exposure to the elements, including sunlight.

F. Erosion mat shall be in accordance with Section 02270.

G. Fertilizer:
   1. Furnish commercial grade fertilizer, uniform in composition that meets the requirements of all State and Federal regulations and standards of the Association of Agricultural Chemists.
   2. Fertilizer shall be slow release complete fertilizer.
   3. Two types of fertilizer mixes shall be used. Fertilizer for application within the former production area shall be 34-0-10; other fertilizers may be approved by the Construction Manager for the former production area, but they must not contain phosphorous. Fertilizer for other areas shall be 22-5-10. Other fertilizers may be approved by the Construction Manager for areas outside the former production area provided the fertilizer mix does not contain more than 6% phosphorous. Fertilizers shall contain not less than 1 percent added sulfur and not more than 8 percent added iron, or an approved equal.
   4. Fertilizer must have MSDS submitted in accordance with this Section.
   5. Fertilizer shall be used for interim seeding only.

H. Construction water shall be obtained from the on-site water source shown on the Construction Drawings.

2.02 EQUIPMENT

A. Provide equipment of size and type to perform work specified in this Section.

PART 3 EXECUTION

3.01 DELIVERY, STORAGE, AND HANDLING

A. Deliver containerized materials in uniform packages bearing the name of the manufacturer, the net weight and a statement of content. Deliver containerized materials to the site in original, properly labeled, unopened, clean containers each showing the manufacturer's guaranteed analysis conforming to applicable regulations and standards.

B. Store materials in a dry area in a manner to prevent physical damage.

3.02 GENERAL

A. Stabilization of disturbed areas by vegetation or by use of a crusting agent shall be performed at completion of excavation and stockpiles or within 7 calendar days of knowing a disturbed area will be idle for more than 45 calendar days, whichever is sooner.

B. Crusting agents may be used as temporary measures prior to placement of interim vegetation after approval for the area by the Construction Manager.

C. Interim vegetation, as specified in this Section, is required for all areas except OSDF final cover system and soil stockpiles, which are scheduled to be disturbed in future. Fertilizer shall be used for interim vegetation as specified in this Section.

D. Permanent vegetation, as specified in this Section, is required for OSDF final cover system. No fertilizer shall be used with permanent vegetation as specified in this Section.

E. Disturbed areas which are scheduled to be significantly disturbed after initial stabilization and/or need effective erosion control immediately, are to be stabilized with the interim seed mix rate specified in this Section. Disturbed areas which are not scheduled to be significantly disturbed again are to be stabilized with the permanent seed mix rate specified in this Section. Soil piles, which require effective erosion control immediately, are to be stabilized with the interim seed mix rate or a crusting agent as specified in this Section.

F. Use an erosion mat as specified in Section 02270 at locations shown on the Construction Drawings after application of seed mixture.

G. Area(s) to be seeded shall be generally free of debris, rock, root material, and other objects that may impede soil preparation and seeding activities. Perform soil

preparation by tilling/cultivating, to a depth of approximately 2 inches, to eliminate uneven areas and low spots. Maintain lines, levels and contours.

H. Repeat cultivation in areas where equipment used for hauling and spreading has compacted the area(s) to be seeded.

3.03 APPLICATION

A. The seeding season, for interim vegetation specified in this Section, is year round. However, if seeding is contemplated during the winter months of December through March, then field conditions should be assessed for ability to provide soil to seed contact. If field conditions do not support the ability to provide soil to seed contact then the area shall be stabilized with a crusting agent followed by seeding during conditions conducive to adequate soil to seed contact.

B. The permanent seeding in wet and dry areas and the cell final cover shall be performed in the Spring Season between April 1 and June 15 and/or the Fall Season between September 20 and November 30, unless otherwise approved by the Construction Manager.

C. Apply fertilizer, seed, and mulch to disturbed areas and areas excavated and graded under this Contract requiring seeding unless otherwise directed by the Construction Manager. Apply mulch within 24 hours of seeding; do not seed areas in excess of that which can be mulched within 24 hours. Winter application of seed and related materials are subject to adjustment as directed by the Construction Manager.

D. Apply seed using either the drilling, broadcasting, or hydroseeding method, as described below:
   1. Seed drilling method:
      a. This method shall be used for applying the permanent seed mix in accessible areas unless otherwise approved by the Construction Manager. The method may also be used for interim vegetation.
      b. Prepare area to be seeded by loosening the soil to a minimum depth of 3 inches.
      c. Apply commercial grade, slow release complete fertilizer, for interim vegetation only, at a rate of 150 lbs/acre at the time of preparing the seedbed for seeding.
      d. Install seed with a seed drill to obtain a final planting depth of ¼ to ½ inch using the seed rates indicated in Tables 02930-1A, 02930-1B, 02930-1C and 02930-2. All seed drilling should be done perpendicular to the direction of surface-water flow.

2. Broadcast Seeding Method:
   a. This method may be used for interim vegetation, and can be performed with the use of mechanical "cyclone" seeders, by hand seeding or by any other method which scatters seed over the soil surface.
   b. This method may also be used for permanent seeding in areas that are not accessible by the seed drill method or areas where seed drilling cannot be performed perpendicular to the direction of the surface-water flow.
   c. If Broadcast Method is used to apply permanent seed mix in sloped areas (3H:1V slope or steeper), seeding application rates in Tables 02930-1A and 02930-1B should be doubled.
   d. Prepare the area to be seeded by loosening the soil to a minimum depth of 3 inches. This is critical to allow seeds to filter into the soil to avoid washout from runoff.
   e. Apply commercial grade, slow release complete fertilizer, for interim vegetation only, at a rate of 150 lbs/acre at the time of preparing the seedbed for seeding.
   f. Install seed by broadcasting evenly over the entire site using the seed rates indicated in this Section.
   g. After application of seed, perform the following prior to placement of erosion mat.
      i. For areas receiving seed mix for cell final cover permanent vegetation (Table 02930-1C), roll seeded area with a 200 to 600 pound drum roller after seeding. If surface is not accessible for the drum roller after seeding, apply sprayed mulch at 1500 pounds per acre minimum and 100 percent continuous coverage. Mix the mulch with water at a ratio of 50 pounds of mulch per 100 gallons of water.
      ii. For areas receiving other seed mixes (Tables 02930-1A, 02930-1B or 02930-2), rake seeded area after seeding
   h. Mulch and disc-anchor using weed free mulch at a rate of 2.0 tons per acre. Spread straw mulch, either by hand or by blowing method, at the rate of 2 air-dried tons per acre. During June through September, increase straw mulch application rate to 3 air-dried tons per acre. Application of straw mulch by the blowing method is exempt from the dust control requirements specified in Part 6 of the Contract Documents.3.

Hydroseeding Method:

a. This method may be used for interim vegetation only. Hydroseeding shall be a two-step process. The seed shall be applied first, followed by a separate application of the mulch. This is to ensure soil to seed contact.
b. The mixture tank shall be cleaned prior to use to ensure remnant seed is not introduced to the proposed seed mixture.

c. Prepare area to be seeded by loosening the soil to a minimum depth of 3 inches. This is critical to allow seeds to filter into the soil to avoid washout from runoff.
d. Apply commercial grade, slow release complete fertilizer, for interim vegetation only, at a rate of 150 lbs/acre. The fertilizer is to be mixed and applied with the mulch.
e. Install seed by hydroseeding evenly over the entire area using the seed rates indicated in Table 02930-2. Use a fan-type nozzle with approximately 500 gallons of water per acre to ensure even distribution.
f. Rake the area where accessible following seeding.
g. Apply sprayed mulch at a net dry weight of 2,000 pounds per acre minimum and 100 percent continuous coverage. Mix the mulch with water at a ratio of 50 pounds of mulch per 100 gallons of water.

E. Application of Crusting Agent:
1. Apply crusting agent in accordance with manufacturer's directions.
2. Unless otherwise specified by the manufacturer, dilute concentrated pine sap emulsion to ratio of 4 parts water to 1 part concentrate. Apply diluted pine sap emulsion at a rate of 2,500 gallons per acre.

3.04 MAINTENANCE

A. Maintain the vegetated areas in satisfactory condition until acceptance of the vegetation by the Construction Manager. Maintenance of the vegetated areas includes repairing eroded areas, revegetating when necessary, watering, and mowing (if applicable). A satisfactory condition of vegetated area is defined as follows:
1. an area shall have a predominant stand of the seeded vegetation;
2. within 3 weeks, germination must occur over 90 percent of the area with no single bare area greater than 3 square feet; and
3. within 3 months, 90 percent of the area must be covered with mature vegetation.

B. The above timeframes for germination and coverage requirements are to be delayed during the dormant season between November 1 and March 15 application of the seed. The performance criteria shall be measured at the beginning of the growing season (April 1) for seed applied during the previous dormant season.

C. Areas that fail to meet these requirements shall be repaired or reseeded as necessary to produce an acceptable stand of vegetation, as specified in this Section.

D. The acceptance inspection will be performed by the Construction Manager who will determine whether repair of vegetated areas or revegetation is required.

E. Maintain areas with a crusting agent to ensure proper erosion control. The crusting agent shall be reapplied to eroded and bare areas as necessary.

3.05 WARRANTY

A. Vegetated areas shall be subject to a warranty period of not less than 12 months from initial establishment of vegetation over 100 percent of the areas seeded.

B. At the end of the warranty period, the Construction Manager will perform an inspection of the area. Seeded areas not demonstrating satisfactory condition of vegetation as specified in this Section, shall be repaired, reseeded, and maintained to meet requirements as specified in this Section at the Contractor's expense.

C. Areas that fail to meet these requirements shall be repaired or reseeded as necessary to produce an acceptable stand of vegetation, as specified in this Section. For the OSDF Cell Final Cover vegetation only, areas that fail to meet these requirements shall be repaired as necessary and reseeded to produce an acceptable stand of vegetation by using an alternate seed mix such as hydroseeding tall fescue as determined to be appropriate by the Construction Manager.

3.06 ACCEPTANCE

A. The vegetated areas shall be accepted at the end of the warranty period if a satisfactory condition exists as defined in this Section.

B. After disturbed areas are stabilized and all necessary corrective work has been completed, the Construction Manager will certify in writing the final acceptance of the vegetated areas.

3.07 CONSTRUCTION QUALITY REQUIREMENTS

A. CQC Consultant will monitor vegetation and crusting agent application in accordance with this Section and Construction Quality Assurance (CQA) Plan.

TABLE 02930-1A

SEED MIX IN DRY AREAS FOR PERMANENT VEGETATION

SPECIES	POUNDS PER ACRE (lb/ac)
Big Bluestem (*Andropogen gerardi*)	3
Little Bluestem (*Andropogen scoparius*)	2
Side-Oats Grama (*Bouteloua curtipendula*)	0.5
Indian Grass (*Sorghastrum nutans*)	2
Canada Wild-Rye (*Elymus canadensis*)	25
Switch grass (*Panicum virgatum*)	0.5
ReGreen	5
Wildflowers[(1)]:	1.5
Butterflyweed (*Asclepias tuberosa*)	
New England Aster (*Aster novae-angliae*)	
Smooth Aster (*Aster laevis*)	
Canada Milkvetch (*Astragalus Canadensis*)	
Purple Prairie Clover (*Petalostemum purpureum*)	
Ox-eye Sunflower (*Heliopsis helianthoides*)	
Bergamot (*Monadara fistulosa*)	
Purple Coneflower (*Echinacea purpurea*)	
Pale Purple Coneflower (*Echinacea pallida*)	
Yellow Coneflower (*Ratibida pinnata*)	
Black-Eyed Susan (*Rudbeckia hirta*)	
Spiderwort (*Tradescantia ohioensis*)	
Blue Vervain (*Verbena hastata*)	
Hoary Vervain (*Verbena stricta*)	
Beardtongue (*Penstemon grandiflorus*)	
Cupplant (*Silphium perfoliatum*)	
Sweet Joe Pye-Weed (*Eupatorium purpureum*)	
White False Indigo (*Baptisia leucantha*)	
Blue False Indigo (*Baptisia australis*)	
Partridge Pea (*Cassia fasciculata*)	
Rattlesnake Master (*Eryngium yuccifolium*)	
Round-headed Bush Clover (*Lespedea Capitata*)	
Stiff Goldenrod (*Solidago risida*)	

Note: (1) Wildflower mix to be apportioned according to species aggressiveness and seed counts as approved by the Construction Manager. If certain species are not available, appropriate substitutions will be approved by the Construction Manager.

TABLE 02930-1B

SEED MIX IN WET AREAS[1] FOR PERMANENT VEGETATION

Species	POUNDS PER ACRE (lb/ac)
Big Bluestem *(Andropogen gerardi)*	3
Canada Wild-Rye *(Elymus canadensis)*	25
S Grass *(Panicum virgatum)*	0.5
Blue Joint Grass *(Calamagrostis canadensis)*	0.5
Porcupine Sedge (*Carex hystericina*)	1 ounce per acre (oz/ac)
Fox Sedge (*Carex stipata*)	1 ounce per acre (oz/ac)
Dark Green Bulrush (*Scirpu.s atrovirens*)	1 ounce per acre (oz/ac)
ReGreen	5
Prairie Cordgrass (*Spartina pectinata*)	1
Wildflowers[2]:	1.5
Red Milkweed (*Asclepias incarnata*)	
New England Aster (*Aster novae-angliae*)	
Wild Senna (*Cassia hebecarpa*)	
Canada Tick Trefoil (*Desmodium canadense*)	
Prairie Blazingstar (*Liatris pycnostachya*)	
Great Blue Lobelia (*Lobelia siphilitica)*	
Bergamot (*Monadara fistulosa*)	
Yellow Coneflower (*Ratibida pinnata*)	
Branched Coneflower (*Rudbeckia hirta*)	
Blue Vervain (*Verbena hastata*)	
Angelica (*Angelica atropurpurea*)	
Sweet Joe-Rye Weed (*Eupatorium purpureum)*	

Notes: (1) Seeding in drainage ditches or swales shall contain erosion mats as specified in Section 02270 after application of seed mixture. Erosion mat shall cover a minimum width of 12 feet.

(2) Wildflower mix to be apportioned according to species aggressiveness and seed counts as approved by the Construction Manager. If certain species are not available, appropriate substitutions will be approved by the Construction Manager.

TABLE 02930-1C

SEED MIX FOR CELL FINAL COVER PERMANENT VEGETATION

Species Grass	POUNDS PER ACRE (lb/ac)
Big Bluestem *(Andropogen geradi)*	0.5
Little Bluestem *(Andropogen scoparius)*	3
Side-Oats Grama *(Bouteloua curtipendula)*	5
Buffalo Grass *(Buchloe dactyloides)*	1
Indian Grass *(Sorghastrum nutans)*	0.5
Canada Wild-Rye *(Elymus Canadensis)*	25
Annual Rye *(Lolium multiflorum)*	10
Prarie Dropseed *(Sporobulus heterolepis)*	1.5
Species Wildflower	**Ounces Per Acre (oz/ac)**
Butterflyweed *(Asclepias tuberosa)*	3.125
Smooth Aster *(Aster laevis)*	0.25
Ox-eye Sunflower *(Heliopsis helianthoides)*	1.75
Bergamot *(Monadara fistulosa)*	0.25
Purple Coneflower (*Echinacea purpurea)*	2.0
Pale Purple Coneflower *(Enhinacea pallida)*	2.0
Yellow Coneflower *(Ratibida pinnata)*	0.375
Black-Eyed Susan *(Rudbeckia hirta)*	1.0
Spiderwort *(Tradescantia ohioensis)*	1.25
Hoary Vervain *(Verbena stricta)*	0.50
Beardtongue *(Penstemon grandiflorus)*	1.0
Sweet Joe Pye-Weed *(Eupatorium perpureum)*	0.25
White False Indigo *(Baptisia leucantha)*	4.25
Blue False Indigo *(Baptisia australis)*	4.25
Partridge Pea *(Cassia fasciculate)*	32
Round-headed Bush Clover *(Lespedea Capitata)*	1.0
Stiff Goldenrod *(Solidago risida)*	0.75

TABLE 02930-2

SEED MIX FOR INTERIM VEGETATION

Species	Pounds Per Acre (lb/ac)
ReGreen	50
Partidge Pea (*Cassia fasciculate)*	10
Canada Wild Rye (*Elymus Canadensis*)	40

[END OF SECTION]