2042

IMPLEMENTATION PLAN FOR AREA 1 PHASE II SOIL CHARACTERIZATION AND EXCAVATION PROJECT

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

NOVEMBER 1997

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

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DRAFT
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REVISION C

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EXECUTIVE SUMMARY

This Implementation Plan describes the specific activities the U.S. Department of Energy (DOE) intends to execute to remediate soils, sediment, perched water, and at- and below-grade structures in Area 1 Phase II (A1PII) at the Fernald Environmental Management Project (FEMP). The A1PII area consists of approximately 153 acres in the southeastern part of the FEMP, immediately east and south of the Former Production Area. The central and southern portions of A1PII consist mostly of open grasslands. The northern portion of the area is also open land, but has been disturbed during the recent Area 1 Phase I (A1PI) remediation and activities associated with the construction of the On-Site Disposal Facility (OSDF). Plant facilities in the A1PII area include:

- The Sewage Treatment Plant (STP) and associated underground utilities. The above-grade components of the STP will be remediated by the Facilities Closure and Demolition Project (FC&DP) consistent with the OU3 Integrated Remedial Design/Remedial Action Work Plan. Remediation activities associated with at- and below-grade components, including the Sludge Drying Beds, are addressed in this Implementation Plan.

- The Dissolved Oxygen (DO) Facility and a portion of the Advanced Wastewater Treatment (AWWT) outfall pipeline. These facilities are integral components of the aquifer restoration program and will remain operational during A1PII remediation activities. These facilities will be dismantled upon completion of the aquifer restoration work and are not included in this Implementation Plan.

- The Trap Range will be remediated similar to the STP. FC&DP will remediate the above-grade components. At- and below-grade components will be addressed in this Implementation Plan. Stabilization and disposition of associated lead contaminated soils are also addressed in this Implementation Plan.

- Soil and debris resulting from remediation of A1PI is stockpiled in the northern area of A1PII, along with two miscellaneous soil stockpiles associated with construction of the rerouted North Entrance Road and the OSDF sediment basin. All pre-existing stockpiles will be removed by the Southern Waste Units (SWU)/OSDF Phase II project, along with any coincident contaminated surface soils. A1PII will certify the area.

- Two sediment traps and two sediment basins remain from A1PI remediation and OSDF construction activities. The sediment traps (ST-2 and ST-3) are north of Sector 2 in A1PI and are to be certified and regraded as part of the A1PII project. The sediment basins (A1PI Sediment Basin and OSDF Sediment Basin) are located north of the west soil stockpile. Both basins are to be used for storm water runoff control during A1PII Sector 2 activities and will be certified by A1PII.

This Implementation Plan describes the area-specific remedial design/remedial action process steps discussed in the Sitewide Excavation Plan (SEP) (i.e., predesign investigations, remedial design,

remedial action, characterization for reuse, precertification and interim grading activities). Certification design will be addressed in separate letter reports. Final restoration (including follow-on activities) will also be conducted separately and is not included in this Implementation Plan. The guidelines provided in the SEP are detailed in this document for area and project-specific conditions encountered in A1PII.

A1PII is subdivided into three sectors for logistical and scheduling reasons. Sector 1 includes the proposed OSDF Borrow Area and is bounded on the north by the STP Access Road and DO Facility. The Trap Range is also included in Sector 1. The area north of the re-routed North Entrance Road is designated as Sector 2 and includes the A1PI East and West Soil Stockpiles and the two sediment basins. Sector 3 is the central area and includes the STP and the DO Facility.

Remedial action in A1PII will be performed by two separate contractors: a site preparation/excavation contractor and a specialty subcontractor for stabilization of the lead-contaminated soil in the Trap Range. Construction drawings and technical specifications have been prepared for the entire project as the site preparation/excavation contractor will be responsible for excavation of the stabilized lead soil. The construction drawings and technical specifications are included with this Implementation Plan in the Integrated Remedial Design Package (IRDP).

The remedial action requirements described in the construction drawings and technical specifications were developed in accordance with the concepts described in this Implementation Plan, as guided by the SEP and the OSDF Waste Acceptance Criteria (WAC) Attainment Plan. As the integrating document for the IRDP, the Implementation Plan provides a comprehensive description of planned remediation activities. Remedial activities for each sector will proceed in the following general order:

- Site preparation, including the installation of surface and/or perched water controls and access control fencing
- Excavation and disposition of above-WAC material
- Removal of at- and below-grade facilities
- Excavation of below-WAC impacted soil
- Waste stream segregation and processing as necessary

- Precertification of excavated areas
- Certification that FRLs are achieved
- Interim grading (following certification)

The history and use of the A1PII area is well known. Nature and extent of contamination has been determined by computer modeling using a comprehensive database including the OU5 Remedial Investigation/Feasibility Study historical data, Removal Action (RvA 14) data, Sludge Drying Bed maintenance data and data from the A1PII predesign investigations. Principal findings of these investigations are:

- Approximately 35 yd^3 of sludge remains in the STP Sludge Drying Beds. The sludge material lies on the surface, can be visually segregated and ranges from zero to six inches thick. The Sludge Drying Beds have been designated as a Hazardous Waste Management Unit (HWMU) because sludges containing a spent solvent, tetrachloroethene, was determined to have been managed in the beds. The sludge material has total uranium concentrations above the OSDF WAC and will be disposed of offsite at a permitted commercial disposal facility.

- Above-WAC technetium-99 is not believed to be present. However, additional testing is underway to confirm this conclusion.

- Trap Range soils exhibit lead concentrations above the final remediation level (FRL). The impacted soil within this area occasionally exceeds the Resource Conservation and Recovery Act (RCRA) toxicity characteristic for lead. The impacted area is surficial and is anticipated to be easily stabilized using in-situ treatment techniques. Once stabilized, this material will be disposed of in the OSDF.

- An evaluation of remnant (i.e., post-excavation) data indicates that the proposed excavations adequately remove all area-specific contaminants of concern, except for a small area with elevated radium and thorium concentrations approximately 300 feet west of the northwest corner of the STP. Further investigation of this area is underway; results will be provided upon completion.

- Tetrachloroethene was not found in perched water during the predesign studies. All but 35 yd^3 of the sludge in the drying beds was previously removed. The storm water/perched water control system for the STP excavation is designed to treat tetrachloroethene, if encountered.

- For uranium and thorium isotopes, correlation is excellent among the real-time Radiation Tracking system (RTRAK), the high-purity germanium detector (HPGe), and laboratory test results. More randomness is observed for radium.

Material to be excavated from A1PII consists primarily of in-situ soil and fill associated with STP operations. Excavation of above-FRL material, stabilized lead-contaminated soil and removal of at- and below-grade facilities is expected to generate approximately 45,990 yd^3 of impacted material. It is anticipated that all but 60 yd^3 of this material will be hauled to and dispositioned in the OSDF, with the remainder containerized and dispositioned at a permitted off-site commercial disposal facility or the Nevada Test Site, as appropriate. Material designated for off-site disposal includes 35 yd^3 of sludge and an estimated 25 yd^3 of special materials that are prohibited in the OSDF. The 45,990 yd^3 of impacted material given above includes 1,958 yd^3 of lead-contaminated soil (i.e., unbulked).

Certification of Sector 1, outside of the Trap Range Area, is scheduled to begin on January 5, 1998. US Environmental Protection Agency (EPA)/Ohio EPA (OEPA) approval of the Sector 1 certification report is required by June 21, 1998 to allow OSDF to start hauling borrow material by June 30, 1998.

Site preparation activities are scheduled to begin for Sector 1 work in July 1998. Some preparatory work, such as construction trailers, laydown areas, parking, and miscellaneous fencing are scheduled to begin during March 1998.

This Implementation Plan covers the remediation of all of A1PII, scheduled for completion during the spring of 2000. Final restoration of the A1PII area will be conducted by another contractor after OSDF activities are complete. The overall schedule is dependent upon federal funding, regulatory approval, and weather conditions.

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LIST OF ACRONYMS AND ABBREVIATIONS

A1PI	Area 1 Phase I
A1PII	Area 1 Phase II
ACA	Amended Consent Agreeement
ACGIH	American Conference of Government and Industrial Hygenists
ACHP	Advisory Council on Historic Preservation
A/E	architect/engineer
ALARA	As Low As Reasonably Achievable
APM	Area Project Manager
ARAR	Applicable or Relevant and Appropriate Requirement
ARWWT	Aquifer Restoration Wastewater Treatment Project
ASCOC	area-specific constituent of concern
ASL	analytical support level
AWAC	above waste acceptance criteria
AWWT	Advanced Wastewater Treatment Facility
BAT	best available technology
BDN-ETS	biodenitrification effluent treatment system
BTV	benchmark toxicity value
BWAC	below waste acceptance criteria
CAM	Control Account Manager
CAMU	corrective action management unit
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CG&E	Cincinnati Gas and Electric Company
CGM	coarse grained material
CM	Construction Manager
COC	constituent of concern
CRDL	contract-required detection limit

CRP	Community Relations Plan
CU	certification unit
D&D	decontamination and dismantlement
dBA	A-weighted decibel
DCN	Design Change Notice
DF&O	Director's Findings and Orders
DO	Dissolved Oxygen Facility
DOE	United States Department of Energy
DQO	data quality objective
EC	Environmental Compliance
ECDC	Engineering/Construction Document Control
EPA	Environmental Protection Agency
ES&H	environmental safety and health
ESH & TRM	Environmental Safety and Health Training Requirements Matrix
FC&DP	Facilities Closure and Demolition Project
FDF	Fluor Daniel Fernald
FEMP	Fernald Environmental Management Project
FTL	Field Tracking Log
GAC	granular activated carbon
GFAA	graphite furnace atomic absorption
GIS	Geographic Information System
GMA	Great Miami Aquifer
HPGe	high purity germanium detector
HWMU	hazardous waste management unit
ICP	inductively coupled plasma
IEMP	Integrated Environmental Monitoring Plan
IFB	invitation for bid
IIMS	Integrated Information Management System

IP	Implementation plan
IRDP	integrated remedial design package
LDR	land disposal restriction
MDC	minimum detectable concentration
MEF	material evaluation form
mph	miles per hour
msl	mean sea level
MTL	material transfer location
NPDES	National Pollutant Discharge Elimination System
NRRP	Natural Resources Restoration Plan
ODOT	Ohio Department of Transportation
OEPA	State of Ohio Environmental Protection Agency
OHPO	Ohio Historic Preservation Office
OSDF	On-Site Disposal Facility
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PCDF	permitted commercial disposal facility
PCE	tetracholorethene (= perchloroethylene)
PSHSP	project-specific health and safety plan
PSP	project-specific plan
PWID	Project Waste Identification Document
QA/QC	quality assurance/quality control
RCI	request for clarification of information
RCRA	Resource Conservation and Recovery Act
RCT	Radiological Control Technician
RD/RA	remedial design/remedial action
RFP	request for proposal
RI/FS	remedial investigation/feasibility study

ROD	Record of Decision
RTRAK	Real-time Radiation Tracking System
RvAWP	Removal Action Work Plan
RWP	Radiological Work Permit
SCEP	Soil Characterization and Excavation Project
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
SSOD	storm sewer outfall ditch
STP	Sewage Treatment Plant
SWIFTS	Sitewide Information Forecasting and Tracking System
SWPPP	Storm Water Pollution Prevention Plan
SWRB	Storm Water Retention Basin
SWTP	Sanitary Wastewater Treatment Plant
TBC	to be considered criterion
Tc	technetium
TCLP	toxicity characteristic leaching procedure
TRM	training requirements matrix
TSS	total suspended solids
UST	underground storage tank
VDS	vendor data submittal
VOC	volatile organic compound
WAC	waste acceptance criteria
WAO	WAC Attainment Operations
WDSS	Waste Disposition Support Services
WPRAP	Waste Pits Remedial Action Project
WTP	Wastewater Treatment Project
XRF	X-Ray Fluorescence

1.0 INTRODUCTION

This Implementation Plan describes the U.S. Department of Energy (DOE)'s proposed remediation of soils, sediment, perched groundwater, and at- and below-grade structures and debris in Area 1 Phase II (A1PII) at the Fernald Environmental Management Project (FEMP) in southwestern Ohio (Figure 1-1). It also addresses remediation of two sediment traps (ST-2 and ST-3) in Area 1, Phase I (A1PI), immediately north of A1PII, and, as a contingency, off-property areas adjacent to A1PII. These remediation activities are in accordance with the Records of Decision (RODs) issued by DOE and the U.S. Environmental Protection Agency (EPA) for Operable Unit (OU) 3 (DOE 1994, 1996a), which addresses at- and below-grade structures, and OU5 (DOE 1996b), which addresses environmental media.

The FEMP property has been divided into eight remediation areas to effectively remediate soil and at- and below-grade structures and debris, as shown in Figure 1-2. The FEMP Sitewide Sequencing Plan, included as Appendix B of the FEMP Sitewide Excavation Plan (SEP; DOE 1997a), provides the remediation schedule. As indicated in the Sitewide Sequencing Plan, Area 1 is being excavated relatively early to allow construction of the On-Site Disposal Facility (OSDF). Impacted environmental media and debris from all FEMP remediation areas that meet OSDF waste acceptance criteria (WAC) will be disposed of in the OSDF. The OSDF will be segmented in cells that will be constructed from north to south within Area 1. Borrow material needed for OSDF construction will be obtained from the southern portion of Area 1. In general, Area 1 lies upgradient of other FEMP remediation areas, so early sequencing of Area 1 facilitates surface water control and helps prevent spread of contamination to clean areas.

These and other factors also contributed to the strategy of addressing Area 1 in three phases (i.e., Phases I, II, and III; Figure 1-2, SEP Section B.2). A1PII is the second of three planned remediation phases in Area 1 and follows A1PI. Except for Sediment Traps ST-2 and ST-3, addressed in this plan, remedial excavation and certification of A1PI is complete; EPA approval is pending on the draft A1PI Certification Report (DOE 1997b), which provides the results of A1PI certification studies.

This Implementation Plan and the SEP satisfy the Amended Consent Agreement (ACA; EPA 1991) requirement for an A1PII remedial action (RA) work plan. In addition, this plan and associated remedial design (RD) drawings and technical specifications constitute the A1PII Integrated Remedial

Design Package (IRDP) in accordance with the strategy outlined in the OU5 Remedial Design Work Plan (DOE 1996c). As the IRDP integrating document, the Implementation Plan describes the planned remediation activities. This will facilitate regulatory agency review and help define the scope of work necessary to procure equipment, supplies, and services for implementation of the remediation. Activities 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 is organized in general conformance with the Model Outline for IRDPs provided in Section 7 of the SEP.

As indicated in the SEP (SEP Section 1.3.2), DOE will involve the public in the A1PII remedial design as follows:

- Upon completion of the final engineering design and prior to implementing the action, DOE will prepare and distribute to the public a fact sheet describing the A1PII remedial design, and will conduct a public briefing on the remedial design.
- DOE will publish in a local newspaper of general distribution a Notice of Availability of this A1PII Implementation Plan when it is submitted to EPA and of other documents for the A1PII remediation when they are submitted to EPA.

These measures will be taken in accordance with provisions of the National Contingency Plan (40 CFR §300.435) and DOE policy as set forth in the FEMP Community Relations Plan (DOE 1995a).

1.1 SCOPE AND GENERAL APPROACH OF THE IMPLEMENTATION PLAN

As shown in Figure 1-1 of the SEP, the area-specific remedial design/remedial action (RD/RA) process at the FEMP involves several steps, including:

- Predesign investigations
- Remedial design
- Remedial action
- Precertification of excavated areas
- Certification
- Postremediation activities

Predesign investigations were conducted in A1PII to better characterize the nature and extent of contamination and to evaluate surface and sub-surface conditions that might affect remedial activities. Section 2.0 provides an overview of these investigations and their findings and describes the area-specific contaminants of concern (ASCOCs) that were of primary consideration in developing the

remedial design. Section 2.0 also presents the results of computer modeling studies used to establish design excavation limits for removing soil exhibiting contamination above the Final Remediation Levels (FRLs) established in the OU5 ROD. Actual excavation limits will be determined based on field conditions, radiological surveys of the area, and physical sampling results.

Section 3.0 provides the technical approach to A1PII remediation, which includes the following activities:

- Preparing the site for remediation
- Removing and dispositioning material having contaminant concentrations above the OSDF WAC
- Demolishing at- and below-grade structures no longer needed for FEMP operations
- Stabilizing soil exhibiting the RCRA toxicity characteristic for lead
- Excavating construction debris and contaminated soils
- Managing these waste streams in accordance with final disposal requirements
- Demonstrating that remediated areas meet FRLs for ASCOCs

A1PII remediation also includes excavation of a perched water zone which is considered an unacceptable threat of contamination to the Great Miami Aquifer (GMA) underlying the FEMP (DOE 1996d). Excavated soil and debris will be sent to the OSDF for disposal if it meets physical and chemical/radiological WAC established for the facility (DOE 1996e). Materials that do not meet OSDF WAC will either be treated on-site to meet WAC and then sent to the OSDF or will be shipped off-site for treatment and disposal at a permitted commercial disposal facility (PCDF).

Environmental controls and monitoring DOE will use during remediation are described in Section 4.0. Controls and monitoring will be established with respect to natural resources and air, surface water, and groundwater pathways. For example, DOE will control storm water runoff and remediation-generated water (e.g, water that accumulates in excavations) to ensure that FRLs for Paddys Run and the Great Miami River, and the mass-based discharge limit for total uranium established in the OU5 ROD, are not exceeded.

The specific methods and procedures to accomplish the scope of work presented in this Implementation Plan will be provided by the chosen contractor in the form of a Safe Work Plan, which will be subject to review and approval by Fluor Daniel Fernald (FDF), the FEMP remediation contractor for DOE. Section 5.0 provides an overview of project-specific health and safety requirements. Section 6.0 describes the management approach to A1PII remediation, including organization, responsibilities,

schedule, contract award, waste management, data and records management, quality assurance/quality control (QA/QC), and integration/coordination of A1PII remediation with other FEMP projects.

1.2 A1PII REMEDIATION AREA BACKGROUND AND DESCRIPTION

A1PII consists of approximately 153 acres in the southeastern portion of the FEMP (Figure 1-2). The area is generally bounded on the north by A1PI, on the east and south by the FEMP perimeter fence, and on the west by trees bordering and upslope of the South Entrance Road, an unnamed Paddys Run tributary and associated ditches, the North Entrance Road, and the Former Production Area (Figure 1-3). Remediation activities described in this plan include two A1PI sediment traps (ST-2 and ST-3) not included in the A1PI certification process. Based on predesign investigations, no off-property excavation is expected to be necessary. However, excavations are planned in the Sewage Treatment Plant (STP) Area along the eastern FEMP property boundary and the adjacent off-property area is included in this plan as a contingency in the event excavation control monitoring or precertification investigations indicate that soils exceeding FRLs are present.

For efficient planning and execution of remediation, particularly in view of the complex logistics and scheduling required to accommodate timely OSDF construction, A1PII has been subdivided into three sectors (Figure 1-3). Sector 1 is southward of the STP Access Road and Dissolved Oxygen (DO) Facility. Sector 2 is north of the North Entrance Road Phase I relocation segment. Sector 3 is between Sectors 1 and 2 and includes the North Entrance Road Phase I Relocation segment and the STP Access Road.

Except for at- and below-grade improvements summarized in Section 1.2.1, the southern and central portions of A1PII (Sectors 1 and 3) consist of rolling grassland. The few trees present are located almost exclusively along the east fenceline and in a remnant fencerow just west of the Trap Range south of the STP Access Road. Virtually all of Sector 2 has been subjected to recent land disturbance because of A1PI remediation and ongoing OSDF construction; it is presently comprised of sediment basins, soil and debris stockpiles, OSDF construction contractor support facilities, and open land. Sector 2 vegetation is essentially limited to grasses established for interim stabilization and herbaceous weeds. The off-property area adjacent to the STP that may be addressed under this plan is cropland on and near an electric transmission right-of way operated by the Cincinnati Gas & Electric Company (CG&E).

Natural (i.e., unmodified) drainage courses are ill defined or nonexistent within A1PII. Surface water in Sectors 1 and 3 is directed generally westward toward the unnamed Paddys Run tributary primarily via sheet flow. Ditches and culverts along and beneath the South Entrance Road and Old North Entrance Road direct flow to the stream. Surface drainage in Sector 2 is directed primarily to the A1PI and OSDF Sediment Basins (Figure 1-3; also see Section 2.3). A detailed description of conditions in each sector is provided in Section 2.0; the remediation approach is discussed by sector in Section 3.0.

1.2.1 Facilities and Other Improvements

Permanent facilities and improvements in and near A1PII include the STP Area, the DO Facility and Flume Building, the Trap Range, roads, and miscellaneous other facilities (Figure 1-3). No underground storage tanks are known to be located in the area. A1PII facilities of special concern include the Sludge Drying Beds in the STP Area, which have been designated a Hazardous Waste Management Unit (HWMU) under RCRA, and lead contaminated soil at the Trap Range, some of which exhibits the RCRA toxicity characteristic for lead. More detailed information about facilities in A1PII is provided in Sections 2.3.4 and 2.3.5 and Appendix E.

1.2.1.1 STP Area

Structures in the STP Area include STP components (e.g., digester, trickling filters) currently used to treat FEMP sanitary wastewater, the Sludge Drying Beds, and the STP Incinerator. The STP became operational in 1952 for treatment of FEMP sanitary wastewater and was later reconstructed to receive both sanitary and process-related wastewater. The use of the STP to treat process-related wastewater was discontinued after the FEMP bio-denitrification effluent treatment system (BDN-ETS) became operational in the late 1980s. DOE plans to replace the STP in early 1998 with a new Sanitary Wastewater Treatment Plant (SWTP). The Sludge Drying Beds were formerly used for management of STP sludge; this facility has been designated a RCRA HWMU on the basis of a determination that spent tetrachloroethene, a RCRA F002 listed hazardous waste, was managed in the beds. The STP Incinerator, located in the northwest corner of the STP Area, operated from November 1954 through December 1979 to burn uranium- and thorium-contaminated and uncontaminated combustible trash.

Approximately 35 yd^3 of residual sludge, expected to exhibit uranium concentrations above the OSDF WAC, remains in the Sludge Drying Beds. Infiltration from the beds, leaks from STP components, and air emissions from the STP Incinerator are indicated as sources of surface and subsurface soil

contamination, primarily by uranium, in and near the STP Area. Predesign investigations (Section 2.0) indicate that surface and subsurface soil in the STP Area and surface soil in an 0.6-acre area in the general vicinity of the STP Area exhibit a concentration of total uranium above applicable FRLs. Above-grade portions of STP Area structures will be demolished by the Facilities Closure and Demolition Project (FC&DP), in accordance with the OU3 RD/RA Work Plan (DOE 1997c), before the remaining at- and below-grade portions are removed under this plan.

1.2.1.2 Dissolved Oxygen Facility and Flume Building

The DO Facility is designed to oxygenate combined wastewater effluent from site discharges to ensure that the FEMP's National Pollutant Discharge Elimination System (NPDES) permit limit for dissolved oxygen is met. The Flume Building houses the Outfall Line Pit from which the combined wastewater is discharged. These facilities are expected to remain operational during and beyond A1PII remediation. Predesign data indicate that soil in the vicinity of these facilities meet applicable FRLs.

1.2.1.3 Trap Range

The Trap Range (referred to as the Skeet Range in the OU3 ROD) is an abandoned shooting range consisting of a small building (Trap Range Building) on a concrete slab, concrete firing line slabs, and a concrete trap house (i.e., partially below-grade bunker) approximately 1200 feet southwest of the STP Area. Range operation resulted in lead contamination of soil in this area (Section 2.1). Above-grade portions of the Trap Range Building will be demolished by the FC&DP, in accordance with the OU3 RD/RA Work Plan (DOE 1997c), before the remaining structures and lead-contaminated soil are removed under this plan.

Based on OU5 Remedial Investigation (RI) data (DOE 1995b), the area of lead contaminated soil at the Trap Range is the only A1PII location with the potential, upon excavation, to be toxicity characteristic hazardous waste under RCRA, which may require cost-effective treatment (see Section 2.1.1 and SEP Table 2-1). Recent predesign investigations (Section 2.2) at the Trap Range confirm that surface soil (0-6 inch depth) over approximately 2.4 acres (estimated 1,958 yd^3) exhibits lead concentrations above the 400 mg/kg FRL, and an additional approximate 1.3 acres (estimated 1,060 yd^3) exhibits lead concentrations above the 200 mg/kg Benchmark Toxicity Value (BTV; see SEP Appendix C). The above-FRL soil also exhibits the RCRA toxicity characteristic for lead and therefore will be treated to

remove the lead toxicity characteristic prior to disposal in the OSDF. After certification of FRL attainment, the remaining above-BTV soil will be left for use as borrow for OSDF construction.

1.2.1.4 Utilities and Pipelines

Electric utilities in A1PII include:

- A CG&E transmission line on steel lattice towers located just within the eastern FEMP boundary and east-west across the area near the STP Area
- Electric distribution lines on wood poles paralleling the southern perimeter fence and from the Former Production Area to the STP Area
- A buried electric distribution cable that traverses the site from the Former Production Area to a small substation located at the DO Facility
- Pole lights with associated power supply lines along the North and South Entrance Roads, at the STP Area, and along the Former Production Area fenceline in the northwestern portion of A1PII.

Above-grade portions of one of the steel lattice towers, wood poles to and within the STP Area, and associated conductors will be dismantled by FC&DP before A1PII remediation begins. Below-grade portions of these latter facilities and the buried electric cable to the DO Facility, which will be replaced by an overhead line, will be removed as part of A1PII activities. The remaining electric utilities will be left in service.

Other utilities in A1PII include a telecommunications (fiber-optic) line and buried pipelines for potable and fire water, storm water, sanitary wastewater, OSDF leachate, oil, and natural gas (Section 2.3.4). The OSDF leachate line, located in Sector 2, and the wastewater discharge line from the Advanced Wastewater Treatment facility (AWWT) and the oil pipeline, located partly or entirely in Sector 1, will remain in service. The remaining buried pipelines, running primarily between the Former Production Area and the STP and DO Facility, will be taken out of service, isolated, excavated and dispositioned with associated bedding and backfill material. Predesign investigations have not indicated soil contamination in the area of these pipelines. However, the STP influent and effluent lines are recognized as having high potential for contamination.

1.2.1.5 Roads

Paved roads in the A1PII remediation area include the STP Access Road, the Old North Entrance Road, and a diagonal segment of the North Entrance Road Phase I Relocation. The latter will be replaced by the permanent Phase II alignment after A1PII remediation activities are completed. Gravel roads are located along the southern and eastern boundaries of A1PII to access monitoring wells, air monitoring stations, and a recently installed water supply well to support OSDF construction. The STP Access Road and associated culverts, and possibly some gravel road segment(s) in and near the STP Area, will be excavated and disposed of in the OSDF. The remaining roads are intended for use after A1PII remediation and will remain. Based on recent predesign investigations, a small area (< 0.1 acre) just west of the Old North Entrance Road and north of the A1PI Sediment Basin exhibits above-FRL concentrations of total uranium in surface soil. It is the only location in A1PII outside of areas within and near the STP Area and at the Trap Range, where soil above FRLs is known to occur.

1.2.1.6 Other Improvements

Miscellaneous improvements in A1PII include fencing, the OSDF water supply well, monitoring wells, air monitoring stations, and benchmarks. Fencing will be excavated or removed when located in areas where soil exceeds FRLs or as needed to accommodate construction. It is anticipated that the OSDF water supply well and all monitoring wells that have not been abandoned before A1PII remediation begins will be left intact. Air monitoring stations and benchmarks, located mostly on the area periphery, are also planned to be left intact. Old agricultural drainage tiles, located in Sectors 2 and 3, will be excavated and dispositioned to the OSDF with associated bedding and backfill material.

1.2.2 Implications of Site Conditions on Remedial Design

Based on information regarding the history, facilities and structures, probable mechanisms of contamination, and contaminant distribution as summarized above, the materials and associated contamination likely to be encountered during A1PII remedial activities are relatively predictable. Therefore, the strategy detailed in Section 3.0 of this plan generally involves excavation to design limits followed by monitoring to ensure that all impacted soil and debris are removed. This situation permits more selective monitoring during the excavation phase than for highly heterogeneous areas where potential for encountering special materials and above WAC materials is relatively high and where excavation in lifts with intensive monitoring may be warranted.

1.3 SUMMARY OF THE REGULATORY DRIVERS

Regulatory requirements and criteria and legal obligations provide the basis for A1PII remediation activities. The pertinence of these to the remediation of A1PII is discussed in the following paragraphs. See Section 1.3.1 of the SEP for additional discussion.

1.3.1 ARARs and TBCs

The subset of ARARs and TBCs from Table A-2 of the SEP pertinent to the A1PII remediation area will be used as the basis for conducting the A1PII soil remediation. They are included with the A1PII Design Criteria Package, presented in Appendix A.

1.3.2 Permits

The NPDES permit (Permit No. 1IO00004*ED) for storm water and wastewater discharges to Paddys Run and the Great Miami River is the only permit that is pertinent to the remediation of A1PII. Storm water discharges from the remediation of A1PII are considered to be already covered under the NPDES permit through implementation of the permit-required sitewide Storm Water Pollution Prevention Plan (RM-0039; DOE 1996f). Thus, no modifications to the permit are required. Perched water and storm water from the STP Area will be collected and transferred to the AWWT for treatment prior to discharge in accordance with protocols detailed in Section 3.4.4. The collection and treatment of perched water and storm water is acknowledged in the application to renew the NPDES permit, which was submitted to the Ohio Environmental Protection Agency (OEPA) on September 22, 1997.

1.3.3 Natural Resource Trusteeship and Related Natural and Cultural Resource Regulations

Two mechanisms drive protection of natural resources during remediation. These include the Natural Resource Trusteeship process and compliance with pertinent federal and state regulations. Both of these mechanisms have been incorporated into A1PII remediation.

A conceptual restoration design for A1PII has been presented to the Trustee Council as part of the Natural Resources Restoration Plan (NRRP), submitted to EPA in August 1997 (DOE 1997d). 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 and other stakeholders, and upon completion of other required remediation activities.

Regulatory drivers for the management of natural and cultural resources and associated monitoring are grouped into three areas: threatened and endangered species protection, wetlands/floodplain protection, and cultural resource management. An additional regulatory aspect is the expected natural resource monitoring as a result of the CERCLA natural resource trusteeship process.

Threatened and Endangered Species - Based on updated FEMP property surveys conducted in 1993-94, 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 A1PII remediation project. No additional threatened/endangered species surveys have been conducted or are planned for the area.

1.3.3.1 Wetlands/Floodplains

Jurisdictional wetlands and waters of the U.S. on the FEMP are delineated in the 1993 FEMP Wetland Delineation Report, officially approved by the U.S. Army Corps of Engineers on August 19, 1993. Based on a review of an overlay of the A1PII boundary on the 1993 FEMP Jurisdictional Wetland Delineation, approximately 0.7 acres of jurisdictional wetlands located within A1PII are anticipated to be impacted as a result of A1PII remediation activities. These wetlands are emergent in nature and are associated with the drainage ditch systems in the vicinity of the North Entrance Road and STP. Dredge and fill activities within these wetland areas are authorized under U.S. Army Corps of Engineers Nationwide Permit 38 ("Cleanup of Hazardous and Toxic Waste") and its corresponding State Water Quality Certification.

The A1PII area is outside the 100-year floodplains of Paddys Run and the Great Miami River (DOE 1996e; DOE 1996f). Therefore, no floodplain impacts will result from A1PII remediation activities.

1.3.3.2 Cultural Resource Management

DOE, the Ohio Historic Preservation Office (OHPO), and the Advisory Council on Historic Preservation (ACHP) have entered into a "Programmatic Agreement Regarding Archeological Investigations at the Fernald Environmental Management Project" (March 6, 1997), pursuant to 36 CFR §800.13. The A1PII remediation area has been surveyed in accordance with this agreement and all potential historic properties discovered have undergone data recovery after consultation with the OHPO and the ACHP. No additional archeological surveys are planned for A1PII. However, a contingency

plan is in place to ensure that any additional cultural resources discovered during remediation activities are recognized and protected (Section 6.6.3).

1.4 COMPONENTS OF THE REMEDY

A1PII remediation activities address specific components of the selected remedies set forth in the OU3 and OU5 RODs for debris and environmental media, including 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 (D&D) of above-grade structures in A1PII (an OU3 ROD remedy component), which are being conducted under other FEMP remedial action plans. The following is 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 for A1PII:

- OU3 Interim and Final RODs (DOE 1994, 1996a)

  - *Remove gross contamination from material in facilities and dismantle facilities.* Detection of gross contamination will be ensured by visual inspection and radiological monitoring during excavation, particularly with respect to STP influent, effluent, and local STP pipelines and associated appurtenances (e.g., manholes, sumps), and the sludge drying beds. Sludge and other gross contaminants will be removed from the facilities prior to demolition. Material with visible residues will be cleaned or diverted from OSDF disposal (Sections 3.3.2 and 3.3.3).

  - *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 disposed of 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.* None of these materials are expected to be encountered in A1PII; if encountered, such materials would be managed in accordance with established protocols as generally described in Sections 3.4 and 6.5.

  - *Treat materials to meet OSDF and/or off-site disposal facility WAC.* Excavated materials that exceed OSDF chemical/radiological WAC, expected to be limited to sludge from the Sludge Drying Beds (estimated 35 yd^3), will be treated as necessary by FDF Waste Management Operations to meet off-site facility WAC. Material that meets OSDF chemical/radiological WAC will be processed (e.g., size-reduced) as necessary to meet OSDF physical WAC before transport to OSDF. Trap Range soil which is contaminated by lead at levels above the FRL and which exhibits the RCRA toxicity characteristic for lead will be treated

onsite prior to disposal in the OSDF. Material handling and treatment is discussed by sector in Sections 3.1.4, 3.2.4 and 3.3.4; programmatic aspects are described in Sections 3.4 and 6.5.

- *Dispose of materials that exceed the OSDF WAC off-site; dispose of remaining materials in the OSDF.* Only sludge from the STP Sludge Drying Beds (estimated 35 yd^3) is expected to require offsite disposal, though other such materials may be encountered, and would be dispositioned appropriately. Material handling and treatment is discussed by sector in Sections 3.1.4, 3.2.4 and 3.3.4; programmatic aspects are described in Sections 3.4 and 6.5.

- *Establish administrative controls through deed restrictions and access controls.* Access controls will be maintained for A1PII following remediation activities as described in Section 3.5.

• OU5 ROD (DOE 1996b)

- *Perform verification sampling to establish horizontal and vertical boundaries of excavation required to attain FRLs for soil and sediment.* Predesign investigations were performed to augment historical data and refine excavation limits for lead-contaminated soil at the Trap Range, above-WAC sludge at the Sludge Drying Beds, and above-FRL soil at the STP Area and elsewhere in A1PII 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 predesign investigations (Section 2.0), contamination above FRLs is exhibited by an estimated 1,958 yd^3 of surface soil at the Trap Range (lead contamination), 29,500 yd^3 of soil on the surface and at depth in the STP Area (total uranium), and 500 yd^3 of surface soil in areas near the STP Area and near the Old North Entrance Road north of the A1PI Sediment Basin. This soil will be excavated as described in Sections 3.1.3, 3.2.3, and 3.3.3. Mitigation measures to minimize short term impacts will be taken with respect to natural and cultural resources (Section 1.3), fugitive dust control (Section 4.0), water quality (Sections 3.0 and 4.0, Appendix C), and health and safety (Section 5.0).

- *Perform certification sampling following excavation of contaminated soil and sediment to demonstrate that FRLs have been attained.* Certification of Sector 1, except the Trap Range, is planned to be complete prior to A1PII remediation. It is expected that precertification and certification of the Trap Range, Sector 2 (including A1PI Sediment Traps ST-2 and ST-3, OSDF Sediment Basin, and A1PI Sediment Basin with associated sediment), and Sector 3 (including the A1PII Sediment Basin, Outfall Channel, and Conveyance Channel with associated sediment) will be accomplished sequentially as remediation activities are completed in these areas (Sections 3.1, 3.2 and 3.3).

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- *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 80 ppm to 50 ppm.* Excavation limits for the STP excavation were established on the basis of uranium concentrations at or below the ALARA goal of 50 ppm; excavation limits for surface soil elsewhere in A1PII were established on the basis of the FRL of 82 ppm (Section 2.5). No excavation control monitoring is planned in either case, although precertification and certification activities will be conducted to ensure that FRLs are achieved (Sections 3.2 and 3.3).

- *Dispose of contaminated soil and sediment that meets the onsite 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.* All of the soil in A1PII that is known to be above FRLs, as described above, except the lead contaminated Trap Range soil, meets the OSDF WAC and will be disposed of there. The lead contaminated Trap Range soil will be treated to remove the RCRA lead toxicity characteristic prior to disposal in the OSDF. (Sections 3.1.4, 3.2.4, 3.3.4 and 3.5.)

- *Excavate contaminated soil containing perched water that presents an unacceptable threat, through contaminant migration, to the underlying aquifer; disposition this excavated soil in a manner consistent with methods indicated above for soil; treat this 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).* Contaminated soil from the STP Area, the only area in A1PII identified in the OU5 Feasibility Study (DOE 1996d) as posing an unacceptable threat to the Great Miami Aquifer, will be excavated (Sections 3.3.2 and 3.3.3). Perched water and storm water that accumulates in the STP Area excavation will be treated in the AWWT; that which is found to contain tetrachloroethene (RCRA F002 listed waste) will be pretreated by granular activated carbon (GAC) filtration (Section 3.4.4).

- *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 offsite facility. Collect and treat contaminated storm water and wastewater as necessary to attain FRLs in Paddy's Run and the Great Miami River and mass-based limits for discharges to the Great Miami River.* As indicated above, storm water that accumulates in the STP Area excavation will be treated in the AWWT. Storm water that accumulates in the STP influent and effluent pipeline excavation trenches will also be treated at the AWWT in view of contamination potential (Section 3.4.4). Based on pre-design investigations (Section 2.0), A1PII areas outside of the STP Area exhibiting soil contamination above FRLs is limited to approximately 2.4 acres of lead contaminated soil at the Trap Range and approximately 0.6 acres of uranium-contaminated soil in

Sectors 2 and 3. Virtually all of the runoff from these areas will be routed to sediment basins before discharge to Paddys Run; that which is not (less than ½ acre) will be appropriately controlled using best management practices (e.g., silt fence). Sediment in these basins found to be above FRLs on the basis of precertification or certification testing will be removed and disposed of in the OSDF (Section 3.3.5).

- *Continue to employ institutional controls, including access controls and monitoring, to ensure continued protectiveness.* Access to A1PII will be restricted using barriers, warning signs, and procedural controls for the duration of remediation activities in the area and will continue after certification of the area and turnover to OSDF. Similarly, monitoring will continue to be conducted in accordance with the Integrated Environmental Monitoring Plan [IEMP (DOE 1997e)]. Long-term institutional controls necessary to implement restoration goals under the site's selected remedy are presented in the NRRP (DOE 1997d) (Section 3.5).

- *Restore the site.* Restoration of A1PII will be conducted in a manner consistent with the NRRP (DOE 1997d), and will include backfilling the STP excavation, grading areas disturbed by excavation as necessary to restore positive drainage, and establishing interim vegetation cover to prevent erosion. Ultimate restoration of the area will be completed as OSDF construction is completed (Sections 3.1.7, 3.2.7 and 3.3.7).

1.5 LESSONS LEARNED

A lessons learned program has been implemented to apply knowledge accumulated during successive remedial efforts conducted under the SEP. Integration of lessons learned from past remedial activities (i.e., A1PI) is imperative to ensure future remedial activities meet all requirements and achieve the highest possible levels of quality at the project level.

Lessons learned during the A1PI remediation project have been incorporated into the SEP. Therefore, by following the guidelines provided in the SEP, these same lessons learned have been incorporated into the A1PII remediation project. In addition to the implementation of the SEP, the Soil Characterization and Excavation Project (SCEP) has been reorganized to provide a single project manager with overall responsibility for the entire remedial effort in an area. This reorganization (Section 6.1) will ensure better control over all activities associated with the remediation of each area and facilitate the dissemination of key information among project personnel.

Because of the general complexity and site-specific nature of soil remediation activities, soil remediation at the FEMP will continue to evolve based on lessons learned during successive remedial efforts.

Lessons learned will continue to be applied to future work efforts to ensure the highest possible quality levels are attained.

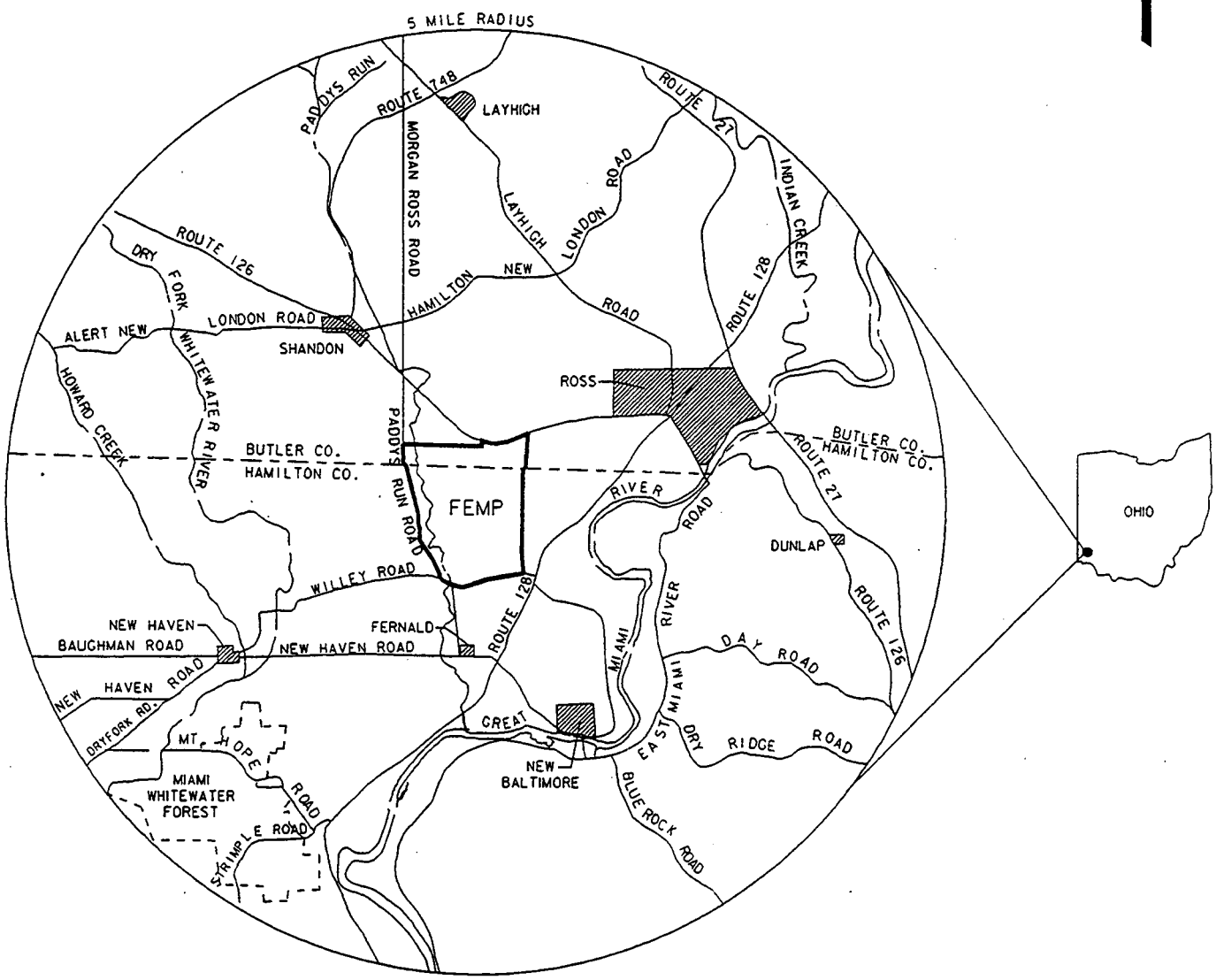

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FIGURE 1-1. FEMP LOCATION MAP

USR/E CRA3/DGN/IP0005.DGN

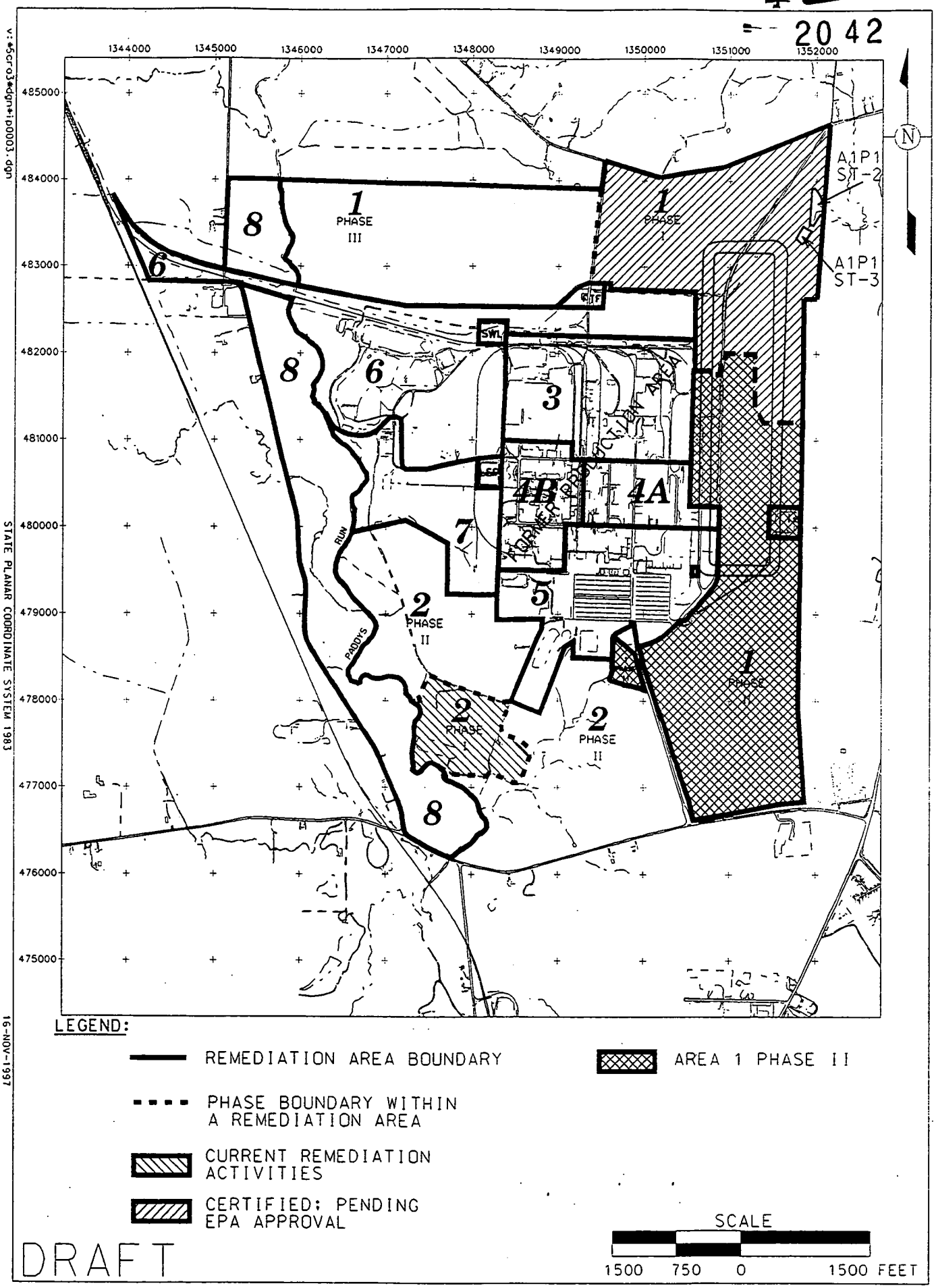
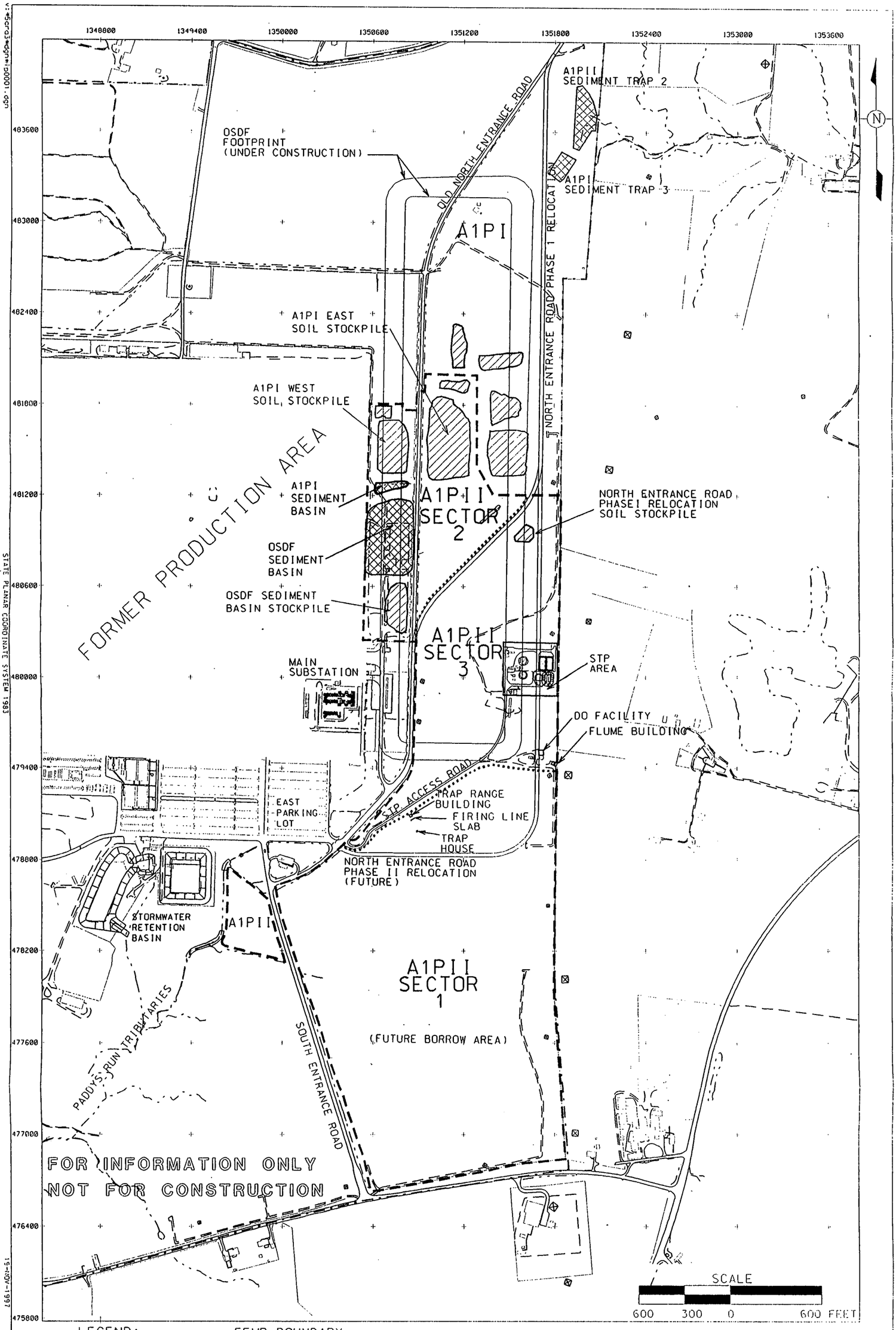


FIGURE 1-2. DESIGNATED REMEDIATION AREAS



LEGEND:

- FEMP BOUNDARY
- AREA 1 PHASE II BOUNDARIES
- SECTOR BOUNDARY
- GRAVEL ROADS
- SEDIMENT BASINS/TRAPS
- SOIL AND DEBRIS PILES
- ELECTRIC UTILITY LATTICE TOWER

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FIGURE 1-3. A1PII EXISTING FEATURES

2.0 PREDESIGN INVESTIGATIONS

This section presents the following information:

- Descriptions of the predesign investigations that support the A1PII remedial actions
- Existing conditions revealed by those investigations, both natural and man-made
- Discussions of site contaminants, especially the ASCOCs that define the scope of site remediation, and
- Estimated limits of excavation required to achieve FRLs.

Section 2.1 discusses early investigations in OU5 that provided the first understanding of site conditions. These projects include the OU5 RI/FS (DOE, 1995a, 1996e), smaller investigations of specific site features, and a leaching and partitioning coefficient study. Section 2.2 describes six recent projects performed to supplement data from earlier studies. Section 2.3 presents the current understanding of surface and subsurface features, both natural and man-made. Section 2.4 presents those ASCOCs that define the scope of site remediation. Section 2.5 presents the estimated limits of remedial excavation.

Remedial excavations will include:

- Removal of six inches of surface soil in and around the STP to reduce total uranium concentrations in surface soils to or below established FRLs

- Excavation in the STP Area to meet FRLs for total uranium, tetrachloroethene, and other materials in subsurface soils.

- Removal of six inches of surface soil from several small areas totalling less than one acre in the general vicinity of the STP. This action will bring the area, part of a previous removal action, in compliance with FRLs.

- Removal of six inches of surface soil in the formerly used Trap Range to reduce surface soil concentrations of lead and arsenic to FRLs.

- Removal of six inches of surface soil in a small area near the Old North Entrance Road in the northwest part of Area 1 to meet FRLs.

Current information indicates that removing soil with above-FRL concentrations of lead and total uranium will remove other contaminants above FRLs except for a small area approximately 300 feet west of the northwest corner of the STP, where a remnant data analysis indicates elevated concentrations of radium and thorium may be present. Further investigation of this area is ongoing.

Lead removal excavations at the formerly used Trap Range will reduce associated arsenic concentrations below the arsenic FRL. Precertification and certification will be conducted to ensure FRLs are attained.

2.1 HISTORICAL INVESTIGATIONS

In general, results of the RI/FS studies in A1PII (DOE 1995b, 1996d) indicated contamination above FRLs, primarily for total uranium, in surface soil throughout much of the north and central parts of A1PII, and at depth in the STP Area. Subsequent analysis of the RI/FS results indicated additional sampling and analysis could substantially improve estimates of the extent of contamination in the area. Results of these subsequent studies are provided in Section 2.2. This section discusses four important historical investigations in A1PII and the relevant findings from each.

Sampling and analysis programs under the OU5 RI/FS included two investigations in the immediate STP Area and one program in the Trap Range. Figures B-1 and B-3 show sampling locations at the STP and Trap Range, respectively (Appendix B). Removal Action No. 14 (RvA 14), a time-critical removal of contaminated soils adjacent to the STP Incinerator, was also conducted in the STP Area. Figure B-3 shows the RvA 14 excavation limits.

This section also addresses data from the following activities that are unrelated to the OU5 RI/FS:

- Data from waste management activities associated with the STP Sludge Drying Beds
- Results of a leachability and partitioning coefficients study.

2.1.1 STP Investigations

Two STP Area investigations were conducted as part of the OU5 RI/FS. All sampling locations from this investigation are depicted in Figure B-1, Appendix B. The first investigation was the surface soil sampling program, conducted in 1988. All samples were collected within the upper 18 inches of soil and were analyzed for radiological parameters only. Surface radiological measurements and limited soil samples collected in the STP Area indicated the presence of localized above-background uranium concentrations. Airborne deposition (i.e. surficial soil contamination) from the incinerator stack was identified northeast of the STP. Some subsurface radiological contamination was also indicated beneath the STP.

The second investigation, conducted in 1990, involved installing six monitoring wells under the Production and Additional Suspect Areas Work Plan. Subsurface soil samples from selected intervals were analyzed for full radiological parameters and results indicated that total uranium concentrations decreased with depth. These data and process knowledge indicated that the STP was the source of subsurface total uranium. The available data indicated that perched groundwater under the STP contained uranium and tetrachloroethene (= perchloroethene, or PCE), but the extent of this contamination in the STP Area was unknown. Six predesign investigations closed these data gaps. The results are summarized in Section 2.2 and presented in full in Appendix B.

2.1.2 Sludge Drying Beds

The Sludge Drying Beds lie north of the sludge digester unit, within the STP Area. There are two sets of beds, east and west, but only the east beds were used (See Figure B-1). The beds consist of sand and gravel layers in concrete containment walls with approximate dimensions of 70 feet wide x 92 feet long x 5 feet deep. The beds were used for dewatering STP sludge by draining and air drying. The Sludge Drying Beds were taken out of service and sludge was removed from the drying beds and containerized in August 1989 and December 1990. No previous sludge removals are documented. Approximately 35 yd^3 of sludge remain in the beds.

Sludge from a Service Building sump was directly added to the drying beds. This sump serviced the site laundry unit, which included dry cleaning operations using PCE, a RCRA-listed spent solvent (F002). Based on process knowledge, the Sludge Drying Beds were designated HWMU No. 41. The OSDF may accept RCRA-listed hazardous wastes that do not exceed WAC. However, any waste exceeding WAC that requires off-site disposal must be handled as mixed waste.

Containerized sludge removed from the beds was characterized, and the results were summarized on Material Evaluation Forms (MEFs) as part of site waste management activities. Radiological analyses indicated a mean total uranium concentration of 1910 ppm, but the detected RCRA Toxicity Characteristic (TC) constituents were less than their respective TC regulatory limits. In addition, all sample results were at least one order of magnitude below the TC regulatory limit when the total concentrations of various constituents were converted to their Toxicity Characteristic Leaching Procedure (TCLP) equivalent concentrations using the 20-fold method dilution factor. PCE was not detected, and only arsenic exceeded its FRL.

The historical waste management characterization data for the sludge indicate the remaining sludge exceeds the WAC for total uranium, but is not a RCRA characteristic waste. Also, as part of the Comparability of In Situ Gamma Spectrometry and Laboratory Data study (DOE, 1997o), additional measurements were taken in the Sludge Drying Beds confirming that sludge is above the OSDF WAC threshold of 1030 ppm for total uranium. The results associated with waste management activities and those from the Comparability Study are presented in Appendix B-1. The characterization data was also used to determine data needs for the underlying sand and clay till, which was sampled as part of the predesign field sampling for miscellaneous areas (see Section 2.2.5). Data from this investigations shows no contamination of the gravel or soil underneath the beds.

2.1.3 Removal Action Testing

RvA 14 involved the time-critical removal of contaminated soils adjacent to the STP Incinerator. The Removal Action Work Plan (RvAWP) was approved by OEPA and EPA in July 1992, and field work began in August 1992. The work was conducted in an iterative manner that:

1. Identified areas with uranium contamination in excess of the following removal criteria:

Areas	Uranium Action Levels	
On-property areas within the STP	300 pCi/g	= 444 ug/g
On-property areas outside the STP	100 pCi/g	= 148 ug/g
Off-property	35 pCi/g	= 51.8 ug/g

2. Performed initial excavations within these areas to remove and containerize radiologically-contaminated soils.

3. Performed post-excavation verification sampling to assure that the action levels were met.

The result was the excavation of 1,320 yd^3 from 12 on-property areas, designated Areas A through J, and Zones I and II, as shown on Appendix B, Figure B-2. An additional 1,740 yd^3 were excavated from off-property areas designated as Zone III, Zone IV, and an area south of Zone IV. The goals of RvA 14 were met, and the pre- and post-excavation verification sampling data are presented in Table B-2, Removal Action 14 Excavation Areas. The OU5 RI presents additional information about this and other OU5 removal actions (DOE 1995a).

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2.1.4 Trap Range

During the OU5 RI (DOE 1995a), a 1993 soil study of the Trap Range included analysis of 18 soil samples to characterize the general distribution of the lead shot. The location and results associated with this study are shown in Appendix B, Figure B-3. This preliminary study confirmed lead contamination in near-surface soils but failed to define the horizontal and vertical extent. The data did, however, provide the basis for the predesign investigation. Figure B-3 also shows the pre-design investigation sample locations.

2.1.5 Leachability and Partitioning Coefficients Testing

FEMP performed batch desorption tests to find the leachability coefficient (K_l) of site surface soil (DOE 1996e). Additional details may be found in Appendix B-9 and the OU5 FS. Surface soil samples in source areas of suspected contamination, including the former production area and the STP, have a K_l value of 15 L/kg, indicating the possible presence of a relatively soluble form of uranium, the dominant contaminant in the STP Area. Uranyl nitrate is the main contaminant in such areas, where uranium was dissolved in a water carrier. Because of its high solubility, uranyl nitrate poses a potential risk to the underlying aquifer.

Soils containing relatively insoluble forms of uranium, such as uranium oxides, exhibit a K_l of 222 L/kg. These forms are probably particulates from stack or incinerator emissions. These less soluble oxides are less soluble and mobile than uranyl nitrate and pose less risk to underlying groundwater.

The FRL in areas with low K_l levels (15 L/kg), including the western portion of the STP, is 20 ppm total uranium. This level will protect the aquifer from the more soluble and transmissible chemical fraction. The FRL of 82 ppm total uranium applies to the remainder of A1PII. Figure 2-1 shows the division of the area based on the two FRLs.

K_D, the soil/water partitioning coefficient, is closely related to K_l and is a critical parameter in soil modeling. The estimated limits of excavation presented ~~in~~ Section 2.5 are based on the assumption that, for A1PII soils, K_D equals K_l.

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2.2 PREDESIGN INVESTIGATIONS

FEMP collected and reported environmental characterization data for soil, water, sediment, and other media during the OU5 RI studies (DOE 1995a). Six Project Specific Plans (PEPS) were developed and executed in 1996 and 1997 to obtain additional data for the remedial design. The results of those studies are reported in the following documents:

- Letter Report for Predesign Investigation for Total Uranium in the STP Area (DOE 1997h)
- Letter Report for Lead Delineation in the A1PII Trap Range (DOE 1997i)
- Letter Report for the Predesign Investigation of Technetium-99 in Soil in the Sewage Treatment Plant Area (DOE 1997j)
- Letter Report for Perched Water Sampling at the Sewage Treatment Plant (DOE, 1997k)
- Letter Report for Area 1 Phase II Field Sampling of Miscellaneous Areas (DOE 1997l)
- Letter Report for the Predesign Investigation Survey of Surface Soils (DOE 1997m)

The results of these predesign investigations and their impact on the RD are summarized below. Each letter report, including sampling strategy, analytical results, and figures, is included in Appendix B.

2.2.1 Total Uranium in the Sewage Treatment Plant

The primary objective of this PSP was to collect additional data to better define the horizontal and vertical extent of contamination and the subsequent amount of excavation required near the STP. Kriging the data collected during early investigations predicted that uranium concentrations exceeded FRLs over a broad area, requiring extensive remedial excavation. However, the number of sampling points was insufficient to establish a high degree of confidence in the modeling. The kriging model evaluates trends along a path to estimate the boundaries of areas requiring remediation. The technique is conservative, overestimating contaminant plumes or required excavations when insufficient data are available.

The PSP proposed up to 20 borings advanced to depths of 8 to 25 feet, with samples collected at multiple intervals and analyzed for total uranium. The PSP was executed in two phases. Phase 1 consisted of the borings within the FEMP boundary in and around the STP Area, including those along the FEMP property line. If any of the borings along the east property boundary indicated above-FRL contamination, the off-site Phase 2 borings would have been performed. The analyses from all the Phase 1 borings were below the FRL; therefore, no additional Phase 2 borings were completed. These

data, in addition to other data from previous investigations, were used in the kriging model to develop the excavation model discussed in Section 2.5.1 and Appendix B-9. The soil boring locations and the associated results are supplied in the Letter Report for this PSP included in Appendix B-3.

Investigations revealed two types of uranium and uranium compounds at the STP, one more soluble than the other. The leachability testing described above provided the leachabilty coefficient (K_1) for each type. The coefficients, in turn, were the bases for FRLs established in the OU5 ROD (DOE 1996b). Table 2-1 shows the leachability coefficients and FRLs. Figure 2-1 shows the corresponding on-site areas in A1PII. The OSDF WAC for total uranium is 1030 ppm.

2.2.2 A1PII Lead Delineation in the Trap Range

Previous investigations showed that lead concentrations exceed the 400 mg/kg FRL, but did not fully define the areal extent of contamination. The concentrations of arsenic, a metal impurity in some lead shot, also exceeded the 12 mg/kg FRL in some locations. The A1PII investigation had three objectives:

1. Delineate the areal extent of contamination in the trap range.
2. Confirm that no vertical contamination though the soil has occurred.
3. Determine if the lead or arsenic concentrations in soils exceed the FRL or the TCLP limit of 5 mg/L.

The scope of this project included collecting and analyzing 50 surface samples at locations. Sample locations were selected based on existing data and on an area walkover which included scooping and sieving the soil for lead shot at each node of a pre-established grid. When a scoop revealed no lead shot, the location was marked, establishing an assumed periphery of contamination. Sample locations were then selected in areas where previous investigations indicated contamination above the FRL, with a greater sampling density along the assumed periphery. Also, several samples were located beyond the assumed periphery, as well as several locations within the middle of the shot distribution pattern. Figure B-3 includes the locations of historical OU5 RI/FS samples and the locations associated with this pre-design investigation.

The PSP was executed in two phases. Phase 1 included the analysis of all samples from the 0"-6" interval for both lead and arsenic using the Graphite Furnace Atomic Absorption (GFAA) and Inductively-Coupled Plasma (ICP) analytical methods. Phase I also included the analysis of selec

samples for TCLP lead from the 0"-6" interval, and for total lead from the 6"-12" interval. These samples were selected based on historical data which showed lead concentrations above the 400 mg/kg FRL.

Phase 2 samples were analyzed based on the results of the Phase 1 analysis. At locations where the Phase 1 0"-6" sample revealed lead concentrations greater than the FRL, the sample was analyzed for TCLP lead and the 6"-12" interval was analyzed for total lead and arsenic to determine the vertical extent of contamination. The Phase 1 analysis showed that lead concentrations exceeded the 400 mg/kg FRL at four sampling locations. The TCLP lead results from these samples also exceed 5 mg/L, the level at which soil may be considered characteristically hazardous. One sample was below the 400 mg/kg FRL, but above the TCLP threshold. All these results lie in close proximity to Remedial Investigation Samples with elevated lead concentrations.

Two locations contained arsenic concentrations that exceed the FRL of 12 mg/kg from the 0 to 6 inch sampling interval. Concentrations in corresponding samples from a depth of 6 to 12 inches were below 12 mg/kg FRL. The data from this study are presented in the Letter Report for this PSP in Appendix B-4.

The following points about TCLP analyses for lead and other contaminants are important:

- Soils exceeding TCLP limits but meeting FRLs may remain in place. Soil becomes a hazardous material only after excavation.
- The OSDF may accept soils exceeding TCLP limits but meeting WAC.
- Soils exceeding both TCLP limits and WAC must be treated as hazardous materials for off-site disposal.

2.2.3 Investigation of Technetium-99 in the Sewage Treatment Plant

Historical data collected to support the OU5 RI indicated that technetium-99 concentrations in soils near the STP exceeded the 30.0 pCi/g FRL and the 29.1 pCi/g WAC. These data were considered to be potentially false positives for the following reasons:

1. Process knowledge indicates widespread technetium-99 contamination was unlikely, especially near the STP.

2. The proportional counting technique used to develop the RI data allows beta-emitting uranium daughter products to be counted as technetium-99. The technique was discontinued by 1995, and newer counting methods are unaffected by uranium daughters.

3. Technetium-99 is very mobile (K_D = 0.118) and elevated activities in surface soils are unlikely.

The objective of this PSP was to collect additional data to re-evaluate earlier OU5 RI results. The scope of this project was limited to collecting and analyzing surface and subsurface soil samples at two locations where earlier investigations had detected technetium-99 within the STP, and in limited areas surrounding the two locations. At each location, samples were collected at 0 - 0.5', 1.0 - 1.5', 2.0 - 2.5', and 3.0 - 3.5' intervals. This PSP was also executed in phases. In Phase 1, samples were collected at the original detection locations and in a symmetrical pattern around the locations. Phase 2 samples were to be collected and analyzed only if any Phase 1 samples exceeded the FRL or WAC. Preliminary Phase 1 results indicate that no technetium-99 is present in the soils at the minimum detectable concentration (MDC). Therefore, the FRL and WAC for technetium-99 was not a consideration in the RD presented in this implementation plan. The Letter Report for this PSP presents the sampling locations and associated data (see Appendix B-5).

2.2.4 Perched Water Sampling in the Sewage Treatment Plant

The purpose of this project was to obtain perched water quality data to facilitate design of the STP excavation. Previous investigations indicated that the perched water contained volatile organic compound (VOC) contamination from the Sludge Drying Beds (DOE 1995a). To further define the nature and extent of the perched water contamination, the PSP included the following objectives:

1. Sample perched water for VOCs and total uranium to determine if water collected during the excavation required treatment.

2. Obtain additional information on the area geological stratigraphy. Historical information indicated that discontinuous sand lenses were found.

The scope of this project included modeling the Coarse Grained Material (CGM) in the area using historical data and additional lithological data collected from the STP total uranium investigation described in Section 2.2.1. Based on the CGM model, three sample locations were selected. At each location, exploration borings were completed to determine if saturated sand lenses existed at the location. Perched water samples were collected from sand lenses greater than one foot thick in two locations, and no lens was found in one location. Perched water samples were analyzed for VOCs and total uranium. Acetone was detected at a concentration of 6 ppb in one sample of perched water from

one boring, but not in a duplicate sample. The acetone detection limit was 10 ppb. The results suggest that the acetone detection was a laboratory artifact. No other detections of VOCs were reported. No total uranium was reported in perched water samples. The detection limits for total uranium were 9.8 and 7.3 for samples from the two borings. The locations of these samples and the associated results are shown in Letter Report (Appendix B-6).

2.2.5 Field Sampling of Miscellaneous Areas

The objective of this study was to obtain additional data from miscellaneous areas around the STP Area, as well as existing underground utilities and roadways, to fill data gaps not covered by other investigations. The scope included the following:

1. Identify the nature of total uranium and VOCs , including RCRA-listed PCE, in the gravel and soil underlying the sludge in the Sludge Drying Beds. Two borings were placed in the Sludge Drying Beds to a depth of approximately 12 feet.

2. Determine the general extent and level of radionuclide, metal and VOC contamination in the soils due to leakage from the old sanitary sewer influent and effluent pipeline. This included taking twelve borings along the length of the pipelines traversing A1PII.

3. Determine the presence of total uranium contamination in surface gravel areas within the STP Area. This included sampling from five borings placed at various locations.

4. Determine the presence of total uranium concentration in the gravel underlying the asphalt STP Access Road. This included placing five borings along the road, extending approximately five feet or less through the gravel/clay interface.

5. Confirm that the off-property fill material used in RvA 14 does not contain total uranium and metals above the FRL. This included placing three borings in the fill material.

No samples were found to contain above-FRL concentrations. The sample locations and the associated results can be found in the Letter Report for this PSP included in Appendix B-7.

2.2.6 Predesign Investigation Survey

The objective of this investigation was to achieve as close as possible to 100% scanning of the area using real-time monitoring systems, including the real time Radiation Tracking System (RTRAK), a mobile system fitted with sodium iodide (NaI) detectors to integrate activity readings over large areas, and the High Purity Germanium (HPGe) detectors. Physical samples were collected in every acre of A1PII, and in areas where the real-time system indicated elevated contamination. The primary

purpose was to collect data to help delineate those areas within A1PII requiring excavation and to delineate areas where soil contamination may exceed the OSDF WAC.

The investigation proceeded in three phases. In the first phase, all RTRAK-accessible areas were scanned using NaI detector systems. Observed total uranium concentration values of 66 ppm and 800 ppm served as decision drivers for the second phase. These action levels were selected to ensure that actual soil concentrations did not exceed the FRL and WAC values at the 95% confidence level. In the second phase, HPGe measurements were taken in every block in the grid, as shown in Figure 1-2 in the Letter Report for this PSP, which is included in Appendix B-8. Each block is approximately 1 acre. Phase 2 also included taking HPGe measurements where the NaI detector measurements exceeded 66 ppm. Within each block, measurement points were established at the center of the block and at the center of each quadrant within the block. At least five non-overlapping HPGe detector measurements were taken at each measurement point to determine if concentrations exceeded the total uranium FRL of 82 ppm.

The third phase consisted of physical sampling to confirm HPGe measurements. The sampling rate was one sample for every two HPGe measurements below the 66 ppm action level and one sample for each HPGe measurement above the 66 ppm action level. One physical sample was taken from blocks in Sector 1.

The data associated with the A1PII RTRAK measurements for total uranium, radium-226, and thorium-232 are presented in Letter Report in Appendix B. Several areas in the northern part of A1PII were inaccessible because of OSDF construction. The RTRAK measurements for total uranium are below 66 ppm trigger level except for areas adjacent to the STP, and no measurements approached the 800 ppm WAC trigger level. These areas were further evaluated using HPGe and physical samples. Initial RTRAK runs in some areas indicated elevated concentrations of radium-226 approaching the FRL. Further evaluation of the data indicates that these readings are caused by elevated radon from natural uranium in soil, since field records show the measurements were taken early in the morning before the radon dissipated. To confirm this hypothesis, two actions were taken. First, eight physical samples were taken from the elevated areas and analyzed for radium-226. The results were well below the 1.7 pCi/g FRL. Second, the RTRAK was re-run over these areas in the afternoon. Both sets of data were

used in the spatial averaging of the results, and it shows that the radium-226 is not a concern in the East Field.

Phase 2 HPGe results are presented in the Letter Report in Appendix B for total uranium, radium-226, and thorium-232, respectively. These measurements include HPGe measurements taken within the grid, where RTRAK measurements exceeded the 66 ppm trigger level for total uranium, and areas inaccessible by the RTRAK. In general, the HPGe complemented the RTRAK in finding elevated readings adjacent to the STP.

Figure 5-2 in the Letter Report in Appendix B shows the location and the associated results of the physical samples for total uranium. These data were used in conjunction with historical data to determine the surface excavation limits as discussed in Section 2.5.4. The RTRAK and HPGe data were not used as the basis for determining excavation limits, but for selecting sample locations that would supplement and better refine the model.

2.3 SURFACE AND SUBSURFACE CONDITIONS

The OU5 RI, along with the OSDF and A1PII Soil Excavation Predesign Investigations, provide much information on the hydrologic and hydrogeologic conditions within A1PII. The site surface and subsurface conditions, as determined from these studies, are discussed below.

2.3.1 Surface Coverage and Drainage Pattern

The FEMP site is located within the Great Miami River drainage basin. On-site topography is mainly level to gently sloping throughout, with elevations ranging from approximately 700 feet above mean sea level (msl) in the northeastern corner to approximately 540 feet above msl along Paddys Run in the southwestern corner. Severe slopes are associated with on-site stream channels (DOE 1996f).

The majority of the site drains to Paddys Run (Figure 2-2). Generally, A1PII drains southwest to drainage ditches leading to an unnamed tributary of Paddys Run (often referred to as the Storm Sewer Outfall Ditch SSOD) Paddys Run is an intermittent, ungauged stream that runs roughly parallel to the western boundary of the site. Existing drainage consists of mainly sheet flow that is uncontrolled before reaching existing conveyance channels (DOE 1996f).

The current FEMP NPDES Permit (Ohio EPA Permit No. 1IO00004*ED) regulates storm water discharges to Paddys Run at four outfall locations. The A1PII area lies within the same drainage area that leads to Paddys Run Outfall No. *4003, except for a small thin area along the southeastern corner of the site (DOE 1996f). Project controls for storm water runoff during soil excavation are addressed in Appendix C.

The A1PII drainage pattern varies somewhat in each sector. In Sector 1, most drainage flows overland, westward to drainage ditches along the South Entrance Road and the STP Access Road. Both drainage ditches lead to culverts that run westward below the South Entrance Road to the SSOD. The Sector 1 subarea west of the South Entrance Road drains to ditches leading to the SSOD. A small area in the extreme southeastern corner of A1PII drains eastward to the Great Miami River, either by overland flow over a steep escarpment or to the Willey Road drainage ditch.

Most of Sector 2 drains westward to the OSDF sediment basin located on the western side of Sector 2. The extreme northwestern corner drains to the A1P1 Sediment Basin, which outfalls to a storm drain leading to the SWRB. A small area, less than one acre, in the southwest corner of Sector 2 drains to the drainage ditch by the North Entrance Road. Both the OSDF Sediment Basin and the drainage ditch flow to the SSOD. Similarly, Sector 3 drains westward, by overland flow, to the drainage ditches by the STP Access Road and North Entrance Road, which lead to the SSOD. The STP Area runoff is also uncontrolled and flows westward and southwest to the same drainage ditches.

Approximately 0.7 acres of jurisdictional wetlands are located in A1PII. The largest wetland is located west of the STP Area (Figure 2-2). All wetlands are shallow and characterized by emergent vegetation.

2.3.2 Soil Stratigraphy and Geotechnical Properties

The surface soil in A1PII consists of silty loams, specifically the somewhat poorly drained Fincastle silt loam in the northern half of the area and the moderately well-drained Xenia silt loam in the south. The southern half of the area also includes pockets of poorly drained Raub silt loam (DOE 1995b). However, much of the soil north of the STP Access Road has been disturbed during previous construction of the STP, access roads, and pipelines, and the new soil stockpiles and sedimentation basins.

The FEMP is built on glacial till underlain by sand and gravel deposits which comprise the GMA, designated as a sole source aquifer under the Safe Drinking Water Act. The GMA is a high-yield aquifer and supplies a significant amount of potable and industrial water to Butler and Hamilton Counties. An unsaturated sand and gravel zone, approximately 20 to 30 feet thick, separates the base of the glacial till from the regional water table in the GMA. Beneath the GMA deposits, shale and limestone bedrock is approximately 200 feet beneath the FEMP (DOE 1997f). Regional studies by the Ohio Geological Survey indicate the shale and limestone bedrock is approximately 330 feet thick in the FEMP area (Fenneman 1916).

The glacial till within A1PII is thickest (up to 50 ft) in the northeastern part, and thins to approximately 20 ft in the southwest (DOE 1995b, 1997f). The deepest soil excavations will occur at the STP Area and along the buried utilities/pipelines trending west-east from the process area fenceline to the STP. Excavation in the STP Area will be up to 20 feet deep and will be up to 10 feet deep along the pipeline. The till thickness in the STP Area and along the pipeline is approximately 30 feet deep, which leaves 10 or more feet of glacial till between the base of the excavation and the top of the unsaturated GMA sand and gravel. The sedimentation basin to be constructed at the northwestern edge of Sector 1 will require a relatively deep excavation of approximately 10 to 15 feet. In this area, the glacial till is approximately 20 feet thick, which results in approximately 5 to 10 feet of glacial till between the top of the unsaturated GMA and the base of the sedimentation basin.

The glacial till is essentially dense, heterogeneous sandy lean clay, with occasional thin and discontinuous interbedded silt, sand and gravel lenses. The glacial till can be further divided into an upper brown clay layer and a lower grey clay layer. Within A1PII, the grey clay, which is in the protective layer of the GMA, ranges in thickness from approximately 10 to 42 feet (DOE 1995b, DOE 1997f, Parsons 1995). The glacial till consists of varying mixtures of fine-grained and coarse-grained soils. Fine-grained soils within the brown and grey till units are predominantly lean clay, with sand contents ranging between values that result in the materials being classified as sandy lean clay or lean clay with sand. The consistency of the lean clay generally increases with depth (through both the brown and grey till layers) from stiff to very stiff and hard; however, the plasticity tends to decrease with depth. Layers of coarse-grained materials exist in the brown till as well as the grey till, and locally display perched water conditions. The coarse-grained materials range from poorly graded to

well-graded sand with scattered gravel, and are typically dense. Directly below the till are sands and gravels of the GMA (Parsons 1995).

2.3.3 Perched Water Zone

Perched water is present above the unsaturated zone of the GMA within the glacial till. The entire section of glacial till is believed to be saturated or near-saturated (DOE 1995b, Parsons 1995). Thin, heterogeneous, and discontinuous silty and sandy zones that can more readily transmit perched water exist within the glacial till (DOE 1995a). The OU5 RI/FS identified such an area within and adjacent to the STP; the general perched water in the till and in the STP Area are discussed below.

2.3.3.1 Perched Water in Till

Overall, the till exhibits between 90% and 100% saturation (close to field capacity) and has the general properties of an aquitard (DOE 1995b, Parsons 1995). When the till reaches fill capacity, it can release water downward under a unit vertical hydraulic gradient into the underlying unsaturated zone of the GMA. Eventually, this downward-moving water will enter the saturated portion of the GMA as recharge. Depths to perched water in the till are generally six feet or less in the eastern portion of the FEMP (DOE 1995b, DOE 1997f).

Slug test data from perched water wells installed in the till indicate that, for wells screened across the brown and grey clay layer interface, the average horizontal hydraulic conductivity is 6.30×10^{-6} cm/sec (DOE 1997f). Slug tests in A1PII till wells indicate a horizontal permeability of 9.51×10^{-7} cm/sec, 2.62×10^{-6} cm/sec, and 1.6×10^{-4} cm/sec, in brown clay, grey clay, and grey silt, respectively (DOE 1995b). Overall, the grey clay layer beneath the brown clay is the least permeable layer above the GMA (DOE 1997f, Parsons 1995). Laboratory (vertical) hydraulic conductivities conducted on grey clay samples range from 9.53×10^{-9} cm/sec to 5.83×10^{-8} cm/sec, and on brown clay samples range from 6.4×10^{-6} cm/sec to 9.0×10^{-9} cm/sec (DOE 1997f). Other laboratory and field measurements indicate the till has an effective porosity of 4% to 10%, and a representative bulk density of 1.85 g/cm^3 (DOE 1997f).

Model calibration studies conducted during the OU5 RI/FS indicate the average vertical groundwater flow rate through the glacial till (including the grey clay layer) to be approximately six inches per year. The time it takes a contaminant to move through the glacial till and break through into the GMA is

controlled by the thickness of grey clay present in the till, the groundwater infiltration rate through the grey clay, and the retardation properties of the grey clay. In the OSDF area (Sectors 2 and 3), modeled breakthrough travel times for uranium, the FEMP's predominant contaminant, range from approximately 210 years (to have a 20 g/L concentration in the aquifer) to 260 years (to have 1% of the source concentration). These breakthrough times were calculated using a retardation factor of 165 for the grey clay, not taking any credit for movement through the brown clay, and not including any retardation in the unsaturated GMA sand and gravel. The modeled breakthrough travel time for 1% of a technetium source, the FEMP's most mobile contaminant, is approximately 3.6 years. This breakthrough time was calculated using a retardation factor of 2.29 for the grey clay, without consideration of movement through the brown clay, and not including any retardation in the unsaturated GMA sand and gravel. This modeling strategy was later used in the OU5 FS to calculate OSDF WAC (DOE 1997f).

Although the till is generally saturated, there are no identified thick or laterally continuous coarse-grained zones in A1PII (DOE 1995b, DOE 1997f). The discontinuous nature of the perched groundwater in the glacial till does not allow measurement of a continuous water table gradient in the OSDF site area. Groundwater flow meter readings from 22 wells taken during the OSDF Predesign Investigation indicate that the horizontal flow directions vary abruptly from well to well, with no discernable patterns. Consequently, horizontal flow regimes are interpreted to be very localized (perhaps on the order of tens to hundreds of feet in length) and not laterally persistent due to the discontinuous nature of the interbedded coarse grained lenses. Taken collectively, the water levels obtained during the OU5 RI indicate that, if the perched water zones were connected, the horizontal gradient would range between 0.008 to 0.015 feet/foot (DOE 1997f). The general flow direction is toward the southwest.

2.3.3.2 Perched Water in the Sewage Treatment Plant Area

The OU5 FS defined a perched water zone within the STP Area that poses an unacceptable threat of contaminant levels within the GMA via vertical migration through the grey clay (DOE 1996e). This zone is comprised of several discontinuous silt and sand lenses within the top 20 feet of till (Figure 2-2). Although the interconnection between the sand and silt layers has not been confirmed through field pump tests, if connected, the flow in this zone is indicated by water levels to the northwest (DOE

1995b). This perched water zone (as will all identified perched water zones) will be excavated along with the soil excavation planned to address soil FRLs. 2042

The extent of excavation will be based upon achieving soil FRLs, which incorporate cross-media impacts from contaminated soil to (uncontaminated) perched water and then migrate vertically to the GMA. Any coarser-grained lenses visible along the excavation wall will be sampled for soil FRLs (see Section 3).

As summarized in the OU5 RI, a total of 24 constituents (11 radio nuclides, 8 inorganic, VOCs, semi-VOCs, and 3 general chemistry parameters) were detected at above-background concentrations in the plume. Besides uranium, the most frequently detected parameter above background was VOCs. Four VOCs were detected in perched water: 1,1-dichloroethane (maximum 3 ppb), 1,2-dichloroethene (maximum 89 ppb), PCE (maximum 39 ppb), and trichloroethene (maximum 13 ppb). Two semi-VOCs were detected at concentrations only slightly above the method detection limit: diethyl phthalate (a common laboratory contaminant) and phenol (DOE 1995a). According to the OU5 RI, the source of the uranium contamination in the STP Area perched water was air deposition from the STP Incinerator ash. However, the sludge in the Sludge Drying Beds contain uranium and may have been a localized source of uranium contamination in the perched water. The source of VOC contamination within the STP Area appears to be from the Sludge Drying Beds, which previously held sludge contaminated with VOCs, including RCRA-listed PCE (DOE 1995b).

As part of the predesign investigation, the perched groundwater was sampled in suspect areas to identify the current nature of contamination for perched water management purposes (DOE 1997k). The analytical results of this investigation indicated no VOC and no total uranium contamination. The decrease in contamination levels may be explained by the elimination of the source of contamination, which was the sludge in the Sludge Drying Beds. Most of the sludge has since been removed, once in August 1989, and once in December 1990; pockets on the surface remain.

2.3.4 At- and Below-Grade Structures and Debris

As indicated in Section 1.2, some A1PII structures and facilities will remain in service throughout the planned remediation. These facilities will either be certified as part of A1PII certification activities or will be left in place for remediation, if necessary, and certified as part of future remediation projects

existing at that time. At- and below-grade portions of facilities and structures to be abandoned will be addressed under this plan following D&D of above-grade portions by FC&DP. A summary of at- and below-grade structures and debris located in Sectors 1, 2, and 3 and how they will be addressed during A1PII remediation is provided below. Additional information is presented in Section 3.0 and Appendix E.

2.3.4.1 Sector 1

Utilities and at- and below-grade structures located in Sector 1 are shown in Figure 2-4. Those of particular concern with respect to A1PII remediation activities include CG&E electric transmission and distribution lines, the AWWT discharge line, the Mid-Valley crude oil pipeline, Trap Range structures, and roads, as discussed below.

CG&E Electric Lines

A CG&E electric distribution line on wood poles runs east-west across the southern boundary of Sector 1, and a CG&E high voltage transmission line on steel lattice towers traverses the southern and eastern boundaries of the sector. These facilities will remain in service, and appropriate coordination will be maintained with CG&E to ensure that A1PII remedial activities are conducted in a manner that ensures continued safe operation of these lines. Based on predesign investigations of soils in the sector), no remedial activities with respect to, or in the area of, these lines are necessary (Section 2.5).

Mid-Valley Crude Oil Pipeline

A 20-inch buried crude oil pipeline traverses the southeast portion of Sector 1. This facility will remain in service during A1PII remediation; appropriate coordination will be maintained with Mid-Valley to ensure remedial activities do not interfere with continued safe operation of the pipeline. Based on predesign investigations of soils in the sector, no remedial activities with respect to, or in the area of, the pipeline are necessary (Section 2.5).

AWWT Discharge Line

A recently installed, high-density polyethylene buried pipeline carrying treated wastewater from the AWWT to the Outfall Pit at the Flume Building (see Section 2.3.4.3) parallels the south side of the STP Access Road through Sector 1. This pipeline will remain in service through A1PII remedial activities, though it may be removed or relocated in conjunction with the DO Facility in the future, if deemed

necessary. Care will be taken, particularly during installation of the surface water management system, to avoid direct disturbance or long-term erosional effects that could interfere with continued safe operation of the pipeline.

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Trap Range

Trap Range facilities and structures include a small metal building on a concrete slab (Trap Range Building), Firing Line slabs, and an in-ground concrete bunker (Trap House). Following demolition and removal of above-grade portions of the building, fencing, bricks, and other debris stacked adjacent to the building by FC&DP, the concrete slabs and below-grade portions of the concrete Trap House will be removed as part of A1PII remediation (Section 3.2.3).

Perimeter Fence

Sector 2 is bounded on the east and south by a wire fence. Predesign investigations of soils in the sector indicate that no remedial activities with respect to, or in the area of, the fence is necessary (Section 2.5).

Roads

Gravel access roads to the monitoring wells, air monitoring stations, OSDF construction water well, and other facilities are located near the southern and eastern boundaries of Sector 1. Based on predesign investigations of soils in the sector, no remedial activities are necessary, and the roads will be certified with the remainder of the sector. Additional gravel roads will be constructed to provide access between existing roads. New roads will provide access to the DO Facility after the STP Access Road is removed. The South Entrance Road is not part of A1PII, but a segment will be certified prior to A1PII activities to permit clean construction of the A1PII Sediment Basin outlet works. Basin construction will require temporary disruption of the road.

Pole Lights

Lights mounted on wood poles with overhead electric power cables are located along the west side of the South Entrance Road northward to the STP Access Road; north of this point, the lights extend for a short distance on the east side of the North Entrance Road and the power cable is underground. These lights may be temporarily disabled to accommodate construction of the A1PII Sediment Basin inlet and outlet structures.

OSDF Supply Well

A water supply well was constructed in Sector 1 south of the DO Facility in 1997, primarily to support construction of the OSDF. Based on predesign investigations, surface soil in the area of the well do not exceed FRLs and the area will be certified prior to initiation of A1PII activities in Sector 1.

Foundations

Remnants of foundations for buildings located on the property prior to FEMP construction are located in Sector 1. Predesign investigations of soils in the sector indicate that no remediation of the foundations will be necessary. If this material is discovered during development of the borrow area it will be placed in the OSDF.

2.3.4.2 Sector 2

Utilities and at- and below-grade structures and debris located within or near Sector 2 are shown on Figure 2-5. Those of particular concern for A1PII remediation include Sediment Traps ST-2 and ST-3, located in A1PI to the north, the A1PI Sediment Basin and OSDF Sediment Basin, an asbestos-containing, bituminous-wrapped fuel gas distribution line, buried agricultural drain tiles, and the Old North Entrance Road.

Sediment Traps AIP1ST-2, AIP1ST-3

Sediment Traps AIP1ST-2 and ST-3, located east of the North Entrance Road in A1PI, were not included in A1PI certification. As part of A1PII Sector 2 activities, the traps will be subject to precertification sampling and analysis, removal of impacted sediment and disposal in the OSDF (if needed), certification, and interim grading and re-seeding.

A1PI and OSDF Sedimentation Basins

These sediment basins, located in west-central portion of Sector 2, were certified but have since received runoff from uncertified areas. The basins will be certified again and the impacted sediment will be removed and disposed of in the OSDF (if needed) as part of A1PII Sector 2 activities. Interim and final grading and restoration of these facilities will be addressed by the OSDF Project following A1PII activities.

Fuel Gas Pipeline

An asbestos-impregnated, bituminous-wrapped fuel gas distribution pipeline is located in and near the OSDF Sediment Basin. No contamination other than that associated with the asbestos-containing wrap is expected to be associated with this pipeline. It will be excavated as part of Sector 2 remediation activities.

Electric Power Cable and Pole Lights

An electric power cable, partly buried and partly overhead on wood poles with lights, parallels the Former Production Area Fence in the northwest corner of Sector 2. These facilities will remain in service and the area will be certified as part of A1PII remedial activities.

Agricultural Drain Tiles

Buried agricultural drain tiles are known to occur in Sector 1 east of the Old North Entrance Road and will be excavated as part of Sector 2 activities. Based on sampling results for tiles located in Area 1, Phase I, as reported in the Draft Remedial Action Work Plan for Soil Remediation Project Area 1, Phase I, Rev. E, Appendix G "Drain Tiles" (DOE 1996h), these tiles are not expected to exhibit above-FRL contamination.

Old North Entrance Road

The Old North Entrance Road, i.e., that segment north of the STP Access Road, and associated culverts will remain in service as a clean haul route from the OSDF, but will be addressed as part of Sector 2 precertification and certification activities. Predesign investigations indicate that soils under the road are below FRLs. The road will ultimately be removed by the OSDF Project after A1PII activities are complete.

OSDF Leachate Conveyance System

A high-density polyethylene pipe was installed to carry leachate collected at the OSDF south along the west side of the North Entrance Road, then west to the AWWT facility. The pipe lies on the west side of the road, so remedial activities in Sector 2 should not pose a risk to the pipe.

2.3.4.1 Sector 3

Utilities and at- and below-grade structures and debris located in Sector 3 are shown in Figure 2-6. The utilities of concern for A1PII remediation are those associated with CG&E transmission lines, STP Area facilities, the DO Facility, the Flume Building, buried utility pipelines, buried electrical duct, STP overhead electric distribution line, buried fiber optic cable, pole lights and warning siren, perimeter fence, gravel roads, STP Access Road, and North Entrance Road Phase I Relocation Segment.

CG&E Transmission Lines

A CG&E high voltage transmission line on steel lattice towers currently loops in diagonally from the east across Sector 3 to the FEMP Main Substation. Above-grade portions of the northernmost lattice tower along the North Entrance Road and northern loop conductor is scheduled to be removed by FC&DP in cooperation with CG&E in FY 98; three new wood poles will be added to support the conductor in the southern easement to facilitate removal of the northern tower, and will remain until the Main Substation is no longer needed. These activities are planned to be completed prior to the start of Sector 3 remediation activities, which will include removal of the remaining portion of the lattice tower to 3 feet below grade. New overhead lines will be installed to the substation near the DO Facility. Additional overhead lines will supply power from the substation to the DO Facility and the OSDF Construction Supply Well.

The CG&E transmission line and associated lattice towers in the north-south easement near the eastern FEMP boundary will remain in service, and appropriate coordination will be maintained with CG&E to ensure that A1PII remedial activities are conducted in a manner that ensures continued safe operation of these lines. It is anticipated that soils adjacent to these facilities will meet the FRL and that additional remediation will not be required.

STP Area Facilities (Bldg. 25A-H; 39D, etc.)

Structures in the STP Area include sewage treatment plant components, including the Sludge Drying Beds, and the STP Incinerator. The STP became operational in 1952 for treatment of FEMP sanitary wastewater and was later reconstructed to receive both sanitary and process-related wastewater. The use of the STP to treat process-related wastewater was subsequently discontinued with installation and start-up of the FEMP bio-denitrification effluent treatment system (BDN-ETS) in the late 1980s. The STP continues to treat sanitary waste, but is planned to be replaced in early 1998 by relocating the

BDN-ETS for use as a replacement sewage treatment plant. The Sludge Drying Beds were formerly used for management of sludge generated by the STP, but are now abandoned; this facility has been designated a RCRA HWMU on the basis of a determination that spent PCE, a RCRA F002 listed hazardous waste, was disposed of in the beds (Section 2.1.2). The STP Incinerator, located in the northwest corner of the STP Area, operated from November 1954 through December 1979 to burn uranium- and thorium-contaminated and uncontaminated combustible trash.

OU5 RI/FS investigations and more recent predesign investigations indicate the presence of contamination (primarily total uranium) in surface and subsurface soils in and adjacent to the STP Area, probably the result of air emissions from the STP Incinerator, Sludge Drying Bed operations, leakage from STP piping, etc., as discussed in Sections 2.1 and 2.2. The above-grade portions of the STP and STP Incinerator will be decontaminated and dismantled by the FC&DP in accordance with the OU3 RD/RA Work Plan (DOE 1997b) and facility-specific implementation plan(s) before demolition of at- and below-grade structures and excavation of impacted soil and debris as part of A1PII Sector 3 remediation. Sector 3 remediation also includes removal of the STP Area perimeter chain link fence and at- and below-grade portions of pole lights in the STP Area.

DO Facility (Bldg. 18P) and Flume Building (Bldg. 18R)

The Dissolved Oxygen (DO) Facility and Flume Building are located south of the STP Area. The DO Facility is designed to oxygenate wastewater effluent from the AWWT and other site discharges as needed to ensure FEMP National Pollutant Discharge Elimination System (NPDES) permit limits for dissolved oxygen are met. The Flume Building houses the Outfall Line Pit, where the combined discharge from the STP and AWWT are discharged to the Great Miami River. A1PII predesign investigations indicate no soil contamination above FRLs in the vicinity of these facilities and they will remain in place through and beyond A1PII remediation activities, which will include certification of soil up to the foundations of these facilities. However, the facilities may be relocated or removed, as appropriate, in the future to accommodate the final North Entrance Road alignment or final site closure.

Utility Pipelines

In addition to the AWWT discharge line, discussed in relation to Sector 1 (Section 2.3.4.1), several utility pipelines traverse across Sector 3 between the Former Production Area and the STP Area.

including two water supply lines, an abandoned AWWT wastewater effluent line, the STP wastewater influent pipeline, and a GC&E fuel gas pipeline which continues to the eastern FEMP boundary and beyond. An STP wastewater effluent pipeline currently in service runs from manhole (MH) 175 at the STP to MH 176C near the DO Facility, then to MH 176B where it combines with the current AWWT discharge line for discharge to the Outfall Line Pit at the Flume Building. An abandoned STP effluent line runs from MH 176C offsite to the Great Miami River. The fuel gas pipeline may be protected by asbestos-containing bituminous coating or wrap, and the STP influent and effluent pipelines are considered to have a high potential for contamination. The remaining pipelines are considered to have low contamination potential. The water, gas, and STP influent and effluent pipelines will be isolated (plugged) at the North Entrance Road and the gas line and STP effluent line will be plugged at or near the FEMP property line. Once isolated, the pipelines will be excavated as part of Sector 3 remediation.

Agricultural Drain Tiles

Buried agricultural drain tiles are known to occur in Sector 3 near the North Entrance Road relocation segment, and will be excavated as part of Sector 3 activities. These tiles are not expected to exhibit contamination above FRLs (Section 2.3.4.2).

Electric Duct and DO Facility Substation (Bldg. 16K)

A buried electric distribution cable in a concrete duct bank, possibly in an asbestos transite conduit, traverses the sector from the Former Production Area to the DO Facility Substation. This cable will be replaced by an overhead line to the substation. The buried duct bank will be excavated as part of Sector 3 remediation. On the basis of predesign investigations (Section 2.2), no soil contamination above FRLs is expected to occur in the area occupied by the duct bank. The overhead line and substation will remain in service and will be ultimately disposed of in conjunction with the DO Facility.

STP Electric Distribution Line

An electric distribution line on wood poles currently traverses the site from the Former Production Area to the STP. A1PII remediation activities include removal and disposal of at and below-grade portions of the wood poles following removal by FC&DP of the conductor and above-grade segments of the wood poles.

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Telecommunication Line

The FEMP main telephone fiber optic cable runs along the east side of the North Entrance Road. It is strung on wood poles along the Phase 1 relocation segment and underground southward to west of the southern Former Production Area boundary. The cable will remain in service through A1PII remedial activities. An abandoned section of buried cable remains in place on the east side of a portion of the former North Entrance Road. The abandoned cable will be left in place for removal during OSDF cell construction. Care will be taken, particularly during installation of the surface water management system, to avoid direct disturbance or long-term erosional effects that could interfere with continued operation of the cable.

Warning Siren

The site warning siren, located on a wood pole near the DO Facility, will stay in place during remediation.

FEMP Perimeter Fence

Sector 3 is bounded on the east by a wire fence. Based on predesign investigations of soils in the sector, no remediation of the fence is expected to be needed. Some sections of fence may have to be moved to accommodate remedial activities around the STP.

Gravel Roads

Gravel access roads to the DO Facility, monitoring wells, and air monitoring stations lie near the eastern boundary of Sector 3. Based on predesign investigations of soils in the sector, no remedial activities are necessary, and the roads will be certified with the remainder of the sector.

STP Access Road

The STP Access Road will be excavated and the area will be subject to precertification and certification as part of Sector 3 activities. Predesign investigations indicate that the gravel contamination beneath the asphalt surface of the road is below the soil FRLs.

North Entrance Road Phase 1 Relocation Segment

This temporary North Entrance Road segment corridor (road and ditches), which forms the north boundary of Sector 3, will be addressed as part of Sector 3 precertification and certification activities.

Surface soil from the corridor was removed prior to building this corridor and predesign investigations indicate that soil in adjacent areas do not exceed FRLs. The road will ultimately be removed by the OSDF Project after A1PII activities are complete.

2.3.4 Environmental Monitoring Facilities

Some groundwater monitoring wells, air monitoring stations, and benchmarks will not be impacted by currently planned A1PII remediation and will be left in place. Figures 2-7 and 2-8 show the locations of all monitoring wells, including those that are to be abandoned. Table E-2 (Appendix E) shows the names and locations of all active wells. Table E-3 shows the names and locations of all wells that are to be abandoned.

2.4 AREA-SPECIFIC CONTAMINANTS OF CONCERN

As discussed in the SEP, the selection process for retaining ASCOCs involves applying a series of decision criteria. Based on the design criteria, COCs are either retained or eliminated as concerns in the remediation area undergoing evaluation. Specific ASCOCs will be provided in the Certification Letter for each Sector. The following is an overview of the selection process.

2.4.1 ASCOC Criteria

The ASCOC selection process includes two steps. The first is the selection of ASCOCs for remedial design and the second is the selection of ASCOCs for certification.

The starting criteria for COC selection include the following:

- The COC must be listed as a soil COC in either the OU2 or OU5 ROD for specified location(s)
- The COC must be attributable to site use, presence, and/or release of the constituent
- The COC must contribute to the vertical and lateral extent of planned soil excavation in the remediation area
- Combined with the other retained ASCOCs, represent at least 99% of the risk to a modeled key receptor (example: Undeveloped Park User at the FEMP)
- Physical characteristics of the COC, such as degradation rate and volatility, indicate a likelihood of persistence in the soil between time of release and remediation.
- Analytical results indicate the true presence of the COC above the action level (FRL), and the COC is not attributable only to false positives or elevated method MDCs.

In order to determine the remedial design COCs for A1PII, the assumption was made that excavating total uranium to the FRL would envelope all other contamination within the area, except in the Trap Range, where lead is the excavation driver. Several actions were taken to confirm this hypothesis.

First, all historical data were evaluated to determine the general pattern of contamination and areas of WAC concern. These data showed that, in the STP Area, total uranium is the primary contaminant and only two areas that were potential WAC concerns. These areas were isolated technetium-99 detections above the FRLs and WAC and the residual sludge in the Sludge Drying Beds, where existing characterization data included detections above the total uranium WAC. To confirm the presence of technetium-99, a predesign investigation study was conducted as discussed in Section 2.2.3. Preliminary findings of this study show that technetium-99 is not of concern in the area, but the final laboratory data are not yet available for review. With regard to the Sludge Drying Beds, a predesign investigation for miscellaneous areas was conducted to determine the extent of contamination. The data indicate that approximately 35 yd^3 of above-WAC sludge remain in the Sludge Drying Beds. This investigation is discussed in Section 2.2.5.

Outside the STP Area, the excavation driver was presumed to be total uranium, except within the RCRA Trap Range, in which the driver is lead.

Based on the assumptions as stated above, the existing and pre-design data were used to determine excavation footprints. Once the excavation footprints were developed, the remnant data were evaluated to determine if the excavation enveloped all the existing detections of COCs above the FRLs. This process consisted of using a three-dimensional model of the area in which the planned excavation footprints had been removed, then plotting existing data above the FRLs to determine if any residual or remnant data points remained. The findings showed that, by using total uranium as an excavation driver for all areas except in the Trap Range, most of the contamination had been removed. Of the remaining data, the contamination had been sufficiently bounded by other samples and no remedial action is necessary. At only one location, approximately 300 feet due west of the northwestern corner of the STP, one sample showed elevated levels of thorium-228 (9.41 pCi/g), thorium-232 (10.1 pCi/g), and radium-226 (9.5 pCi/g). Subsequent investigations will confirm and bound the contamination in this area.

2.5 EXCAVATION LIMITS

The A1PII excavation boundaries were determined using a kriging model with data from the OU5 RI/FS, predesign studies, and other investigations as input. The general methodology is described in Appendix B-9.

Results of the modeling indicate the need for excavation of surface soil and deeper excavations to address contamination above the soil FRLs. The deeper excavations will occur in the STP Area. The depths and volumes of all planned soil excavation are described below.

2.5.1 STP Excavation Limits

The estimated depth of soil excavation within the STP fenced boundary is depicted in Figure 2-9. These depths were determined based upon the results of the STP Area total uranium analytical model. This model incorporated all available lithologic data within the STP Area, total uranium soil data within the STP Area, and the excavation of at-or-below-grade structures (e.g., building foundations and piping) in the STP Area. The excavation will result in 29,500 yd^3 of soil. Figure 2-10 shows the impacted zones with the STP. Note that the removal of the foundations generally envelopes the contamination.

2.5.2 Trap Range Excavation Limits

The Trap Range excavation limits are based upon the 400 ppm contour of lead contamination, which is the soil FRL for lead (Figure 2-11). This results in an excavation "footprint" that also incorporates any arsenic contamination above the soil FRL of 12 p.m.. The top 6 inches of soil will be excavated within the 2.4 acre footprint, resulting in 1,958 yd^3 of excavated soil.

2.5.3 Surface Soil Excavation Limits

The surface soil (0-6 inch depth) excavation boundary (excluding deeper excavation areas) is based upon the 82 ppm modeled contour for total uranium contamination. The excavation boundaries are depicted in Figure 2-12. Table 2-2 shows the soil excavation volumes required due to contaminant concentrations exceeding FRLs and soils lying in the existing soil stockpile footprints.

TABLE 2-1
LEACHABILITY COEFFICIENTS AND FRLs
FOR TOTAL URANIUM IN OU5

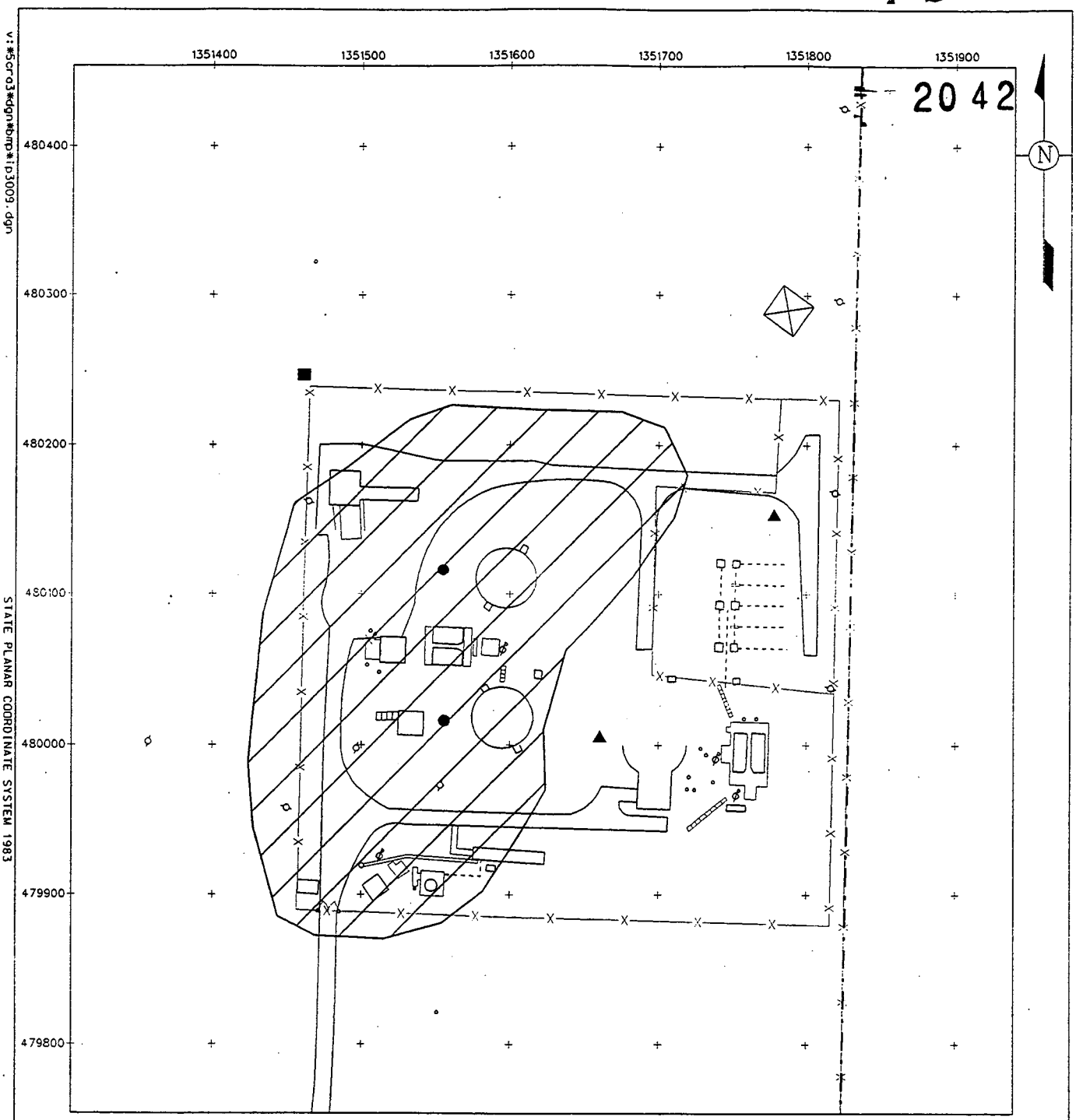
LEACHABILITY COEFFICIENT, K_l (L/kg^3)	FRLs (ppm)	
	ON FEMP PROPERTY	OFF FEMP PROPERTY
325	82	50
15	20	N/A

TABLE 2-2
SOIL EXCAVATION VOUMES

	Concentration > FRL		Stockpile Footprint		Totals	
	Area (acre/ft^2)	Volume (bcy)	Area (acre/ft^2)	Volume (bcy)	Area (acre/ft^2)	Volume (bcy)
Sector 2	0.02/ 871	16	10.98/ 478,289	8,857	11/ 479,160	8,873
Sector 3	0.6/ 26, 136	485	0.4/ 17,424	322	1/ 43,560	807

bcy = bank cubic yards

000065



LEGEND:

- FEMP BOUNDARY
- BATCH TEST (K_1 OR K_d > 100 L/kg)
- SOIL/PERCHED WATER CONCENTRATION (K_1 OR K_d < 100 L/kg)
- SOIL/PERCHED WATER CONCENTRATION (K_1 OR K_d > 100 L/kg)
- K_1 OR K_d = 15 L/kg
- K_1 OR K_d = 222 L/kg

SCALE

100 50 0 100 FEET

DRAFT

FIGURE 2-1. STP K_1 OR K_d STUDY DIVISIONS

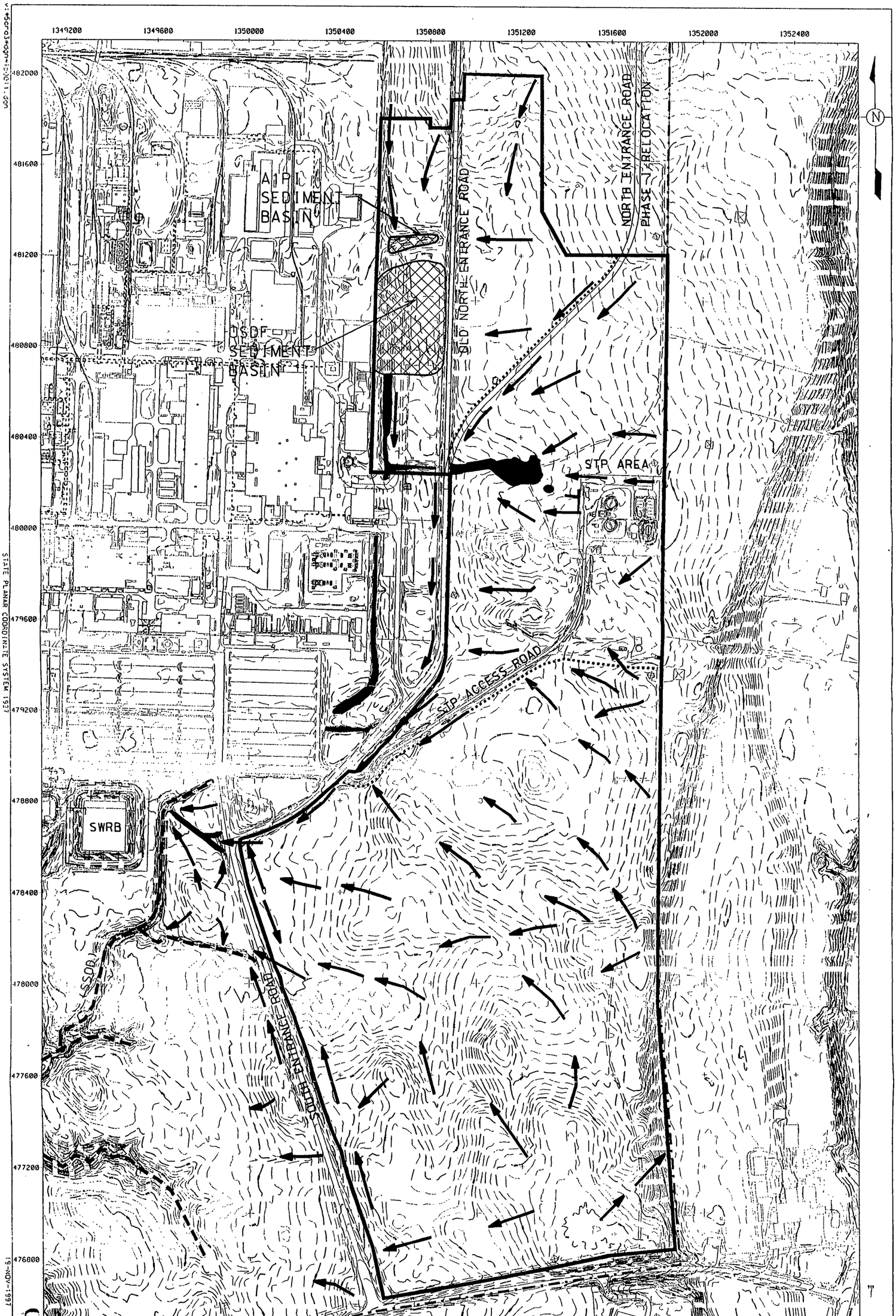


FIGURE 2-2. A1PII SURFACE TOPOGRAPHY AND SURFACE WATER FEATURES

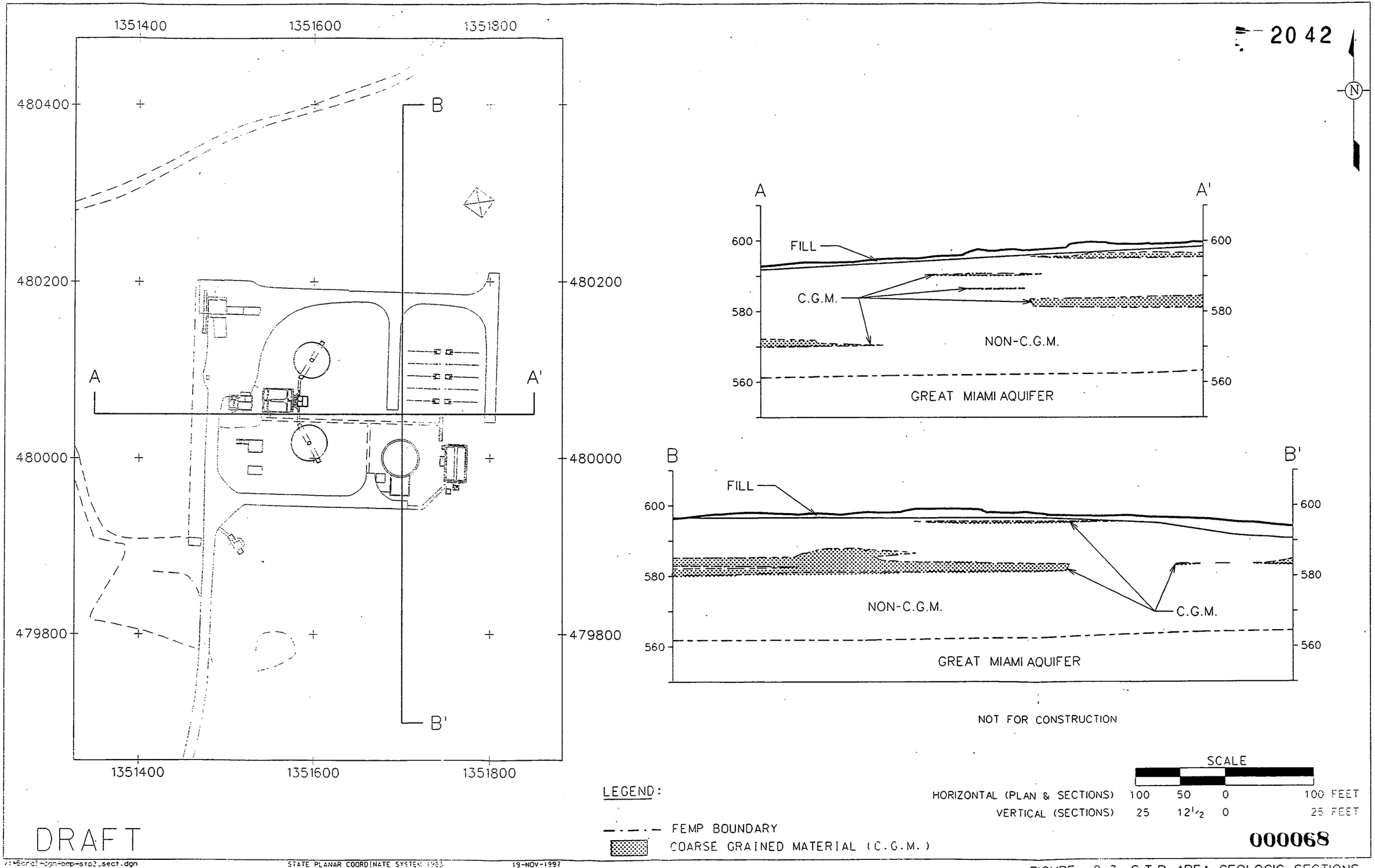


FIGURE 2-3. S.T.P. AREA GEOLOGIC SECTIONS

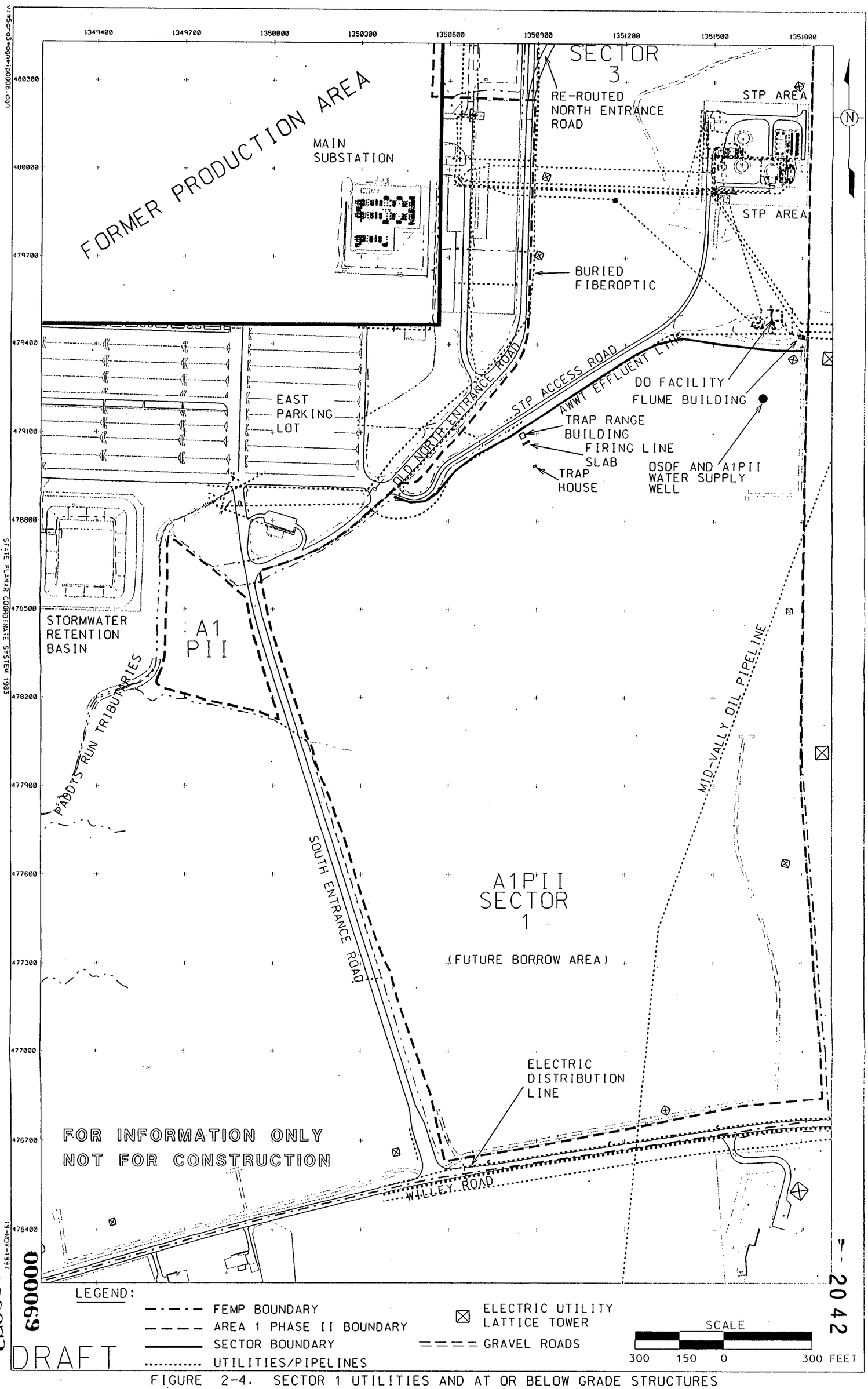


FIGURE 2-4. SECTOR 1 UTILITIES AND AT OR BELOW GRADE STRUCTURES

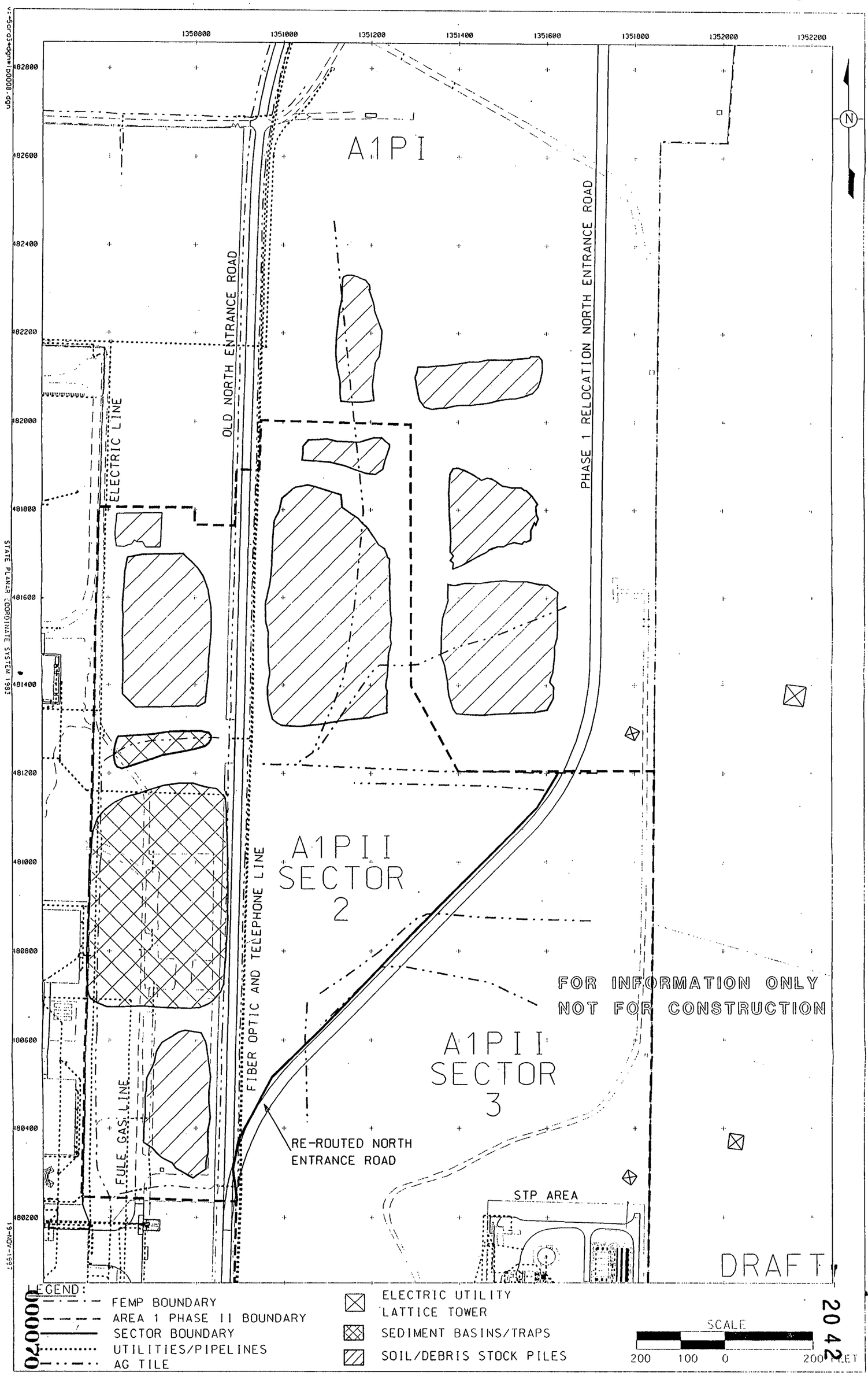


FIGURE 2-5. SECTOR 2 UTILITIES AND AT OR BELOW GRADE STRUCTURES

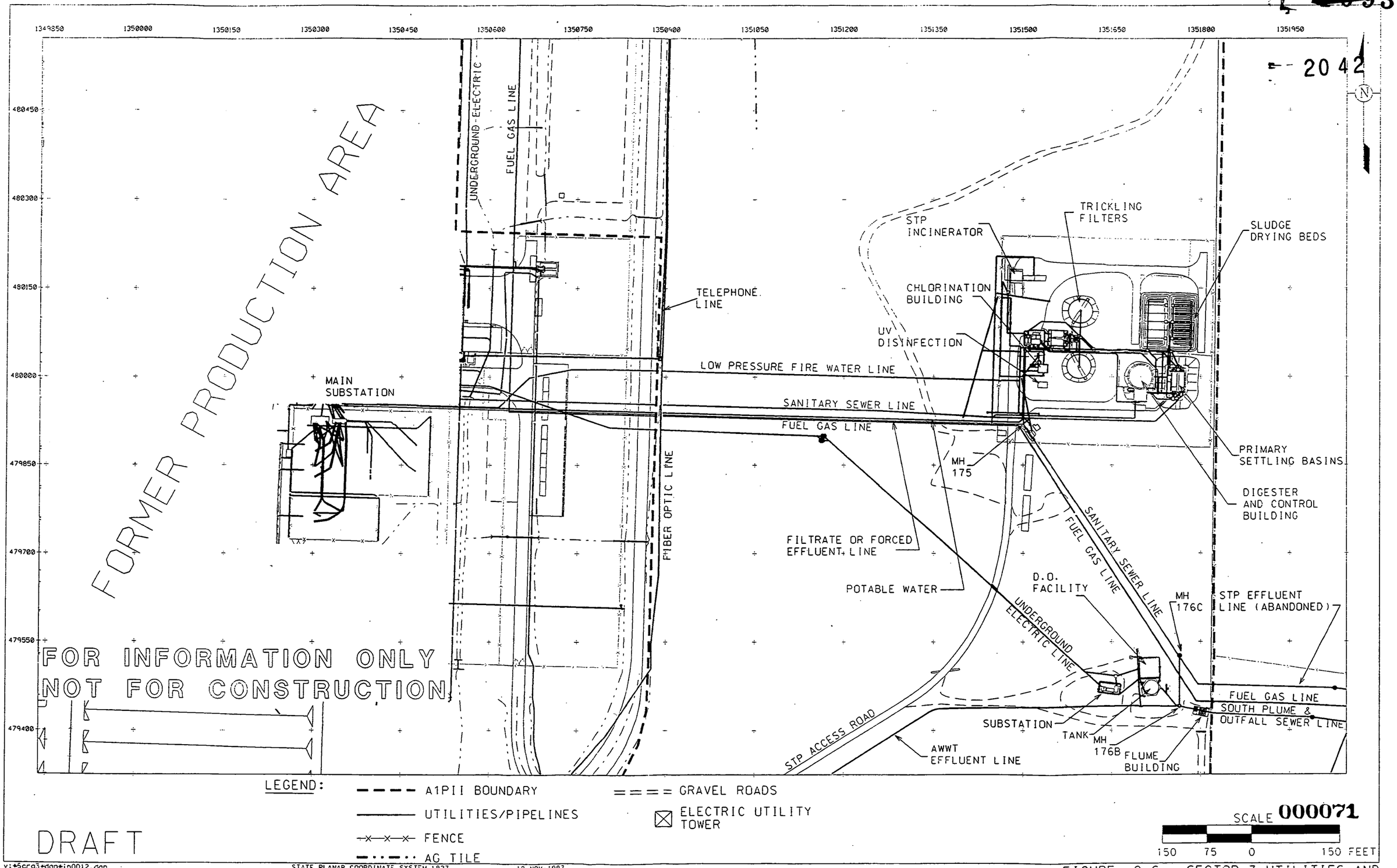


FIGURE 2-6. SECTOR 3 UTILITIES AND AT OR BELOW GRADE STRUCTURES

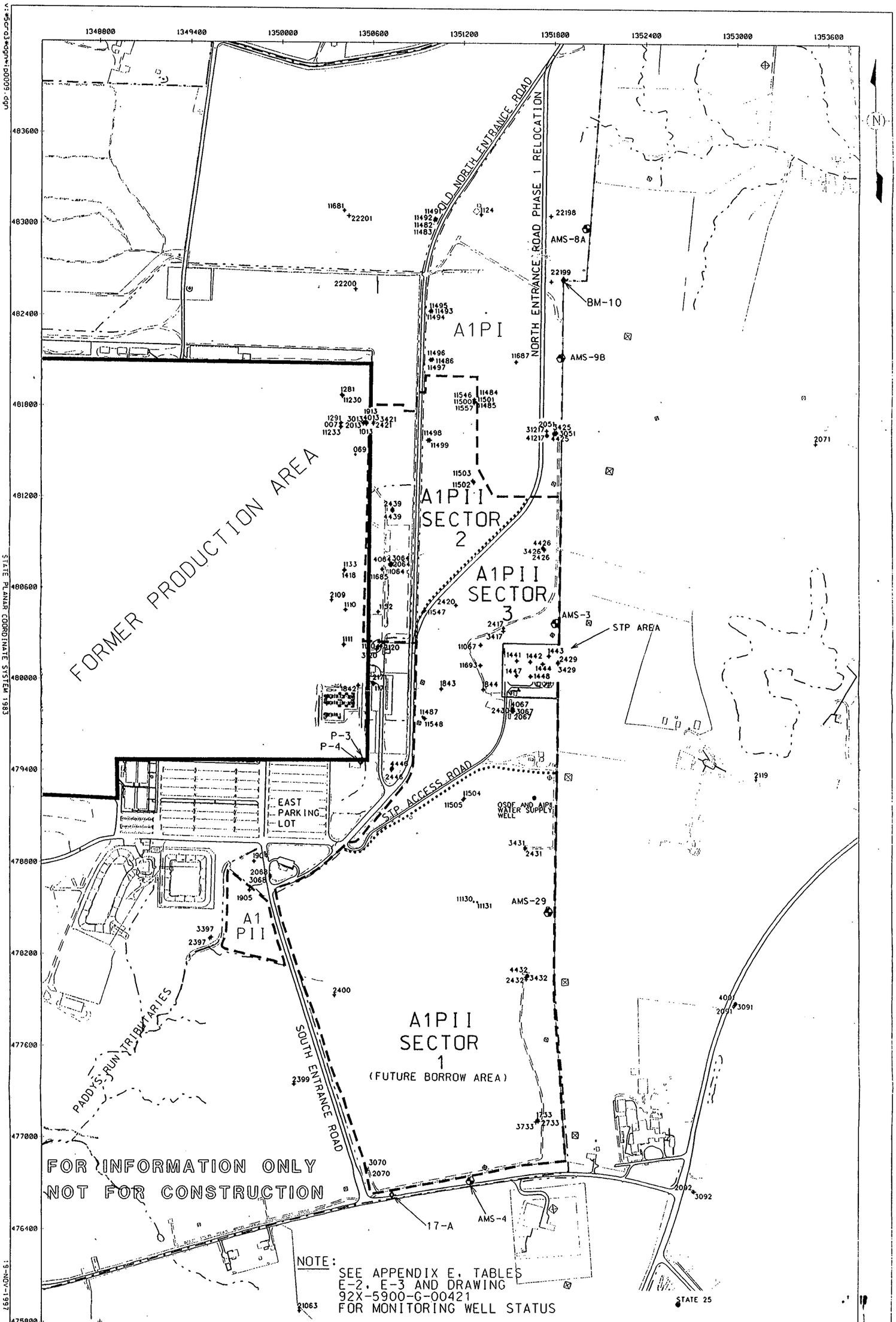


FIGURE 2-7. ENVIRONMENTAL MONITORING AND RELATED FACILITIES

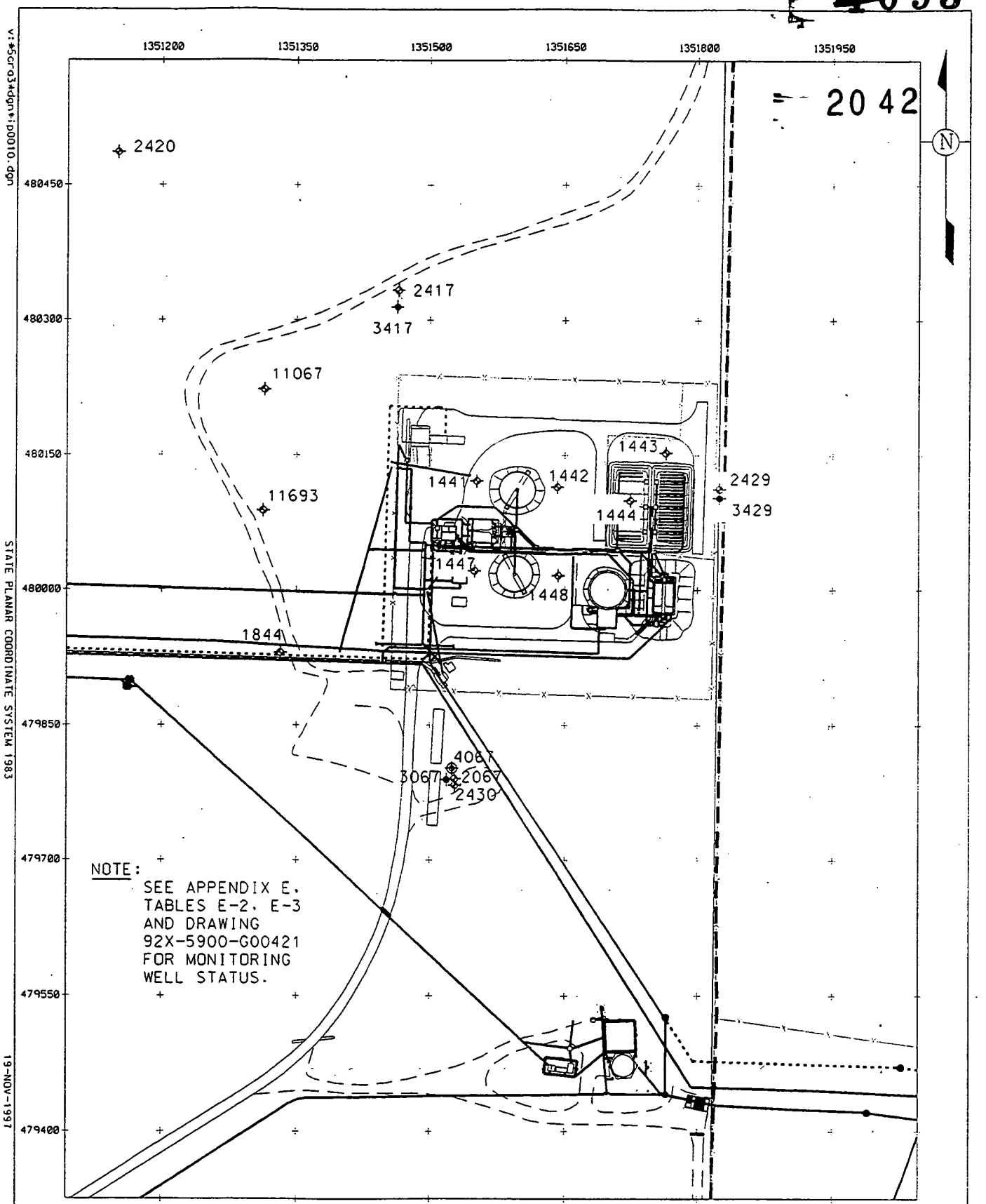
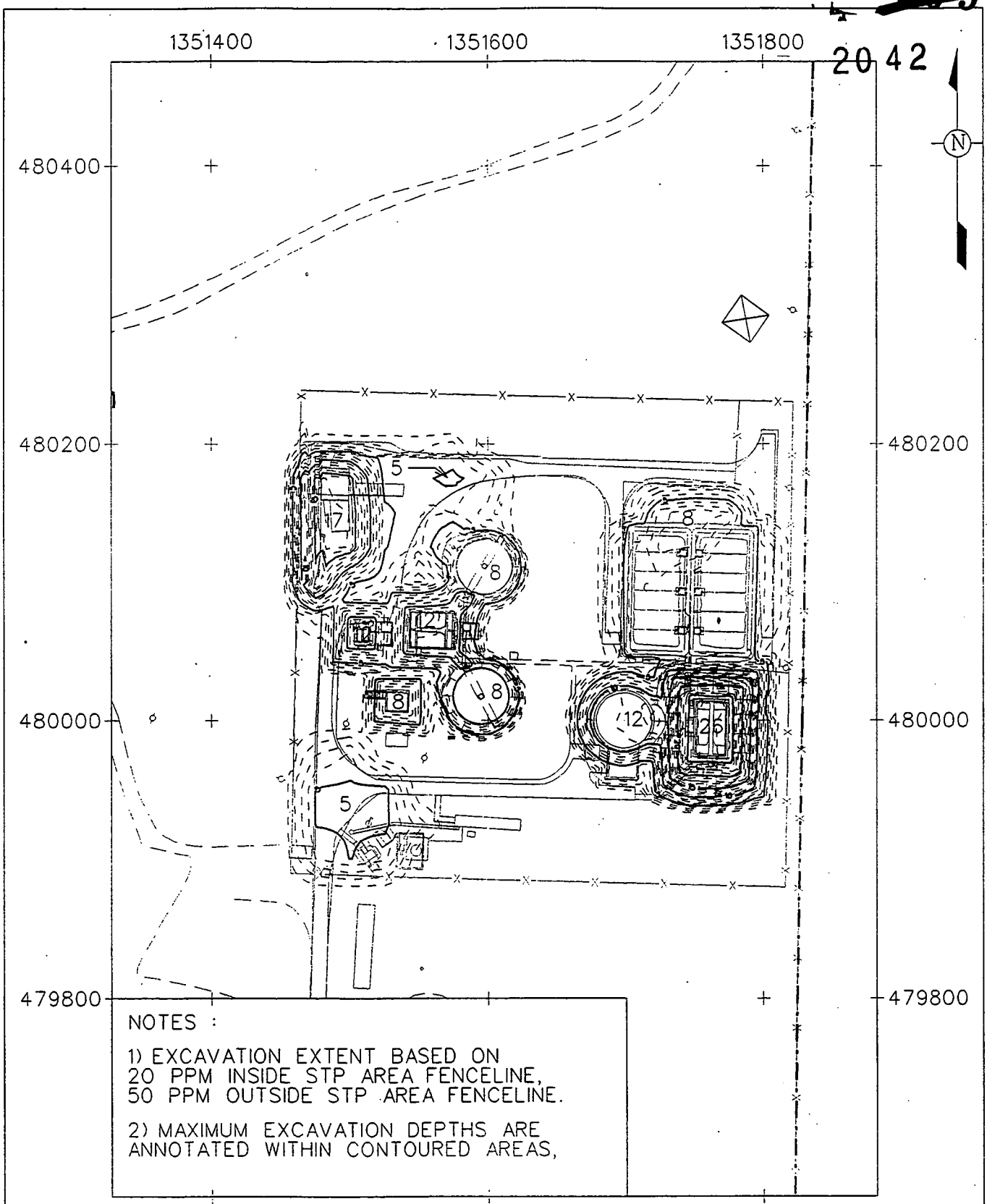


FIGURE 2-8. STP AREA WELL LOCATIONS



NOTES :

1) EXCAVATION EXTENT BASED ON 20 PPM INSIDE STP AREA FENCELINE, 50 PPM OUTSIDE STP AREA FENCELINE.

2) MAXIMUM EXCAVATION DEPTHS ARE ANNOTATED WITHIN CONTOURED AREAS,

LEGEND:

NOT FOR CONSTRUCTION

FEMP BOUNDARY
EXCAVATION, MAJOR CONTOURS (5')
EXCAVATION, MINOR CONTOURS (1')

SCALE
100 50 0 100 FEET

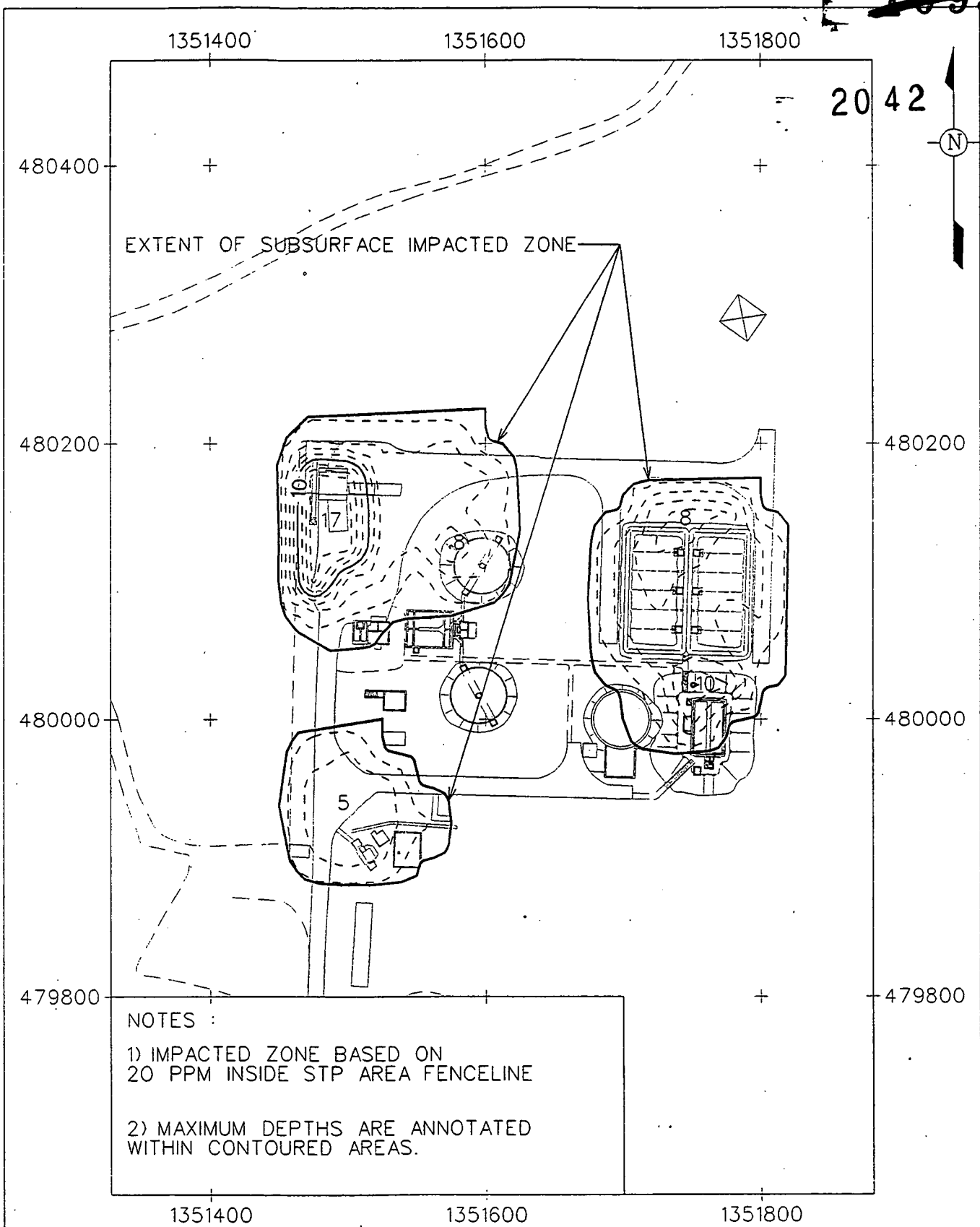
DRAFT

v:\5cr3\dgn\bmp\ip2007.dgn

STATE PLANAR COORDINATE SYSTEM 1983

18-NOV-1997

FIGURE 2-9. STP AREA EXCAVATION DEPTHS



LEGEND:

- FEMP BOUNDARY
- DEPTH CONTOURS, MAJOR (10')
- DEPTH CONTOURS, MINOR (2')

SCALE

100 50 0 100 FEET

DRAFT

FIGURE 2-10. STP AREA IMPACTED ZONE

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STATE PLANAR COORDINATE SYSTEM 1983

19-NOV-1997

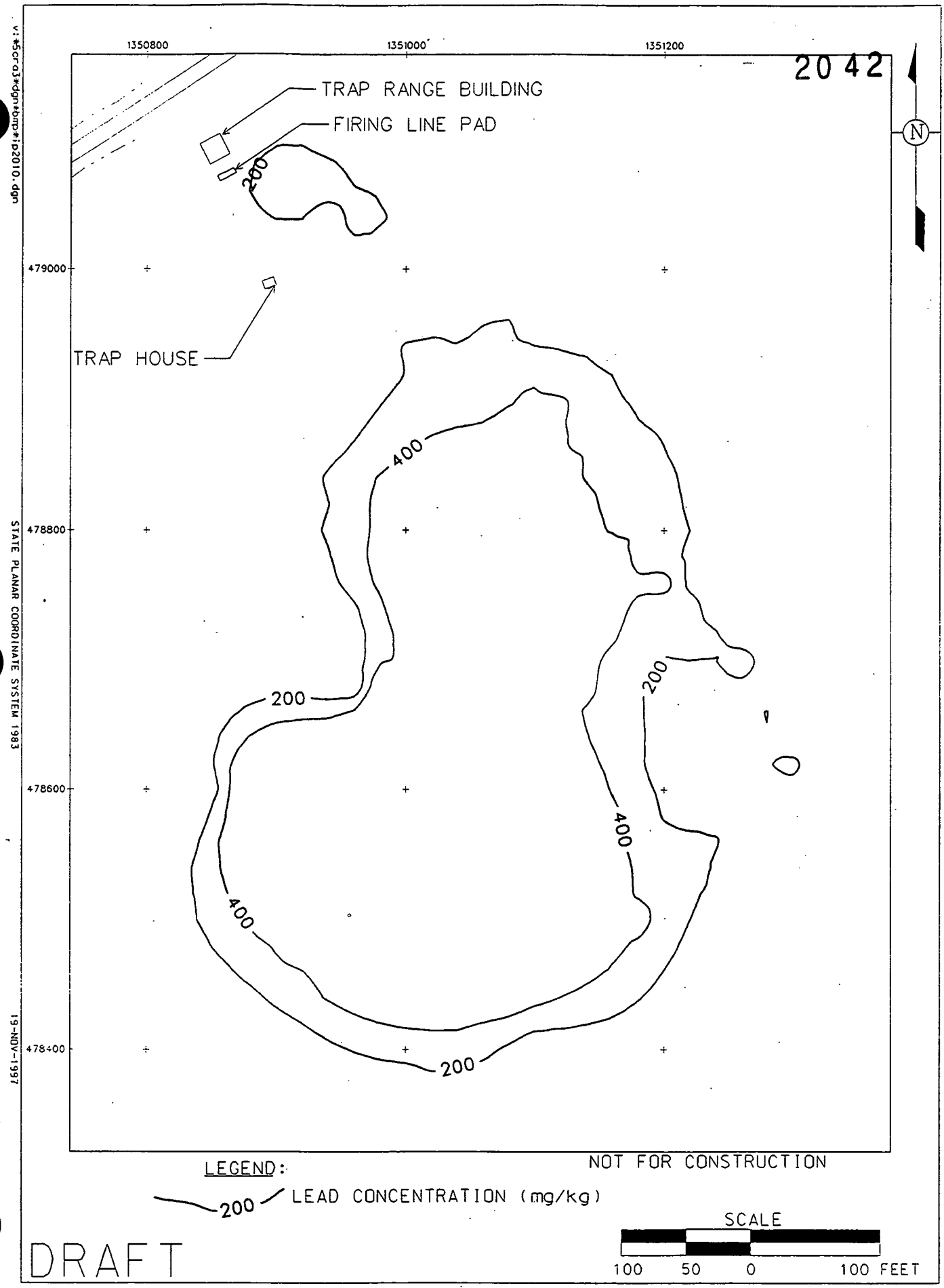
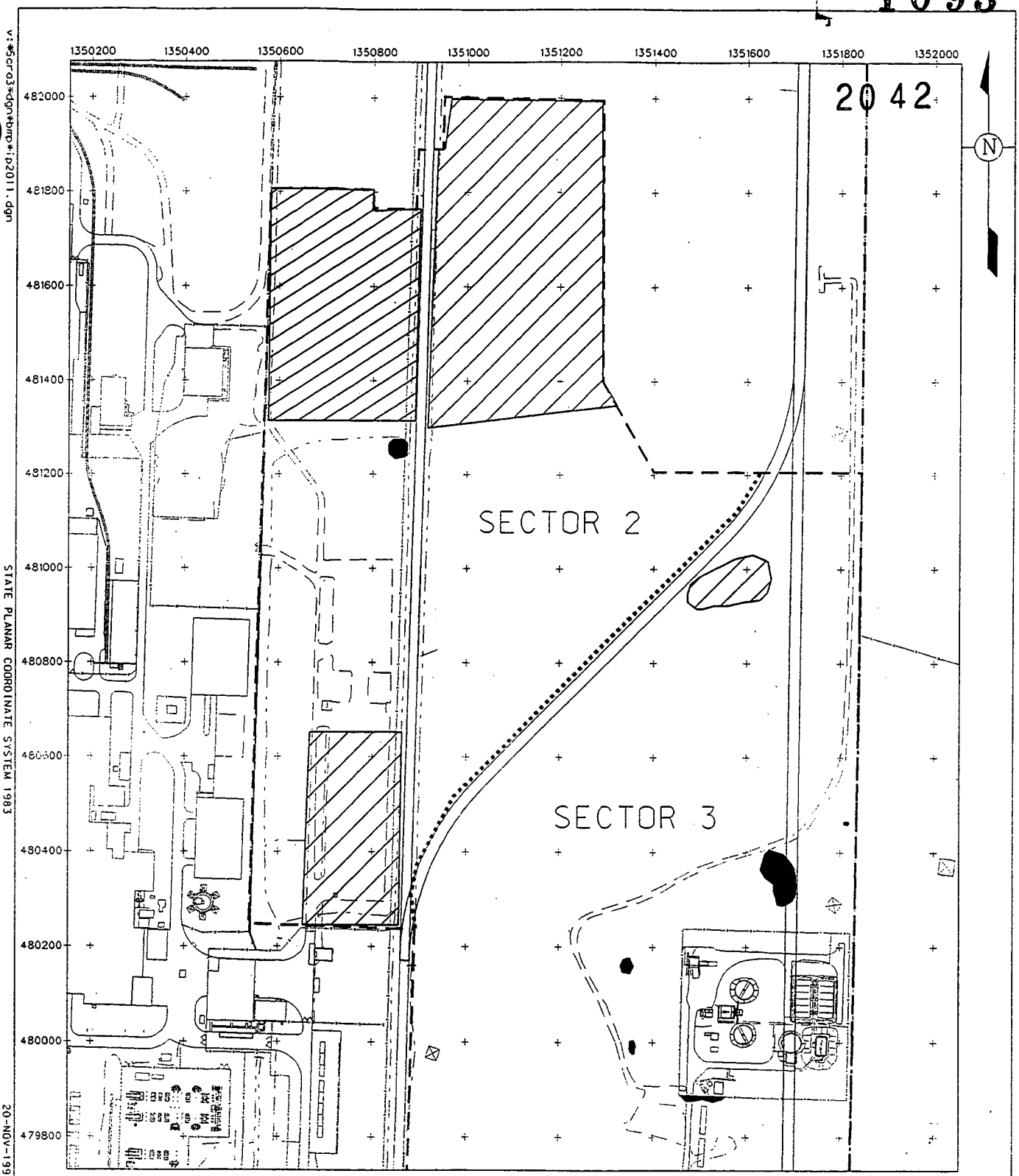


FIGURE 2-11. EXTENT OF EXCAVATION IN TRAP RANGE AREA



NOT FOR CONSTRUCTION

LEGEND:

- CONCENTRATION EXCEEDS FRL's
- AREAS UNDER SOIL STOCKPILES
- SECTOR BOUNDARY
- FEMP BOUNDARY
- AREA 1 PHASE II BOUNDARY

SCALE

300 150 0 300 FEET

DRAFT

FIGURE 2-12. EXTENT OF SURFACE EXCAVATION, AREA 1, PHASE II

3.0 REMEDIAL ACTION APPROACH

This section describes the technical approach that will be used to remediate A1PII. As discussed in Section 1.2, A1PII has been divided into three sectors that will be sequentially remediated. Remedial activities will be generally carried out in accordance with the guidance provided in Sections 3.0 and 4.0 and Appendix F of the SEP. This section details the area-specific approach that will be implemented to address those guidelines. Construction drawings and technical specifications are provided as part of the IRDP and will serve as part of the contract documents governing contractor activities. Specific methods and procedures will be provided in the contractor's Safe Work Plan, which will include the following individual plans:

- Site Clearing Work Plan
- Support Location Plan
- Surface Water Management and Erosion and Sediment Control Plan
- Environmental Monitoring and Related Facilities Protection Plan
- Equipment Wash/Decontamination Plan
- Underground Utility Removal Plan
- Concrete Removal work Plan
- Excavation Work Plan
- Dewatering Plan
- Asbestos Handling Plan
- Dust Control Plan
- Treatability Study Work Plan
- Stabilization Work Plan
- Material Documentation Work Plan
- Traffic Control Plan
- Construction QA Plan

These plans will be reviewed and approved by FDF before remedial activities begin.

A1PII remediation tasks are integrated with the scheduled start-up of the new Sanitary Wastewater Treatment Plant (SWTP), which will replace the existing Sewage Treatment Plant (STP), and the construction of Cells II through V of the OSDF. The drivers for the sequence and schedule of remediation activities in A1PII are:

- Sector 1 requires immediate certification since select borrow material is needed for OSDF construction.

- Sector 2 remediation and certification will allow construction of the OSDF, including installation of the OSDF Borrow Area Haul Road from Sector 1, to proceed concurrently with remediation and certification of Sector 3.

- Sector 3 remediation cannot begin until the SWTP is operational and D&D of the above-grade portions of the STP has been completed. Certification of Sector 3 will allow backfilling of the excavated STP Area, which must be completed before other projects can construct the southern leg (Phase II) of the rerouted North Entrance Road, remove and certify a portion of the rerouted (Phase I) North Entrance Road, and then construct OSDF Cell V.

Additional information regarding the schedule for remediation of A1PII is provided in Section 6.10.

3.1 Sector 1 REMEDIATION

Sector 1 is the southern portion of A1PII from the STP Access Road to the southern boundary of the FEMP (Figure 3-1). Sector 1 remediation activities include:

- Certifying Sector 1, excluding the Trap Range and including the A1PII Conveyance Channel, Sediment Basin, and Outfall, and select locations in Sector 2
- Constructing the A1PII Conveyance Channel, Sediment Basin, and Outfall, including stockpiling excavated material for reuse
- Remediating the Trap Range.

3.1.1 Preliminary Activities

Certain activities will be completed in Sector 1 prior to award of the remediation contract. Accelerated completion of these activities will facilitate the timely use of Sector 1 as a borrow area for construction of the OSDF. These activities include:

- Certifying the sector
- Installing access controls
- Preparing the support area

3.1.1.1 Expedited Certification

Certification of Sector 1, excluding the Trap Range and including two small locations in Sector 2, will be expedited. Certification of Sector 1, other than the Trap Range, will allow the area to be used as a

borrow area for construction of the OSDF, including construction of part of the OSDF Borrow Area Haul Road. Certification of select portions of Sector 2 (identified as 2A on construction drawings [Dwg G0020]) will allow construction of OSDF Cell III and the remainder of the OSDF Borrow Area Haul Road (Dwg G0012). Although the A1PII Conveyance Channel is outside the Sector 1 boundary, it will be constructed as a Sector 1 task (Section 3.1.2.7) to provide surface water management and erosion and sediment control for most of Sector 1. Characterization for reuse of the A1PII Conveyance Channel, Sediment Basin, and Outfall will allow "clean" construction of these facilities and reuse of excavated material. Since the facilities will then receive runoff from uncertified areas, they will have to be certified at a later date.

The certification units will be designed in accordance with the procedures described in Section 3.1.7. The Certification Design Letter documenting this design and detailing certification activities is being prepared concurrently with preparation of this Implementation Plan.

3.1.1.2 Installation of Access Controls

Access controls for Sector 1 (Dwg G0020) include:

- Construction fencing and signs along accessible boundaries
- Construction fencing and signs around the Trap Range
- Gates at equipment access points
- Formal access protocols (e.g., FEMP Site Procedure EP0008 or equivalent).

Installation of these controls will be completed prior to award of the construction contract for the remediation of A1PII and retained for the construction period. This expedited installation of these controls will allow use of Sector 1 as a borrow area as soon as certification is complete.

3.1.1.3 Preparation of Support Area

The Support Area (Section 3.1.2.4) will be prepared prior to award of the construction contract. This preparation will include regrading of the area, installation of an access driveway with ditch culvert for drainage, installation of gravel for parking and laydown areas, and installation of power and telephone service to the site. This preparation will minimize the time required by the construction contractor to complete site preparation activities.

3.1.2 Site Preparation

Planned site preparation activities in Sector 1 include:

- Establishing site boundaries and controls
- Surveying and site layout
- Clearing
- Establishing the support area
- Abandoning, protecting, and hooking up utilities
- Protecting environmental monitoring and related facilities
- Installing the surface water management system and erosion and sediment controls
- Installing equipment wash facilities

3.1.2.1 Establishing Site Boundaries and Controls

As previously described (Section 3.1.1.2), access controls around Sector 1 will be installed prior to award of the construction contract. Additional boundaries and controls will be established as follows:

- A portion of the underground utilities between the former Production Area and the STP will have to be removed to allow construction of the A1PII Conveyance Channel and the OSDF Borrow Area Haul Road. This area will be classified as a "Soil Contamination Area" when excavation activities begin. However, radiological monitoring of these utility lines and their immediate vicinity will be conducted during excavation (Section 3.1.3) and may result in an upgraded posting.

- Any additional fencing, signs, barriers, or equipment access points beyond those already established for the certified area will be placed, as necessary, to control access to construction areas.

3.1.2.2 Surveying and Site Layout

Initial site preparation activities will include locating and marking (Spec 02050) the pertinent control boundaries, subsurface facilities to be protected or removed, limits of excavation, and facilities to be installed. Vertical and horizontal controls will be established using existing benchmarks in and near A1PII (Dwg G0001). Survey control points, including baselines and temporary benchmarks, will be established in the field based on the coordinate system shown on the construction drawings Dwg G0001). Feature and facility locations to be located and staked in the field include, but are not limited to:

- Boundaries: A1PII boundary and certified area boundary will be established before the remediation contract for Sector 1 is awarded. Additional construction zone boundaries and control point locations will be surveyed and staked where necessary.

- Subsurface Utilities: The AWWT Facility discharge line along the south side of the STP Access Road, the Mid-Valley Oil Pipeline in southeast quadrant of Sector 1, the fiber optic cable along the east side of the North Entrance Road, and electric conduits for pole lights along the North and South Entrance Roads are to remain. Segments of the fuel gas line, fire and potable water lines, STP influent line, AWWT wastewater effluent line (FT-4-12"V), and electrical duct between the North Entrance Road and the STP/DO Facility intersected by the A1PII Conveyance Channel are to be removed.

- Site Preparation Facilities: Support area and related utility hookups; A1PII Conveyance Channel, Sediment Basin, and Outfall, including related excavations and structures; other ditches and berms for surface water control, soil storage areas, and equipment wash facilities.

- Remedial Excavation and Construction Areas: Trap Range structures and soil excavation limits.

- Miscellaneous Facilities: As appropriate.

3.1.2.3 Clearing

Relatively limited clearing will be necessary for Sector 1 site preparation or remedial activities. Tree sampling program results (SEP Appendix D) indicate the upper sections of FEMP trees are below FRLs. Any trees and shrubs that must be cleared to accommodate Sector 1 activities will be cutoff approximately one foot above the ground surface, cut into manageable size, transported to the woodchip stockpile area (near the Southern Waste Units), and then chipped for use as on-site mulch during remediation or restoration (Spec 02100). The woodchip stockpile will be periodically turned by the contractor to prevent combustion. Remaining roots and stumps in certified areas will be ground in place or grubbed and stockpiled with surface soil for eventual use in the OSDF vegetative cover layer. Stumps and roots remaining in areas to be excavated will be ground in place and excavated and hauled to the OSDF with the excavated soil. In the Trap Range remediation area, any remaining stumps and roots in areas subject to demolition and excavation will be excavated/grubbed and dispositioned in the OSDF along with excavated debris. (Specs 02205)

3.1.2.4 Establishing the Support Area

As part of Sector 1 site preparation activities, a support area will be established in an uncertified area on the west side of the North Entrance Road, just north of the intersection with the STP Access Road

(Figure 3-1). This support area will be used for A1PII remediation activities in Sectors 1, 2 and 3. Prior to award of the construction contract, the area will be graded and covered with gravel; a driveway will be installed, including a ditch culvert for drainage; and power and telephone will be provided to the temporary utility pole (Dwg G0005). The remediation contractor will install his office trailer(s) and electric/telephone service to them. No radiological control point facility is planned for Sector 1 activities.

3.1.2.5 Abandoning, Protecting, and Hooking Up Utilities

All utilities to be excavated or removed as part of Sector 1 remedial activities will be safely shutdown and abandoned (e.g., de-energized, isolated/plugged, purged) in accordance with FEMP procedures before A1PII remediation begins. The utilities to be excavated in Sector 1 include segments of the following, which will be intersected by the planned A1PII Conveyance Channel (Dwg G0016):

- CG&E fuel gas line
- STP influent line
- AWWT wastewater effluent line (FT-4-12"V)
- Potable water line
- Fire water line
- DO Transformer electrical duct

Excavation of these lines is discussed in Section 3.1.3.

Utilities supported by buried electric conduits, pole lights along the South Access Road, overhead electric lines (e.g., between the former Production Area and DO Facility area), and the AWWT Facility discharge pipeline could be disrupted during installation of the A1PII Conveyance Channel/Sediment Basin/Outfall. The lighting system will be de-energized as needed and restored by FDF in accordance with standard FEMP procedures. Inlet works construction will involve installation of a culvert beneath the AWWT Facility discharge pipeline (Section 3.1.2.7), which will be supported and insulated (Dwg G0019).

Potential disruption of in-service utilities will be minimized to the extent possible. The remaining utilities include subsurface facilities noted in Section 3.1.2.2, air monitoring station power supplies (Appendix E), and utilities for the DO Facility, Flume Building and related appurtenances, and the Mid-Valley pipeline. Utility protection provisions will be included in the contractor's Safe Work Plan.

Sector 1 activities will include extending electric, telephone, and central fire alarm service to the support area from overhead lines extending from the Former Production Area to the DO Facility. Water and sanitary facilities in the support area will be supplied by the contractor. Water needed for equipment wash and dust control in Sector 1 will be available at equipment access points via truck, hose, or above-ground lines from the OSDF Water Supply Well located south of the DO Facility.

3.1.2.6 Protection of Environmental Monitoring and Related Facilities

Site preparation will include protecting groundwater monitoring wells that are to remain in use, as described in Section F.6 of the SEP. The wells are primarily located in the eastern and southern portions of Sector 1 (Dwg G0001). The contractor will also be responsible for protecting air monitoring stations (e.g., AMS-4, AMS-29 and associated power supplies) and benchmarks (N-5, OSDF-3) in areas potentially affected by construction activities. Such protection will include installation of bollards and construction fencing around all specified monitoring wells, air monitoring stations, and benchmarks. Other appropriate protective measures will be implemented as appropriate. Specific protective measures will be presented as part of the contractor's Safe Work Plan, subject to FDF review and approval.

3.1.2.7 Installation of Surface Water Management System and Erosion and Sediment Controls

A comprehensive surface water management system for A1PII, including erosion and sediment controls, will be implemented to control surface water run-on/runoff, minimize potential recontamination of remediated areas, and minimize discharges of potentially contaminated surface water during remedial activities. Major system components will be installed during construction activities associated with Sector 1. A detailed description of the A1PII surface water management system is presented in Appendix C. The system is designed in accordance with applicable State, Federal, DOE, and FEMP requirements, including the following principal criteria for indicated functional components:

- Erosion and sediment control: Ohio Department of Natural Resources (ODNR) standards for construction and materials
- Vegetative stabilization, silt fencing, and ditch protection: Ohio Department of Transportation (ODOT) Construction and Material Specifications and Location and Design Manual, Volume 2 (Drainage) and ODNR Rainwater and Land Development Manual

- Sediment basins, drainage ditches, and related structures: - ODNR Rainwater and Land Development Manual

All storm water control structures (A1PII Conveyance Channel, Sediment Basin, Outfall, and tributary ditches) are designed to control, at a minimum, surface water runoff resulting from a 10-year, 24-hour storm event of 4.1 inches as defined by the ODNR Rainwater and Land Development Manual. Notable components of the Surface Water Management System as they relate to Sector 1 activities are described below.

A1PII Conveyance Channel/Sediment Basin/Outfall

The major Sector 1 site preparation activity is installing the A1PII Conveyance Channel/Sediment Basin and Outfall (Dwgs G0014 and G0016). This system will provide ultimate drainage and sediment control for virtually all Sector 1 and 3 areas disturbed as a result of remedial activities. Open excavations at the STP Area, along the STP influent and effluent pipeline and other minor areas noted below will be controlled separately (Section 3.3.2.8). The system is located and designed to accommodate, with reasonable future modifications, surface water control needs for the OSDF, and will provide drainage for the east side of the FEMP after A1PII remediation is complete.

The Conveyance Channel will be lined with an erosion control blanket (Spec 02270) and is designed (i.e., slope of 0.8 percent with 34 foot bottom width and 3:1 side slopes) to convey peak design flows while maintaining velocities of less than three feet per second without the need for energy dissipation. The inlet works for the basin includes five, 36-inch diameter corrugated polyethylene culverts beneath the STP Access Road (Dwg G0019). This crossing coincides with the design location for Phase II of the rerouted North Entrance Road. Erosion at the inlet and discharge ends of the culverts will be controlled with riprap (Dwg G0014).

The Outfall includes two riser/barrel structures; two, 48-inch diameter corrugated metal pipe culverts with anti-seep collars under the existing South Access Road; and headwall with riprapped outfall channel to an unnamed Paddys Run tributary (Dwg G0014). The outfall channel is designed with a check dam at the discharge end to dissipate the flow velocity and minimize erosion in the tributary. Both the inlet works and Outfall are designed to accommodate future modifications and anticipated future OSDF needs (Appendix C).

Construction activities (i.e., excavation; installation of culverts, backfill, and channel/slope stabilization) will generally be sequenced from down gradient to upgradient, as follows: 2042

- Outfall Channel
- Sediment Basin
  - Basin outlet works
  - Basin inlet works
- Conveyance Channel (south to north).

This sequencing will help minimize surface water run-on to the excavation and permit early use of the Sediment Basin for storm water control from upgradient disturbed areas.

Soil for the A1PII Conveyance Channel, Sediment Basin, and Outfall will be excavated from an area characterized for reuse (Section 3.1.1.1). The top six inches will be excavated and staged for eventual use in developing the OSDF vegetative cover layer. Subsurface soil will be excavated and staged upgradient of the structures in certified soil stockpile areas (CSSAs) (Dwg G0014). The soil will undergo geotechnical testing for potential use in OSDF construction.

The A1PII Conveyance Channel will intersect the pipelines/utility lines west of the STP. All of these lines, except the STP influent line, are considered non-contaminated. As described in more detail in Section 3.3.3.1, soil removed from above the STP influent line will be considered non-impacted and staged in CSSAs. Pipe bedding will be considered impacted and staged in impacted soil stockpile areas (ISSAs) pending characterization for potential reuse, or hauled directly to the OSDF. Soil and bedding removed from the other pipelines/utility lines intersected by the A1PII Conveyance Channel will be considered non-impacted. Excavation of all of these pipelines is discussed in Section 3.1.3.

All SSAs will be surrounded by a silt fence (Spec 02270) and stabilized with a crusting agent (Spec 02270) to minimize erosion until removal from the area. In addition, all stockpiles will be identified with color-coded rope fences to ensure that different classifications of material are not commingled (Spec 02270).

Trap Range Surface Water Management

Diversion ditches will be constructed around the Trap Range, within the adjacent certified area, to minimize run-on to the Trap Range remediation area and to ensure that runoff is isolated from the adjacent certified area (Dwg G0005). The ditches will discharge through three, 18-inch diameter corrugated metal pipe culverts under the STP Access Road into the Sediment Basin. This crossing coincides with the design location for Phase II of the rerouted North Entrance Road. Erosion at the inlet and discharge ends of the culverts will be controlled with riprap. Material excavated during construction of the ditches will be staged in CSSAs.

3.1.2.8 Installation of Equipment Wash Facilities

Equipment wash facilities (portable, gasoline-engine-driven high pressure washer and water supply tank on a gravel pad) will be established before the start of excavation activities in Sector 1. The equipment wash facilities will be graded to drain to the A1PII Sediment Basin. The facilities will be required at the following access points:

- From the Trap Range to the STP Access Road
- From the utility corridor west of the STP to the STP Access Road (for excavation of the underground utilities in conjunction with the A1PII Conveyance Channel)
- From the certified area to the STP Access Road.

All vehicles entering the OSDF Contamination Area will be required to exit through the OSDF Decontamination Facility.

3.1.3 At- and Below-Grade Structure Demolition

Two below-grade pipelines in Sector 1, the Mid-Valley Crude Oil Pipeline and the AWWT Facility discharge line, will remain in place and operational (Dwg G0007). The oil pipeline is remote from planned excavation activities. The AWWT Facility discharge line is close to areas to be excavated at the Trap Range (Dwg G0005); however, it will be well marked and easily avoided. Installation of the culverts under the STP Access Road will require that the AWWT Facility discharge line be supported and insulated (Dwg G0019). The gravel access roads to the groundwater monitoring wells, air monitoring stations, and OSDF construction well will be certified and remain in place.

Three at- and below-grade structures will require demolition as part of remediation activities in Sector 1 (Dwg G0005): 2042

- Trap Range Building slab
- Firing line slab
- Trap House

The FC&DP will perform D&D on the Trap Range Building to approximately ground level. The at- and below-grade portions of this building and other structures in Sector 1 (i.e., the firing line slab and the trap house) will then be demolished during A1PII remediation. The general procedures for D&D of at- and below-grade structures/foundations in A1PII are described in Section 3.3.3.2.

In addition, as described in Section 3.1.2.7, segments of the pipelines/utility lines west of the STP (Dwg G0016) will be removed as part of Sector 1 activities to allow construction of the A1PII Conveyance Channel. Details about the structures and the required remediation work are provided in Appendix E. The CG&E fuel gas line, potable and fire water lines, and DO transformer electrical duct are considered non-contaminated, while the STP influent line is considered potentially contaminated. All will be excavated in accordance with the procedures outlined in Section 3.3.3.1.

3.1.4 Treatment and Excavation of Lead-Contaminated Soil

As described in Section 2.2.6, there are no above-WAC locations in Sector 1 and, outside of the former Trap Range, no above-FRL material. Soil with lead contamination above the FRL of 400 mg/kg is present at the Trap Range (Dwg G0005). Some of this soil contains arsenic contamination, an impurity in the lead, above the FRL of 12 mg/kg. All of the above-FRL arsenic contamination is bounded by the above-FRL lead contamination. Predesign sampling (Section 2.2.2) has defined the limits of the above-FRL lead contamination to be an area of approximately 2.4 acres, all of which is in the top six inches of soil. The estimated volume of soil with lead contamination above the FRL (400 mg/kg) is 1960 yd^3, all of which is considered to exhibit the toxicity characteristic for lead.

3.1.4.1 General Approach

Soil with lead contamination above the FRL will be stabilized in place, excavated, and dispositioned to the OSDF. It is currently planned to use a separate contractor for the in-situ stabilization. This will allow the bid and award of the stabilization contract to be expedited, apart from the excavation contract, to meet the required schedule for completion of Sector 1 activities. Specific construction

methods and procedures for stabilization and excavation will be provided in the contractors' Safe Work Plans. The general procedures are illustrated in Figure 3-2.

3.1.4.2 Stabilization of Lead-Contaminated Soil

The stabilization contractor will be required to treat the above-FRL, lead-contaminated soil to meet specified performance criteria (Spec 02211) for disposal in the OSDF. These criteria include removing the toxicity characteristic (i.e., leach less than 5 mg/l of lead in the TCLP test) of the material within the limits shown in the construction drawings (Dwg G0005). The stabilization contractor will define requirements for stabilization, including type and quantities of agents and admixtures (e.g., phosphates, sulfides, portland cement, lime, flyash, etc.) in a Treatability Study (Spec 02211). In addition, the application and mixing methods will be discussed initially in a Conceptual Stabilization Plan to be submitted with the bid, and defined in a Stabilization Work Plan to be submitted after completion of the Treatability Study. Since above-FRL contamination is confined to the top six inches of soil, the stabilization contractor is expected to spread the admixtures on the lead-contaminated soil and plow/disc them in thoroughly to achieve stabilization.

3.1.4.3 Stabilization/Excavation Control Monitoring

Following in-situ stabilization of the above-FRL lead-contaminated soil, samples will be taken for TCLP analysis. Sample density and demonstration criteria will be in accordance with SW-846 (EPA 1986), using a upper confidence level on the mean of 90 percent. If TCLP analyses of the stabilized soil indicate the lead toxicity characteristic is still present, additional stabilizing agent/admixture will be applied and further testing will be performed. When the TCLP analyses of the stabilized soil indicate that the above-FRL lead-contaminated soil has been adequately stabilized, the stabilized soil will be excavated (Spec 02205), loaded into trucks, and hauled to the OSDF by the excavation contractor. X-Ray Fluorescence (XRF) screening will then be used to verify that all above-FRL material has been removed. The XRF may be used in-situ, or discrete samples may be taken for ex-situ analysis. If the XRF screening indicates the presence of soil containing above-FRL concentrations of lead, additional stabilization/excavation will take place and the XRF screening will be repeated. This step will be reiterated until the screening indicates the FRL has been attained. The area will then undergo precertification (Section 3.1.6) and certification (Section 3.1.7). Once the area is certified, it will become part of the borrow area. In this way, soil with lead contamination above the benchmark toxicity value (BTV) of 200 mg/kg will be excavated for construction of the OSDF.

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3.1.5 Material Handling and Treatment

The at- and below-grade structures and foundations in Sector 1 will be processed to meet OSDF physical WAC. In general, this processing will take place as the structures/foundations are being excavated.

The soil at the former Trap Range that exceeds the lead FRL and has been shown to exceed the RCRA toxicity characteristic limit for lead will require treatment to remove the toxicity characteristic. This activity will be coordinated with FDF Waste Management. The following generator information will be provided to the Integrated Information Management System (IIMS) (Section 6.5) by the excavation contractor for this material:

- Estimated volume
- Material tracking location (MTL) of origin
- Visual description of material.

Since the material will be treated and disposed on site, the contractor will be responsible for assuring OSDF WAC are met prior to disposal. These responsibilities include:

- Completion of waste profile
- Evaluation for treatment
- Treatability studies
- Treatment
- Processing to achieve OSDF physical WAC

FDF will perform sampling to demonstrate the lead toxicity characteristic has been removed and that OSDF chemical/radiological WAC are achieved.

If any special materials are encountered, they will be handled in accordance with Section 3.3.4.5.

If any material is shipped off-site, FDF Waste Management will be responsible for assuring off-site WAC are met before shipment. These responsibilities include:

- Completion of waste profile
- Evaluation for treatment
- Identification of appropriate off-site disposition
- Receipt of approval from the receiving facility
- Packaging for shipment
- Certification for ODOT requirements
- Coordinating off-site shipment.

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3.1.6 Precertification Evaluation and Additional Excavation

After XRF screening (Section 3.1.4.3) indicates that all above-FRL soil has been removed from the former Trap Range, up to 30 discrete samples will be collected from the base and periphery of the lead excavation and sent to a laboratory for lead analysis. This sampling density, coupled with the XRF measurements, will provide assurance that the area can be certified. If laboratory results indicate that above-FRL lead concentrations remain, additional material will be stabilized and removed, and the base of the footprint will be resampled. Activities that could disturb the area will be delayed until laboratory results indicate that FRLs have been attained. The area will then be ready for certification.

3.1.7 Certification and Characterization for Reuse

As described in Section 3.1.2, Sector 1, excluding the Trap Range and including two small portions of Sector 2 will be certified prior to award of the remediation contract for A1PII. Also, the A1PII Conveyance Channel, Sediment Basin, and Outfall will be characterized for reuse. The Trap Range will be certified following stabilization and excavation of the above-FRL lead contamination and precertification of the area. In all cases, predesign and predesign investigation information will be used to design the boundaries of the certification (or characterization) units (CUs). The delineation of CUs, the CU-specific certification COCs, and the certification sampling approach will be described in the Certification Design Letters (Section 7.2 of the SEP). The Certification Design Letter for Sector 1, excluding the Trap Range and including the small portions of Sector 2 and the A1PII Conveyance Channel, Sediment Basin, and Outfall, is being prepared concurrently with this Implementation Plan.

3.1.8 Interim Grading and Restoration

Areas subject to remedial excavation at the Trap Range and other areas of Sector 1 that are disturbed during installation of the surface water management system or incidental activities will be graded as necessary to provide positive drainage. An interim vegetative cover will then be established, or the area will be periodically stabilized with crusting agent (typically every six months) (Spec 02900). Further interim grading and site restoration will be done by the OSDF contractor at a later time after borrow material is excavated from this area for OSDF construction.

3.2 SECTOR 2 REMEDIATION

Sector 2 is in the northernmost portion of A1PII, extending roughly between Cells III and VII of the OSDF (Figure 3-3). It lies between A1PI to the north and Phase I of the rerouted North Entrance Road to the south. Sector 2 remediation activities include:

- Minor stripping (6-12") of above-FRL surface soil
- Excavating agricultural drain tiles
- Precertifying and, if necessary, removing sediments from the OSDF Sediment Basin, A1PI Sediment Traps, and A1PI Sediment Basin
- Certifying the OSDF Sediment Basin, A1PI Sediment Traps, and A1PI Sediment Basin.

It should be noted that, as described in predesign investigations (Section 2.2), most of Sector 2 is below FRLs and does not require remediation.

3.2.1 Site Preparation

Planned Sector 2 site preparation consists of the following activities:

- Establishing site boundaries and controls
- Surveying and site layout
- Clearing
- Abandoning, protecting, and hooking up utilities
- Abandoning and protecting environmental monitoring and related facilities
- Installing a surface water management system and erosion and sediment controls
- Installing an equipment wash facility

3.2.1.1 Establishing Site Boundaries and Controls

Site boundaries and controls will be established for Sector 2 as follows:

- Access control will be established by installing construction fencing and signs along accessible borders, particularly along boundaries where permanent or construction fencing is not already installed (e.g., along the north side of the North Entrance Road relocation segment). Controlled equipment access ways to the area will be established on the Old North Entrance Road at the southern boundary to the area and near the northern boundary as necessary to access the OSDF (Dwg G0021).

- From a radiological control standpoint, all of Sector 2 will be classified as a "Soil Contamination Area" when site preparation activities begin. Any needed radiological postings beyond those already established at the start of construction activities will be placed at radiological boundaries and access ways as an initial site preparation activity.

- Construction fencing and signs are already established at the boundaries of the OSDF Sediment Basin and A1PI Sediment Traps/Sediment Basin. Access to A1PI certified areas from these uncertified zones will be controlled and maintained in accordance with Site Procedure EP0008 or equivalent.

3.2.1.2 Surveying and Site Layout

Initial site preparation activities will include locating and marking (Spec 02050) pertinent control points and boundaries, subsurface facilities to be protected or removed, and limits of excavation, and facilities to be installed. Feature and facility locations to be located and staked in the field include, but are not limited to:

- Boundaries: A1PII boundary and areas to be certified (Sector boundary, A1PI Sediment Traps). Additional construction zone boundaries and control point locations will be surveyed and staked where necessary.

- Subsurface Utilities: Electric power cable along Former Production Area fence on or adjacent to the northeast portion of Sector 2 and pole lights along the North Entrance Road and Former Production Area fence will remain. The agricultural drain tiles, fuel gas line west of the North Entrance Road, and abandoned fiber optic lines along the east side of the Old North Access Road will be removed.

- Site Preparation Facilities: Ditches and berms for surface water control as needed

- Remedial Excavation Areas: Surface soil excavation areas.

- Miscellaneous Facilities: As appropriate.

3.2.1.3 Clearing

Any clearing needed for Sector 2 preparation or remediation will be conducted as described in Section 3.1.2.3 for Sector 1.

3.2.1.4 Abandoning, Protecting and Hooking Up Utilities

All utilities to be excavated or removed as part of Sector 2 remediation will be safely shutdown and abandoned (e.g., de-energized, isolated/plugged, purged) in accordance with FEMP procedures before A1PII remediation begins. The only known facilities in this category in Sector 2 are a four-inch fuel gas distribution line (FEMP line from CG&E main) within and near the existing OSDF Sediment Basin and a fiber optic cable along the east side of the Old North Access Road (Dwg G0025). These lines are abandoned and will be excavated as described in Section 3.2.2.

Potential disruption of in-service utilities will be minimized to the extent possible. The remaining utilities include a buried power cable and pole lights along the east Former Production Area fence; pole lights and associated power cables, and telecommunications lines along the south side of the rerouted North Entrance Road. Construction fences and signs, or similar measures to control work in the vicinity of these utilities, will be installed as needed.

No utility tie-ins are planned for Sector 2. Water needed for dust control in Sector 2 will be available to the contractor at equipment access points via truck, hoses, or above-ground lines from the OSDF Water Supply Well, located south of the DO Facility.

3.2.1.5 Protection of Environmental Monitoring and Related Facilities

Protection of air monitoring stations and benchmarks in and near Sector 2 (Dwg G0001) will be as described for Sector 1 (Section 3.1.2.6). Specific protective measures will be presented as part of the contractor's Safe Work Plan, subject to FDF review and approval. No monitoring wells are expected to remain in Sector 2.

3.2.1.6 Installation of Surface Water Management System

A comprehensive surface water management system for A1PII, including erosion and sediment controls, has been planned and will be implemented. Additional details are provided in Appendix C. Notable components of the surface water management system as they relate to Sector 2 activities include:

- A1PI Sediment Basin and OSDF Sediment Basin The A1PI Sediment Basin, OSDF Sediment Basin, and associated drainage ditches currently receive drainage from OSDF construction areas in A1PI (certified) and from A1PII Sector 2 (uncertified). Minor work (e.g., grading, ditch/berm construction) will be undertaken as necessary to keep the system functional during Sector 2 remedial activities.

- Other Surface Water Control Structures - Site preparation activities are not expected to include construction of any major surface water control structures. However, small ditches or berms may be constructed to control drainage in localized areas, as needed.

- Other Erosion and Sediment Control Measures - A small area (< 0.5 acres) south of the OSDF Sediment Basin drains to the old North Entrance Road ditch and to an unnamed Paddys Run tributary. Impacted surface soil may be stripped from part of this area, but since it is small and relatively flat, runoff will be directed to down gradient silt fencing installed during site preparation activities. Silt fencing will also be installed along down gradient perimeters of other areas to be excavated or disturbed as

necessary to retain sediments, as described in the Surface Water Management Plan (Appendix C).

3.2.1.7 Installation of Equipment Wash Facility

Two equipment wash facilities will be required during Sector 2 remediation. These will be field located to allow equipment to:

- Enter A1PI (certified) to access the A1PI Sediment Traps (uncertified)
- Exit the A1PI Sediment Traps.

Since the A1PI Sediment Traps are located within a certified area that had minimal contamination before certification, the traps are not expected to be contaminated. However, until they are certified, it will be necessary to wash equipment entering and leaving the area. The equipment wash facilities will each consist of a portable, gasoline-engine-driven high pressure washer and water supply tank on a gravel pad. Haul trucks returning to either the east or west portion of Sector 2 from the OSDF, a Radiological Control Area, will be decontaminated at the OSDF Equipment Decontamination Facility.

3.2.2 At- and Below-Grade Structure Demolition

The only at- and below-grade structures in Sector 2 that will require demolition as part of remediation activities are agricultural drain tiles, the fuel gas line west of the North Entrance Road, and an abandoned fiber optic line along the east side of the Old North Access Road (Dwg G0025). The general procedures for demolishing such non-contaminated lines are described in Section 3.3.3.1. In summary, backfill and bedding will be removed to expose the lines and staged for characterization and potential reuse. The lines will then be removed and processed to meet OSDF physical WAC.

3.2.3 Soil and Debris Excavation and Segregation

The general approach for excavation of above-FRL material in Sector 2 is discussed in the following paragraphs.

3.2.3.1 Excavation of Above-FRL Material

As discussed in Section 2.2.6, there is one area in the northwest corner of Sector 2 with above-FRL contaminant levels, primarily due to air deposition. Therefore, above-FRL contamination is only expected in the surface soil (i.e., less than six inches deep) and the distribution is expected to be somewhat homogeneous. The sampling results described in Section 2.2.6 confirm that the above-FRL

contamination in Sector 2 is shallow (0 to 6 inches) and homogeneous and covers an area of 2042 approximately 11 acres.

In addition, there are several soil and debris stockpiles in Sector 2 that will be removed by the OSDF contractor prior to award of the A1PII remediation contract. The OSDF contractor will also strip six inches of soil (considered impacted material) after these Temporary Stockpiles are removed. Including this stripped soil under the OSDF Temporary Stockpiles, approximately 8,870 yd^3 of impacted material will be excavated from Sector 2. The above-FRL material will be excavated using Excavation Approach A - Shallow Excavation of Impacted On-Property Areas Outside the Former Production Area and Other Waste Storage/Management Units, as outlined in the SEP.

This excavation will be in accordance with the project-specific technical specifications (Spec 02205). Specific construction methods and procedures will be detailed in the contractor's Safe Work Plan. The procedures for excavating this material are discussed in Section 3.3.4.3. In general, the above-FRL soil (Dwg G0013) will be excavated and loaded into trucks for disposition to the OSDF. Precertification radiological scanning (Section 3.2.5) will then be performed, followed by supplemental excavation, if required. The area will be then be ready for certification (Section 3.2.6).

3.2.3.2 Excavation Control Monitoring

The above-FRL material in the northwest corner of Sector 2 is relatively shallow (approximately six inches deep). Therefore, excavation will essentially consist of scraping the above-FRL material off and loading it into trucks for disposal in the OSDF. Upon completion of excavation activities, the area will be ready for precertification (Section 3.2.5).

3.2.4 Material Handling and Treatment

The above-FRL soil in the northwest corner of Sector 2 has been shown to be below OSDF WAC Section 2.5) and will be sent to the OSDF following excavation. This activity will be coordinated with FDF Waste Management. The following generator information will be provided to IIMS (Section 6.5) by the excavation contractor:

- Estimated volume
- MTL of origin
- Visual description of material.

If any special materials are encountered, they will be handled in accordance with Section 3.3.4.5.

3.2.5 Precertification Evaluation and Additional Excavation

After above-FRL material in the northwest corner of Sector 2 is excavated, radiological scanning system (RSS) or high-purity germanium (HPGe) measurements will be taken to precertify the excavation area for gamma-emitting radionuclides. The locations of the Temporary OSDF Stockpiles (Dwg G0001), A1PI Sediment Traps (ST-2 and ST-3), OSDF Sediment Basin, and A1PI Sediment Basin will also be precertified and certified as part of Sector 2 activities. If RSS or HPGe measurements indicate above-FRL, gamma-discernable radionuclides, additional excavation will take place to remove the identified material. When the excavation floor and periphery meet the precertification protocol for gamma-emitting radionuclides, the excavation surface will be ready for certification (Section 3.2.6).

3.2.6 Certification

Predesign and predesign investigation information will be used to design the boundaries of the certification units (CUs). The delineation of CUs, the CU-specific certification COCs, and the certification sampling approach will be described in the Certification Design Letter (Section 7.2 of the SEP).

3.2.7 Interim Grading and Restoration

Interim grading and restoration of Sector 2 (Spec 02900) will be conducted after certification. Sector 2 will be substantially regraded for OSDF construction. Therefore, interim grading will only be done to provide positive drainage from the area. The OSDF and A1PI Sediment Basins will be left intact. However, the A1PI Sediment Traps will be graded to match surrounding topography. Upon completion of grading, a vegetative cover will be established on disturbed areas as needed for interim stabilization (Spec 02900). Crusting agents, mulch, and silt fencing will be placed and maintained as necessary to minimize escape of sediment until vegetative cover is well established. Final vegetative cover will be applied, in accordance with applicable provisions of the NRRP, after OSDF construction in this area is complete.

3.3 SECTOR 3 REMEDIATION

Sector 3 consists of the area between Sectors 1 and 2, including the STP, the DO Facility, the Phase I rerouted North Entrance Road, the STP Access Road, and associated roadside ditches and culverts (Figure 3-4). Remediation activities in Sector 3 include:

- Excavation of above-WAC sludge at the STP
- Excavation of the STP and associated underground utilities
- Removal of underground utilities exterior to the STP
- Stripping of above-FRL surface soil (0-6 inches)
- Removal of the STP Access Road.

The SWTP startup (and dependent STP shutdown) and the OSDF Cell V construction schedules present a limited window-of-opportunity for removal, transport, and disposition of impacted materials from Sector 3. For these activities to begin, the following are required:

- New SWTP ready for operation by March 1998
- Full operation of new SWTP by April 1998
- STP cleanout and safe shutdown by August 1998
- Above-grade structures demolition by October 1998.

The STP excavation must begin no later than March 1999 to allow completion of the following tasks before construction of OSDF Cell V:

- Certification of Sector 3 and the final backfilling of the STP excavation by April 2000
- Construction of the southern leg (Phase II) of the rerouted North Entrance Road to begin in May 2000 and be completed by October 2000 (not in A1PII scope)
- Removal and certification of the Phase I rerouted North Entrance Road (not in A1PII scope) by October 2001.

3.3.1 Preliminary Work

Two activities will be completed in Sector 3 prior to award of the remediation contract:

- Abandonment/rerouting of electric power
- Installation of the Remediation-Generated Water Transfer Line in the former production area.

3.3.1.1 Abandonment/Rerouting of Electric Power

Several existing utility lines will be removed during remediation of Sector 3 (Section 3.3.2.6). One of these, the electric duct (Dwg G0004), provides power to DO Facility and nearby air monitoring

stations. Replacement power will be supplied by new overhead lines to the substation near the DO Facility and additional overhead lines to supply power from the substation to the DO Facility and the OSDF Construction well. All of this work will be completed before award of the A1PII excavation contract.

A CG&E high voltage transmission line on steel lattice towers currently loops in diagonally from the east across Sector 3 to the FEMP Main Substation, then back west to the north-south easement near the eastern FEMP boundary. Above-grade portions of the northernmost lattice tower along the North Entrance Road (Dwg G0016) and northern loop conductor will be removed prior to award of the excavation contract. The tower will be removed to 3 feet below grade and the remaining portion will be removed as part of A1PII activities. Three new wood poles will be added to support the conductor in the southern easement to facilitate removal of the northern tower, and will remain until the Main Substation is no longer needed.

3.3.1.2 Remediation-Generated Water Transfer Line

As discussed further in Section 3.3.2.8, water generated during the excavation of the STP will be treated at the AWWT Facility. To accomplish this, a new 8-inch diameter, high-density polyethylene (HDPE) line will be installed from the Tank Farm to the existing 12-inch diameter AWWT wastewater effluent line (FT-4-12"V) on the west side of the A1PII Conveyance Channel (Dwg G0013). Inside the former Production Area, the existing 12-inch line must be tapped and tied-in to an existing manhole (Dwg G0019) that discharges to the Storm Water Retention Basins (SWRB) for treatment at the AWWT Facility using a new 8-inch diameter HDPE line. Tapping the existing 12-inch line and installing the new 8-inch line in the former Production Area will be completed prior to award of the A1PII remediation contract. This will eliminate the need for the remediation contractor to enter the former Production Area, and associated training and ingress/egress requirements, and facilitate completion of the Sector 3 remediation activities.

3.3.2 Site Preparation

Sector 3 site preparation activities consist of the following activities:

- Establishing site boundaries and controls
- Surveying and site layout
- Clearing
- Establishing radiological control facilities

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- Establishing Special Materials Transfer Area
- Abandoning, protecting, and hooking up utilities
- Abandoning or protecting environmental monitoring and related facilities
- Installing water management system and erosion and sediment controls
- Installing equipment decontamination facility
- Constructing a temporary haul road.

3.3.2.1 Establishing Site Boundaries and Controls

Site boundaries and controls will be established as follows:

- Access control will be established by installing construction fencing and signs along accessible borders, particularly where permanent or construction fencing is not already installed (e.g., along the south side of the North Entrance Road relocation segment). Controlled equipment access ways to the area will be established via the STP Access Road at its intersection with the North Entrance Road and on the Sector 3 temporary haul road at its intersection with the OSDF Borrow Area Haul Road (Dwg G0022).

- If necessary based on monitoring, the STP Area and the influent/effluent lines will be classified as a Contamination Area (CA), and the rest of Sector 3 will be classified as a "Soil Contamination Area" when site preparation activities begin. Construction fence, postings, and two radiological control points, one on the Temporary Haul Road (with Equipment Decontamination Facility; Section 3.3.2.9) and one for personnel and portable equipment (with Radiological Control Trailer; Section 3.3.2.4) will be installed on the perimeter of the CA by modifying those already established for the STP Area D&D. Additional fencing and radiological postings at the boundaries of the area beyond those already established at the start of construction activities will also be installed, as necessary, as an initial site preparation activity.

3.3.2.2 Surveying and Site Layout

Initial site preparation activities will include locating and marking pertinent control boundaries, protecting or excavating subsurface facilities, establishing excavation limits, and erecting facilities. Feature and facility locations to be located and staked in the field include, but are not limited to:

- Boundaries: A1PII boundary and areas to be certified (Sector boundary). Additional construction zone boundaries and control point locations will be surveyed and staked where necessary.

- Subsurface Utilities: AWWT Facility effluent pipeline to Flume Building, telecommunication lines and eclectic conduits for pole lights along the east side of the North Entrance Road will remain. All other subsurface pipelines/utility lines will be removed.

- Site Preparation Facilities: Temporary Haul Road, STP Water Management Facility and Transfer Line, Equipment Decontamination Facility, Radiological Control Trailer, STP Run-on Control Ditch.

- Remedial Excavation Areas: STP excavation; surface soil excavation areas; pipelines and DO Facility Transformer electrical duct, agricultural tiles, soil staging areas, Special Material Transfer Area.

- Miscellaneous Facilities: As appropriate.

3.3.2.3 Clearing

Any clearing needed for Sector 3 activities will be conducted as described in Section 3.1.2.3 for Sector 1.

3.3.2.4 Establishing Radiological Control Point Facilities

Radiological control point facilities will include a radiological control trailer (Spec 13125) installed as part of Sector 3 site preparation and an Equipment Decontamination Facility for cleaning and monitoring trucks and heavy equipment leaving the STP Area (Section 3.3.2.9). The radiological control trailer will consist of a double trailer with radiological personnel monitoring equipment, an emergency shower, change-out rooms, and a break room. All personnel will enter and exit the controlled area through this facility.

3.3.2.5 Establishing Special Materials Transfer Area

The Special Materials Transfer Area will be used to stage Special Material encountered during excavation activities in A1PII (Section 3.3.4.5). The transfer area will be located south of the STP, near the STP Access Road (Dwg G0007). It will consist of a gravel pad on a geomembrane liner with perimeter construction fencing to control access.

3.3.2.6 Abandoning, Protecting, and Hooking Up Utilities

All utilities to be excavated or removed as part of Sector 3 remediation will be safely shutdown and abandoned (e.g., de-energized, isolated/plugged, purged) in accordance with FEMP safe shutdown procedures before A1PII remediation begins. Known facilities in this category consist of segments of the CG&E fuel gas line, STP influent and effluent line, AWWT wastewater effluent line (FT-4-12"V), potable and fire water lines, and DO Transformer electrical duct, and localized STP piping and electrical lines.

Potential disruption of in-service utilities will be minimized to the extent possible. The remaining utilities include CG&E electric transmission and distribution lines, overhead power and communication

lines to the DO Facility Substation, the AWWT Facility discharge pipeline, power feeds to the warning siren, the OSDF water supply well, air monitors along the east FEMP boundary, and pole lighting at the DO Facility and along the east side of the access roads (Dwg G0001). Construction fences and signs, or similar measures to control work in the vicinity of these utilities will be installed as needed.

Sector 1 Support Area services will be extended to the Radiological Control Trailer for Sector 3 remediation (see Section 3.3.2.4). Electric power will also be extended to the Remediation-Generated Water Transfer System from the DO Facility overhead line to power pumps. No other utility installations are planned. Water and toilet facilities at the Support Area will be supplied by the contractor. Water needed for dust control in Sector 3 will be available to the contractor at equipment access points via truck, hoses, or above-ground pipelines from the OSDF Water Supply Well located south of the DO Facility.

3.3.2.7 Protection of Environmental Monitoring and Related Facilities

Protection of monitoring wells and protection of air monitoring stations and benchmarks in and near Sector 3 will be as described for Sector 1 (Section 3.1.2.6). Specific protective measures will be presented as part of the contractor's Safe Work Plan, subject to FDF review and approval.

3.3.2.8 Installation of Water Management System

As discussed in Section 3.1.2.7, a comprehensive surface water management system for A1PII, including erosion and sediment controls, has been planned and will be implemented. Additional details are provided in Appendix C. Notable components of the surface water management system as they relate to Sector 3 activities include:

- A1PII Conveyance Channel/Sediment Basin/Outfall - Surface drainage from Sector 3 will be directed to the A1PII Conveyance Channel constructed as part of Sector 1 site preparation (Section 3.1.2.7)

- Diversion Ditches - Diversion ditches/berms will be constructed during site preparation to divert surface drainage from upgradient areas around planned deep excavations in the STP Area and, where needed, into trenches excavated to remove pipelines, agricultural drain tiles, and electrical ducts, and into areas of extensive surface soil excavation. Small ditches or berms may also be constructed to control drainage in localized areas. Temporary measures (e.g., application of crusting agents, mulching, seeding) will be taken as needed to stabilize the area in accordance with provisions of the Surface Water Management Plan.

- Other Erosion and Sediment Control Measures - Silt fencing will be installed, as necessary, down gradient of areas to be excavated or otherwise disturbed to intercept sheet flow, retain sediments, and disperse flow before runoff reaches collection ditches (Appendix C, Spec 02270).

In addition, special measures will be implemented during excavation of the STP to control perched water and storm water runoff. These measures are discussed in the following paragraphs.

Continuous Berm

A continuous berm will be installed along the north side of the STP to minimize runoff from the upgradient area (Dwg G0007). The berm will be constructed of geosynthetic fabric wrapped around clean soil (Spec 02270).

Remediation-Generated Water Transfer System

Sector 3 site preparation activities will include installing tanks and appurtenances to store perched water or storm water that accumulates in excavations in the STP Area or in the trenches excavated to remove the STP influent and effluent pipelines (Dwg G0006). Temporary sumps and pumps will be constructed in the excavated areas to collect and deliver perched water that seeps into the excavations and storm water that falls on or runs into the excavations to the tank system. In addition, water from the Decontamination Facility (Section 3.3.2.9) will also be collected and pumped to the tank system.

The system will be comprised of multiple flexible fabric tanks (Spec 13205) and ancillary pumps (Spec 15160) and piping, fittings and valves (Spec 15060) within a containment berm (Spec 02206). The containment will be compacted and sized to accommodate 100% of the total volume of all of the tanks. Water in the tanks will be sampled to determine the required treatment. If the organic content of the water in a tank exceeds organic waste acceptance guidelines for the AWWT Facility (Section 3.4.4), it will be trucked to the AWWT Facility for granular activated carbon pretreatment. Otherwise, it will be pumped to the SWRB for treatment at the AWWT Facility. During overflow conditions at the SWRB, this water will be stored, to the extent possible, or pumped to the A1PII Sediment Basin.

Discharge to the AWWT Facility will be accomplished by installing a new 8-inch diameter, HDPE line from the Remediation-Generated Water Transfer System to the existing 12-inch diameter AWWT

wastewater effluent line (FT-4-12"V) on the west side of the A1PII Conveyance Channel (Dwg G0013). Since the water handling system will be in operation until Sector 3 is certified, the new line is necessary to allow removal of the existing line between the North Entrance Road and the STP and certification of the trench. Inside the former Production Area, the existing 12-inch line will be tapped and tied-in to an existing manhole (Dwg G0019) that discharges to the Storm Water Retention Basins (SWRB) for treatment at the AWWT Facility. The tap and tie-in will be completed prior to award of the A1PII remediation contract (Section 3.3.1.2).

3.3.2.9 Installation of Equipment Decontamination Facility

This decontamination facility will be established during Sector 3 site preparation activities to allow decontamination and radiological monitoring of equipment exiting controlled portions of the Sector and to wash equipment exiting non-controlled areas of the Sector via the Temporary Haul Road or OSDF Borrow Area Haul Road. The decontamination facility will be similar to the OSDF facility (Dwg G0023) and will collect and contain decontamination wastewater for transfer to the Remediation-Generated Water Transfer System (Section 3.3.2.8). The excavation contractor will be responsible for keeping the haul road clear of mud, debris, and potentially impacted materials by washing the wheels and undercarriage of equipment exiting these areas and for routine cleaning of the Temporary Haul Road.

All vehicles entering the OSDF Contamination Area will be required to exit through the OSDF Decontamination Facility.

3.3.2.10 Construction of Temporary Haul Road

A temporary haul road will be constructed between the STP Area and the OSDF Borrow Area Haul Road during site preparation in Sector 3 (Dwg 0012). The road will be constructed of geotextile and geogrid overlain by gravel. Associated temporary drainage ditches and culverts will be included as needed to ensure drainage.

3.3.3 At- and Below-Grade Structure Demolition

Detailed descriptions of A1PII at- and below-grade structures and a brief description of associated remediation are provided in Appendix E. Except as discussed in Section 3.1.2, these structures are

located in Sector 3. These can be generally grouped into three categories, pipelines/utility lines, structures/foundations, and roadways.

In general, FC&DP will perform D&D on the above-grade portion of the structures to approximately ground level. The A1PII remediation project will then demolish the remaining, at- and below-grade portions. The interface between the FC&DP (above-grade D&D) and SCEP (at- and below-grade D&D) is highlighted in Appendix E.

3.3.3.1 Below-Grade Pipelines/Utility Lines

Removal of A1PII below-grade pipelines and utility lines will be in accordance with Appendix F of the SEP. The procedures will differ slightly if there is known or potential contamination associated with the pipeline/utility line. Portions of below-grade pipelines/utility lines west of the STP will be removed as part of the remediation of Sector 1 (Section 3.1.3).

Non-Contaminated Pipelines/Utility Lines

Pipelines and utility lines in A1PII for which data indicate that there is no contamination, or for which there is no data or process knowledge that indicate contamination, are identified in Appendix E. These include the following (Dwg G0016):

- AWWT Facility Discharge Line
- Agricultural drainage tiles
- Storm sewers
- Electric duct
- Potable water line
- Fuel gas line (asbestos-impregnated, bitumen-wrapped)
- Fire water line
- AWWT wastewater effluent line (FT-4-12"V)
- Fiber optic line

The AWWT Facility discharge line and fiber optic line are to remain in place. The agricultural drain tiles under the rerouted (Phase I) North Entrance Road will remain in place and be excavated when the road is removed. Non-contaminated pipelines/utility lines inside the STP fence will be excavated, along with the rest of the STP Area, to attain FRLs. In many cases, these pipelines/utility lines will be encountered when excavating the STP structures and foundations. The non-contaminated

pipelines/utility lines outside the STP fence will generally be excavated apart from those inside the fence and, in some cases, in conjunction with contaminated pipelines at the same location.

The general procedures for excavating non-contaminated pipelines/utility lines outside of the STP fence are illustrated in Figure 3-5. Any material exceeding FRLs, which is only anticipated at the surface, will be removed first. Next, backfill and bedding will be removed to expose the pipe/utility line (Spec 02205). Since there is no reason to expect that this material is contaminated above FRLs, it will be staged and characterized for reuse. The pipeline/utility line will then be removed and processed to meet OSDF WAC. Remaining bedding material will then be removed and staged with the other backfill and bedding material.

Each trench will then be certified to verify that there is no above-FRL material in the trench. If any is encountered, it will be removed and sent to the OSDF. Following certification, each trench will be backfilled with the staged material and additional clean fill (Spec 02206), as required to bring it to grade. If subsurface conditions indicate potential instability if the trench is left open during certification, the trench may be backfilled when acceptable certification results are received.

Contaminated Pipelines/Utility Lines

Most of the contaminated pipelines/utility lines within the STP fence will be excavated during D&D of the at- and below-grade structures/foundations. The remaining sections will be excavated as part of the overall STP excavation to attain FRLs. As these pipelines/utility lines are encountered, they will be excavated, inspected for above-WAC material, and properly dispositioned. The two pipelines outside of the STP fence that have potential contamination (i.e., the STP Wastewater Influent and Effluent Lines) will generally be excavated apart from those inside the fence and, in some cases, in conjunction with non-contaminated pipelines at the same location.

The general procedures for excavating these lines are illustrated on Figure 3-6. As shown on the figure and where required, any material with contamination in excess of the FRLs will be removed first. In most cases where there is such material, it is expected to be at the surface, completely above the pipeline. Next, backfill above the pipe bedding will be removed (Spec 02205). Since this material is expected to be below FRLs, it will be staged (Spec 02205), on geotextile to differentiate it from the underlying soil, for characterization and potential reuse.

The pipe bedding, including six inches of over-excavation on each side of the bedding, will then be removed to expose the pipe. Since this material is potentially contaminated, it will be dispositioned to the OSDF, or to the Operable Unit 1 Stockpile if it exceeds OSDF WAC.

For all contaminated pipelines, liquids will be drained using trays, buckets, or a pipe/hose inserted into the pipeline before the line is removed. If this liquid is primarily water, it will be transferred to the Remediation-Generated Water Transfer System. If the liquid is not primarily water, it will be containerized for sampling to determine the disposition. Following removal, all contaminated pipelines will be inspected. If the pipe contains deposits of above-WAC contamination, it will be taken to the Special Material Transfer Area for evaluation. If the pipe does not contain deposits of above-WAC contamination, the pipe will be treated, as necessary, to meet OSDF physical WAC. The remaining pipe bedding will then be removed, along with approximately six inches of over-excavation on either side of and below the bedding, and dispositioned to the OSDF, or to the Operable Unit 1 Stockpile if it exceeds OSDF WAC.

At this point, the trenches will be from 5 to 12 feet deep. To minimize cost and expedite excavation, every attempt will be made to maintain vertical sides on the trench. Therefore, for safety reasons, samples to demonstrate that FRLs have been attained will normally be taken from ground level. When worker access to the trench is required, the excavation will conform to OSHA requirements (29 CFR 1926). If any above-FRL material is identified, it will be removed and sent to the OSDF. Because of the depth of these pipelines and associated safety concerns, each trench will be backfilled as soon as laboratory data confirm all above-FRL material has been removed. The backfilling operation will be accomplished using staged material and additional clean fill (Spec 02206), as required, to bring it to grade. Upon completion of all Sector 3 remediation, the surface of the entire area will be certified (Section 3.3.7).

3.3.3.2 Structures and Foundations

Demolition of at- and below-grade structures and foundations in Sector 3 (Dwg G0003) will be in accordance with the SEP and technical specifications (Spec 03316). General procedures for demolishing at- and below-grade structures/foundations in A1PII are illustrated in Figure 3-7. In most cases, the deepest foundations will be removed first. The at-grade portion(s) will be removed and processed to meet OSDF physical WAC. In the case of structures, the at-grade portion(s) may include

covers and floors. In the case of foundations, such as slabs, curbs and footings, this will generally include the entire foundation. As necessary, backfill and bedding adjacent to the structure will be then be removed and stockpiled in a designated area (Dwg G0007) for characterization. If contamination levels are below FRLs, it will be used as backfill; otherwise, it will be sent to the OSDF.

Where applicable, the below-grade portion(s) of the structure will then be removed and processed to meet OSDF physical WAC. Excavation to achieve FRLs will then be performed as part of the overall area program. After all remediation is complete, the surface will be certified (Section 3.3.7), and deep excavations backfilled and graded.

3.3.3.3 Roadways

The STP Access Road and Temporary Haul Road will be removed as one of the last construction activities in A1PII (Dwg G0022). In general, the roads will be excavated in a manner similar to removing shallow contamination (Section 3.3.4.3) prior to precertification (Section 3.3.6) and certification (Section 3.3.7).

3.3.4 Soil and Debris Excavation and Segregation

Soil excavation activities in Sector 3 include removal of above-WAC and above-FRL material. Except for the above-WAC material associated with the Sludge Drying Beds, this work will generally follow demolition of the at- and below-grade structures. The contractor will be generally responsible for:

- Excavating impacted material within A1PII
- Containerizing above-WAC sludge from the Sludge Drying Beds and transporting the containers to the Special Materials Transfer Area
- Transporting and placing special material in the Special Materials Transfer Area
- Transporting and unloading impacted above-FRL and below-WAC material to the OSDF.

Impacted material is all material with above-FRL contamination, while non-impacted material has below-FRL contamination.

As described in Section 2.5, the estimated extent of contamination above the WAC and FRLs was determined by incorporating RI/FS data into a geostatistical model. This model was then finalized by deleting data for material removed during previous removal actions and adding data from the predesign investigations.

There are two FRLs for total uranium in A1PII, 82 mg/kg for most of the area and 20 mg/kg for a small area in the STP vicinity. Where contamination above the FRL of 82 mg/kg is expected, a total uranium concentration of 50 mg/kg was modeled to account for ALARA considerations. These factors resulted in a design depth of excavation for contamination, which is the minimum excavation depth. Additional excavation may be required in certain areas for foundation removal. The actual extent of excavation will depend on field conditions identified during construction and may exceed the design depth (Section 2.5). Excavation control monitoring (Section 3.3.4.4), precertification sampling (Section 3.3.6), and certification sampling and analysis (Section 3.4 of the SEP) will establish the actual excavation depth.

3.3.4.1 General Approach

During excavation, Sector 3 will be classified as a radiological contamination area. Excavation activities include:

- Excavation of above-WAC material
- Excavation of below WAC/above FRL material
- Excavation of special materials
- Control of surface and subsurface water
- Transportation and disposition of impacted material
- Excavation control monitoring.

Each of these activities is discussed in the following paragraphs. In addition to these activities, the contractor will be responsible for transporting and unloading impacted soil and debris at the OSDF. Details are included in the construction drawings and specifications.

3.3.4.2 Excavation of Above-WAC Material in the Sludge Drying Beds

Impacted material that is known to exceed the OSDF WAC in Sector 3 (i.e., the remaining sludge in the sludge drying beds) will be excavated prior to, and separately from, material that meets the OSDF WAC. As this area is excavated, the material will be segregated and handled separately and excavation

control monitoring (Section 3.3.4.4) will be performed to ensure all above-WAC material has been removed.

The sludge in the Sludge Drying Beds at the STP (Dwg G0007) contains above-WAC (1,030 mg/kg) concentrations of total uranium (Section 2.1.2). The depth of this material varies from 0 to 6 inches and can be visually identified. It is currently estimated that approximately 35 yd^3 of sludge remain in the Sludge Drying Beds. Since this material is also considered a RCRA-listed waste (Section 2.1.2), it will be excavated on a priority basis and handled as a mixed waste.

This excavation will be in accordance with the project-specific technical specifications (Spec 02205). Construction methods and procedures will be detailed in the contractor's Safe Work Plan. The general approach that will be used to excavate this material is shown on Figure 3-8. The sludge will be removed and loaded into white metal boxes. Excavation and haul equipment, as well as the containers, will remain outside of the Sludge Drying Beds during removal of the sludge to minimize health and safety concerns. Radiological field survey measurements (Section 3.3.4.4) will then be taken to demonstrate that all above-WAC material has been removed. The containers will be decontaminated and staged at the Special Materials Transfer Area pending offsite treatment and disposal.

3.3.4.3 Excavation of Below WAC/Above FRL Material

Contamination in Sector 3 occurred in several ways, including air deposition, pipe leaks, and seepage through the Sludge Drying Beds. Therefore, two types and extents of contamination are expected: shallow/homogenous and at-depth/discontinuous.

Shallow/Homogenous Contamination

Contamination outside of the STP area is expected to be shallow and homogenous since air deposition was the primary pathway. The sampling results described in Section 2.2.6 confirm a location of above-FRL contamination in Sector 3 outside of the STP (Dwg G0007). This contamination is shallow (0 to 6 inches) and homogeneous and covers an area of approximately one acre.

In addition, there is one soil stockpile in Sector 3 that will be removed by the OSDF contractor prior to award of the A1PII remediation contract. The OSDF contractor will also strip six inches of soil (considered impacted material) after this Temporary Stockpiles is removed. Including this stripped soil

under the OSDF Temporary Stockpile, approximately 800 yd^3 of shallow/homogenous impacted material will be excavated from Sector 3. The above-FRL material will be excavated, as outlined in the SEP, using Excavation Approach A - Shallow Excavation of Impacted On-Property Areas Outside the Former Production Area and Other Waste Storage/Management Units.

This excavation will be in accordance with the project-specific technical specifications (Spec 02205). Specific construction methods and procedures will be detailed in the contractor's Safe Work Plan. The general procedures for excavating this material are illustrated on Figure 3-9. The above-FRL soil will scraped off to a depth of six inches, excavated, and loaded into trucks for disposition to the OSDF. Precertification radiological scanning (Section 3.3.6) will then be performed, followed by supplemental excavation, if required. The area will be then be ready for certification (Section 3.3.7).

At-Depth/Discontinuous Contamination

Contaminants at the STP are expected to be distributed both on the surface and at-depth since the pathways included air deposition, pipe leaks, and seepage through the Sludge Drying Beds. However, as described in Section 2.1, the highest contaminant levels were removed by a previous removal action. Therefore, material with above-WAC contamination levels is not expected. In addition, the above-grade structures at the STP will be removed by FC&DP. The remaining at- and below-grade structures and foundations will be removed as part of the A1PII remediation (Section 3.3.3.2). Therefore, the above-FRL material in the STP Area will be excavated using the general approach outlined in Approach D - Excavation Following D&D in the Former Production Area, STP and FTF in the SEP.

This excavation will be in accordance with the project-specific technical specifications (Spec 02205). Specific construction methods and procedures to achieve these requirements will be detailed in the contractor's Safe Work Plan. The general sequence for excavating this material is shown on Figure 3-10. At- and below-grade structures and foundations, including associated pipelines and utility lines, will be removed first. Next, the top 2½-feet of the remaining soil will be excavated. Most of the remaining pipelines and utility lines will be removed at this time. The surface of the excavation will then be scanned using the radiological scanning system (RSS) or HPGE equipment to determine the presence of above-WAC material. If any is identified, it will be excavated and hauled to the Operable Unit Stockpile. The remaining above-FRL material, as defined by 3-D modeling based on RI/FS and pre-design sampling (Section 2.5), will be excavated in bulk according to the excavation design depth

(Dwg G0007) and dispositioned to the OSDF. An estimated 29,500 yd^3 of impacted soil is expected to be excavated to a maximum depth of approximately 20 feet in the STP in conjunction with removal of at- and below-grade structures, foundations, and pipelines, and above-FRL soil. Following demonstration that the design depth of excavation has been achieved, precertification activities will take place (Section 3.3.6). The area will then be ready for certification (Section 3.3.7).

Debris such as reinforced concrete and structural steel is not anticipated in A1PII other than that generated through D&D. Any such material that is encountered will be excavated, processed, as needed, to comply with OSDF physical WAC, and sent to the OSDF.

3.3.4.4 Excavation Control Monitoring

All excavations in uncertified areas will be radiologically monitored by FDF Radiological Control Technicians. Discovery of contamination levels above regulatory limits will require the area to be posted for radiological exposure control point purposes. Appropriate controls will be implemented to govern work activities in the posted area.

The organic content of the atmosphere in all excavations at the STP will be monitored for health and safety purposes using a photoionization detector (PID). If organic levels indicate the presence of free organic liquids that could exceed the OSDF WAC are encountered, the excavated material will be considered above-WAC. Otherwise, it will be dispositioned to the OSDF. Upon completion of excavation activities, the area will be ready for precertification (Section 3.3.6).

Excavation of the above-WAC material at the Sludge Drying Beds will be monitored using radiological field survey measurements. The RI/FS data, results from the predesign investigation, and visual observations have delineated the extent of the sludge, all of which has total uranium above the WAC of 1,030 mg/kg (Section 2.2.6). Above-WAC material will be excavated within these established limits (Figure 3-8) and RSS or HPGe equipment will be used to scan the perimeter and floor of the excavation to confirm that material exceeding the WAC is not present. If potential above-WAC uranium activity is identified with the RSS or HPGe, additional material will be excavated until results indicate all above-WAC material has been removed.

As stated in Section 3.3.4.3, the top 2½ feet of soil in the STP will be excavated following removal of at- and below-grade structures and foundations. The surface of this excavation will be scanned using RSS or HPGe equipment to determine the presence of above-WAC material. If any is indicated, it will be excavated and hauled to the Operable Unit 1 Stockpile. The remaining above-FRL material in the STP will be excavated to the limits shown on the construction drawings. As piping is uncovered, it will be examined for potential above-WAC deposits and handled accordingly. In addition, the trenches will be scanned for above-WAC material and any identified will be hauled to the Operable Unit 1 Stockpile.

3.3.4.5 Excavation of Special Materials

As described in the SEP, and used in this document, special materials include:

- Asbestos
- Transformers
- Lead acid batteries
- Medical/infectious waste
- Piping
- Pressurized containers
- Nonpressurized containers
- Tires
- Non-soil residues
- Uranium metal
- Miscellaneous debris

Except for the asbestos-impregnated, bitumen--wrapped gas line, piping with deposits that contain above-WAC levels of contaminants, and possible transite conduit associated with the buried electric duct, no special materials are anticipated in A1PII. However, if such materials are encountered, the radiological level will first be determined by FDF Radiological Control Technicians (RCTs) (Section 6.1.4) for occupational health and safety considerations. Special material that cannot be handled by the contractor due to health and safety concerns will be handled by FDF. Under normal circumstances, these special materials will be identified, excavated, handled, and documented in accordance with Table 3-1, SEP guidelines, and technical specifications (Spec 02205). The excavation contractor will prepare procedures for special material handling and include these as part of the Safe Work Plan. In general, special materials will be placed in a safe configuration (i.e., container, plastic, etc.), as required, and temporarily staged in a Special Materials Transfer Area for later disposition by FDF Waste Management.

SCEP/Waste Disposition Support Services (WDSS) will provide a field representative to visually observe during all excavation activities. This representative's primary function will be to assist with the identification and handling of special materials. 2042

3.3.5 Material Handling and Treatment

Four general types of material are expected to be encountered in Sector 3:

- Sludge from the Sludge Drying Beds with total uranium contamination exceeding OSDF WAC that also contains a RCRA-listed hazardous waste (i.e., a mixed waste)
- Material exceeding OSDF physical WAC
- Material with contamination levels below OSDF WAC and containing a RCRA-listed hazardous waste (also a mixed waste)
- Material meeting OSDF physical, chemical, and radiological WAC.

3.3.5.1 Material Not Meeting On-Site WAC

Mixed waste (sludge) from the Sludge Drying Beds that exceeds OSDF WAC will require treatment to meet Land Disposal Restrictions (LDRs) before off-site disposal. The current plan is to ship this material to a permitted commercial disposal facility for required treatment and disposal. Note that other mixed waste with below-WAC levels of contamination that may be encountered in Sector 3 is allowed in the OSDF and will be dispositioned there. Pipe with deposits that contain above-WAC levels of contamination will be considered above-WAC and containerized for offsite disposal.

Management of any other material that does not meet OSDF WAC will be coordinated with the FDF Waste Management. The following generator information will be provided to IIMS (Section 6.5) by the excavation contractor for material not meeting OSDF WAC:

- Estimated volume
- Project area/sub-area or certification unit (CU) grid of origin
- Visual description of material

FDF Waste Management will be responsible for ensuring off-site WAC are met prior to transportation. Responsibilities for materials that fail the chemical/radiological OSDF WAC are:

- Completion of waste profile

- Evaluation for treatment
- Identification of appropriate off-site disposition
- Receipt of approval from the receiving facility
- Packaging for shipment
- Certification for DOT requirements
- Coordinating off-site shipment.

3.3.5.2 Attainment of OSDF WAC

A key component of the on-site WAC attainment program is the IIMS tracking system (Section 6.5), which traces excavated impacted material to RI/FS, predesign, precertification, and supplementary WAC data.

The following actions will be performed to demonstrate compliance with the OSDF WAC:

- Assign OSDF-bound materials to material profiles, as described in the SEP
- Implement IIMS tracking requirements
- Segregate impacted materials according to OSDF Impacted Materials Placement Plan Categories 1 through 5 (DOE 1996e)
- Reduce size, fill void spaces, package (if required), and otherwise comply with physical OSDF WAC requirements
- Inspect the material visually to verify it meets physical OSDF WAC requirements
- Inspect the material visually to verify it does not include prohibited items
- Perform IIMS WAC attainment query in conjunction with manifest preparation, to verify material meets OSDF chemical/radionuclide WAC.

Material that does not meet the OSDF physical WAC will be processed at or near the excavation area, as necessary, to meet the physical WAC then sent to the OSDF. Anticipated processing includes size reduction of concrete, pipe, and debris. Pipe will first be inspected to ensure that it contains no above-WAC deposits.

Debris processing will occur with appropriate controls based on the processing method and area/material conditions. Such controls, if required, may include water sprays, dust suppressants, or foam to reduce the generation of fugitive dust.

3.3.6 Precertification Evaluation and Additional Excavation

After the STP is excavated to the limits shown on the construction drawings, RSS or HPGe measurements will be taken to precertify the floor and periphery of the excavation for gamma-emitting radionuclides. If RSS or HPGe measurements indicate above-FRL, gamma-discernable radionuclides are present, additional excavation will take place to remove the identified material. When the excavation floor and periphery meet the precertification protocol for gamma-emitting radionuclides, the excavation surface will be ready for certification.

3.3.7 HWMU Closure and Certification

Closure of HWMU No. 41, the Sludge Drying Beds, must be demonstrated as part of Sector 3 certification. As described in Section 2.2.4 of the SEP, this will be accomplished by collecting four samples from within the footprint of the Sludge Drying Beds and analyzing them for tetrachloroethene. These samples will be separate from those collected for certification of FRL attainment. Since the Sludge Drying Beds are only approximately 70 feet by 92 feet, this sample density will be greater than that required for certification and will provide representative assurance that no hazardous material remains. Closure will be demonstrated when the average concentration of tetrachloroethene in the samples is less than the FRL (3.6 mg/kg).

Predesign and predesign investigation information will be used to design the boundaries of the certification units (CUs). The delineation of CUs, the CU-specific certification COCs, and the certification sampling approach will be described in the Certification Design Letter (Section 7.2 of the SEP).

3.3.8 Interim Grading and Restoration

Interim grading and restoration of Sector 3 will be initiated following certification by backfilling the deep STP excavation to match the surrounding contours. Borrow for this operation will be obtained from three potential sources:

- An A1PII borrow area developed in the southeast corner of A1PII (Dwg G0002), if the material meets fill requirements
- Other suitable, on-site borrow sources
- Offsite borrow sources.

The A1PII borrow area will be certified and soils to be excavated will have been tested for geotechnical properties to ensure suitability prior to use and will be graded and revegetated following removal of borrow. Sediment and erosion control methods will be employed as appropriate in the development of this area (Appendix C). The backfill will be installed in controlled lifts and compacted as necessary to meet foundation specifications for the OSDF (Spec 02206). Upon completion of grading, a cover will be provided on disturbed areas as needed for interim stabilization (Spec 02900). Final vegetation cover will be established by others following OSDF construction activities in the area and in accordance with applicable provisions of the NRRP.

3.4 IMPACTED MATERIAL HANDLING AND TREATMENT

Impacted material waste streams that are generated during A1PII excavation activities will be managed in accordance with FEMP procedure EW-1019, "Management of At- and Below-Grade Impacted Material." This procedure provides for programmatic segregation and characterization of waste streams to ensure that only materials that meet the OSDF WAC are disposed on-site. EW-1019 adheres to the requirements set forth in the SEP, OSDF WAC Attainment Plan, and the OSDF Implementation Plan.

3.4.1 Waste Planning

The material waste streams expected during A1PII remediation, including their source location and disposition, are shown in Table 3-2. This information will be incorporated into a Project Waste Identification and Disposition (PWID) form prior to field implementation of each project phase. Each waste stream will be associated in the PWID with at least one source material tracking location (MTL). A material documentation drawing which identifies MTLs will be included in the design package.

The PWID will govern disposition of waste streams throughout project execution. Compliance with the PWID during project activities will be documented by completing field tracking logs (FTLs) for interim movements (e.g., stockpiling, backfilling, transfer to containers), and by completing manifests for OSDF disposition. Requirements for documentation of waste streams using FTLs and manifests will be included in contract technical specifications. Waste stream information, including but not limited to PWIDs, MTLs, FTLs, manifests, and supporting data, will be tracked in the Integrated Information Management System (IIMS) database.

3.4.2 Waste Stream Generation

Waste streams within each MTL will be segregated as they are excavated in accordance with the specific waste stream designations identified on the PWID. Specific management requirements are identified in the Waste Management Plan for Soil Characterization and Excavation Project (DOE 1997n) and EW-1019. Waste disposition staff will support construction during waste excavation activities by conducting the following activities:

- Provide technical direction and oversight for identifying, segregating, and managing impacted material waste streams
- Prepare FTLs/manifests for transfer of material between MTLs, including but not limited to, stockpiles and the OSDF
- Prepare waste stream profiles for material dispositioned to stockpiles or the OSDF
- Track waste streams in IIMS
- Prepare weekly inventory reports for staged material
- Conduct weekly audits of staged material for inventory security and erosion controls.

3.4.3 Waste Stream Storage, Treatment and Disposal

Each of the anticipated waste streams will require interim management as well as final disposition. In some cases, interim management will be limited to integration between field and office to ensure that manifests are prepared and sufficiently backed by electronic data in IIMS to support direct disposition to the OSDF upon excavation of impacted material. In other cases, interim management will be more complex, requiring staging the material in a stockpile or container for sampling and analysis, or simply to await scheduling for on- or off-site disposition.

Typically, only planned interim staging and final disposition can be clearly defined for a waste stream during project design. Other interim management requirements are subject to project conditions such as availability of OSDF capacity for a specific waste matrix (e.g., soil versus debris) and the quality of excavated material for construction purposes. Consequently, only anticipated stockpile and container staging, and the anticipated final disposition of waste streams are recorded in the original PWID. Any additional management approaches that are identified during project development are documented by

updating the PWID. Changes made in the field during project implementation are documented through tracking mechanisms.

The following outline identifies all possible interim and final disposition options that may be used during a project. Requirements identified in the Waste Management Plan and Section 7 of EW-1019 will be adhered to in all cases.

- Bulk waste stream management for on-site disposition: Waste streams that meet the OSDF chemical, radiological, and physical WAC.
  - OSDF - from project area
  - OSDF - from a stockpile
  - Project-specific stockpiles
  - Site-wide stockpiles, including the Woodchip Stockpile
  - Cut-and-fill working stockpiles
  - Backfill

- Bulk waste stream management for off-site disposition: Waste streams that exceed the OSDF chemical or radiological WAC, and can be managed bulk.
  - Project-specific stockpiles
  - Operable Unit 1 Stockpile (SP-6)

- Containerized waste streams that are dispositioned on-site:
  - Interim container storage pending characterization
  - Bulked prior to OSDF disposition

- Containerized waste streams that are dispositioned off-site
  - Materials that exceed the OSDF WAC and cannot be managed in bulk
  - Transferred to WPM for off-site disposition in container system

FTLs/manifests will be used in all cases for tracking of material that will be dispositioned to the OSDF. Information that supports WAC determinations will be retrievable through IIMS using either the FTL (interim staging) or manifest (OSDF disposition) form numbers. This information will be available for review by WAC Attainment Operations (WAO) Compliance Assurance.

FTLs also will be used to track above-WAC containerized materials from the project area. However, subsequent management of the material will be conducted under existing site waste management procedures (Functional Area 17), with tracking conducted in the SWIFTS database.

Management protocols for stockpiles will include administrative controls (posting and boundary delineation) that ensure only suitable material is staged at the stockpile location. Silt fencing and either

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vegetative or crusting agent covers will be installed to control run-off and erosion. When stockpiles are in use, dust controls will include compaction and application of water mist for visible dust. Rope fencing and signs will be used to control ingress and egress.

3.4.4 Wastewater Management

Wastewater will be produced during A1PII remediation activities from the perched water seepage into trench and STP excavations, storm water that falls or runs into the open excavations, residual waters from pipelines and STP operational units, and from equipment decontamination. These waters have potential for containing concentrations of uranium and, for waters within the STP excavation, tetrachloroethene.

Residual water from STP Wastewater Influent and Effluent pipelines, decontamination operations, and storm water in the STP Wastewater Influent and Effluent pipeline trenches will be potentially contaminated with uranium. Therefore, this water will be collected and accumulated in tankage in the Remediation-Generated Water Transfer System.

Perched water and storm water from within the STP excavation will also be collected and accumulated in the Remediation-Generated Water Transfer System. The STP Sludge Drying Beds were designated a HWMU because they managed sludge and wastewater potentially containing the spent listed solvent tetrachloroethene (see Section 2.1.2). The water (environmental media) in the STP excavation thus has the potential to contain this contaminant. However, pre-design investigation of STP area perched water did not detect tetrachloroethene or other volatile organic compounds (VOCs) (see Section 2.2.4). Nevertheless, due to the potential presence of this constituent, all accumulated water will be sampled and analyzed for tetrachloroethene. If tetrachloroethene is detected (i.e., result is above the contract required detection limit [CRDL] of 5-10 micrograms/liter [μg/L]), then the accumulated water will be transferred for pre-treatment (activated carbon) prior to treatment at the AWWT Phase II (activated carbon) facility. If tetrachloroethene is not detected, then the accumulated water will be transferred for treatment at the AWWT Phase I facility before discharge to the receiving surface water. If subsequent accumulated volume sampling and analysis events repeatedly indicate that tetrachloroethene is not present, then this sampling and analysis will cease, and the water from the STP excavation will be commingled with the other wastewater and transferred for treatment at the AWWT Phase I facility via the SWRB before discharge to the receiving surface water.

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The Remediation-Generated Water Transfer System is a temporary component of the FEMP's storm water/wastewater treatment system. The purpose is to manage environmental media (perched water and storm water) during the remediation of the STP, some of which has the potential to contain tetrachloroethene. As such, the water transfer system can be considered a temporary unit (40 CFR §264.553) to facilitate remediation within the already designated corrective action management unit (CAMU). In lieu of the design, operating, and closure standards (referenced below) that would otherwise apply to hazardous waste tank systems, the following controls are being implemented:

Hazardous Waste Tank System	Remediation-Generated Water Transfer System
· Secondary containment system in place prior to tank system being put into service. [OAC 3745-55-93(A)(1) & 40 CFR §265.193(a)(1)]	Secondary containment system in place prior to tank system being put into service.
· Secondary containment system capable of collecting releases and accumulated liquids until the collected material is removed. [OAC 3745-55-93(B)(2) & 40 CFR §265.193(b)(2)]	Secondary containment system capable of containing releases of environmental water until it is removed.
· Secondary containment system constructed of materials compatible with the materials to be managed. [OAC 3745-55-93(C)(1) & 40 CFR §265.193(c)(1)]	Secondary containment system constructed of compacted earth (Spec 02206) which is compatible with the environmental water to be managed in the tanks. Material and compaction specifications are identical to those for the sediment basins which handle similar water.
· Secondary containment system designed or operated to contain 100% of the capacity of the largest tank within its boundary. [OAC 3745-55-93(E)(1)(a) & 40 CFR §265.193(e)(1)(I)]	Secondary containment system designed to contain 100% of the capacity of the total tankage volume within its boundary.
· Secondary containment system designed or operated to either prevent runon of precipitation, or to contain precipitation from a 25-yr/24-hr rainfall event. [OAC 3745-55-93(E)(1)(b) & 40 CFR §265.193(e)(1)(ii)]	Secondary containment system designed to prevent surface water runon.
· Secondary containment system capable of preventing lateral as well as vertical migration of the hazardous waste if released from the tanks. [OAC 3745-55-93(E)(1)(d) & 40 CFR §265.193(e)(1)(iv)]	Secondary containment system capable of preventing lateral and limiting vertical migration of the environmental water, if it is released from the tanks, until it is removed.
—	As promptly as allowed by the ability of the AWWT facilities to accept the water and other needed coordination arrangements, transfer the accumulated waters for AWWT treatment in accordance with the protocols described in Section 3.4.4.

Hazardous Waste Tank System	Remediation-Generated Water Transfer System
· Inspect regularly to detect erosion or signs of releases of hazardous wastes. [OAC 3745-55-95(A)(4) & 40 CFR §265.195(a)(4)]	Inspect regularly (especially after storms) under the protocols of the SWPPP (Section 4.3.2) to ensure integrity; repair and/or install additional controls as required.
· At closure of a hazardous waste tank system, remove or decontaminate all waste residues, contaminated containment system components, and contaminated soils. [OAC 3745-55-97(A) & 40 CFR §265.197(a)]	After it is no longer needed for the A1PII remediation, the tanks will be emptied of their contents and removed (anticipate reuse elsewhere on-site in subsequent soil remediation projects). The secondary containment system soils will undergo FRL attainment precertification/ certification (and supplemental excavation as necessary).

3.5 INSTITUTIONAL CONTROLS

Institutional control and monitoring of A1PII will continue after remediation activities are completed, beyond that afforded by DOE's sitewide security program, through the use of construction fences or equivalent barriers and certified area warning signs that will be placed along accessible boundary segments of areas as they are certified. Access to these areas will be further controlled by procedure (i.e., Site Procedure EP0008 or similar procedure) to minimize the potential for introducing contamination from unremediated areas of the site. Similarly, DOE will continue to monitor A1PII conditions in accordance with the IEMP (DOE 1997d). Monitoring activities are expected to be similar to those currently performed in the area, including natural resource impact monitoring under the Natural Resources Impact Monitoring Plan (part of the IEMP); air pathway parameters, including fugitive emissions (visible dust), airborne radiological particulates and radon; surface water quality in accordance with the NPDES compliance program; and groundwater monitoring at wells located on the periphery of A1PII for RCRA compliance and related purposes. Long-term institutional controls necessary to implement restoration goals under the site's selected remedy are presented in the NRRP (DOE 1997e).

TABLE 3-1
PROTOCOLS FOR SPECIAL MATERIAL

SPECIAL MATERIAL	EXAMPLES	PROTOCOLS
Friable Asbestos	Piping insulation	General: ACM may not be staged in the excavation area. If delays are expected prior to OSDF disposition, transport to temporary staging area. Friable ACM-wrapped pipe: Size reduce to maximum 10 (±1) ft. length, wrap, double bag or equivalent, label, and disposition to OSDF as Category 5. Pipe 12 inches or greater in diameter must be split axially or radially. Other friable ACM that meets OSDF Category 5: Wrap, double bag or equivalent, label, and disposition to OSDF. ACM that does not meet OSDF WAC: Size reduce, wrap or double bag as above, label, then containerize and transport to temporary staging area for evaluation for off-site disposition.
Non-pressurized Containers	Intact drums, metal and wood boxes, cans	Intact containers: Visually inspect for leaks and indication of contents. Overpack or repack leaking containers prior to movement from area of discovery. If safety considerations allow, open container and record description of contents on Visual Inspection Form. Transport to temporary staging area for further evaluation. Empty containers: Crush or size reduce and manage as OSDF Category 2.
Pressurized Containers	Aerosol cans, Freon containers, gas cylinders, propane tanks, fire extinguishers	General: Handle intact containers as though they contain material. Evaluate container integrity. Breached containers: Evaluate for OSDF Categories 2, 3 and 5. Category 5 is evaluated on a case-by-case basis and requires a request for disposal (RFD). Intact containers: Overpack and move to FEMP temporary staging area for evaluation. If container is to be dispositioned in OSDF, it must be punctured, crushed or cut so that the interior is open to the atmosphere.
Piping and Pumps	Drain lines, sewer lines, process piping, pumps	General: Drain contaminated and potentially contaminated free liquids using trays, buckets, or pipe/hose inserted into pipeline/appurtenance. Dependent on nature of liquid: if viscous, containerize in drum(s) or white metal box(es), sample for disposition evaluation, and disposition accordingly; if free-flowing, transport to Remediation-Generated Water Transfer System, sample and disposition at AWWT according to protocols in Section 3.4.4. Piping with process residues: Cap and remove pipe after emptying free liquids. Containerize for off-site disposition. Piping with above-WAC deposits: Cap and remove pipe after emptying free liquids. Containerize for off-site disposition. Other piping: Manage as OSDF Category 2. Pumps: Remove after emptying free liquids. Evaluate for OSDF Categories 2, 3 and 5. Category 5 is evaluated on a case-by-case basis and requires a request for disposal (RFD). Note: MEF/SWIFTS research is required prior to trenching activities for contaminated piping.
Non-soil Residues	Green salt, black oxide, sump cake, fly ash	Field screen to determine radionuclide content. Segregate uranium-bearing residues, containerize, and transport to temporary staging area for evaluation. Stockpile non-uranium residues and evaluate for OSDF Category 1 or 5. Category 5 requires a RFD.

TABLE 3-1
CONTINUED

SPECIAL MATERIAL	EXAMPLES	PROTOCOLS
Transformers	Electrical equipment	General: Segregate and evaluate to determine if contains fluids. Empty transformers: Manage as OSDF Category 2, 3, or 5. Fill void spaces greater than 1 cf. with flowable, cohesionless material or a quick set grout. Category 5 requires a RFD. Transformers containing fluids: Drain fluids into a container and transport container to temporary staging area. Evaluate fluids for off-site disposition. Manage emptied transformer as described above.
Lead Acid Batteries	Vehicle or equipment batteries	Segregate, containerize and transport to temporary staging area for disposition evaluation.
Uranium Metal	Derbies, ingots, billets, irregularly shaped scrap uranium	Segregate, containerize, and transport to temporary staging area for evaluation for off-site disposition. Will either be classified as nuclear material and sold, or classified as a waste and disposed off site.
Medical/Infectious Waste	Syringes, vials	Evaluate on case-by-case basis for OSDF Category 5 (requires a RFD). Containerize and move to temporary staging area if field operations do not allow timely completion of this evaluation. Medical/infectious waste not meeting OSDF requirements will be containerized and transported to temporary staging area for evaluation for off-site disposition.
Miscellaneous Debris	Oil/air filters, radiators, cable/wire, tools, heavy equipment, office materials, documents	Evaluate on case-by-case basis for OSDF Category 5 (requires a RFD). Containerize and move to temporary staging area if field operations do not allow timely completion of this evaluation. Miscellaneous debris not meeting OSDF requirements will be containerized and transported to temporary staging area for evaluation for off-site disposition.
Tires	Scrap tires from miscellaneous equipment (Note: OEPA definition)	Containerize and transport to temporary staging area for evaluation for off-site disposition.

TABLE 3-2
WASTE STREAM DISPOSITION

Waste Stream	Expected Source Location	OSDF WAC Status	Pre-Disposition Options	Final Disposition Options	Estimated Volume (yd^3)
Impacted Material					
Lead-contaminated Soil	Trap Range	Toxicity characteristic for lead	In-situ chemical treatment	OSDF	1,960
F-listed AWAC Sludge	Sludge Drying Beds	AWAC	Containerize	PCDF	35
All other OSDF Category 1 Soil	All Areas	BWAC	Stockpile	OSDF	41,350
OSDF Category 2 Debris	All areas	BWAC	Stockpile	OSDF	2,150
OSDF Category 3 Debris	All areas	BWAC	Stockpile	OSDF	300
OSDF Category 4 Compressible/High Organic Material	All areas	BWAC	Stockpile	OSDF	0
OSDF Category 5 Ancillary Material	All areas	BWAC	1. Stockpile 2. Containerize	OSDF	0
Prohibited Items (see Table 2 of EW-1019)	All areas	Prohibited Item	Containerize	1. NTS 2. PCDF	0
Special contingency materials (see Table 1 of EW-1019)	All areas	AWAC	Containerize	1. NTS 2. PCDF	25
Special contingency materials (see Table 1 of EW-1019)	All areas	BWAC	1. Stockpile 2. Containerize	OSDF	0
Remediation-Generated Water					
Perched water/ storm water	STP excavation, STP influent/effluent trenches	N/A	Temporary tanks in Remediation-Generated Water Transfer System, with sampling and analysis	If PCE is above detection limits: pre-treatment (GAC) followed by AWWT Phase II; else, AWWT Phase I via SWRB	According to precipitation
Equipment Decontamination Facility wastewater	All areas				
Equipment Wash Facility wastewater	All Equipment Wash Facilities	N/A	Mainly to A1PI, A1PII or OSDF Sediment Basins	Paddy's Run except A1PI Sediment Basin outfall to AWWT via SWRB	According to precipitation
Storm water	All areas outside of STP excavation and STP influent/effluent trenches				

AWAC = Above OSDF Waste Acceptance Criteria (WAC)
BWAC = Below OSDF Waste Acceptance Criteria
AWWT = Advanced Waste Water Treatment facility
N/A = Not Applicable
NTS = Nevada Test Site
OSDF = On-Site Disposal Facility
PCDF = Permitted commercial disposal facility
STP = Sewage Treatment Plant
SWRB = Storm Water Retention Basin

Note: Estimated volumes based on Appendix G estimates for OSDF, rounded up to the nearest 10 yd^3.

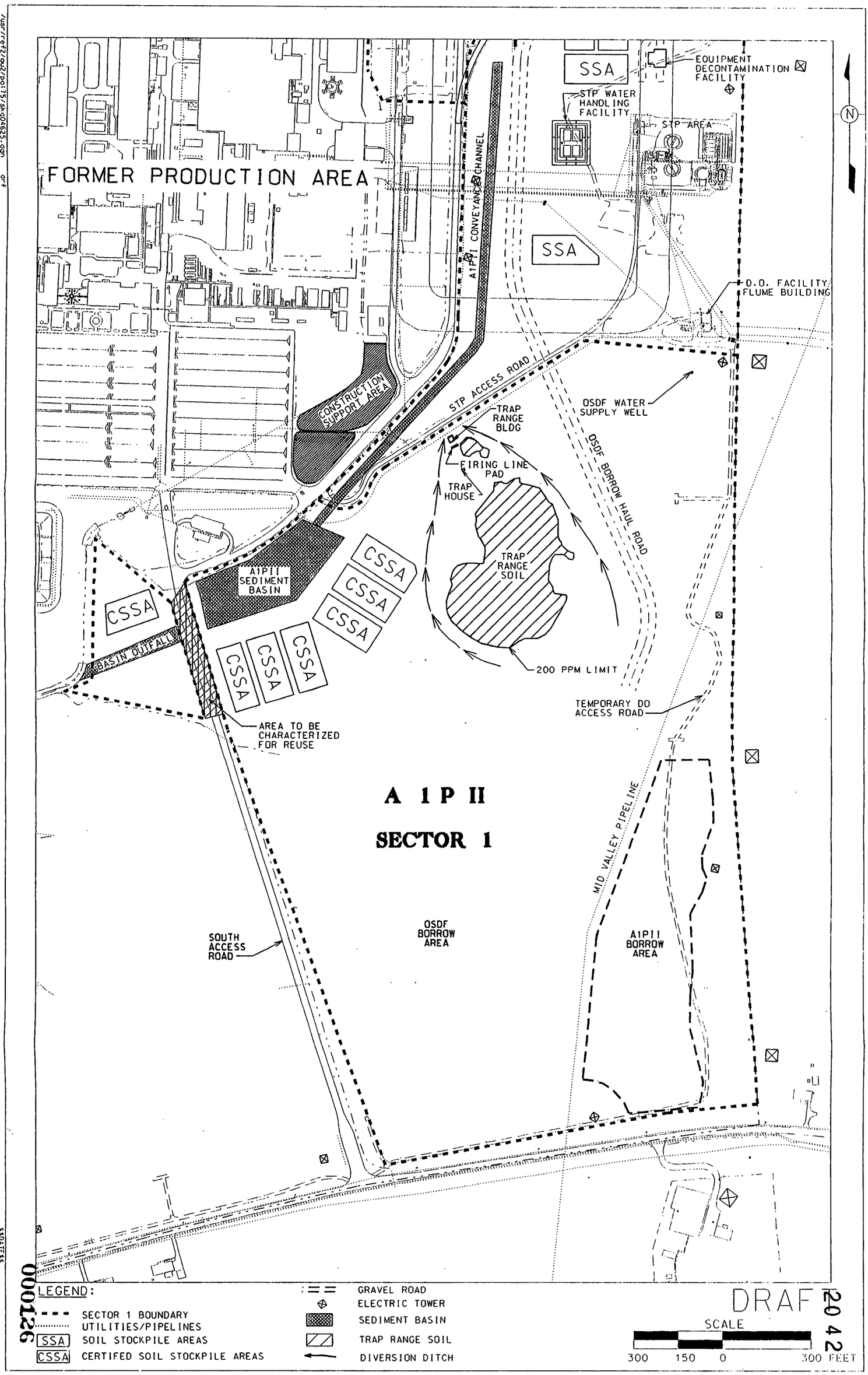
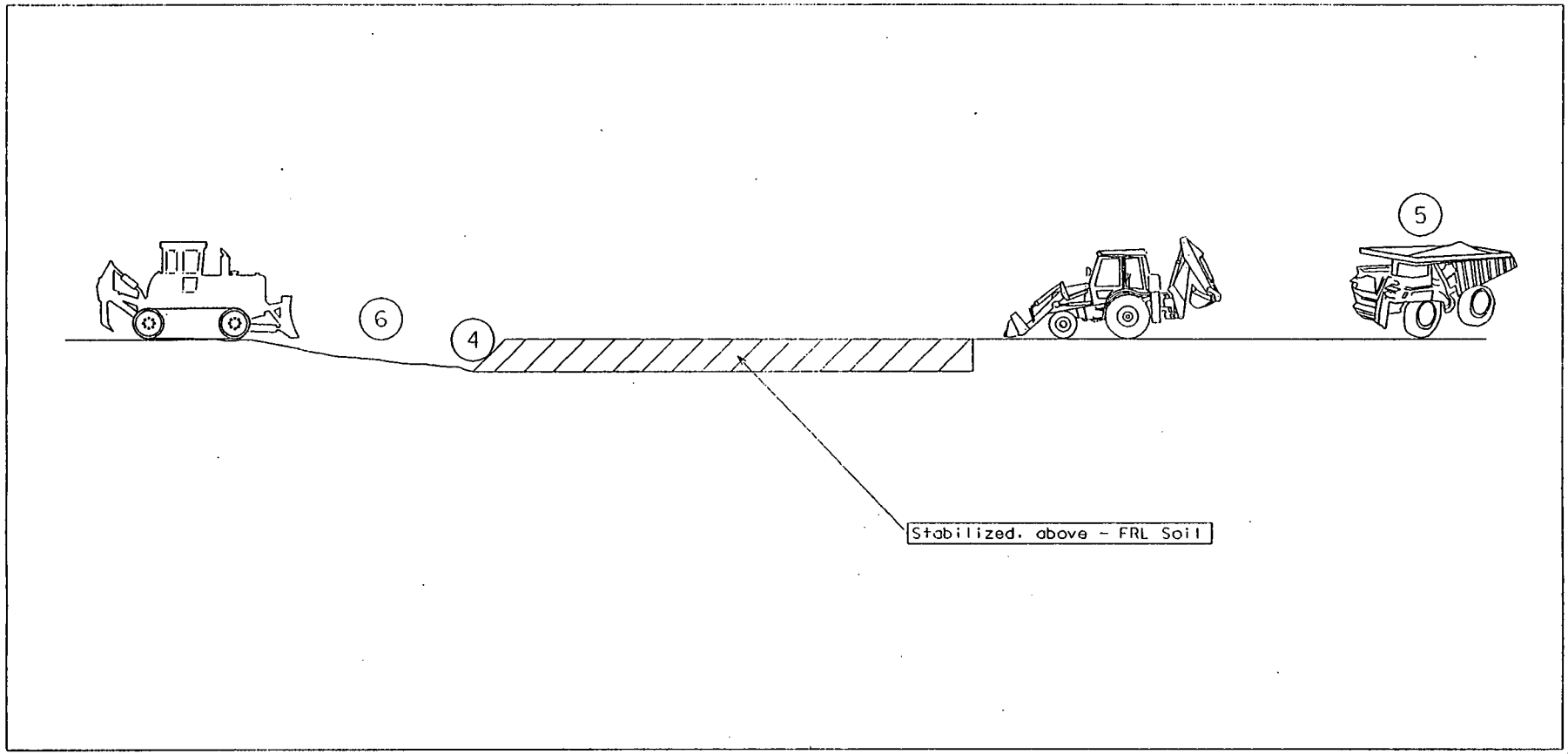


FIGURE 3-1 SECTOR 1 CONCEPTUAL REMEDIATION PLAN



1 Survey and stake limits of above-FRL soil based on RI/FS and pre-design sampling (not shown)
2 Stabilize above - FRL soil in-place (not shown)
3 Sample and analyze stabilized soil to demonstrate removal of toxicity characteristic (Not Shown)
4 Excavate stabilized soil
5 Load stabilized soil into trucks for disposition to OSDF
6 Perform confirmatory sampling and as required, supplemental excavation until FRLs are attained
7 Perform certification (not shown)

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FIGURE 3-2 Excavation of Lead-Contaminated Soil at the Trap Range

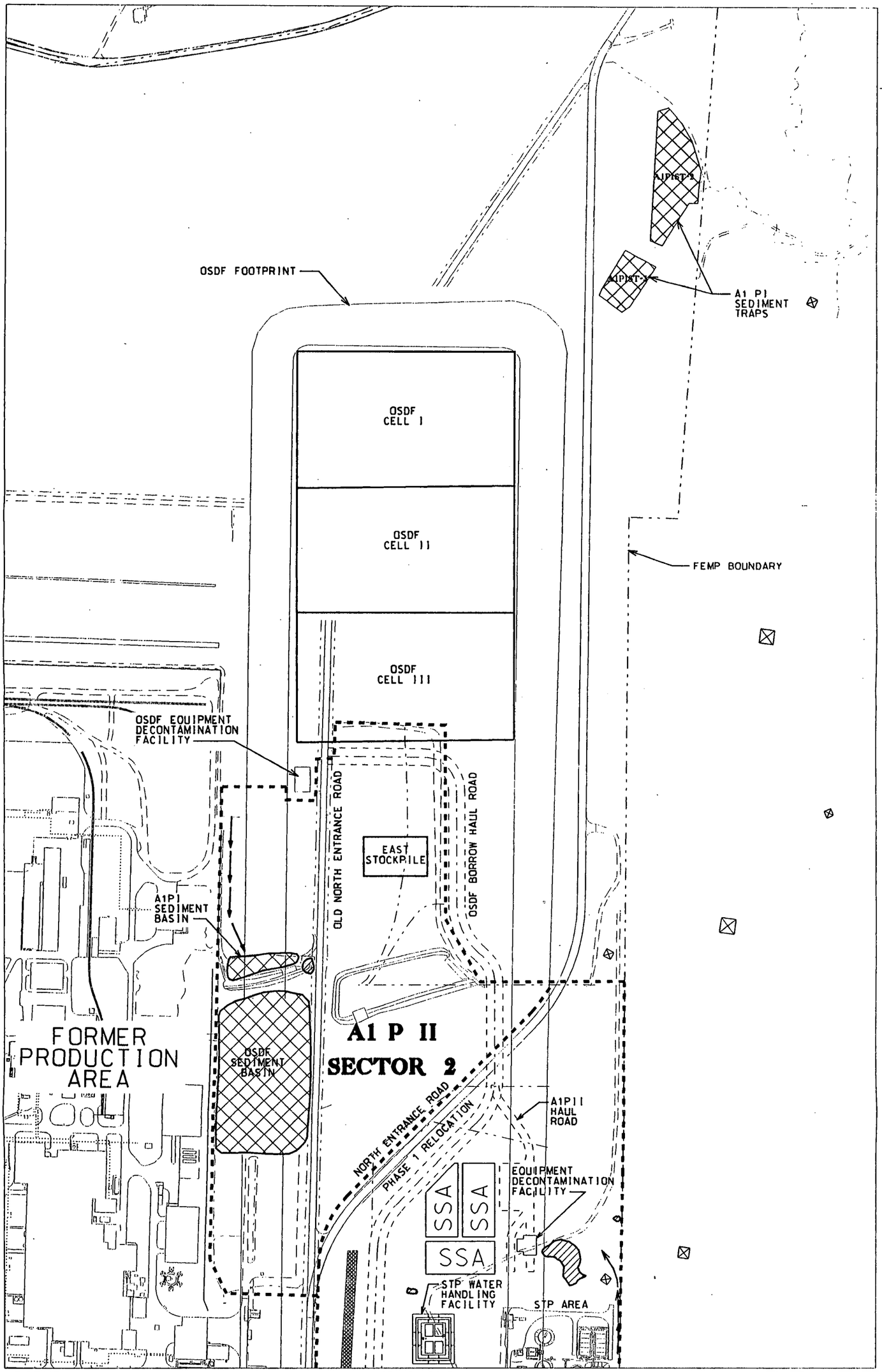

FIGURE 3-3 SECTOR 2 CONCEPTUAL REMEDIATION PLAN

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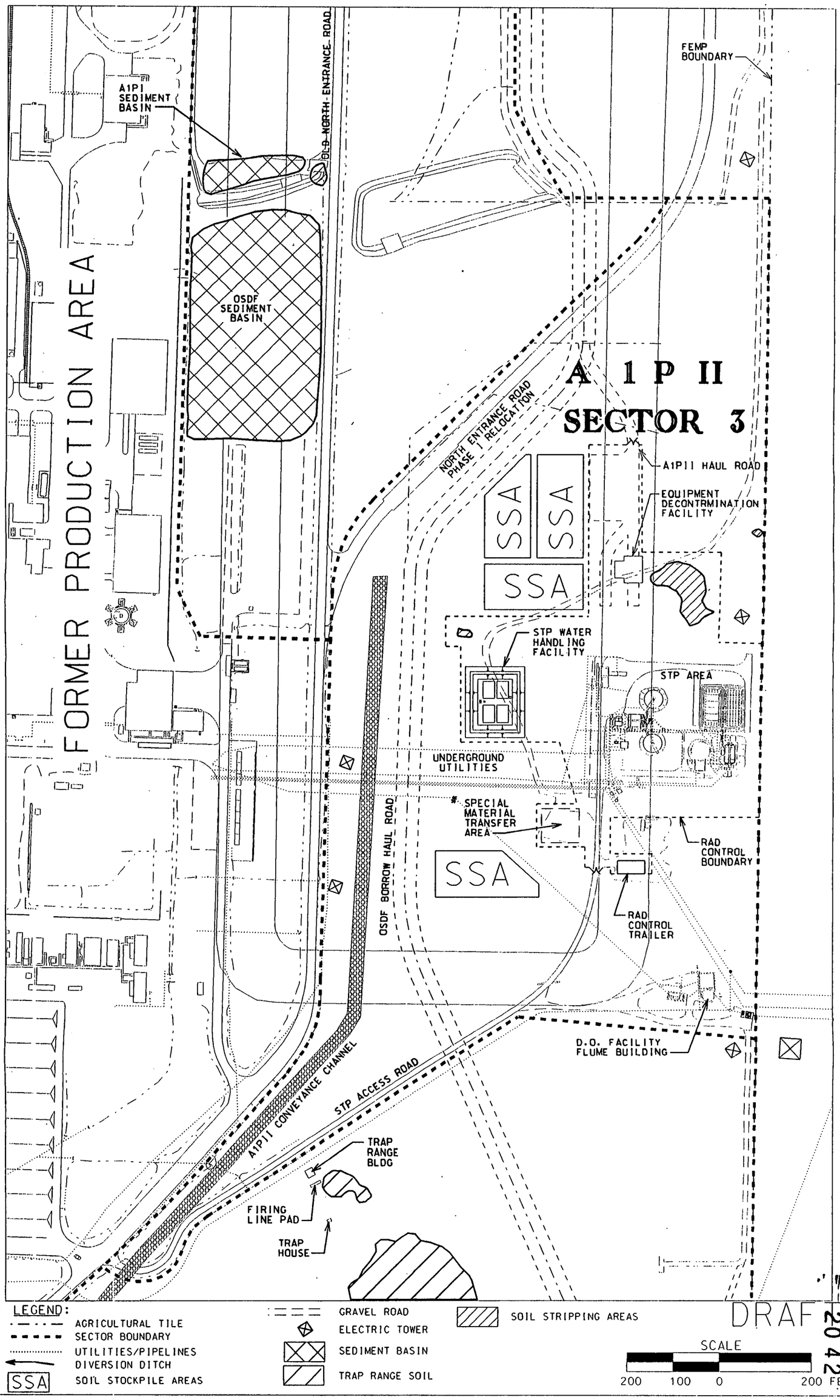

FIGURE 3-4 SECTOR 3 CONCEPTUAL REMEDIATION PLAN

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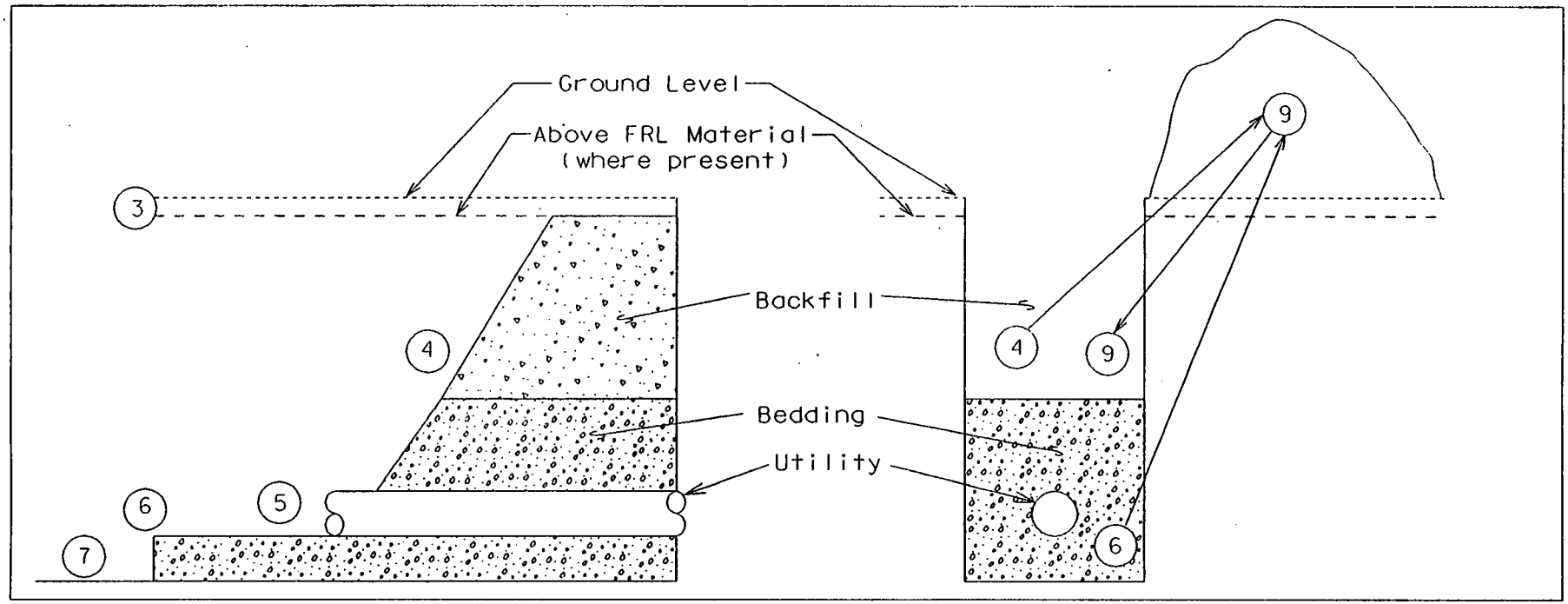

1 Survey and stake limits of above FRL material based on RI/FS and pre-design sampling (Not Shown)
2 Survey and stake pipeline routing (Not Shown)
3 Excavate above FRL Material, as required, and disposition to OSDF
4 Excavate below FRL material to expose pipe and stage for reuse
5 Remove pipeline and process for disposition in OSDF
6 Remove remaining bedding and stage and stage for reuse
7 Perform confirmatory sampling and supplemental excavation, as required, until FRLs are achieved
8 Perform certification of trench (Not Shown)
9 Backfill trench

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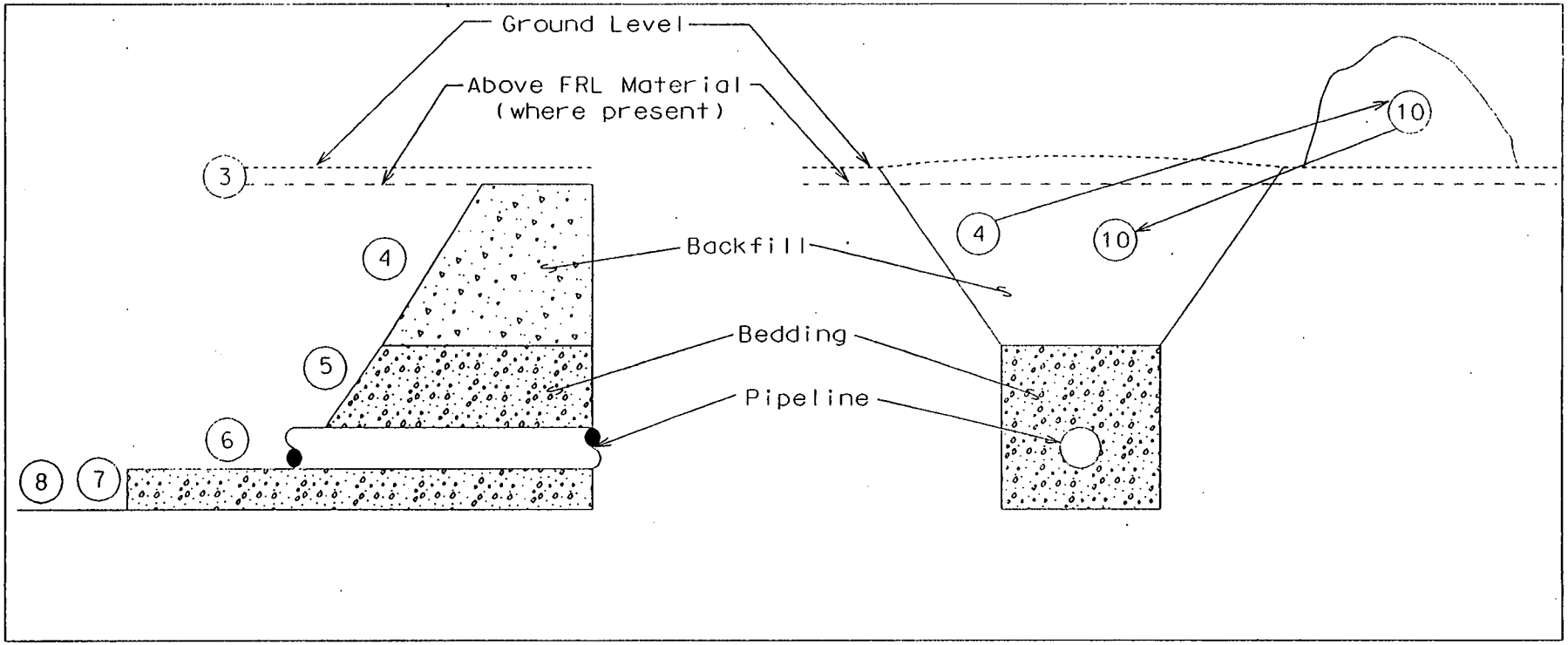
FIGURE 3-5 Excavation of Non-Contaminated Pipelines/Utility Lines



1 Survey and stake limits of above FRL material based on RI/FS and pre-design sampling (Not Shown)
2 Survey and stake pipeline routing (Not Shown)
3 Excavate above FRL material, as required, and disposition to OSDF
4 Excavate below FRL material to top of pipe bedding and stage for reuse
5 Excavate bedding to expose pipeline and disposition to OSDF
6 Remove pipeline, examine for above WAC material.Process for disposition to OSDF if below WAC. Handle as special material if above WAC
7 Excavate remaining pipe bedding and disposition to OSBF if below WAC (to OU-1 stockpile if above WAC)
8 Perform confirmatory sampling and supplemental excavation as required until FRLs are achieved
9 Perform certification of trench (Not Shown)
10 Backfill trench

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FIGURE 3-6 Excavation of Pipelines with Associated Contamination

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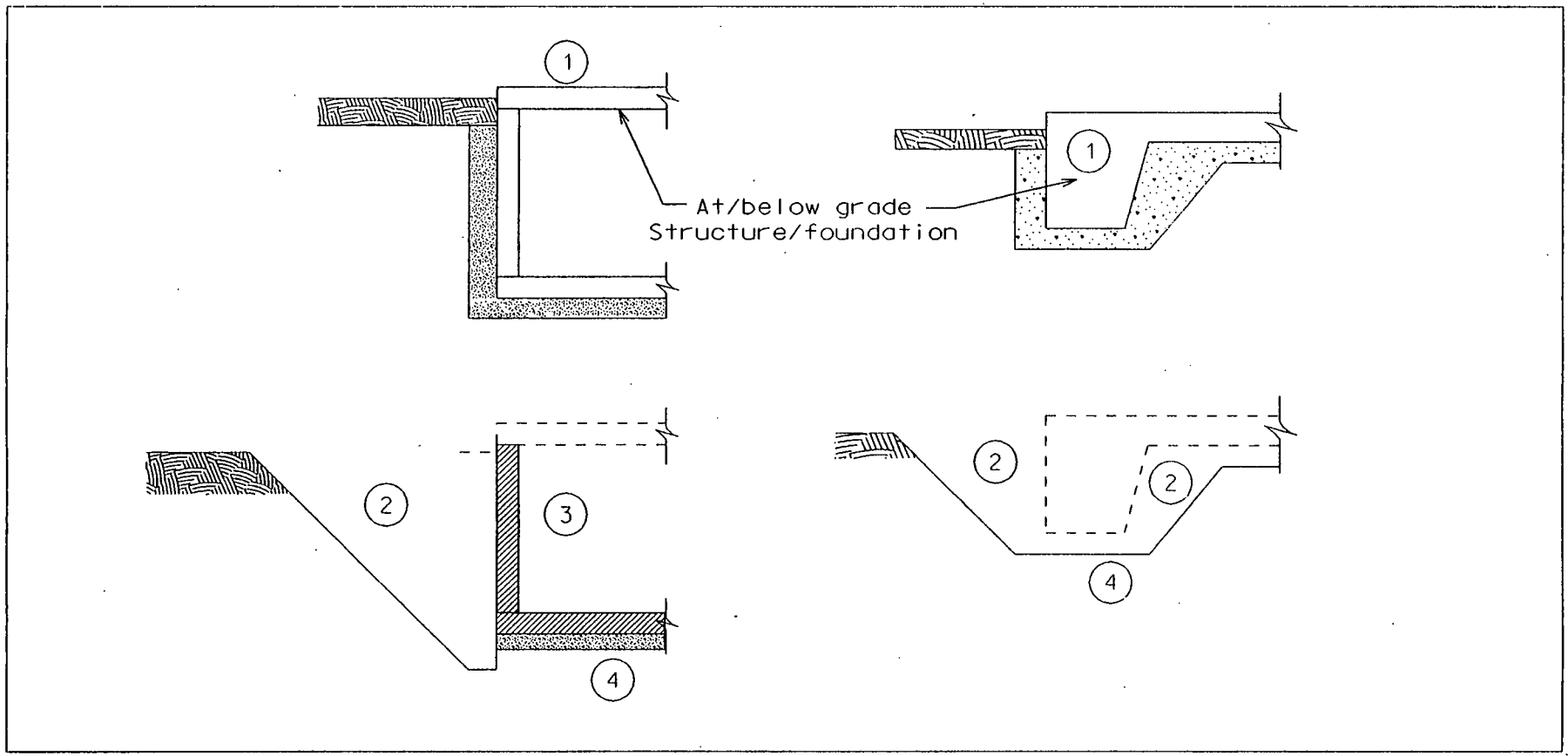

1 Remove at grade portion of structure and process for disposition to OSDF
2 Remove backfill around structure and place in OSDF
3 Remove below-grade portion of structure and process for dispostion to OSDF
4 Perform confirmatory sampling and supplemental excavation, as required, to demonstrate all above WAC material has been removed
5 Perform FRL-driven excavation and certifcation as part of program for entire area (not shown see figure 3-)
6 Backfill STP area (Not Shown)

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FIGURE 3-7 Excavation of Structures / Foundations

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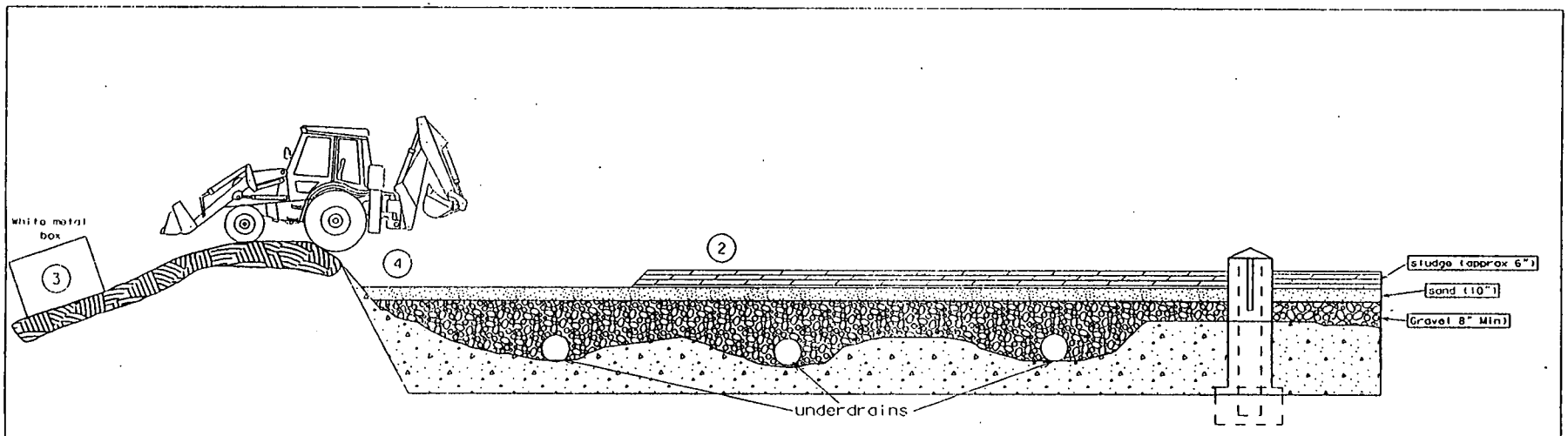

Longitudinal Section of Sludge Dring Beds
(one bay shown - six bays total)

1 Stake Limits of above - WAC sludge (not shown)
2 Excavate sludge from outside Sludge Drying Beds
3 Load sludge into white metal boxes for offsite treatment and disposal
4 Perform confirmatory sampling and supplemental excavation, as required, until all above WAC material is removed (not shown)

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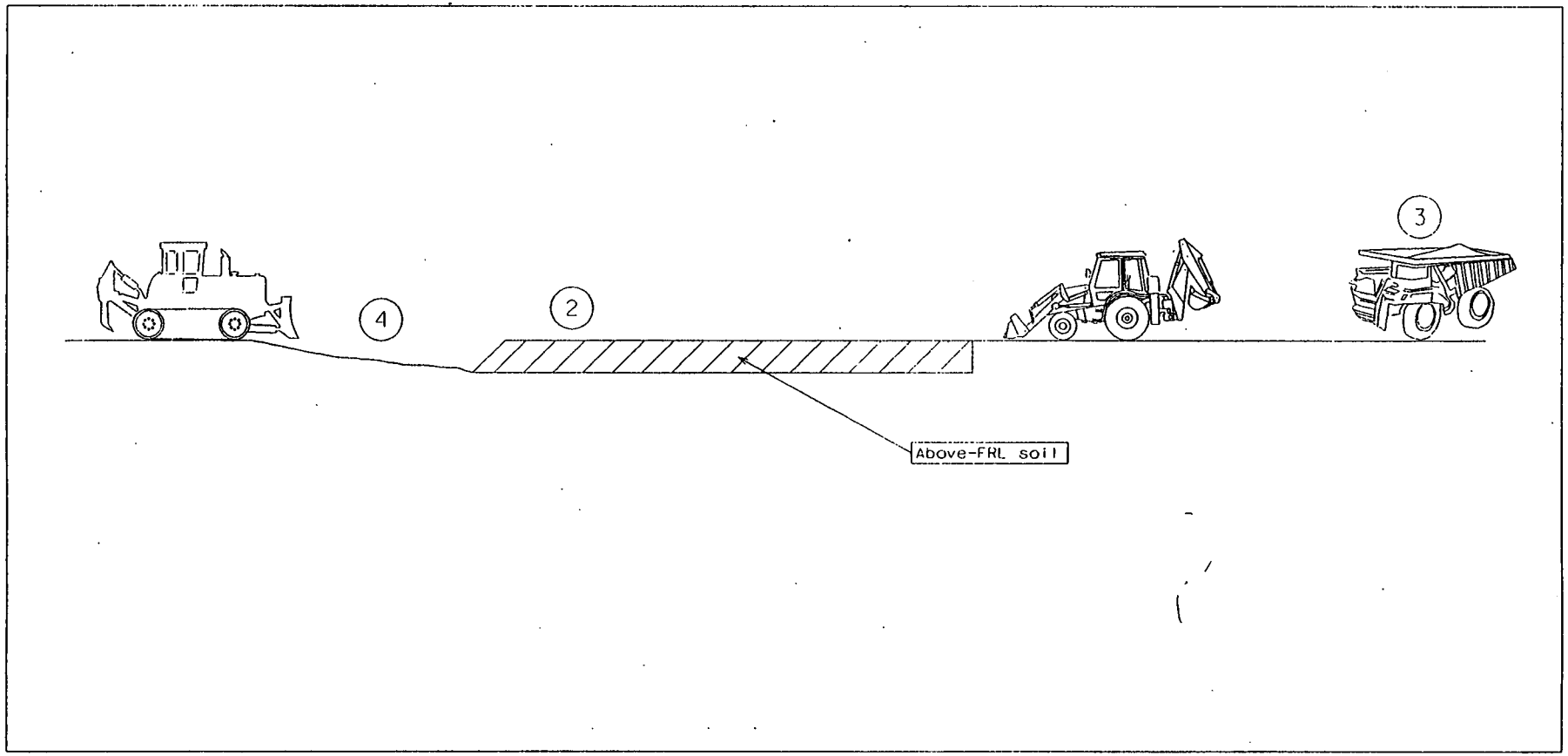
FIGURE 3-8 Excavation of above WAC material at Sludge Drying Beds



1 Survey and stake limits of above-FRL soil based on RI/FS and pre-design Sampling (not shown)
2 Excavate above-FRL soil
3 Load above-FRL soil into trucks for disposition to OSDF
4 Perform radiological scanning and confirmatory sampling and, as required, supplemental excavation until FRLs are attained
5 Perform certification (not Shown)

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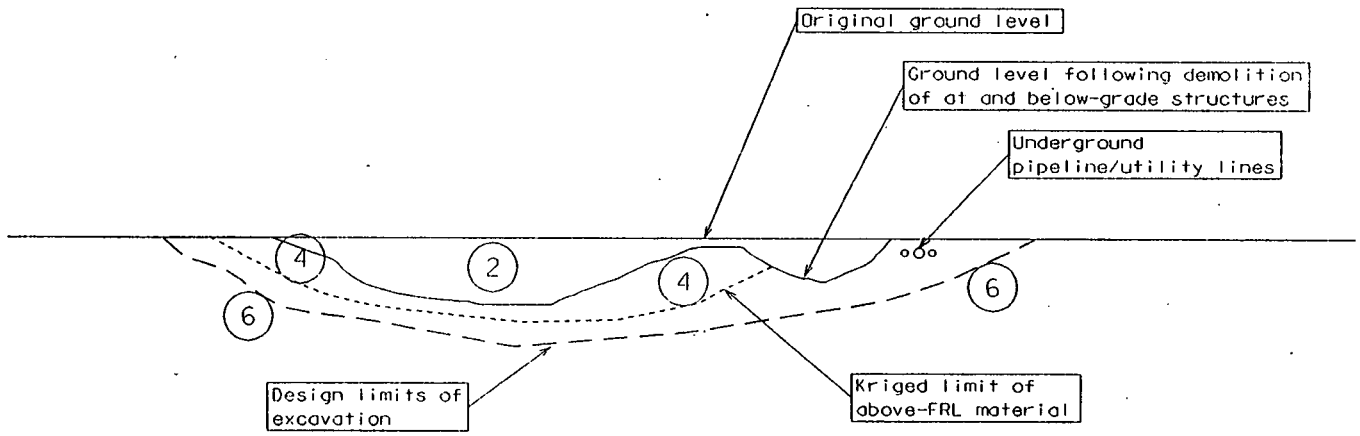
FIGURE 3-9 Excavation of Shallow Above-FRL Soil



1 Survey and stake limits of above-FRL soil based on RI/FS and pre-design sampling (not shown)
2 Excavate foundations
3 Load debris into trucks for disposition to OSDF (not shown)
4 Excavate above-FRL Soil
5 Load above-FRL soil into trucks for disposition to OSDF (not shown)
6 Perform radiological scanning and confirmatory sampling and, as required, supplemental excavation until FRLs are attained
7 Perform certification (not shown)

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FIGURE 3-10 Sequencing of Excavation at the Sewage Treatment Plant

4.0 PROJECT-SPECIFIC ENVIRONMENTAL CONTROLS AND MONITORING 2042

This section defines the project-specific environmental controls and monitoring that will be performed as part of A1PII remediation, how the resulting information will be used by the project organization, and how it will be integrated with sitewide monitoring and reporting requirements. Control mechanisms and monitoring/inspection requirements are provided for impacts to natural resources, as well as environmental impacts through air, surface water, and groundwater pathways.

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

4.1 NATURAL RESOURCE IMPACTS

On-property natural resources include those associated with threatened and endangered species, cultural resources, and wetlands/floodplains. As stated in Section 1.3.3, approximately 0.7 acres of wetland are expected to be impacted during the remediation of A1PII. As also stated in Section 1.3.3, compensatory wetland mitigation for A1PII wetland impacts will be addressed on a sitewide basis in accordance with the NRRP. The following paragraphs describe the control mechanisms and monitoring that will be implemented in A1PII in regard to natural resource impacts.

4.1.1 Control Mechanisms

The SEP establishes a four-component strategic control mechanism for natural resource impacts.

The first component, identification of unavoidable impacts to natural resources anticipated to result from remediation activities, has been addressed in the OU2 and OU5 RODs (DOE 1995c, 1996b). These RODs identified the unavoidable potential natural resource impacts anticipated because of remediation activities relevant to A1PII to be initiated under the SEP.

The second component, avoidance of impacts to FEMP natural resources as practicable, has been controlled through planning and design. Sensitive natural resource areas have been designated at the FEMP. These "Priority Natural Resource Areas" are illustrated in the Natural Resource Impact Monitoring Plan (briefly discussed below) and in Figure 5-2 of the SEP. No Priority Natural Resource Areas are located within A1PII area. All access points, laydown areas, etc., for the A1PII soil remediation project are outside Priority Natural Resource Areas. Potential impacts to other FEMP natural resources will be minimized through the incorporation of appropriate environmental control mechanisms as well. These are addressed in the subsequent, media-specific discussions.

The third component, monitoring to document the actual extent of impacts, is addressed in Section 4.1.2.

The fourth component, natural resource restoration, is briefly described in Section 1.3.3, and is the subject of the NRRP.

4.1.2 Monitoring

Monitoring of natural resource impacts associated with A1PII and other sitewide remedial activities will be conducted under the Natural Resources Impact Monitoring Plan (part of the IEMP). Descriptions of the objectives, regulatory drivers, monitoring, data evaluation, and reporting requirements for the program are provided therein. Sitewide monitoring of natural resource impacts will continue under the IEMP during A1PII soil remediation activities. Monitoring under that program will verify and document the actual extent of natural resource impacts anticipated by and identified in the RODs and will identify any unanticipated impacts to natural resources. The natural resource monitoring data collected from the FEMP will be updated in the NRRP as it is relevant to restoration.

4.2 AIR PATHWAY

This subsection presents the air pathway control and monitoring requirements for noise, fugitive emissions (visible dust), airborne radiological particulates and radon, and direct radiation during A1PII soil remediation activities. Air pathway monitoring activities, to the maximum extent possible, will make use of both the existing FEMP occupational air monitoring program and the sitewide environmental monitoring program (described in Section 6.0 of the IEMP). Using existing monitoring programs will help ensure that project-specific data are of comparable quality and are beneficial in

evaluating and reporting project-specific air pathway releases under the various regulatory drivers. associated with these monitoring programs. Administrative and engineering control techniques, in accordance with "Fugitive Dust Control Requirements" (RM-0047; DOE 1997g) developed from the FEMP fugitive dust control best available technology (BAT) determination, will be implemented during A1PII soil remediation activities including excavation, hauling, and placement of soils to mitigate potential emissions of fugitive dust and of airborne radiological particulates.

4.2.1 Noise

4.2.1.1 Control Mechanisms

Noise control and abatement during the A1PII remediation will include noise control devices (mufflers) on vehicles and machinery, proper maintenance of vehicles and machinery, and may also include rescheduling heavy equipment use times in the field. Currently, only minimal remediation activities are anticipated to be performed after sunset.

To ensure that 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 specified in the project-specific health and safety requirements (see Section 5.0). This administrative action level will be used to assess the need for hearing protection for field personnel in the remediation areas, the need for maintenance of vehicles and machinery, and the need for additional noise control and abatement.

4.2.1.2 Monitoring

Noise monitoring will be conducted as part of A1PII project-specific health and safety requirements. Noise measurements will be made in the field by FDF health and safety personnel, using health and safety protocols for noise monitoring, to 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.

Components of noise monitoring will include establishing remediation area-specific background levels prior to the start of excavation activities, and occasional monitoring during implementation of remedial activities. 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 health and safety requirements), health and safety personnel will contact the project field manager to begin appropriate corrective actions.

Field managers will be responsible for documenting noise monitoring in the field in accordance with records management guidelines presented in Section 6.7, as well as for initiating noise abatement measures.

4.2.2 Fugitive Emissions

4.2.2.1 Control Mechanisms

Water, commercially available dust suppression agents, or other appropriate methods and work practices will be used proactively to reasonably minimize dust generation from A1PII soil remediation activities including soil excavation, handling, hauling, and placement. In general, the opportunity for dust generation will be minimized using work practices, including removing material from the undercarriage of equipment, cleaning paved haul roads, or applying water (or other dust suppressant agent) to unpaved haul roads. Beyond that, water or other dust suppression agents will be applied in quantity sufficient to reasonably minimize dust generation, but limited so that they do not result in migration of the agent beyond work area boundaries, ponding, or disruption of other portions of work.

For excavation activities, dust control will be by progressive increments focused on making the material less dusty. The base mechanism is anticipated to be reliance on inherent moisture in the soil and soil-like material; in dry conditions, dust control will be initiated prior to excavation. If visible dust emissions occur during excavation, one or a combination of the following dust control methods are anticipated to 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 be focused on making the material to be transported unlikely to become airborne. The base mechanism is anticipated to be reliance on inherent moisture in the soil or soil-like materials, coupled with a 15 mph speed limit during hauling. If visible dust emissions occur during handling, hauling, or placement, one or a combination of the following dust control methods are anticipated to 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 (atypical load bed covers)
- Reduce equipment speed
- Cover equipment load bed.

As discussed in Section 3.0, an equipment wash or equipment decontamination facility will be used to remove visible deposits of soil or other materials retained on the wheels or undercarriages of haul equipment that could readily become visible fugitive emissions if deposited on paved or treated unpaved roadways or parking areas. Clods, clumps, or visible deposits of soil or other material that could readily become visible fugitive emissions will be promptly removed from paved or treated unpaved roadways/parking areas. Appropriate dust control mechanisms will be applied to reasonably minimize the generation of visible dust that may result from the removal process.

The number or type of dust suppression equipment in operation will not preclude stopping work if there is visible dust or excessive visible dust. Visible dust indicates a need to increase the level of dust control effort. Increasing levels of visible dust indicate a need to increase the level of dust control effort, including possible alteration, slowdown, or temporary suspension of the work activities generating the visible dust. The work activities observed to be generating the visible dust will be temporarily suspended if the visible dust exceeds the site-specific limit or Ohio standard [see "Fugitive Dust Control Requirements" (RM-0047; DOE 1997g)]. 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 FDF 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.

The contractor will develop a Dust Control Plan, as part of the Safe Work Plan, which will specify:

- A narrative description of 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

- A listing of methods to be used to suppress dust, and the associated frequency that routine dust suppression is to take place
- By method, the materials to be used to suppress dust — e.g., water, dust suppression agents, etc.
- By method, the specific types and quantities of equipment to be used to suppress dust
- A description of the notification process, including designation of personnel, that the contractor intends for SCEP personnel to utilize during non-work periods to notify the contractor of an "off-hours dust alert."

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

4.2.2.2 Monitoring

Project personnel will tour the areas of remediation activities 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 progressively implement corrective measures.

Additionally, visual monitoring will be conducted in accordance with 40 CFR Part 60, Appendix A, Method 22, "Visual Determination of Fugitive Emissions from Material Sources and Smoke Emission from Flares." Furthermore, visual determination of opacity will be conducted on "project field activities" and "material handling/vehicle traffic on storage piles" [identified in the table in "Fugitive Dust Control Requirements" (RM-0047)], 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).

Field managers will be responsible for documenting visible emission monitoring records in the field, in accordance with the record keeping guidelines defined in Section 6.7, as well as for initiating fugitive dust abatement measures. Records of the following information for each work day (including off-hours dust-alert response, except as noted below) will be maintained for the A1PII soil remediation project:

- The date, weather conditions, and scheduled work activities (e.g., excavation, trenching, hauling, placement, compaction, loading, etc.)

- Records of opacity readings (if any) conducted that day 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]

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- Time of dust-alert notification given to the contractor, names of the individuals involved (SCEP 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 by area (or segment) to which applied

- Application rate of water or other dust suppression agents — at a minimum, tank truck load capacity and number of tankloads applied per area (or segment) to which applied

- Identification of the party(ies) responsible for the dust control activity by area (or segment) — at a minimum, name of the contractor.

4.2.3 Airborne Radiological Particulate

4.2.3.1 Control Mechanisms

All airborne radiological particulate emissions associated with A1PII soil remediation activities are anticipated to be from fugitive emissions. Control mechanisms for fugitive emissions are presented in Section 4.2.2.1. No airborne radiological particulate control mechanisms, beyond those provided by fugitive emission control, are anticipated for environmental or public safety concerns as a result of A1PII soil remediation activities.

4.2.3.2 Monitoring

Airborne radiological particulate emissions associated with A1PII soil remediation activities will be monitored via the sitewide airborne radiological particulate monitoring program presented in Section 6.0 of the IEMP. The monitoring network encompasses all the current and expected diffuse and point sources at the FEMP. The data collected under the sitewide airborne radiological particulate monitoring program will be used to assess the collective effect of concurrent remediation activities at the FEMP site under various regulatory drivers described in Section 6.0 of the IEMP.

No supplement or modification to the sitewide airborne radiological particulate monitoring program is anticipated to be required as a result of A1PII soil remediation activities. Monitoring stations already

exist downwind (under the prevailing wind) from A1PII, and the monitoring frequency and analyses addressed by the program adequately address the COCs in the A1PII remediation area. No airborne radiological particulate monitoring stations need relocation to facilitate A1PII soil remediation activities.

4.2.4 Radon

4.2.4.1 Control Mechanisms

Emission of radon from soil being remediated under the A1PII soil remediation project is not anticipated to be an environmental or public safety concern. Hence, no project-specific radon control mechanisms are anticipated for A1PII soil remediation activities.

4.2.4.2 Monitoring

Any potential radon emissions associated with A1PII soil remediation activities will be monitored via the sitewide radon monitoring program presented in Section 6.0 of the IEMP. No supplement or modification to that sitewide radon monitoring program is anticipated for A1PII soil remediation activities. No radon monitoring stations need relocation for A1PII soil remediation activities.

4.2.5 Direct Radiation

4.2.5.1 Control Mechanisms

No project-specific direct radiation control mechanisms beyond that provided by fugitive emissions control are anticipated to be required for environmental or public safety concerns for A1PII soil remediation activities.

4.2.5.2 Monitoring

Environmental radiation levels associated with A1PII soil remediation activities will be monitored via the sitewide environmental direct radiation monitoring program presented in Section 6.0 of the IEMP. No supplement or modification to that sitewide environmental direct radiation monitoring program is anticipated for A1PII soil remediation activities. No environmental direct radiation monitoring stations need relocation for A1PII soil remediation activities.

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4.3 SURFACE WATER PATHWAY

4.3.1 Control Mechanisms

As a condition of its NPDES permit (Ohio EPA Permit No. 1IO00004*ED), 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 these types of discharges. The SWPPP also contains provisions on the inspection programs which are being implemented to ensure that discharges of storm water associated with construction and industrial activities comply with the requirements of the FEMP NPDES permit and of the SWPPP.

A1PII is located outside the "storm water runoff controlled" Former Production Area drainage basin. The A1PII area currently drains to NPDES-permitted storm water outfall *4003. Outside the FEMP's Former Production Area drainage basin, storm water from construction activity is regulated as an industrial activity (if a certain magnitude of earth-moving activities is involved). A1PII soil remediation activities are a subset of construction activities. In accordance with both the SWPPP (under the FEMP's NPDES permit) and the SEP, erosion and sediment controls will be installed where appropriate to protect downgradient areas. These controls have been designed in accordance with A1PII's Surface Water Management Plan (Appendix C), and will be installed in accordance with the technical specifications and the contractor's Surface Water Management and Erosion and Sediment Control Plan to manage surface water run-on and runoff, minimize erosion, and control sedimentation in on-site surface waters such as Paddys Run.

Clearing and grading activities conducted in support of A1PII soil remediation will result in the generation of small quantities of downed trees and brush. The majority of such material will be encountered during the site preparation phase of A1PII soil remediation activities. As discussed in Section 3.1.1.3, that material will be handled by chipping (or shredding) and stockpiling in the Area 2 Phase I wood chip pile located near the meteorological data tower for potential use during remediation or as mulch during future site restoration activities. During the excavation phase of A1PII soil remediation activities, any stumps and roots remaining from site preparation phase activities will be managed by grinding them in place, then removing them with the soil during excavation. Such management of chipped material is in accordance with Section 5.1.3 of the SEP.

Collection and management of perched water and storm water will be required in the STP excavation area. Because of the potential contaminants within the STP area, water collected in the STP excavation area will be transferred to either the AWWT Phase I or Phase II facility, as necessary, for additional treatment. Refer to Section 3.4.4 for further details.

The FEMP drainage area map (Figure 2-1 of the SWPPP) has been revised to show changes in the drainage areas flowing to NPDES-permitted storm water outfall *4003 that result from A1PII soil remediation activities. Revisions to the descriptions of the watershed basins currently provided in Section 4.0 of the SWPPP will be provided with the annual SWPPP update, along with a FEMP drainage area map (updated for changes from subsequent projects).

It is anticipated that the surface water management and sediment/erosion control mechanisms for A1PII will remain largely in place until remediation of the area has been completed; however, they will be dismantled or reconfigured by task during A1PII interim grading and final restoration grading. To the extent practical, surface water runoff from the area being worked will be conveyed via pumping or other appropriate mechanism to the adjacent area where the conveyance system is still intact. In accordance with the SWPPP and the SEP, once the A1PII area is certified clean, the pumps will be taken out of the basins and flow diverted to Paddys Run.

4.3.2 Inspection

Construction activity inspections mandated by the SWPPP will be conducted in the A1PII remediation area. Under the FEMP's construction activity inspection program, weekly inspections will be conducted within all site construction areas and after any precipitation events totaling 0.5 inch or more within a 24-hour period. Construction activity inspections are documented and maintained as part of the NPDES and SWPPP files at the facility.

Industrial activity inspections might also be conducted in the A1PII remediation area, if required under the SWPPP. The industrial activity inspection program covers both areas within and outside the former production area drainage basin. However, industrial activity inspections are not typically conducted in areas subject to the more frequent construction activity inspections. Under the FEMP's industrial activity inspection program, inspections are conducted in areas draining to the site's controlled storm sewer system (former production area drainage basin) and the uncontrolled watershed basins draining

through NPDES permitted storm water outfalls *4003 through *4006. Industrial activity inspections are documented and maintained as part of the NPDES and SWPPP files at the facility. 2042

Inspections conducted in the A1PII areas will ensure that:

- Erosion and sedimentation controls required under the contractor's Surface Water Management and Erosion and Sediment Control Plan 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 siltation to Paddys Run or other off-property waterways is not occurring as a result of construction activities initiated under the A1PII soil remediation activities.

As previously described, the A1PII surface water management system captures all potentially contaminated surface water and directs it to either sediment traps, sediment basins, or the AWWT facility for additional treatment. Potentially contaminated storm water in the STP influent and effluent pipeline trenches and potentially contaminated perched water or storm water from the STP excavation will be collected, tested, and treated (including pre-treatment) as necessary at the AWWT Phase II facility or at the AWWT Phase I facility, before discharge to the receiving surface water. (See Sections 3.3.2.7 and 3.4.4 for additional discussion of the Remediation-Generated Water Transfer System and STP Area perched and storm water management.) Discharge from the AWWT is monitored at NPDES permitted outfall *4001 under the IEMP-conducted NPDES permit monitoring. Discharges of surface water runoff from the A1PII drainage areas will flow to NPDES-permitted storm water outfall *4003 after initial sedimentation treatment at the sediment basins. Discharges at outfall *4003 are also monitored under the IEMP-conducted NPDES permit monitoring. Additional IEMP-conducted surface water monitoring occurs at SWD-02 prior to outfall *4003 (see Figure 4-9 of the IEMP).

The SEP discusses potential project-specific storm water monitoring programs for soil remediation areas located outside the storm water runoff controlled 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 (GMA).

As previously described, the A1PII surface water management system captures all potentially contaminated A1PII storm water runoff. Potentially contaminated A1PII storm water receives sedimentation treatment at sediment basins before discharge to the receiving surface water. Discharges of surface water runoff from the A1PII drainage areas are monitored under the IEMP-conducted surface water monitoring program at SWD-02, and discharges at NPDES-permitted storm water outfall *4003 are also monitored under the IEMP-conducted NPDES permit monitoring. Because the objectives of the SEP-contemplated storm water monitoring are met through other existing means no project-specific storm water monitoring program will be implemented for the A1PII soil remediation project.

4.4 GROUNDWATER PATHWAY

The GMA is an extensive aquifer located, in part, beneath the entire FEMP (including the A1PII area). GMA groundwater in the A1PII area flows roughly to the east at a hydraulic gradient of approximately 0.0008. As determined during the OU5 RI, the principal COC for the GMA is total uranium. The GMA FRL for total uranium is 20 μg/L, as established by the OU5 ROD (DOE 1996b). The OU5 ROD also established GMA FRLs for 49 other COCs. In the A1PII area, GMA concentrations of total uranium are all below the FRL. Thus, the GMA beneath the A1PII area is not targeted for remediation of an uranium plume. A few isolated detections of cadmium, lead, and zinc above their respective FRLs have been detected in the GMA beneath the A1PII area. These constituents are currently being monitored under the IEMP to determine if that situation is persistent. Additional information on the GMA in the A1PII area can be found in the OU5 RI Report (DOE 1995b).

4.4.1 Control Mechanisms

Consistent with the SEP's strategic approach, the following paragraphs present the actual control mechanisms to be employed by the A1PII soil remediation project to protect the groundwater pathway. During remediation of A1PII, excavations are not anticipated to extend into the unsaturated sands and gravels of the GMA. Measures will be implemented to protect the GMA during construction of surface water control facilities and excavation of impacted materials. These measures will include

minimization of run-on to exposed surfaces during excavation and the control and treatment of potentially contaminated surface waters during A1PII remedial activities. Run-on and runoff controls are discussed in Section 3.0 by sector.

4.4.2 Monitoring

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. Sitewide monitoring of groundwater will continue under the IEMP during A1PII soil remediation activities.

Twenty two (22) existing monitoring wells were selected from the IEMP's RCRA property boundary monitoring program to monitor groundwater in the vicinity of the A1PII area in 1997 and 1998 (Table 4-1, Figure 2-7). These existing monitoring wells are located along the perimeter of A1PII; all but two (2070 and 3070) are located along the eastern perimeter of A1PII. Three (3) additional wells in the A1PII soil remediation area are included in the IEMP's routine water-level monitoring program. Considering the spatial distribution of these existing wells and the dispersion of groundwater due to the groundwater gradient, the well configuration as it remains after preceding well abandonment activities will be adequate to identify (screen for) potential impacts to the regional aquifer during, or as a result of, A1PII remediation activities. The following paragraphs provide an overview of the IEMP's groundwater monitoring program for these wells. Sampling and analysis will be conducted according to IEMP requirements.

Groundwater monitoring will focus on the FRL constituents that have had an FRL exceedance in the GMA. Quarterly sampling will occur so that seasonal concentration changes can be monitored. To document GMA baseline conditions for the A1PII soil remediation project, the GMA will be sampled prior to A1PII site preparation excavation activities. Samples will be analyzed for the IEMP-designated constituents (see Table 4-2). Under the IEMP, all 50 GMA FRL constituents will be analyzed at a five year frequency regardless of whether an FRL exceedance has been detected.

Data from this monitoring effort will be used to assess the impact of A1PII soil remediation activities on the GMA and will be reported in the IEMP reports. During implementation of A1PII soil remediation activities, the data will be evaluated in conjunction with Aquifer Restoration and

Wastewater Project personnel to spot a trend or change in trend that could indicate a potential adverse impact to groundwater quality within the GMA. The data will be carefully scrutinized in an effort to determine whether the soil remediation activities are adversely affecting the GMA groundwater (e.g., vertical migration through the glacial overburden as a result of surface water infiltration), or whether other conditions (e.g., migration of existing plume, groundwater remediation activities) are the likely impacting factors. In the event that data indicate a potential adverse impact, an appropriate future course of action will be evaluated and implemented, considering the following:

- Is this area of the GMA already planned for groundwater remediation? If not, should it be remediated (in accordance with the criteria in the OU5 ROD, DOE 1996b)?
- If the answer to either of the above is yes: Is GMA groundwater remediation of this area already ongoing? If not, should GMA groundwater remediation for the area be re-prioritized?
- What modifications to the A1PII soil remediation project, if any, can be retrofitted to mitigate the situation?
- What modifications to approach can be implemented in subsequent soil remediation projects to further minimize potential adverse impacts to the GMA from soil remediation activities?

TABLE 4-1

GROUNDWATER MONITORING WELLS FOR REMEDIATION AREA 1 PHASE II

Count	Well ID	IEMP Groundwater Monitoring Program [A]	
		RCRA Property Boundary [B]	Groundwater Elevation [C]
1	2051	✓	✓
2	31217	✓	✓
3	41217	✓	
4	2426	✓	✓
5	3426	✓	✓
6	4426	✓	
7	2417	✓	✓
8	3417	✓	✓
9	2429	✓	✓
10	3429	✓	✓
11	2430	✓	✓
12	3067	✓	✓
13	4067	✓	
14	2431	✓	✓
15	3431	✓	✓
16	2432	✓	✓
17	3432	✓	✓
18	4432	✓	
19	2733	✓	✓
20	3733	✓	✓
21	2070	✓	✓
22	3070	✓	✓
23	2400		✓
24	2421		✓
25	3421		✓

NOTES:

(A) Source: Integrated Environmental Monitoring Plan (IEMP), Section 3.0, Groundwater Monitoring Program. Presentation sequence is north to south, and shallow to deep.

(B) Source: IEMP Section 3.5.2.2, RCRA Property Boundary Monitoring

(C) Source: IEMP Section 3.5.1.6, Routine Water-Level Monitoring Program

TABLE 4-2

LIST OF CONSTITUENTS WHICH WILL BE ANALYZED QUARTERLY IN THE RCRA BOUNDARY MONITORING WELLS

General Chemistry	Inorganic	Radionuclide	Organic
Fluoride	Antimony	Neptunium-237	Benzene
Nitrate/Nitrite	Arsenic	Strontium-90	Carbon Disulfide
	Beryllium	Technetium-99	Trichloroethene
	Boron	Thorium-228	
	Cadmium	Thorium-232	
	Total Chromium	Total Uranium	
	Cobalt		
	Lead		
	Manganese		
	Mercury		
	Molybdenum		
	Nickel		
	Selenium		
	Silver		
	Vanadium		
	Zinc		

Source: IEMP, Section 3.5.2.2, RCRA Property Boundary Monitoring

5.0 PROJECT SPECIFIC HEALTH AND SAFETY 2042

All FEMP employees, visitors, vendors, and contractors are required to abide by the provisions of the applicable project-specific Environmental Safety and Health and Training Requirements Matrix (ESH&TRM), Project-Specific Health and Safety Plans (PSHSPs), site Work Permits, and the contractor's Safe Work Plan, which is prepared by the contractor and approved by SCEP management. SCEP managers and supervisors are responsible for ensuring compliance with ESH & TRM and/or PSHSP requirements. All personnel have stop-work authority for imminent safety hazards resulting from noncompliance with the applicable health and safety practices.

All contractor activities conducted in support of A1PII remediation are governed by the safety requirements specified in the remediation contract, which addresses environmental, occupational, industrial, and construction health and safety. In addition to the contract requirements, ESH&TRMs, PSHSPs, permits, and the requirements of this document, the contractor will comply with all federal, state, and local requirements (e.g. OSHA). Health and safety requirements and procedures for this Implementation Plan will be governed by the A1PII PSHSP, site Work Permits, the contractor Safe Work Plan and the overall strategy discussed in the SEP (Section 6.0).

A project-specific occupational monitoring strategy will be developed by the FEMP Safety and Health organization for the A1PII project. The contractor will incorporate their occupational exposure monitoring requirements into their Safe Work Plan. These strategies will address the contaminants of concern for the A1PII project area and will comply with all federal, state, and local requirements (e.g. OSHA, ACGIH).

In accordance with the procedure, "Developing Project-Specific Health and Safety Plans," FEMP-SH-0001, or equivalent procedure, a PSHSP will be developed for A1PII construction, excavation, and impacted material placement activities.

The applicable ESH&TRMs will be included in the contract information bid package (IFB)/request for proposal (RFP) solicitation package and will provide the contractor with information related to the

possible hazards and the safety requirements to execute each task from which the contractor can develop their specific Safe Work Plan. Section 6.0 of the SEP is being revised to include the ESH&TRM and to clarify that it will be included in the IFB/RFP package rather than the IRDP. These changes are necessary to comply with the latest revision (July 28, 1997) of FEMP-SH-0001.

The PSHSP may be revised after reviewing the contractor's Safe Work Plan, as tasks and/or associated hazards and mitigators are identified, added, or deleted. Upon specific request by the EPA, DOE would submit the PSHSP(s) for informational purposes only. The PSHSP(s), as well as the detailed Work Plans, will be maintained at the project site, with controlled copies in the project document control files.

A site occupational health and safety representative is assigned to the design team and will review all project design documents to ensure compliance with all applicable worker safety and health regulations. FDF will provide all radiological occupational monitoring for the contractor. RCTs will provide support for A1PII activities. The contractual radiological work requirements for A1PII 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. Survey results will be forwarded from FDF to the contractor.

6.0 REMEDIAL ACTION MANAGEMENT STRATEGY

This section describes the A1PII organizational structure, contractor selection process, impacted material management, contingency management protocols, data and records management procedures, the QA/QC process, integration of A1PII activities with other FEMP activities, and the activity schedule.

6.1 ORGANIZATION AND RESPONSIBILITIES

A1PII organizational charts are provided in Figures 6-1 and 6-2. The currently applicable names of specific FEMP organizations are used for convenience in this plan; they are intended to also denote functionally equivalent organizations that may result from future organizational changes.

6.1.1 DOE and Regulatory Agencies

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

The DOE Fernald Area Office (DOE-FEMP) Remedial Action Project Manager is responsible for ensuring that FEMP remedial actions meet all project goals, standards, specifications, and requirements. The DOE OU5 Team Leader provides DOE-FEMP programmatic direction for A1PII remediation.

The DOE-FEMP Facility Representative will conduct field oversight of the project through Technical Leads, who 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 Project Manager, as appropriate, to seek prompt resolution of any issues or problems.

6.1.2 A1PII General Organization and Responsibilities

The Fluor Daniel Fernald (FDF) Soil Characterization and Excavation Project (SCEP) is responsible for overall project management and technical guidance to the A1PII Project Team, who will execute the

A1PII project under the direction of the A1PII Area Project Manager (APM). The SCEP and the FDF Soil and Water Projects Division will provide programmatic management and support. The general A1PII project organization, shown in Figure 6-2, includes the following individuals/groups:

- Project Management
  - SCEP Project Director
  - APM
  - Project Engineer
  - Construction Manager
  - Project Support and Administration
  - Project Controls
- Primary Technical Areas
  - Engineering
  - Characterization
  - Construction
  - Functional Support

The roles and responsibilities for these individuals and groups within SCEP are summarized in following subsections; additional roles and responsibilities are defined in FEMP procedures.

6.1.3 Project Management

6.1.3.1 SCEP Project Director

The SCEP Project Director reports directly to the Vice President of the Soil and Water Projects Division. The Project Director provides guidance and a point of interface for all APMs and serves as the SCEP program and administrative point of contact with DOE and the regulatory agencies.

6.1.3.2 A1PII Area Project Manager

The APM has overall responsibility for completing A1PII remediation within budget and schedule parameters. Specific APM responsibilities include:

- Providing administrative and technical direction
- Securing project staff through SCEP
- Ensuring that coordination is established and maintained with FEMP projects and organizations not functionally represented on the project team
- Scheduling and internal and external coordination

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- Serving as project technical contact with DOE and the regulatory agencies
- Monitoring performance (scope, schedule, and budget)
- Ensuring that POC milestones are completed.

6.1.3.3 Project Engineer and Construction Manager

The Project Engineer and Construction Manager (CM) serve as lead technical managers during the design and construction phases, respectively. Specific responsibilities include:

- Providing technical direction and coordination of Technical Leads and SCEP functional support personnel
- Coordinating with FEMP projects and organizations not functionally represented on the project team to ensure attainment of A1PII and FEMP sitewide remediation goals
- Serving as an alternate project technical contact with DOE.
- Managing and coordinating all engineering, design (Engineering Lead) and construction (CM) issues as described in Sections 6.1.4.1 and 6.1.4.3.

6.1.3.4 Project Support and Administration

Project Support and Administration coordinates and produces all A1PII documents. Specific responsibilities include:

- Interfacing with Engineering/Construction Document Control (ECDC)
- Managing project document reviews, including the review/comment/response process
- Providing clerical support personnel to the project as needed
- Coordinating space and computer access
- Procuring office equipment and supplies.

6.1.3.5 Project Controls

The Project Controls group provides the APM with cost and schedule information for all 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 and maintaining cost, schedule, and technical baselines through the issuance of change proposals

- Collecting monthly status reports to evaluate current trends which would result in forecast variances from the established baselines

- Assisting Control Account Managers (CAMs) and other project personnel in the various administrative duties associated with establishing the baselines and forecasts, as well as ensuring that all 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 division and site commitment trackers to ensure that all project commitments are entered into the tracking systems and that responsible personnel are kept informed of commitment requirements

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

6.1.4 Primary Technical Areas

The primary technical areas for A1PII are Engineering, Characterization, Construction, and Functional Support. Engineering and Construction will be supported by contractors.

6.1.4.1 Engineering

Engineering will be the lead project technical organization from the planning phase through construction (Title I/II, III). The Project Engineer, as Engineering Lead, will manage all engineering and design issues. The Project Engineer will report to the APM and will be assisted by other staff engineers and an Architect/Engineer (A/E) contractor. Specific engineering responsibilities include:

- Developing the engineering design for the IRDP and supporting engineering documentation with assistance from the A/E

- Providing technical direction and oversight of the A/E

- Reviewing and modifying the design A/E designs and engineering services

- Reviewing and approving all engineering documents

- Coordinating daily A1PII activities with other FEMP remediation projects and support organizations

- Determining the need for predesign investigations and developing engineering requirements and specifications for characterization investigations

- Reviewing and approving as-built drawings supplied by the Construction Contractor at the completion of field work

- Reviewing and approving Design Change Notices (DCNs), Vendor Data Submittals (VDSs), and Requests for Clarification of Information (RCIs)

- Verifying that all contractual work has been performed.

6.1.4.2 Characterization

Characterization is responsible for development, analysis, and communication of data and information regarding physical conditions and nature and extent of contamination in A1PII as needed for remedial design, construction, precertification, and certification. This is directed by the A1PII Characterization Lead, who reports to the A1PII Project Manager. Specific responsibilities include:

- Establishing and maintaining coordination with FDF Soil & Water Projects support organizations, including the Analytical Laboratory and Sample and Data Management, as necessary to accomplish their mission

- Preparing project-specific plans (PSPs) for field investigations related to predesign, discovery of unanticipated impacted materials during construction, WAC attainment testing, precertification testing, and FRL certification as needed by the project and in accordance with specifications provided by Engineering

- Preparing Certification Design Letters

- Coordinating and overseeing field sampling and laboratory analysis activities being conducted in accordance with PSPs and Certification Design Letters

- Managing and analyzing characterization data, including modeling, to determine extent of contamination and impacted material excavation limits

- Documenting current and prior characterization investigations and modeling studies in technical reports as required.

For clarification, environmental monitoring sampling is covered under the IEMP (DOE 1997d) and will be performed by Environmental Monitoring personnel.

6.1.4.3 Construction

Construction, under the direction of the CM, will be the lead organization during remedial action implementation. The CM will have a Construction Coordinator, a Construction Field Engineer, a

Construction Contracts Manager to manage all excavation/remediation activities. Specific responsibilities include:

- Providing input and constructability reviews during design
- Assisting in the development/evaluation of construction cost estimates and bid packages
- Evaluating bids
- Managing the construction contractor during daily remedial activities
- Coordinating daily work activities in the field
- Providing direction to the construction contractor within the scope of the contract
- Providing contract administration
- Managing excavation/remediation
- Reviewing and approving any modifications or changes to the contract documents
- Providing final approval authority for construction contractor submittals
- Integrating field activities with Characterization, Engineering, and Functional Support personnel.

The construction contractor provides remedial action/construction services during the site preparation and excavation phases. The contractor is represented on-site by qualified field representatives authorized to act on behalf of the contractor.

The contractor will be qualified, as required by the contracts, to perform all aspects of work required to successfully prepare the site and/or excavate the A1PII area. The contractor will be registered/permitted in accordance with applicable local, state, and federal requirements and will demonstrate significant prior related experience.

The contractor reports contractually to the A1PII CM, coordinating daily work activities with, and taking technical direction from, the CM within the contract scope. The contractor is responsible for all equipment, materials, and activities relating to the project. The contractor is also responsible for scheduling and coordinating work with subcontractors to complete the project within the schedule approved by the FDF CM. The contractor will provide an experienced supervisory representative

during all A1PII construction activities. The contractor is responsible for preparing and submitting as-built drawings and specifications, updated as needed, and a copy of documentation generated during A1PII remediation activities where specified by the contract. 2042

The construction contractor field representatives shall be qualified individuals who are capable of supervising A1PII construction activities. They are responsible for coordinating and supervising the contractor's work in A1PII. The contractors' field representatives responsibilities include:

- Performing construction/remediation activities as specified in plans, drawings and specifications
- Reviewing and interpreting all elements of the A1PII design and informing the CM of any discrepancies among plans, specifications and field conditions
- Obtaining CM-approved changes or modifications to project specifications and construction drawings
- Distributing all documentation required by the project specifications in a timely manner
- Attending all project coordination meetings
- Scheduling all phases of the applicable A1PII activities
- Maintaining a daily log of all A1PII activities and assisting the CM in reviewing and approving submittals, as necessary
- Implementing and verifying all QC procedures required of the contractor and/or lower-tier subcontractors
- Obtaining CM approval before acquisition and use of alternative materials or methods
- Coordinating all technical requirements with the CM.

6.1.4.4 SCEP Functional Support

SCEP functional areas will support remediation under the guidance of the lead organization and/or the APM. Generally, the each group's technical lead will manage the functional support staff.

Health and Safety - Support will include:

- Preparing all health and safety documents for the project (including a Safety Assessment and ESH&TRMs)
- Reviewing project documents as they are prepared for compliance with health and safety requirements
- Providing health and safety technical support during the remedial action
- Overseeing implementation of the A1PII PSHSP
- Overseeing contractor adherence to safe work practices and provisions of their Safe Work Plan.

The health and safety representative will have stop-work authority if unsafe work practices go uncorrected. Any FEMP employee or subcontractor can stop work if they believe that the work situation is unsafe.

Radiological Control - Support will include:

- Preparing all required radiological control documents for the project (including radiological ALARA)
- Reviewing project documents as they are prepared for compliance with radiological requirements
- Providing technical assistance during the remedial action
- Overseeing adherence to radiological control requirements during the remedial action.

Environmental Compliance (EC) - Support will include:

- Preparing all required EC documents for the project, including the ARARs crosswalk, and environmental ALARA
- Reviewing project documents as they are prepared for EC requirements
- Regulatory coordination, both internal and with the regulatory agencies

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- Providing support during the remedial action
- Providing oversight to ensure compliance with environmental requirements during remedial action, including erosion and sediment control inspection required by the SWPPP, evaluating wastewater discharges, and periodic visible emission evaluations for controlling fugitive dust.

Quality Assurance - Support responsibilities will include:

- Developing and implementing QA plans for the project
- Monitoring the project to ensure compliance with FEMP procedures.

QA for A1PII will be performed in accordance with quality program elements identified in the FEMP QA Program, RM-0012. The QA representative has stop-work authority if quality concerns go unresolved.

Waste Disposition - Support will be provided by a SCEP/WDSS representative and will include:

- Preparing Project Waste Identification and Disposition (PWID) forms
- Defining Material Tracking Locations (MTLs)
- Providing technical direction and oversight for waste stream segregation and management
- Preparing Field Tracking Logs (FTLs), OSDF Manifests, and waste stream profiles
- Coordinating with SCEP Construction, SCEP Characterization and Waste Management and Technologies for handling and disposition of waste streams.

All waste management disposition activities will be performed in accordance with the Waste Management Plan for SCEP (DOE 1997r).

Natural and Cultural Resources - Support will include:

- Assessing the natural resources within the project area and assessing potential damages for consideration during the design and planning stages of the project
- Planning and implementing A1PII final restoration as described in the NRRP (DOE 1997e)
- Handling unexpected discoveries of cultural resources during A1PII site preparation and excavation.

6.2 CONFIGURATION MANAGEMENT

Configuration management includes identifying, grading, tracking, and controlling the A1PII project technical baselines in accordance with site procedure CM-0001, "Configuration Management," or equivalent procedure, to ensure consistency among design requirements, physical configuration and technical operations throughout the design, construction and operation stages. Configuration management also ensures the systematic evaluation, coordination, disposition, documentation, implementation, and verification of all changes, and their impact on cost, schedule, and other project technical baselines.

In accordance with site procedure ED-12-4015, "Performance Grading," this project has been assigned Performance Grade 5 based on the importance of hazard mitigation and safety.

6.3 CONTRACTOR PROCUREMENT AND AWARD STRATEGY

Procurement and contract awards for all A1PII activities will generally be performed through fixed price/fixed unit price contracts. The FEMP acquisition system follows Federal Acquisition Requirements (FARs) and is designed to ensure adequate and effective competition among prospective bidders/proposers. The procurement process, which is in accordance with Appendix F of the SEP, is summarized below.

6.3.1 Bid Solicitation Process

A1PII construction contractors will be solicited competitively through Invitations for Bids (IFBs) or Requests for Proposal (RFPs). The IFB/RFP solicitation package is prepared during the design process by the FEMP Construction Engineer with input from Engineering, Health and Safety, QA/QC, Procurement, and other applicable disciplines. The IFB/RFP solicitation package is made up of several parts, including technical specifications and construction drawings, ESH&TRMs, QA/QC requirements, and the statement of work. Development of a clear and complete IFB/RFP solicitation package will be emphasized to avoid protests, minimize change orders, and establish the framework for compliance with construction quality acceptance and health and safety requirements, and ARARs compliance throughout the A1PII project. Sealed bids/proposals will have to be submitted by potential contractors at or before a specified place, date and time.

During the pre-award survey, contractors meeting the minimum qualifications will be identified for further evaluation. When a bidder/proposer is found to be both responsive and responsible, the FEMP Contract Administrator will make a recommendation and contract award. The IFB/RFP solicitation package dictates how many days after award or Notice to Proceed that contractor performance period begins and ends.

As the lead agency responsible for CERCLA activities at the FEMP, DOE retains final approval authority for any procurement action which exceeds established dollar limits for each type of procurement action. Any A1PII actions over the established limits must be approved by the DOE Contracting Officer prior to award.

6.3.2 Equipment and Material Procurement

The majority of the standard support equipment and materials for the A1PII project will be procured by the contractor performing the remediation during the site preparation phase. Procurement of equipment and material will be in accordance with design specification requirements consistent with the submittal schedule included in the contract, pending approval. Vendor data will be submitted by the contractor for applicable project team management (contractor's field representative, CM) review to ensure design and specification requirements are met. Responsibility for maintenance and repair of procured equipment and material lies with the contractor until final acceptance and turnover.

6.4 CONTRACTOR MANAGEMENT

FDF will directly oversee the contractor performing remediation work and 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 FDF CM will ensure that safety concerns are brought to the attention of the FDF Health and Safety Officer and the responsible contractor who will correct these concerns. FDF is responsible for implementing the A1PII remedial action project in accordance with DOE direction.

6.4.1 Status Meetings

Upon contract award, the FDF CM will conduct regularly scheduled status meetings with the APM, Engineering, Health and Safety, and QA; construction contractor field representative; and others a

warranted. The meetings will address action item status, project progress, planning, schedule status, safety items, quality, environmental protection, and problem resolution.

The construction contractor will be required to submit a daily report (or log) to the CM, covering the previous day's work status and identifying any safety or quality problems encountered. This report and the CM's daily report will be maintained in the FDF project file.

6.4.2 Surveillance and Inspection

The contractor has first line responsibility to inspect work and correct any deficiencies. FDF and the contractor field representative will conduct inspections and surveillances to ensure the design is being properly implemented and contract requirements are being satisfied. QC inspection will be in accordance with the Construction QA Plan and design requirements. If a deficiency is noted, the contractor will be notified immediately in order to implement the necessary corrective action(s) as soon as possible. Failure of the contractor to satisfactorily correct a deficiency will constitute cause to either issue a cure order/notice or to stop work.

6.4.3 Health and Safety Oversight

A Health and Safety representative will be assigned to the A1PII project. While all personnel are responsible for following all safety requirements identified in the project-specific ESH&TRM and the subsequent contractor's detailed Safe Work Plans, as appropriate, the A1PII Project Team personnel will perform periodic surveillance during the A1PII remedial action project to monitor compliance. Although all project personnel have stop work authority for imminent safety hazards, the Health and Safety representative will have stop-work authority (in the event of threat to worker and/or public safety) until the proper corrective follow-up actions are taken. The Health and Safety representative assigned to the field project will be the single point of contact for all safety, industrial hygiene, fire protection, and radiological issues or concerns, and will direct those concerns to the CM for resolution/implementation.

6.4.4 Radiological Monitoring and Oversight

To ensure occupational radiological compliance, FDF Radiological Control Technicians (RCTs) will be assigned to the A1PII project. The assigned RCTs will perform the necessary radiological monitoring and oversight to provide documentation demonstrating project compliance with regulatory occupational

exposure control requirements. The project-specific ESH&TRM will be the basis for the required project occupational radiological monitoring and will identify action levels to ensure personnel radiological safety, as well as industrial/occupational safety, by limiting exposure.

6.5 IMPACTED MATERIAL MANAGEMENT

Impacted materials generated during A1PII remediation will be managed under the FEMP Waste Disposition Program, which is implemented as an integrated effort by SCEP waste disposition, waste programs, construction, and waste acceptance organizations. Roles and responsibilities for each of these organizations are established in Procedure EW-1019, "Management of At- and Below-Grade Impacted Material." Programmatic controls begin with waste planning during the pre-design phase, at which time a volume estimate for each waste type (physical matrix combination) 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 On-site Disposal Facility (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 WACs
- 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 System (IIMS) database. Anticipated impacted material segregation protocols are listed in Table 6-1. Relationships between IIMS and other site databases are illustrated in 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 Site-wide Environmental Database (SED) through a grid system to retain connections to historical RI/FS and newly generated data when excavated material is moved from the source location. It also interfaces with the Site-wide 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 Field Tracking Logs (FTLs) and OSDF Manifests, with information subsequently entered to IIMS. Key data elements that are recorded on these forms are listed below:

- Project number and name
- Source Material Tracking Location (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 FEMP Operating Record.

MTLs are defined electronically in IIMS using a grid system. Prior to project start-up, SED data is 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 soils 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 (5) 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 & vegetation)
Profile # 95,000	OSDF Category 5	Friable asbestos-containing material, sludges, materials requiring case-by-case approval

Numeric extensions (e.g., 91,001...95,999) are used for further waste stream delineation on an 2042 needed basis. The second digit of the profile number identifies the OSDF Category of the waste material. The waste profile number facilitates electronic information retrieval from IIMS. It also supplementary information such as material descriptions and data group identifiers for characterization data maintained in impacted waste stream characterization records and the SED.

All wastes manifested to the OSDF will be covered under a waste stream profile. The manifest number facilitates retrieval of electronic characterization information from IIMS, if required, to support a determination that the waste meets WAC.

6.6 CONTINGENCY MANAGEMENT

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

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

6.6.1 Materials Which Require Special Handling

Plans for managing special materials encountered during A1PII remediation are addressed in Section 3.3. Such materials include asbestos-containing materials (e.g., asbestos-impregnated bituminous wrapped gas pipeline, transite conduit, if any, for the electrical cable to the DO Facility Transformer) which are reasonably expected to be encountered. Special materials may also be encountered that are of a type or in a location that has not been anticipated and specifically addressed elsewhere in this plan. Protocols for handling such materials are described in Table 3-1. These protocols, together with those outlined in Appendix F of the SEP, will be used for the management of unanticipated materials in the identified categories.

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

6.6.2 Unexpected Contamination or Soil Conditions

A1PII excavations could progress to a point where continued work would cause the remedial action to differ from the design, such as:

- Excavating outside an area of feasible storm water control, as needed
- Encountering soil types or excavation depths that are not within design parameters
- Discovering contamination in an area that impacts present or planned future land use.

In accordance with the SEP, the FEMP design change process would be used to effect design changes in cases where conditions and design changes do not differ significantly from those already acknowledged and approved for the project. If conditions are significantly different from the approved design, one of the following options would be exercised:

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

Conditions recognized as falling in this contingency category and plans for managing these conditions are listed in Table 6-2.

6.6.3 Unexpected Discovery of Cultural or Historic Resources

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

is required to be on-site within four hours. DOE will consult with the appropriate parties (e.g., OHPO), pursuant to 36 CFR Part 800, to determine a course of action, avoiding and minimizing any adverse impacts to the extent practical. If human remains, or associated funerary object, unassociated funerary object, sacred object, or object of cultural patrimony is discovered, the appropriate Native American tribe(s) would 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. Work stoppages in the immediate area would last at least 30 days. See Appendix F of the SEP and FEMP procedure EP-0003, "Unexpected Discovery of Cultural Resources," for additional details.

6.7 DATA AND RECORDS MANAGEMENT

Data and records management for the A1PII remediation will be in general accord with the strategy and protocols as described in Section 3.6 of the SEP and quality assurance protocols for data management activities as described in Appendix E of the SEP. The primary documents that will be generated during A1PII remediation and the files in which they will be maintained are identified in Table 6-3.

6.8 QA/QC AND REGULATORY AUDIT

The A1PII project activities will be assessed to verify compliance to program requirements specified in the A1PII Implementation Plan. This will include audits, surveillances and inspections commensurate to the scope of assessment and level of verification with respect to field tasks, contract execution and programmatic implementation of driver documents. Quality assurance programmatic drivers are considered to be the DOE approved FDF QA Plan, (RM-0012), the EPA approved Sitewide CERCLA QA Project Plan (SCQ), and the draft SEP Appendix E, SEP Quality Assurance Project Plan (QAPP).

The applicable quality requirements will be specified in all planning documents defining project activities. This includes Data Quality Objectives (DQOs) and Project Specific Plans (PSPs) that serve as planning and field instructions for environmental real-time and physical sampling to support project data collection. Additionally, the engineering design packages will include the necessary QC to assure conformance to design specifications. Part 9 of the contract documents describes appropriate QA requirements. A Construction Quality Assurance Plan will be submitted by construction contractors for SCEP approval. Other documents that require QA review and concurrence are procedures, purchase requisitions and Project Execution Plans.

The SCEP QA lead will coordinate project QA/QC oversight through audits, surveillances, inspections, vendor surveys, and other internal assessments needed to verify quality related to IRDP activities. External assessments from FDF will also be coordinated with the SCEP QA lead. The contractor will be responsible for field inspections, nonconformance identification, and corrective action that is documented in a controlled manner.

The DOE-FEMP, EPA, and OEPA have ready 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.

All FDF procurement requisitions are reviewed and signed by SCEP QA. The A1PII QA representative will identify materials receipt inspection requirements and when vendor source inspections are necessary. Nonconforming items will be tagged and dispositioned as unacceptable until corrective measures are determined.

6.9 INTEGRATION OF A1PII PROJECT WITH OTHER FEMP ACTIVITIES

A1PII remediation activities are planned and will be conducted in cooperation with other FEMP remediation projects and activities to ensure effective and efficient attainment of project-specific and sitewide remediation objectives. Interface with many FDF support groups is ensured by means of functional support representatives who are integral members of the A1PII Project team (e.g., environmental compliance, natural and cultural resource management, sampling and analysis). However, as noted in Section 6.1, the Area Project Manager is responsible for ensuring that coordination is established and maintained with other projects and support groups, and the Project Engineer is responsible for effecting this coordination on a day-to-day basis. Key interfaces with organizations not directly represented on the A1PII Project Team include the following:

- Sitewide Planning and Scheduling
  - Integrating the A1PII plan and schedule with the FEMP master schedule
- OSDF Project
  - Planning and scheduling activities in the southern (Sector 1) portion of A1PII to accommodate OSDF construction and development of the OSDF Borrow Area and OSDF Haul Road, and to provide a storm water management system for A1PII that can be readily modified to accommodate stormwater management

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needs for OSDF operations and the OSDF Borrow Area. Key elements of coordination include area certification; construction of the A1PII Sediment Basin and Outfall Channel; Trap Range remediation and certification, and development of A1PII Borrow Area in southeast corner of A1PII

- Planning and scheduling remediation of the northern (Sector 2) and central (Sector 3) portions of A1PII to accommodate OSDF cell construction and related support activities, including construction of the OSDF Borrow Haul Road and the A1PII Conveyance Channel component of the storm water management system. Key elements of coordination include location and movement of stockpiles, surface and subsurface excavation in the STP Area, excavation of subsurface utilities and surface soil, removal (as necessary) of sediment from sediment basins, and area certification

- Planning and scheduling activities to ensure timely placement of A1PII impacted material into the OSDF in accordance with the IMPP and other pertinent requirements

- Coordinating construction and certification as necessary to enable removal of the Phase I North Entrance Road segment and construction of the planned Phase II alignment after A1PII remediation activities under this plan are complete

• Facilities Closure & Demolition Project (FC&DP)
  - Coordinating above-grade demolition of STP components, STP Incinerator, Trap Range Building, etc. with at-grade and below-grade remediation of these facilities by SCEP under this IP, including delineation of breaklines, scheduling, stockpiling, access controls, support facilities, interim stabilization measures, facilities turnover. Includes cooperation of Aquifer Restoration & Wastewater Treatment Projects regarding scheduling of STP utility construction, STP shutdown and condition of facilities upon turnover.

• Aquifer Restoration & Wastewater Treatment Projects (ARWWT)
  - Planning and implementing construction to accommodate continued operability of the AWWT discharge line, Outfall Line Pit (Flume Building), and DO Facility, including provisions for constructing a new access road to DO Facility/Flume Building to replace present STP/DO Facility access road, which will be removed

  - Coordinating anticipated needs for collecting, transporting and treating perched water and/or storm water recovered from STP excavation and other remediation-generated water (e.g., decontamination wastewater) with current and anticipated capabilities (e.g., influent flow volume and quality requirements, removal efficiencies) of Storm Water Retention Basin (SWRB), AWWT, pretreatment system, and associated collection system. Includes coordination to modify lift station(s) or other facilities for use in conveying wastewater to SWRB

- Assessing potential adverse effects on the GMA from deep excavations (STP Area, STP influent/effluent lines, OSDF Sedimentation Basin) and designing and implementing measures to ensure protectiveness.

- Site Utilities
  - Coordinating installation of electrical power supply and communications lines to A1PII Support Area and Radiological Control Trailer
  - Coordinating as necessary to remove, replace, or relocate other utilities, including replacement of buried electric cable to DO Facility transformer with overhead line, abandonment of CG&E fuel gas line and removal of water supply lines.

- Operable Unit 1
  - Staging above-WAC soil designated for disposition to an off-site permitted commercial disposal facility

- Southern Waste Units Remedial Action Project
  - Coordinating removal of the A1PI East and West Stockpiles and remediation of the OSDF Sediment Basin, including removal of impacted surface soils

- FDF Real Estate Office
  - Coordinating to obtain cooperation of CG&E and Mid-Valley on matters potentially affecting their utility facilities or areas within easements for these facilities, including excavation on or near CG&E rights-of-way (e.g., STP Area excavation) and Mid-Valley pipeline right-of-way (for borrow material)
  - Coordinating to secure agreement for off-property remedial activities, if necessary (e.g., off-property impacted area sampling and excavation).

6.10 SCHEDULE

In accordance with the ACA, this Implementation Plan identifies A1PII remedial action project-specific milestones subject to enforceable deadlines by EPA. As discussed in Section 1.0, the work area is segmented into three (3) sectors (Figure 1-3). The start of remedial activities in each sector is driven by other site activities as further discussed in Section 3.0 and as summarized below:

- Sector 1 is considered to be ready for certification, except for soils in the Trap Range. This area is designated for immediate certification because select borrow material is needed for OSDF construction by June 30, 1998. In addition, two small areas of Sector 2 will be certified at the same time to allow unencumbered construction of OSDF Cell III and the northernmost portion of the OSDF Borrow Area Haul Road.

- Sector 2 remediation and certification includes removal of the A1PI East and West Stockpiles and remediation of the OSDF Sediment Basin. These actions, including removal of impacted surface soils, will be performed by the Southern Waste Units

Remedial Action Project. Sector 2 certification activities are planned to commence immediately following completion of these activities.

- Sector 3 remediation is constrained by startup activities for the new sewage treatment plant and D&D of the the above-grade portions of the existing STP. Certification of Sector 3 will allow backfilling of the excavated STP Area, which must be completed before construction of the southern leg (Phase II) of the rerouted North Entrance Roud. The construction of the latter and subsequent removal of the Phase I North Entrance Road By-Pass is a constraint on construction of OSDF Cell V.

A conceptual schedule is provided for each sector on Figures 6-3 through 6-5. These schedules are based on current funding assumptions and the overall site remediation schedule. For information purposes, a schedule is also provided of predecessor activities for remediation of the STP Area (Figure 6-6).

TABLE 6-1
SEGREGATION PROTOCOLS FOR A1PII WASTE STREAMS

WASTE STREAM	SEGREGATION PROTOCOLS
Impacted Material[1]	
Lead-contaminated Soil	If not stabilized and disposed on-site: Bulk containerize [roll-offs] or stock pile, and sample for PCDF WAC; bulk, off-site shipment by truck for either treatment or disposal, pending sample results.
F-listed AWAC Sludge	Containerize and sample for PCDF WAC; off-site shipment by truck for either treatment or disposal, pending sample results.
BWAC Material	Segregate in accordance with OSDF waste stream categories in Table 5 of EW-01019. Physical processing, as necessary, of debris for OSDF disposition. Confirm chemical/radiological OSDF WAC compliance per EW-1019 Tables 3 and 4. [Note that Table 3 prohibitions apply only to areas defined in the OU2 and OU5 RODs as potentially RCRA toxicity characteristic.] FTL to temporary staging area or manifest to OSDF.
Prohibited Items	Off-site containerized shipment by truck to NTS or PCDF. See Table 2 of EW-1019 for list of prohibited items.
AWAC Special Material	Off-site containerized shipment by truck to NTS or PCDF. See Table 1 of EW-1019 for list of special materials.
BWAC Special Material	Segregation of prohibited items and special materials. Physical processing, as necessary, of remaining debris for OSDF disposition. See Table 1 of EW-1019 for list of special materials. FTL to temporary staging area or manifest to OSDF.
Remediation-Generated Water[1]	
Perched Water/ Storm Water from STP Excavation, STP Influent/Effluent trenches, and Equipment Decontamination Facility Wastewater.	Accumulate in tankage at Remediation-Generated Water Transfer System, sample and analyze for PCE, and disposition to Pretreatment System/AWWT Phase II Treatment System,or SWRB/AWWT Phase I Treatment System, per protocols described in Section 3.4.4.

AWAC = Above OSDF Waste Acceptance Criteria
BWAC = Below OSDF Waste Acceptance Criteria
AWWT = Advanced Waste Water Treatment facility
FTL = Field Tracking Log
NTS = Nevada Test Site
OSDF = On Site Disposal Facility
PCDF = Permitted commercial disposal facility
PCE = Tetrachloroethene
RCRA = Resource Conservation and Recovery Act
ROD = Record of Decision
STP = Sewage Treatment Plant
SWRB = Storm Water Retention Basin
WAC = Waste Acceptance Criteria

[1] Estimated volumes based upon Appendix G; entries for OSDF categories rounded up to nearest 100 or 1,000.

TABLE 6-2
CONTINGENCY PLANS FOR RECOGNIZED BUT UNEXPECTED CONTAMINATION OR SOIL 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 IP for known utilities. Submit a letter to regulatory agencies describing the design revision, and proceed with excavation.
Discovery that soil contamination above FRLs extends off-property in STP Area.	Restrict excavation to on-property portion of excavation. Seek and obtain FEMP approval to proceed with off-property activities, including any necessary investigations and excavation. Develop any necessary project-specific sampling plans and revise design, including modification of access controls and radiological control boundaries, as necessary, within the guidelines established in the SEP and corresponding on-property excavation protocols established in this IP. Submit letters describing investigation plans and design changes to the regulatory agencies, and proceed with investigations and excavation.
Discovery that excavation of contaminated soil in the STP Area potentially compromises the stability of CG&E electric transmission tower located immediately north of the STP Area.	Restrict excavation as necessary to ensure tower integrity. Coordinate with Site Utilities, CG&E, and FC&DP to determine necessary safe shutdown requirements, design/construct activities for removal of existing tower and installation of replacement tower, and remediation approach, including any necessary additional investigations and excavation. Develop any necessary project-specific sampling plans and revise design, including modification of access controls and radiological control boundaries, as necessary. If the design conforms to SEP guidelines or protocols established in this IP for removal of tower, submit letter describing investigation plans, design changes, and schedule implications to the regulatory agencies, and proceed. Otherwise, discuss optional approaches with the regulatory agencies to determine if the area must be addressed as an exception to guidelines.
Discovery of AWAC 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.
SWRB in overflow condition.	Pump water in STP influent/effluent trenches and STP excavation to OSDF Sediment Basin.
Perched water/storm water accumulated in the STP excavation exceeds AWWT acceptance guidelines for floatable oil and grease (i.e., visible sheen) or total suspended solids.	Excessive floatable oil and grease: Retain accumulated water in the excavation; develop and implement field procedure to safely remove oil and grease with absorbants before transfer to Remediation-Generated Water Transfer System holding tanks or AWWT. Excessive total suspended solids: Determine additional holding time and pump configuration needed to reduce suspended solids to within guidelines and implement.
Quantity of accumulated perched water/storm water containing detectable tetrachlorothene in STP excavation exceeds available capacity to store or pretreat.	Prepare options to develop additional storage or pretreatment capacity, coordinating with ARWWT, as necessary. Discuss optional approaches with the regulatory agencies to determine if the area must be addressed as an exception to guidelines.

ARWWT = Aquifer Restoration & Waste Water Treatment Project
AWAC = Above OSDF Waste Acceptance Criteria
AWWT = Advanced Waste Water Treatment facility
CG&E = Cincinnati Gas & Electric
DOE = Department of Energy
FC&DP = Facilities Closure & Dismantlement Project
FEMP = Fernald Environmental Management Project
IP = Implementation Plan
IRDP = Integrated Remedial Design Package
SEP = Sitewide Excavation Plan
STP = Sewage Treatment Plant
SWRB = Storm Water Retention Basin

TABLE 6-3
A1PII PRIMARY RECORDS AND ASSOCIATED FILES

DOCUMENT	FILE
Construction drawings and associated field logs	• IIMS GIS Component • Engineering/Construction Document Control
Miscellaneous Field Logs	• Engineering/Construction Document Control
Manifest-type Documents	• IIMS SWIFTS Component • Engineering/Construction Document Control
Containerized Impacted Material Documents	• IIMS SWIFTS Component • Site Operating Record
Analytical Data and Associated Field Logs	• IIMS SED Component • Engineering/Construction Document Control

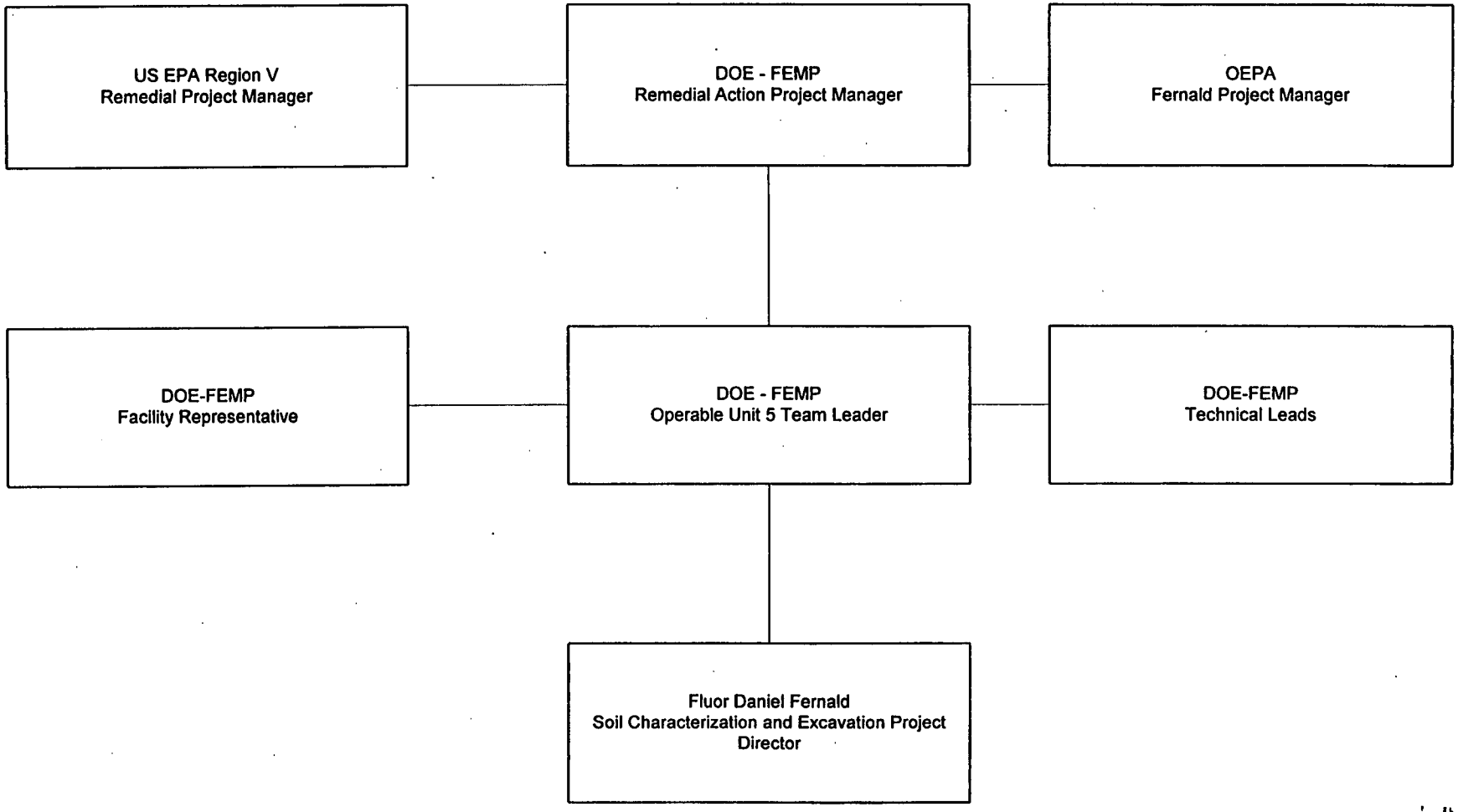

Figure 6-1
Agency Organization
for Area 1, Phase II

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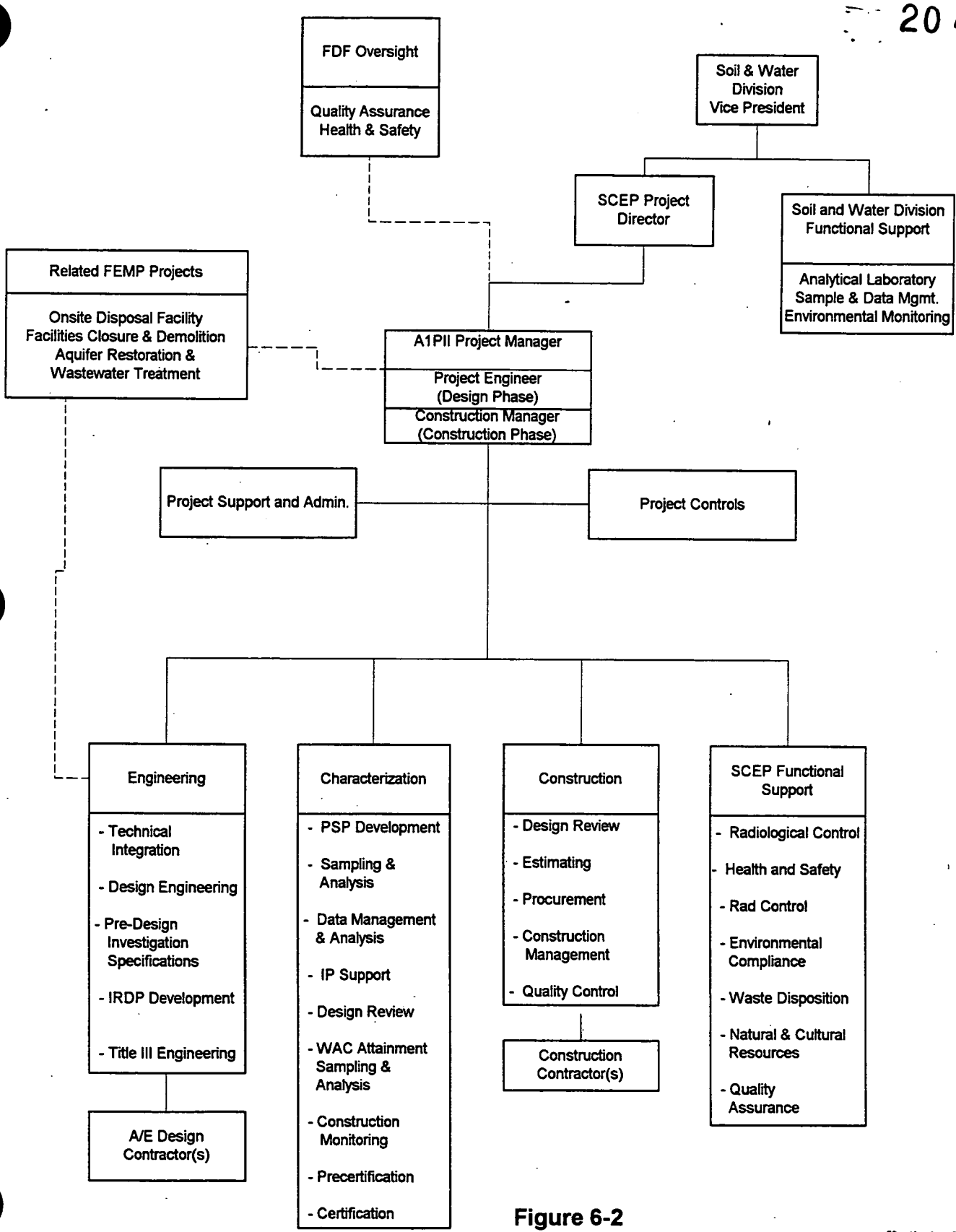
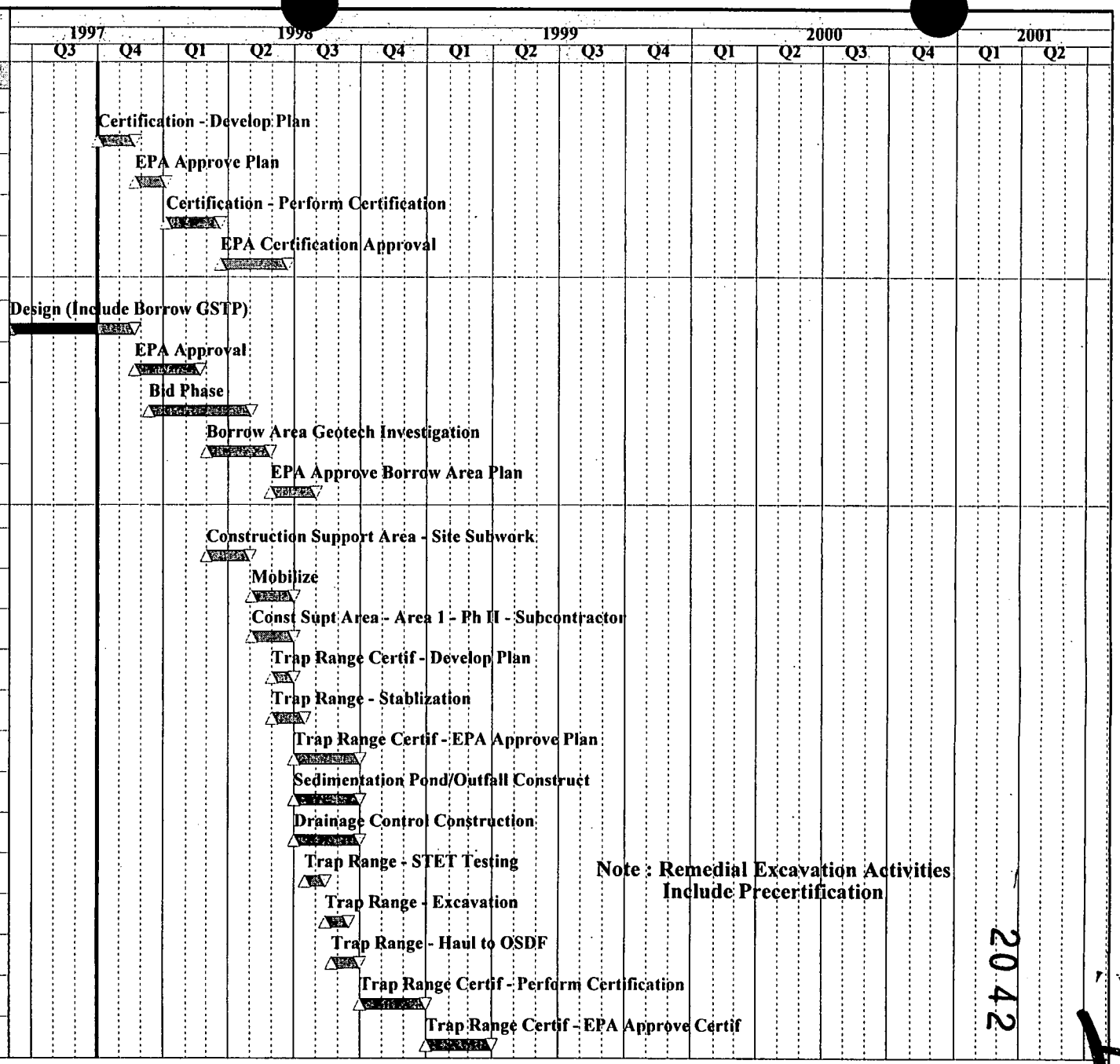


Figure 6-2
A1PII
Project Organization

Activity Description	Orig Dur	Early Start	Early Finish
Area 1 - Phase II - Sector 1			
Borrow Area Certification			
Certification - Develop Plan	52	01OCT97	21NOV97
EPA Approve Plan	44	22NOV97	04JAN98
Certification - Perform Certification	76	05JAN98	21MAR98
EPA Certification Approval	92	22MAR98	21JUN98
Area 1 - Phase II - Design / Bid - All Sectors			
Design (Include Borrow GSTP)	52	01JUN97A	21NOV97
EPA Approval	92	22NOV97	21FEB98
Bid Phase	144	12DEC97	04MAY98
Borrow Area Geotech Investigation	89	02MAR98	29MAY98
EPA Approve Borrow Area Plan	62	30MAY98	30JUL98
Area 1 - Phase II - Sector 1 Construction			
Construction Support Area - Site Subwork	60	02MAR98	30APR98
Mobilize	57	05MAY98	30JUN98
Const Supt Area - Area 1 - Ph II - Subcontractor	57	05MAY98	30JUN98
Trap Range Certif - Develop Plan	30	01JUN98	30JUN98
Trap Range - Stablization	45	01JUN98	15JUL98
Trap Range Certif - EPA Approve Plan	92	01JUL98	30SEP98
Sedimentation Pond/Outfall Construct	92	01JUL98	30SEP98
Drainage Control Construction	92	01JUL98	30SEP98
Trap Range - STET Testing	30	16JUL98	14AUG98
Trap Range - Excavation	31	15AUG98	14SEP98
Trap Range - Haul to OSDF	40	22AUG98	30SEP98
Trap Range Certif - Perform Certification	92	01OCT98	31DEC98
Trap Range Certif - EPA Approve Certif	90	01JAN99	31MAR99



Project Start	01JAN97
Project Finish	30APR00
Data Date	01OCT97
Run Date	18NOV97

Early Bar
Progress Bar
Critical Activity

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Sheet 1 of 1

FD Fernald / Dept of Energy
Area I Phase II Sector 1
Classic Schedule Layout

Figure 6-3

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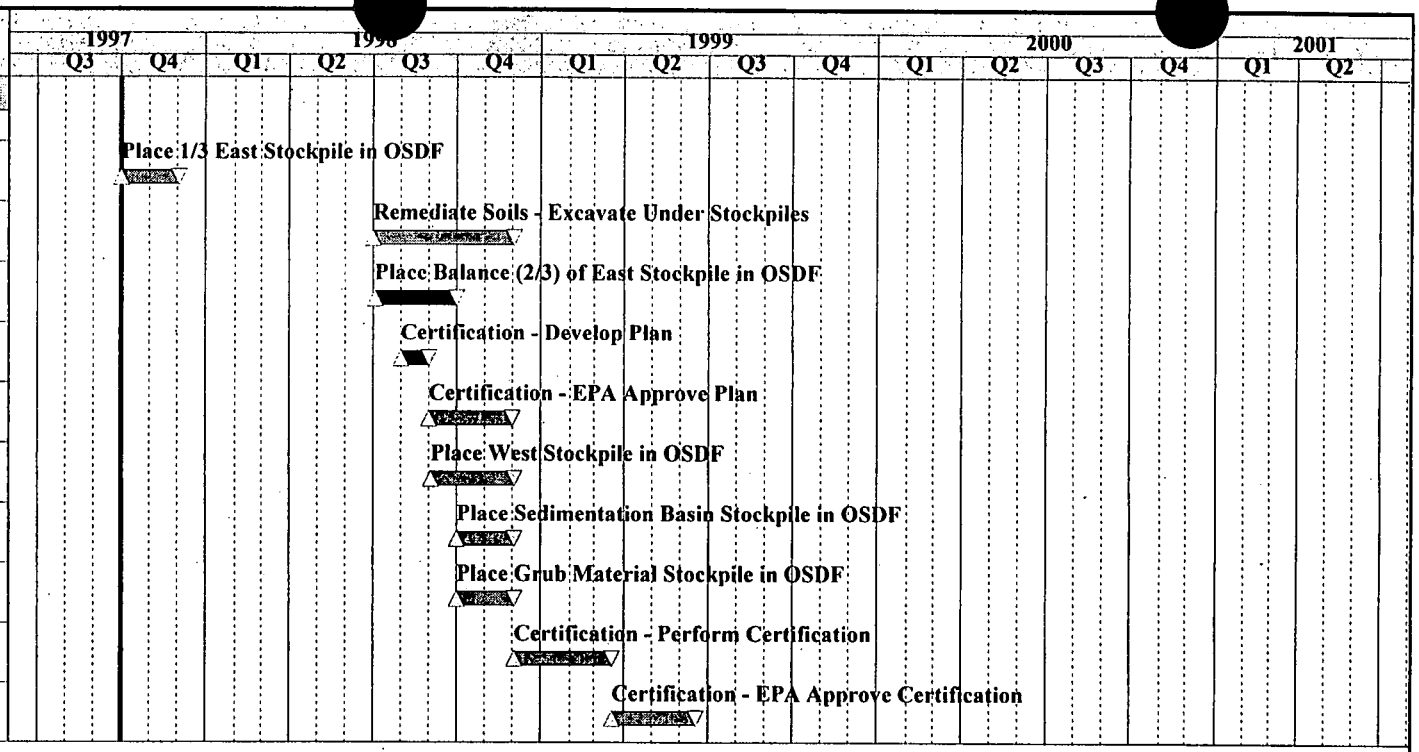
Description	Orig Dur	Early Start	Early Finish
Area 1 - Phase II - Sector 2			
Place 1/3 East Stockpile in OSDF	62	01OCT97	01DEC97
Remediate Soils - Excavate Under Stockpiles	154	01JUL98*	01DEC98
Place Balance (2/3) of East Stockpile in OSDF	91	03JUL98*	01OCT98
Certification - Develop Plan	30	01AUG98*	30AUG98
Certification - EPA Approve Plan	92	31AUG98	30NOV98
Place West Stockpile in OSDF	91	02SEP98	01DEC98
Place Sedimentation Basin Stockpile in OSDF	62	01OCT98	01DEC98
Place Grub Material Stockpile in OSDF	62	01OCT98	01DEC98
Certification - Perform Certification	107	02DEC98	18MAR99
Certification - EPA Approve Certification	91	19MAR99	17JUN99



Note : Remedial Excavation Activities Include Precertification

000181

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Project Start	01JAN97	Early Bar	
Project Finish	30APR00	Progress Bar	
Data Date	01OCT97	Critical Activity	
Run Date	18NOV97		

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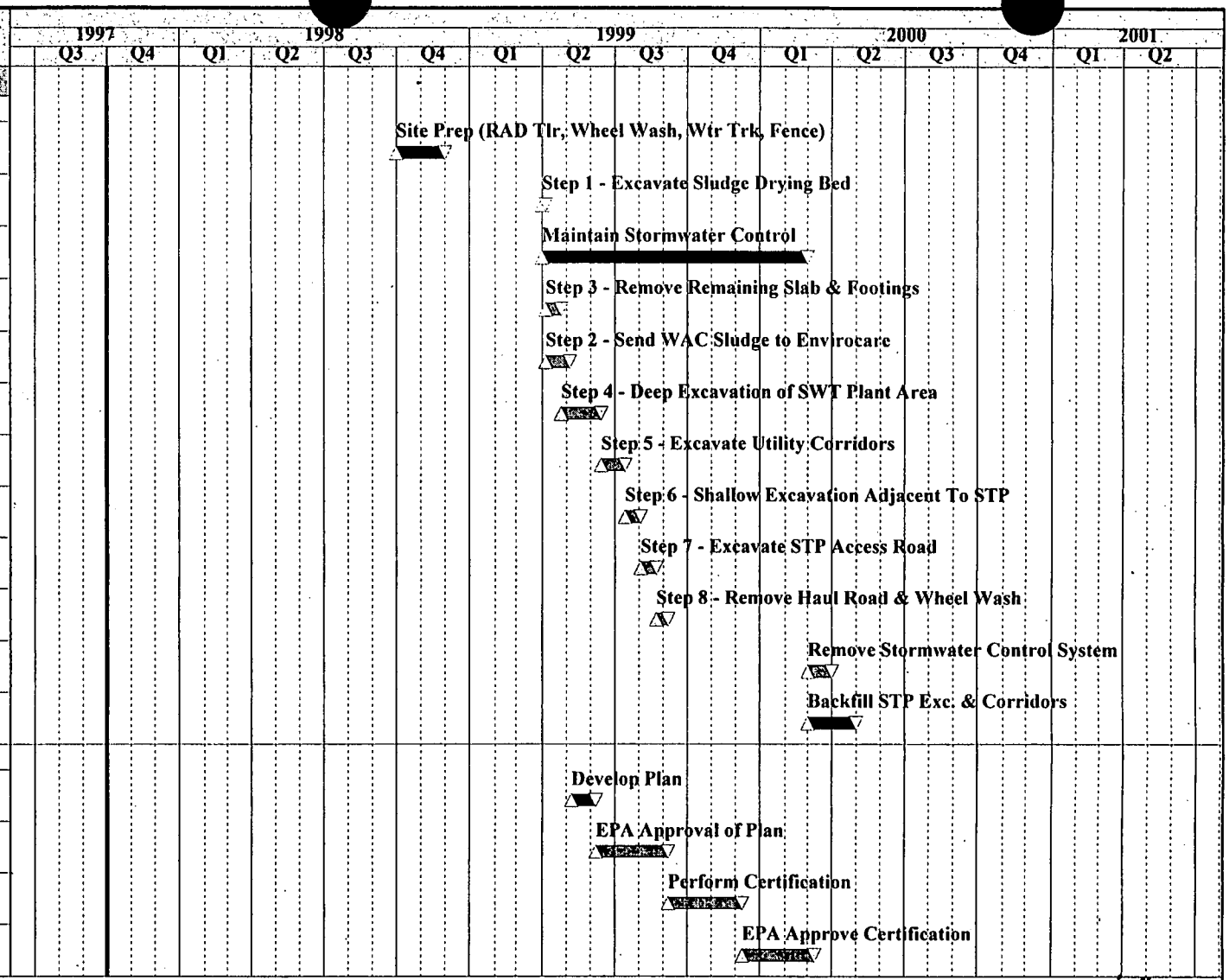
Sheet 1 of 1

FD Fernald / Dept of Energy
Area I Phase II Sector 2
Classic Schedule Layout

Figure 6-4

Activity Description	Orig Dur	Early Start	Early Finish
Area 1 - Phase 2 - Sector 3			
Area 1 - Phase II - Sector 3 Construction			
Site Prep (RAD Tlr, Wheel Wash, Wtr Trk, Fence)	61	01OCT98*	30NOV98
Step 1 - Excavate Sludge Drying Bed	5	01APR99*	05APR99
Maintain Stormwater Control	335	01APR99	29FEB00
Step 3 - Remove Remaining Slab & Footings	20	06APR99	25APR99
Step 2 - Send WAC Sludge to Envirocare	31	06APR99	06MAY99
Step 4 - Deep Excavation of SWT Plant Area	50	26APR99	14JUN99
Step 5 - Excavate Utility Corridors	30	15JUN99	14JUL99
Step 6 - Shallow Excavation Adjacent To STP	20	15JUL99	03AUG99
Step 7 - Excavate STP Access Road	20	04AUG99	23AUG99
Step 8 - Remove Haul Road & Wheel Wash	15	24AUG99	07SEP99
Remove Stormwater Control System	30	01MAR00	30MAR00
Backfill STP Exc. & Corridors	61	01MAR00	30APR00
Area 1 - Phase II - Sector 3 Final Certification			
Develop Plan	31	08MAY99*	07JUN99
EPA Approval of Plan	91	08JUN99	06SEP99
Perform Certification	92	08SEP99	08DEC99
EPA Approve Certification	92	09DEC99	09MAR00



Note : Remedial Excavation Activities Include Precertification

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Project Start	01JAN97	Early Bar	
Project Finish	30APR00	Progress Bar	
Data Date	01OCT97	Critical Activity	
Run Date	18NOV97		

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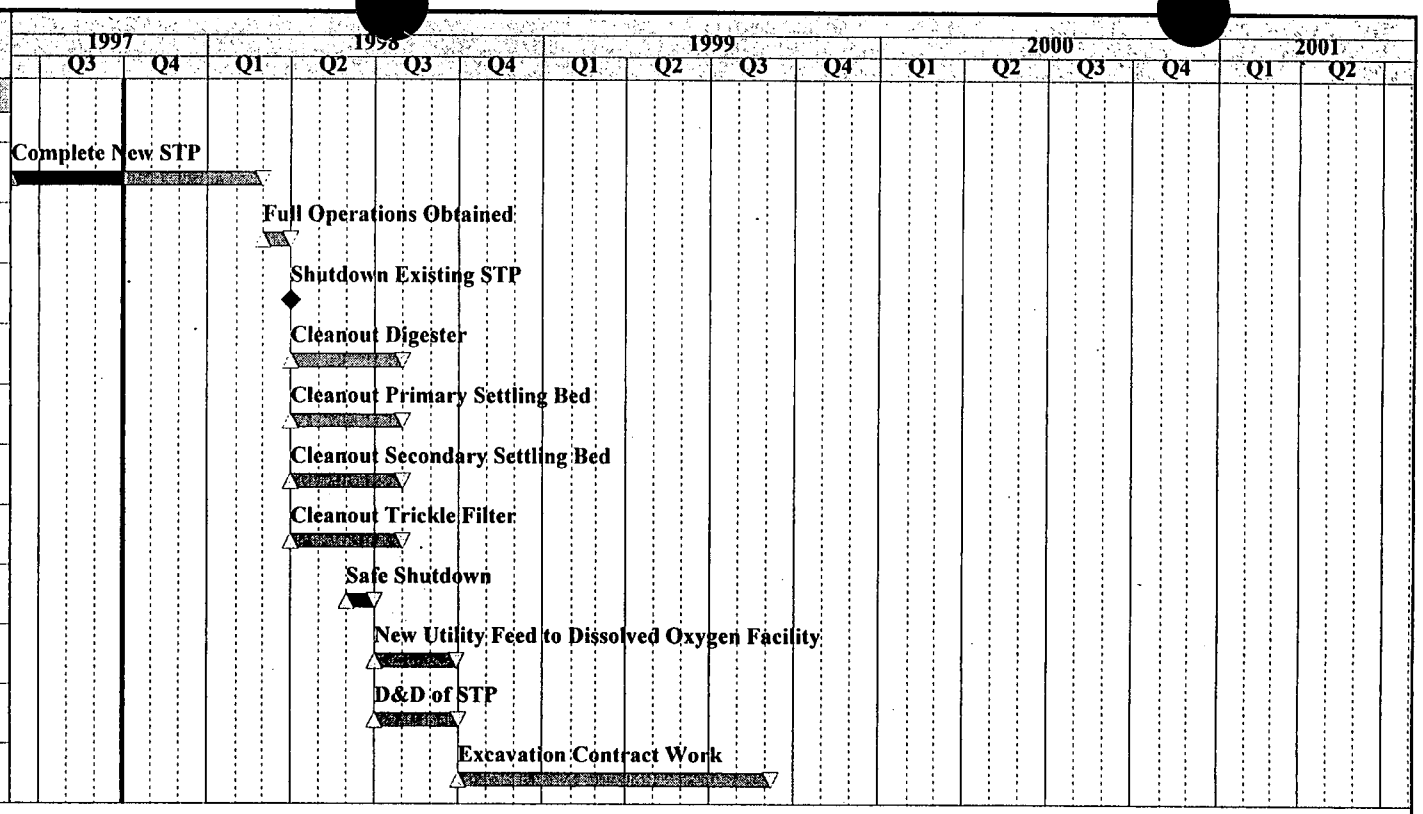
Sheet 1 of 1

FD Fernald / Dept of Energy
Area 1 Phase II Sector 3
Classic Schedule Layout

Figure 6-5

Description	Orig Dur	Early Start	Early Finish
STP Interfaces			
Interface between Soils, Operations, SSD & D&D			
Complete New STP	151	01JUN97A	28FEB98
Full Operations Obtained	31	01MAR98	31MAR98
Shutdown Existing STP	0		31MAR98
Cleanout Digester	122	01APR98	31JUL98
Cleanout Primary Settling Bed	122	01APR98	31JUL98
Cleanout Secondary Settling Bed	122	01APR98	31JUL98
Cleanout Trickle Filter	122	01APR98	31JUL98
Safe Shutdown	30	01JUN98*	30JUN98
New Utility Feed to Dissolved Oxygen Facility	90	01JUL98*	28SEP98
D&D of STP	92	01JUL98	30SEP98
Excavation Contract Work	342	01OCT98	07SEP99



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Project Start	01JAN97	Early Bar
Project Finish	30APR00	Progress Bar
Data Date	01OCT97	Critical Activity
Run Date	18NOV97	

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Sheet 1 of 1

FD Fernald / Dept of Energy
Area I Phase II STP Interfaces
Classic Schedule Layout

Figure 6-6

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