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ADMIN RECORD

Well Abandonment and Replacement Program Work Plan FY96

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March 1996

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

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Organization _____

Title

Well Abandonment and
Replacement Program Work
Plan FY96

_____ 4/2/96
Program Manager Date

_____ 4/2/96
Program Manager Date

_____ 4/2/96
Quality Assurance Manager Date

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ABBREVIATIONS, ACRONYMS, AND INITIALISMS

AAC	additional area of concern
ASTM	American Society of Testing and Materials
BZ	buffer zone
CA	controlled area
CDPHE	Colorado Department of Public Health and Safety
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLP	Contract Lab Program
D&D	Decontamination & Decommissioning
DOE	Department of Energy
EMD	Environmental Management Division
EPA	Environmental Protection Agency
ERD	Environmental Restoration Division
FO	Field Operations
FY	Fiscal Year
GMP	Groundwater Monitoring Program
GPR	ground penetrating radar
GRRASP	General Radiochemistry and Routine Analytical Service Protocol
GT	Geotechnical
H&S	Health and Safety
HASP	Health and Safety Plan
HSS	Health and Safety Specialist
IA	Industrial Area
IDM	Investigation-Derived Materials
IHSS	Individual Hazardous Substance Sites
IM/IRA	Interim Measure/Interim Remedial Action
MDF	Main Decontamination Facility
NAPL	Nonaqueous Phase Liquid
NEPA	National Environmental Policy Act
OP	Operating Procedure
OSHA	Occupational Safety and Health Administration
PA	Protected Area
PAC	potential area of concern
pH	hydronium ion concentration
PPE	personal protective equipment
PVC	polyvinyl chloride
QA	Quality Assurance
QAA	QA Addendum
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RFEDS	Rocky Flats Environmental Database System
RFETS	Rocky Flats Environmental Technology Site
RFFO	Rocky Flats Field Office
RMA	radioactive management area
RMRS	Rocky Mountain Remediation Services, L L C
SOW	Statement of Work
SVE	Soil Vapor Extraction

TAL	target analyte list
UHSU	Upper Hydrostratigraphic Unit
VOC	volatile organic compounds
WARP	Well Abandonment and Replacement Program

1.0 INTRODUCTION

The United States Department of Energy (DOE) Rocky Flats Environmental Technology Site (RFETS) has initiated a Well Abandonment and Replacement Program (WARP) under the direction of the Environmental Restoration Division (ERD) of Rocky Mountain Remediation Services, L L C (RMRS) This FY96 WARP Work Plan describes the implementation of eight new well installations, eleven well abandonments and the geotechnical drilling of five boreholes Presented in this section, are subsections under the following headings Objectives, Statement of Scope (the proposed well abandonments, well installation, and geotechnical drilling), Project Staffing and Responsibilities, Work Location and Site Description

1.1 OBJECTIVES

WARP is a maintenance program for the Groundwater Monitoring Program (GMP) at RFETS Implementation of WARP achieves the general objective of ensuring the viability of groundwater monitoring wells and piezometers for the purpose of collecting representative samples of groundwater and other groundwater parameters WARP provides a means to eliminate and selectively replace wells and piezometers where sample and water level readings are suspected of not being representative of subsurface conditions or the elimination of wells that are no longer needed Operating procedure (OP) GT 11, Plugging and Abandonment of Wells, identifies the following as general objectives of well abandonment

- Prevention of groundwater and soil contamination through the well,
- Prevention of intermixing of subsurface waters through the well,
- Conservation of hydraulic characteristics of hydrogeologic units, and
- Minimization of physical hazards

The specific objectives of Fiscal Year (FY) 96 WARP are to meet the following goals

- Using State of Colorado well abandonment and Site procedures to properly abandon wells and piezometers located within or adjacent to IHSSs with known or suspected nonaqueous phase liquids (NAPLs) which are scheduled for 1996 removal actions

- Install five wells at locations where water quality or piezometric data is needed for the Industrial Area (IA) groundwater monitoring program before initiation of building decommissioning and decontamination activities per the Interim Measure/Interim Remedial Action (IM/IRA) Work Plan (DOE 1995)

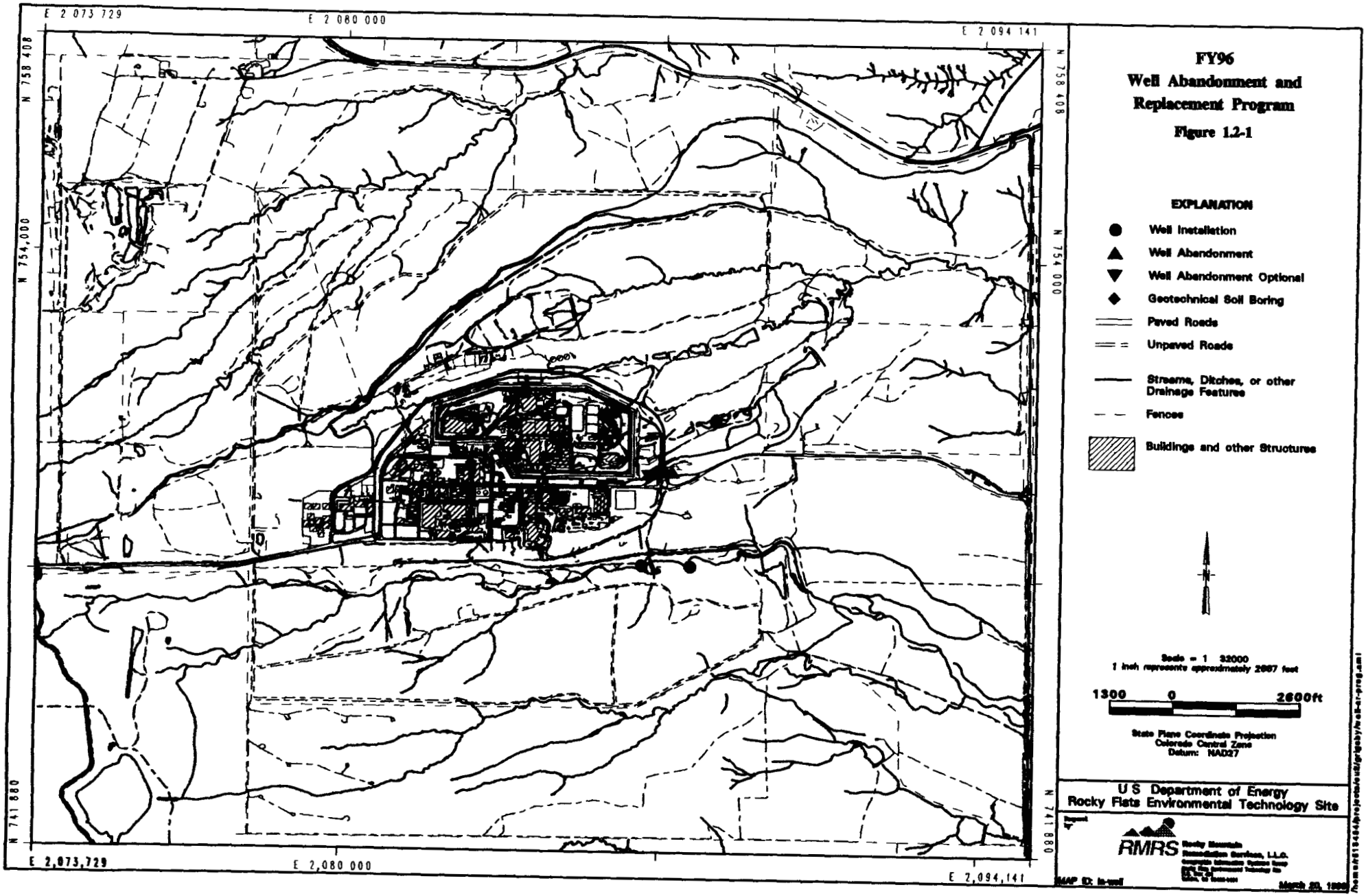
- Install three wells at locations where water quality or piezometric data is needed for the sitewide groundwater monitoring program (DOE 1996 and RMRS 1996)

- Collect geologic and geotechnical data for a foundation engineering evaluation for a proposed low-level mixed waste management facility

During fiscal year FY94, the WARP abandoned 39 groundwater monitoring wells, installed 19 replacement groundwater monitoring wells, and performed other well maintenance activities at RFETS (EG&G 1995a) The FY94 WARP also assisted with geotechnical, seismic, and well evaluation programs This FY96 WARP Work Plan describes the implementation of the next phase of the program

1 2 STATEMENT OF SCOPE

The scope of work described in the FY96 WARP Work Plan is composed of four tasks (1) abandon eleven wells to assist with source removal accelerated actions in Individual Hazardous Substance Sites (IHSSs) 110 and 113, (2) install up to five wells for compliance with IM/IRA Rocky Flats IA (DOE 1995), (3) install three Tier II monitoring wells under the RFETS Action Level Framework for Surface Water, Groundwater, and Soils (DOE 1996 and RMRS 1996), and (4) drill five geotechnical boreholes for soils engineering testing for the proposed mixed-waste hazardous management unit east of the solar ponds Locations for the four tasks are shown in Figure 1 2-1


E 2 073 729
E 2 080 000
E 2 094 141
N 758 408
N 754,000
N 741 880
E 2,073,729
E 2,080 000
E 2,094,141
FY96
Well Abandonment and
Replacement Program
Figure 1.2-1
EXPLANATION
Well Installation
Well Abandonment
Well Abandonment Optional
Geotechnical Soil Boring
Paved Roads
Unpaved Roads
Streams, Ditches, or other Drainage Features
Fences
Buildings and other Structures
Scale = 1 32000
1 inch represents approximately 2667 feet
1300 0 2600ft
State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27
U S Department of Energy
Rocky Flats Environmental Technology Site
RMRS
MAP ID: fa-well
March 20, 1996

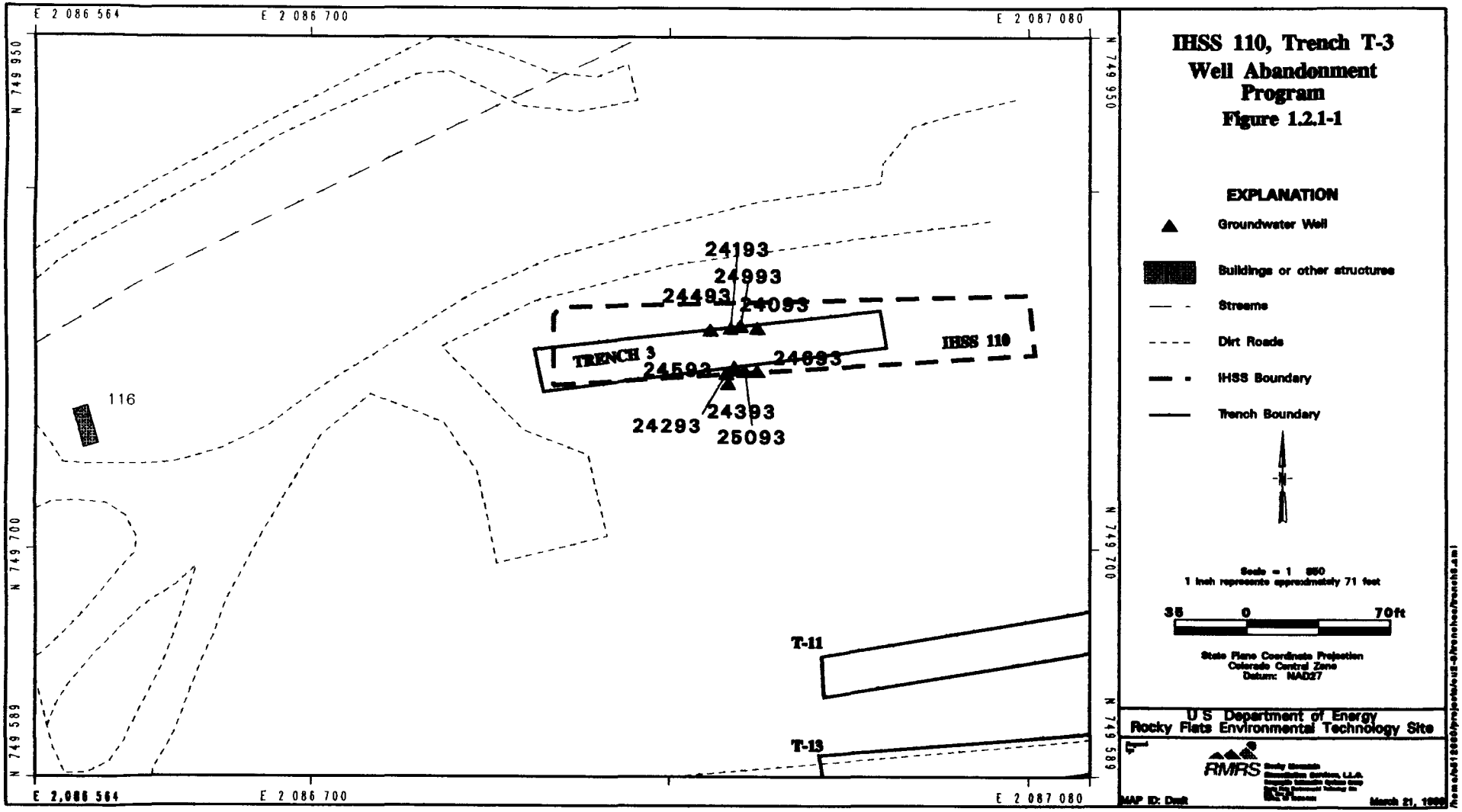
RMRS will determine the sequence and timing for the well abandonment, well installation, and geotechnical borehole drilling tasks, and may alter the number of wells or boreholes to be abandoned, installed, or drilled However, these changes in the program are anticipated to be minor and will include only abandonments and installations that can not be delayed because of potential harm to groundwater at RFETS Abandonment, installation, and geotechnical drilling activities are detailed in Section 2 0 The schedule for implementation of this Work Plan will be provided in the drilling subcontract Statement of Work (SOW) The schedule will address the time requirements for implementation of the Work Plan and deliverables from the contract award date

RMRS has prepared and submitted a bid package that provides for drilling subcontractor support for well abandonment, well installation, and geotechnical drilling and sampling An additional bid package for a geotechnical subcontractor has been prepared to interpret the results of the field and laboratory geotechnical investigation These activities will be performed in compliance with existing OPs in the Geotechnical (GT) and Field Operations (FO) areas, and the Quality Assurance Project Plan (QAPP) (RMRS 1995) In addition, the FY96 WARP will be implemented under a FY96 WARP task-specific Health and Safety Plan (HASP) prepared by RMRS The following sections summarize the scope of the proposed well abandonments, new well installations, and geotechnical drilling for FY96 WARP

1.2 1 Well Abandonments

A total of up to eleven groundwater monitoring wells or soil vapor extraction piezometers are proposed for abandonment at RFETS during FY96 (see Figures 1 2 1-1 and 1 2 1-2) Well abandonments will be performed in two phases as identified in Tables 1 2 1-1 and 1 2 1-2 according to OP, GT 11, Plugging and Abandonment of Wells Phase I wells will be abandoned before the Phase II wells

The nine Phase I wells, piezometers, and conductor casings, identified in Figure 1 2 1-1 and Table 1 2 1-1, were used during the pilot soil vapor extraction project for Operable Unit 2 These nine wells are in or next to Trench T-3, IHSS 110, an area required to be remediated by source removal as an Interagency Agreement Phase 1 wells consist of four, 8- to 12-in diameter, conductor well casings and five, 2- to 4-in diameter, well casings The four wells (i e , 24193, 24393, 24993, and 25093) with


E 2 086 564
E 2 086 700
E 2 087 080
N 749 950
N 749 700
N 749 589
24193
24993
24493
24093
TRENCH 3
IHSS 110
24592
24693
24293
24393
25093
116
T-11
T-13
IHSS 110, Trench T-3
Well Abandonment
Program
Figure 1.2.1-1
EXPLANATION
Groundwater Well
Buildings or other structures
Streams
Dirt Roads
IHSS Boundary
Trench Boundary
Scale = 1 : 850
1 inch represents approximately 71 feet
35 0 70ft
State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27
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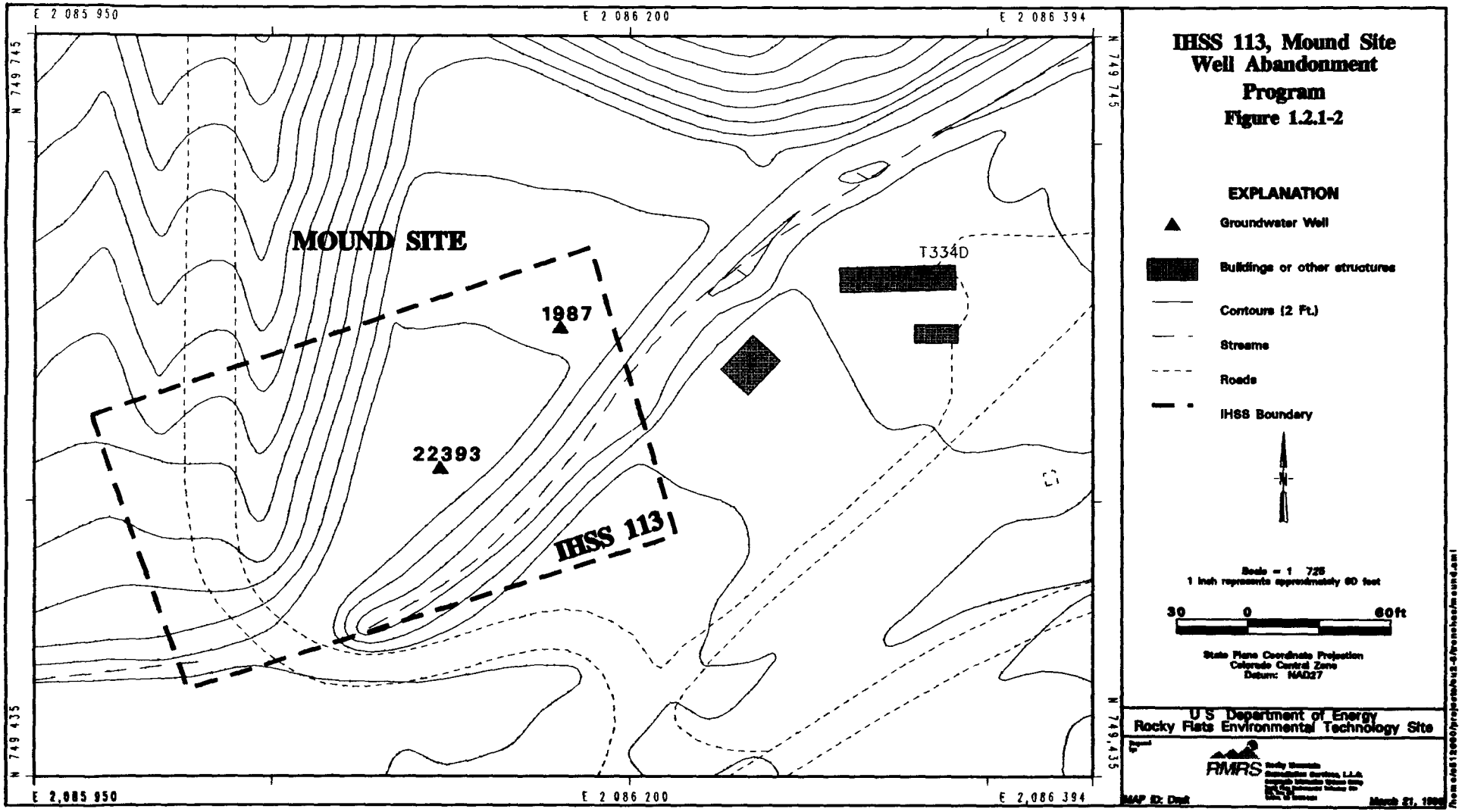
RMRS
MAP ID: Draft
March 21, 1996


E 2 085 950
E 2 086 200
E 2 086 394
N 749 745
N 749 435
MOUND SITE
1987
22393
T334D
IHSS 113
E 2,085 950
E 2 086 200
E 2,086 394
IHSS 113, Mound Site
Well Abandonment
Program
Figure 1.2.1-2
EXPLANATION
Groundwater Well
Buildings or other structures
Contours (2 Ft.)
Streams
Roads
IHSS Boundary
N
Scale = 1 : 720
1 inch represents approximately 60 feet
30
0
60ft
State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27
U.S. Department of Energy
Rocky Flats Environmental Technology Site
RMRS
MAP ID: Draft
March 21, 1996

conductor casing are bedrock wells that were previously abandoned during FY94 WARP and used to isolate the alluvium from the bedrock The five well casings (i e , 24093, 24293, 24493, 24593, and 24693) are alluvial soil vapor piezometers used to monitor subsurface air pressure and to inject air and to extract soil vapor in the vadose zone

Table 1.2.1-1 Phase I Wells, IHSS 110, Trench T-3

Well Number (Location Code)	Well Purpose	Abandonment Method	Conductor Casing or Well Casing Diameter	Casing Depth (ft)
24093	Piezometer	Overdrill	4 in well	18
24193	Collection Well	Drill out grout inside conductor casing	12 in conductor	15
24293	Piezometer	Overdrill	4 in well	17
24393	Injection Well	Drill out grout inside conductor casing	12 in conductor	17
24493	Piezometer	Overdrill	2 in well	15 2
24593	Piezometer	Overdrill	2 in well	14 2
24693	Piezometer	Overdrill	2 in well	16 4
24993	Piezometer	Drill out grout inside conductor casing	8 in conductor	17
25093	Piezometer	Drill out grout inside conductor casing	12 in conductor	17 1

Table 1.2.1-2 Phase II Wells, IHSS 113, Mound Site

Well Number	Well Purpose	Abandonment Method	Well Casing Diameter	Casing Depth (ft)
1987	Monitoring Well	In-place	2 in	11 9
22393	Piezometer	In-place	2 in	121 3

The two Phase II wells at the Mound Site, identified in Figure 1 2 1-2 and Table 1 2 1-2, were used for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site characterization purposes at the Mound Site, IHSS 113 These two wells are in or next to a soil contamination area which is anticipated to be remediated by source removal in FY97 depending on budget and schedule

1 2 2 Well Installations

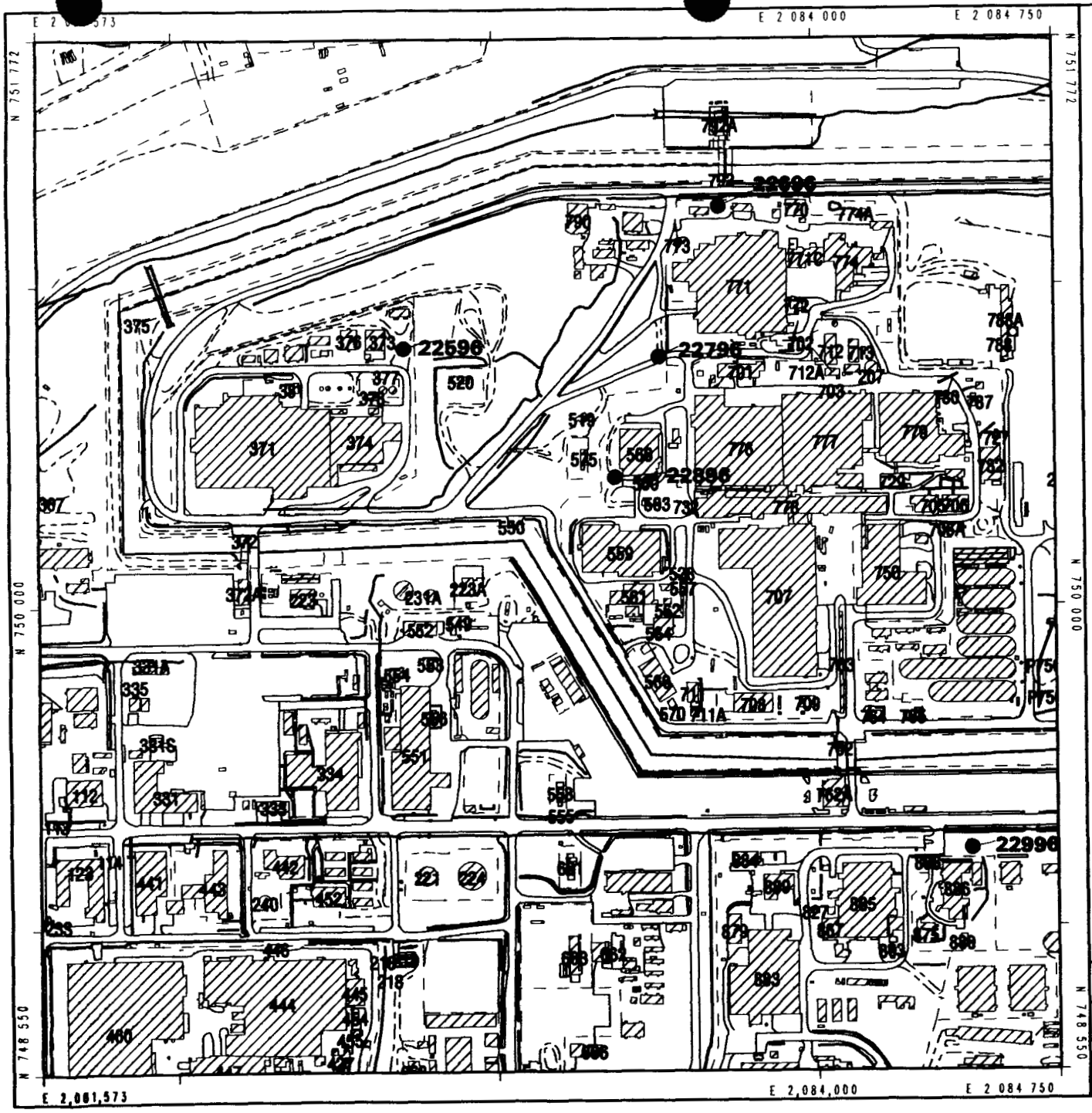
Eight groundwater monitoring wells will be installed under FY96 WARP (see Figures 1 2 2-1 and 1 2 2-2) Five wells in support of the IA IM/IRA (EG&G 1995) and three wells in support of the RFETS Action Level Framework for Surface Water, Groundwater, and Soils (RMRS 1996), as referenced under the Regulated Federal Facilities Compliance Act (DOE 1996)

The IA IM/IRA specifies that additional alluvial groundwater monitoring wells will be installed for detection monitoring purposes associated with decommissioning and decontamination activities planned for the IA The five IA IM/IRA wells, identified in Figure 1 2 2-1 and Table 1 2 2-1, are needed to supplement a groundwater monitoring network in the central and western parts of the IA and are located within the Protected Area (PA)

The three Tier II wells are located along site surface water and groundwater drainage's for detection monitoring purposes Well locations and other siting information are shown in Figure 1 2 2-2 and Table 1 2 2-1

Table 1.2.2-1 IA IM/IRA and Tier II Well Locations and Rationale

Well Number	Location	Siting Rationale
22596	Northeast of Building 371	Lack of Potentiometric and water quality data in the IA
22696	North of Building 771 and north of T771A and T771B	Lack of Potentiometric and water quality data in the IA
22796	Northwest of Building 776 and Southwest of Building 771	Lack of Potentiometric and water quality data in the IA
22896	Southwest of Building 566	Lack of Potentiometric and water quality data in the IA
22996	Northeast of T886A	Lack of Potentiometric and water quality data in the IA
23096	North of Pond C-1	Lack of Potentiometric and water quality data for Tier II monitoring
23196	East of Pond C-1 along Woman Creek	Lack of Potentiometric and water quality data for Tier II monitoring
23296	Between the dam footing of Pond B-2 and Pond B-3 along South Walnut Creek	Lack of Potentiometric and water quality data for Tier II monitoring



IA IM/IRA
Well Installation Program

Figure 1.2.2-1

EXPLANATION

- IA IM/IRA Wells
- Paved Roads
- Unpaved Roads
- Streams, Ditches, or other Drainage Features
- Fences
- Buildings and other Structures

Scale = 1 : 5500
1 inch represents approximately 458 feet

200 0 400ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

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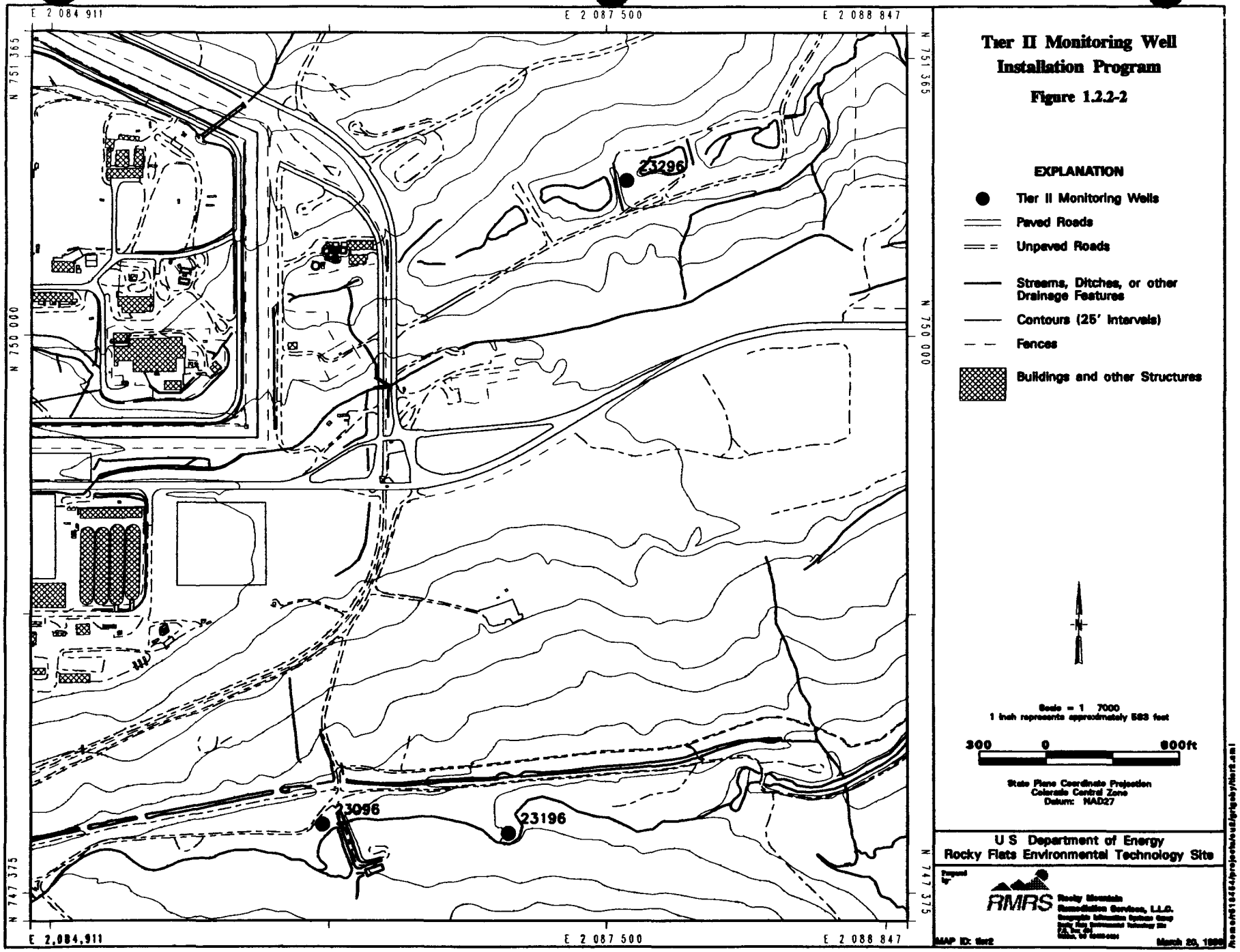
RMRS Rocky Mountain Remediation Services, L.L.C.

MAP ID: ia-well

March 30, 1999



Tier II Monitoring Well Installation Program

Figure 1.2.2-2

EXPLANATION

- Tier II Monitoring Wells
- Paved Roads
- Unpaved Roads
- Streams, Ditches, or other Drainage Features
- Contours (25' Intervals)
- Fences
- Buildings and other Structures

Scale = 1 7000
1 Inch represents approximately 583 feet

300 0 600ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U S Department of Energy
Rocky Flats Environmental Technology Site

RMRS Rocky Mountain Remediation Services, L.L.C.

MAP ID: tier2

March 20, 1996

/home/rfets184/projects/esd/grigsby/tier2.aml

These wells will be completed in the upper hydrostratigraphic unit (UHSU) which consists of Rocky Flats Alluvium, valley fill alluvium, and some underlying weathered bedrock Groundwater elevations may fluctuate seasonally and the level of saturation of the UHSU also varies depending upon locality Maps showing unsaturated areas at RFETS and adjacent well hydrographs will be consulted before well drilling (EG&G 1995c)

Wells will be installed using conventional construction methods in OP, GT 06, Monitoring Wells and Piezometer Installation Typical well construction materials will consist of 2-in diameter, schedule 40 or 80 polyvinyl chloride (PVC) riser and factory cut well screen, 6-in diameter steel surface casing with locking cap and lock In high traffic areas steel safety posts will be installed at each corner of the well In traffic areas and where pavement exists at a wellsite, a pre-cut, 3-ft x 3-ft opening will be removed before drilling starts

1 2.3 Geotechnical Investigation Boreholes

Five geotechnical boreholes are planned under FY96 WARP for geologic logging and geotechnical soil sampling in the IHSS 165 area, as located in Figure 1 2 3-1, east of the solar ponds in the PA These boreholes and resulting soil geotechnical analyses will be used to assess the geotechnical suitability of this area for a low-level mixed-waste management facility During drilling, representative samples of alluvial and bedrock materials will be collected for laboratory geotechnical analyses Each borehole will be advanced to the unweathered bedrock contact estimated to occur within 40 and 65 ft of ground level Completed boreholes will be abandoned using the OP, GT 05, Plugging and Abandonment of Boreholes

1 3 PROJECT STAFFING AND RESPONSIBILITIES

Implementation of FY96 WARP will be carried out by RMRS employees and a RMRS drilling subcontractor Additional engineering support will be provided by a RMRS geotechnical subcontractor Figure 1 3-1 shows the RMRS organization chart indicating the relative positions of authority regarding the management of WARP Key project positions for WARP FY96 and responsibilities are explained in the following sections

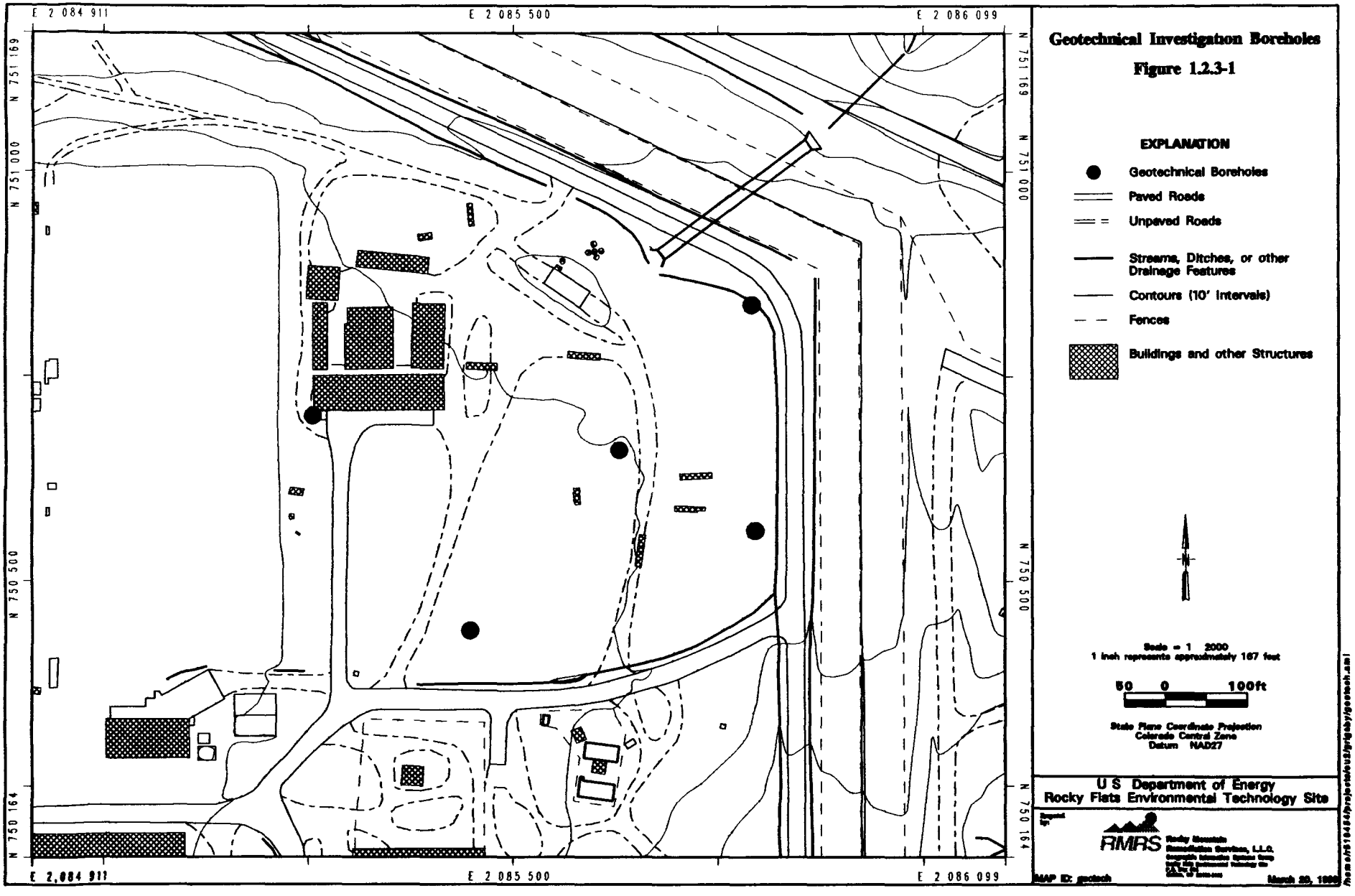
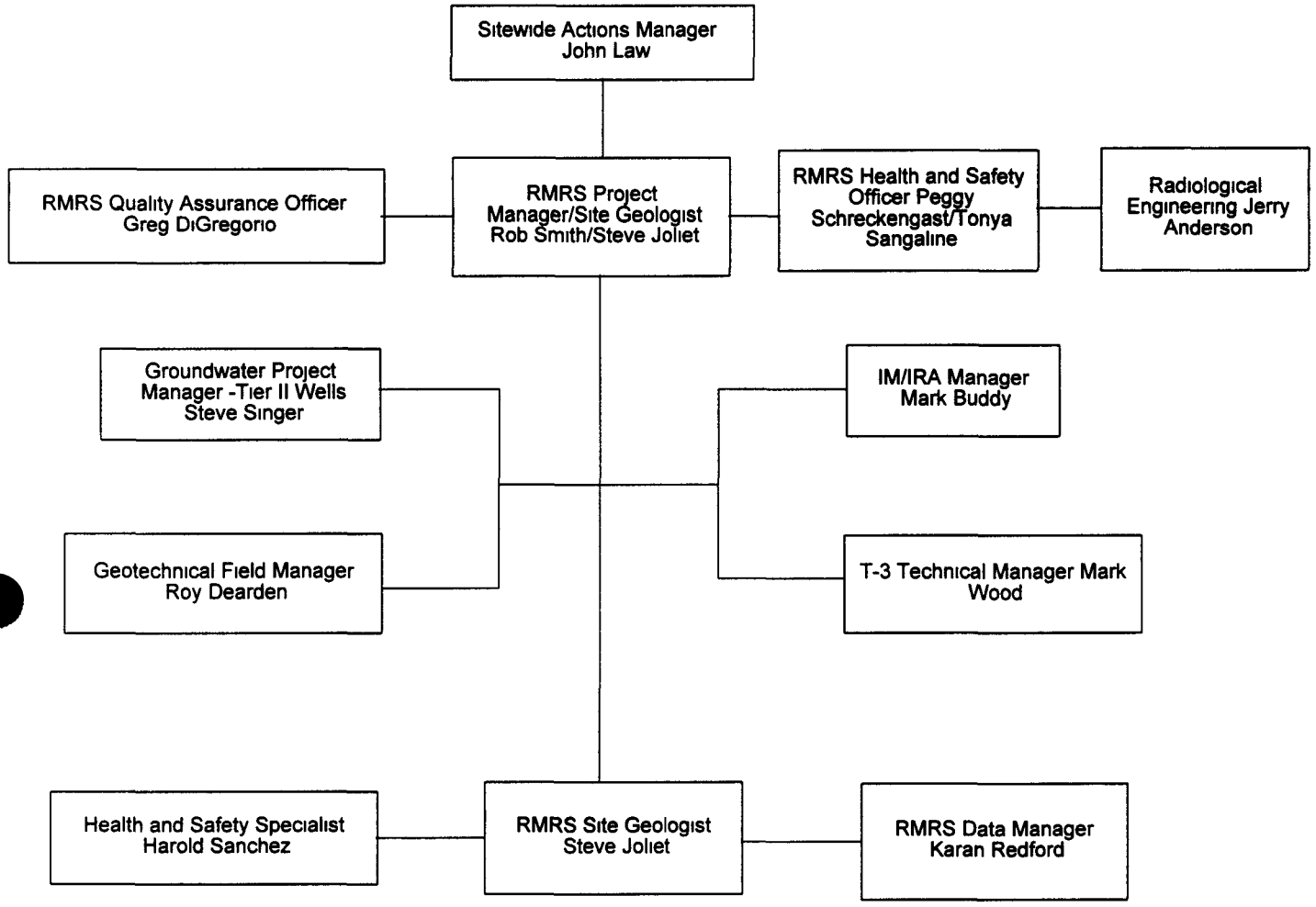

E 2 084 911
E 2 085 500
E 2 086 099
N 751 169
N 751 000
N 750 500
N 750 164
Geotechnical Investigation Boreholes
Figure 1.2.3-1
EXPLANATION
Geotechnical Boreholes
Paved Roads
Unpaved Roads
Streams, Ditches, or other Drainage Features
Contours (10' Intervals)
Fences
Buildings and other Structures
Scale = 1 2000
1 inch represents approximately 167 feet
50 0 100ft
State Plane Coordinate Projection
Colorado Central Zone
Datum NAD27
U S Department of Energy
Rocky Flats Environmental Technology Site
RMRS
MAP ID: geotech
March 30, 1999

Figure 1 3-1

WELL ABANDONMENT AND REPLACEMENT PROGRAM
PROJECT ORGANIZATION



1 3.1 RMRS Project Positions

RMRS Project Manager

The RMRS Project Manager is the primary interface between the RMRS project management which this FY96 WARP Work Plan supports and the RMRS Field Geologist The project manager communicates with the field geologist as required, and provides overall project direction from RMRS The Project Manager will also act as the RMRS Field Project Manager

RMRS Field Project Manager

The field project manager or designee is responsible for coordinating project activities and providing managerial and technical support to help ensure that schedules are met and necessary resources are available to conduct the project The field project manager or designee is the main point of contact for matters of project scope, technical direction, peer review of field forms, schedule, and budget

RMRS Quality Assurance (QA) Officer

The QA officer evaluates the task for quality requirements in compliance with the QAPP (RMRS 1995) and standards of professional practice The QA officer approves all documents addressing quality parameters, conducts orientations, and performs reviews and audits of field activities, project records, and other functions that potentially affect project quality

RMRS Health and Safety (H&S) Supervisor

The HS supervisor provides oversight and direction and performs audits to help ensure adherence to the H&S requirements of the WARP HASP and professional standards of practice

RMRS Health and Safety Specialist (HSS)

The HSS provides monitoring services for hazardous, chemical, and radiological contaminants in the work area Certain minimum qualifications and training requirements must be met before a HSS shall be

authorized to perform monitoring services HSSs must be certified by Radiological Engineering and Industrial Hygiene in accordance with relative and appropriate standards A subcontractor HSS, to be determined, may be substituted on the basis of RMRS HSS availability

RMRS Site Geologist

A site geologist will supervise subcontractor drilling crews and conduct project field operations on a day-to-day basis The site geologist will be responsible for compliance with the requirements of this work plan and other applicable project documents, including completion and authentication of all field forms The site geologist will conduct a variety of support tasks that help ensure that facilities, equipment, supplies, vehicles, and records are of high quality for job performance

RMRS Technician and Data Manager

A data manager will be responsible for entering data acquired in the field into the Rocky Flats Environmental Database System (RFEDS) in accordance with applicable standard operating procedures The field technician will assist the site geologist, as needed, in compliance with the requirements of this work plan and other applicable project documents, including completion of all field forms The field technician will also help with soil sampling and sample management The field technician will assist with a variety of support tasks that help ensure that facilities, equipment, supplies, vehicles, and records are of high quality for job performance A subcontractor technician or data manager may be substituted on the basis of availability

1.3.2 Drilling Subcontractor Representative

The drilling subcontractor's representative is the only individual authorized to discuss work schedules and related matters with RMRS personnel The subcontractor's representative will submit a daily drilling summary report of work and materials attributed by bid item which the subcontractor's representative and RMRS site geologist will co-sign at the completion of each work day

1.4 WORK LOCATION AND SITE DESCRIPTION

RFETS operations have generated nonhazardous, hazardous, radioactive, and mixed radioactive waste and these types of wastes may be encountered in the subsurface Groundwater monitoring wells proposed for abandonment, installation, and the geotechnical borings are located within the site perimeter of RFETS which comprises approximately 6,550 acres RFETS is divided into three security zones (See Figure 1 2-1) The major RFETS structures, including all former production buildings, are located within the 400-acre Site Security Zone (i e , controlled area [CA]) Within the CA is the PA, which surrounds the most secure former production areas of RFETS The controlled area is surrounded by a 6,150 acre Buffer Zone (BZ)

The eleven wells to be abandoned include nine wells in the Trench T-3 area of the BZ and two wells at the Mound Site in the CA The eight monitoring wells to be installed include four in the PA , one in the CA, and three in the BZ The five geotechnical boreholes are located in the PA Access requirements and operating procedures vary widely between the PA, CA, and BZ

1 5 RFETS CONDITIONS

The Site is situated on an eastward-sloping pediment capped by alluvial deposits At RFETS, the pediment surface is dissected by a series of east-northeast trending stream-cut valleys These valleys lie 50- to 200-ft below the level of the pediment surface Most bedrock is concealed beneath colluvial material accumulated along the gentle valley slopes The geology of RFETS has been described in the Geologic Characterization Report, (EG&G 1995b) and in the "Phase II Geologic Characterization, Data Acquisition (EG&G 1992a) " These reports provide detailed descriptions of the soils and rock units found in the subsurface at RFETS In addition, boring logs exist for wells installed after 1986 These boring logs will be used by the RMRS Site Geologist for estimation of subsurface lithologies at the proposed new well and geotechnical boring sites The new monitoring wells will be installed in the unconfined UHSU Well completion and subsurface data for the wells and piezometers to be abandoned is available and were used to estimate the drilling and grouting requirements

The groundwater conditions at RFETS have been described in the Hydrogeologic Characterization Report (EG&G 1995c), and Well Evaluation Reports (EG&G 1994a and 1994) Groundwater at RFETS occurs under confined and unconfined conditions

2.0 WELL ABANDONMENT, INSTALLATION, AND GEOTECHNICAL DRILLING

The following sections address the well abandonment, installation, and geotechnical drilling procedures, RFETS access, reporting and documentation, permitting requirements, and field communications as they pertain to WARP Activities to be conducted under WARP will be conducted in accordance with Environmental Management Division (EMD) geotechnical, groundwater, and field operations OPs, which are incorporated by reference into the Work Plan

2 1 WELL ABANDONMENT

This section presents the well abandonments to be performed during FY96 WARP Table 2 1-1 lists and Figures 1 2 1-1 and 1 2 1-2 locate the wells to be abandoned during FY96 WARP Instructions for well abandonment activities are described in OP GT 11, Plugging and Abandonment of Wells The following sections address key elements of OP GT 11 and other relevant OPs as they apply to WARP Decontamination and environmental material handling procedures pertaining to well abandonment activities are addressed in Sections 2 4 and 2 5

2 1 1 Pre-Abandonment Activities

Pre-abandonment activities, including radiation screening and work site preparation, will be conducted at each abandonment site in accordance with the RMRS WARP task-specific HASP, and OP FO 16, Field Radiological Measurements In addition, the following pre-abandonment activities not specifically addressed in the OPs will be necessary

- Measure and record groundwater level and total depth of the well

- Calculate the volume of water contained within the well to ensure the construction of an amply sufficient waste liquid containment structure as described in OP GT 11

TABLE 2 1-1

WELL INFORMATION FOR WELL ABANDONMENTS

- FY96 WARP

Well	Well Class	Northing	Easting	Well Status	Completion	Hydro-Stratigraphic Unit	Surface Elevation (feet)	BOT Conductor Casing (feet)	Diameter Conductor Casing (inch)	TD Well Casing (feet)	Diameter Well Casing (inch)	Top of Filter Pack (feet)	Top of Screen (feet)	BOT Screen (feet)	BOT Filter Pack (feet)	Top Bedrock (feet)	TD Boring (feet)
24093	PZ	749808	2086918	INSTALLED	ALLUVIUM	UHSU	5956 0	0 0	0 0	18 1	4 0	5 0	6 0	15 4	16 2	13 4	18 3
24193	CW	749808	2086905	ABANDONED	BEDROCK	UHSU	5956 0	15 0	12 0	74 4	4 0	20 5	22 0	72 0	75 0	12 9	75 0
24293	PZ	749786	2086903	INSTALLED	ALLUVIUM	UHSU	5957 0	0 0	0 0	17 0	4 0	4 0	5 0	15 0	15 6	14 6	17 6
24393	IW	749789	2086907	ABANDONED	BEDROCK	UHSU	5957 0	17 0	12 0	74 4	4 0	21 0	22 0	72 0	75 0	15 1	75 0
24493	PZ	749807	2086895	INSTALLED	ALLUVIUM	UHSU	5956 0	0 0	0 0	13 5	2 0	6 9	8 1	11 1	13 5	13 0	15 2
24593	PZ	749781	2086904	INSTALLED	ALLUVIUM	UHSU	5956 0	0 0	0 0	13 8	2 0	7 3	8 3	11 3	13 8	13 3	14 2
24693	PZ	749787	2086918	INSTALLED	ALLUVIUM	UHSU	5956 0	0 0	0 0	14 5	2 0	7 2	9 0	12 0	14 5	13 7	16 4
24993	PZ	749809	2086910	ABANDONED	BEDROCK	UHSU	5956 0	17 0	8 0	76 0	2 0	22 0	23 4	67 6	76 0	14 3	76 0
25093	PZ	749787	2086912	ABANDONED	BEDROCK	UHSU	5957 0	17 1	12 0	71 0	2 0	21 0	23 0	68 0	71 0	15 1	71 0
1987	MW	749623	2086171	INSTALLED	ALLUVIUM	UHSU	5968 4	0 0	0 0	11 9	2 0	3 0	3 5	11 9	12 2	10 8	16 1
22393	PZ	749564	2086121	INSTALLED	BEDROCK	LHSU	5969 3	3 1	8 0	121 3	2 0	106 0	108 2	118 0	121 0	11 4	121 3

PZ = Piezometer
CW = Collection Well
IW = Injection Well
MW = Monitoring Well

BOT= Bottom
TD = Total Depth
UHSU = Upper Hydrostratigraphic Unit

- Break up and remove the concrete well pad as specified in OP GT 11 Remove the protective casing as specified in OP GT 11

2.1 2 Abandonment Methods

Wells shall be abandoned by one of five methods in accordance with OP GT 11

1) Casing Pulling

2) Casing Destruction (i e , drilling out casing)

3) Overdrilling

4) Overcoring

5) Abandonment in Place (i e , without casing removal)

Under WARP, the Phase I wells listed in Table 1 2 1-1 will be abandoned using mainly the overdrilling and casing pulling methods, due to favorable well completions less than 18-ft, static groundwater levels of 22-ft, combined with the remedial objective of Trench T-3 Table 2 1 2-1 lists available well data for each of the eleven wells to be abandoned The Phase II wells listed in Table 1 2 1-2 will be abandoned using mainly the abandonment in-place method The abandonment in-place method is preferred for the Phase II wells because the volume of investigative-derived materials can be minimized Unless unforeseen conditions are encountered in the field, the nine Phase I wells will be abandoned by overdrilling the well casing to completely remove all well construction materials from the five alluvial soil vapor extraction (SVE) wells, or by drilling out the grout within the four bedrock wells conductor casing If these methods prove to be inappropriate, the wells will be abandoned by one of the other three methods listed above

Some wells scheduled for abandonment may have been drilled much deeper than the present total depth, then plugged back and completed in a shallower zone If grout is encountered immediately beneath the casing, drilling or reaming activities will be terminated If sand pack or backfill is present below the

current total depth, it will be removed by reaming or drilling to the original total depth or until grout is encountered The grouted interval is considered to be previously abandoned, therefore, reaming or drilling through the grout is not necessary

Casing Destruction

Casing destruction can be used only on wells with PVC well casing This method involves drilling out the well casing and annular completion materials with a rotary drill bit or auger Procedures for drilling out casing are provided in GT 11 The RMRS site geologist will determine through cuttings examination when all annular materials have been reamed from the borehole

Pulling Casing

Wells with steel, stainless steel, or cast iron casings shallower than a total depth of 30 ft can potentially be abandoned by casing pulling It is possible that casings in some of these wells will exceed the available lifting capabilities of the drilling rigs, making it necessary to resort to overdrilling and overcoring or casing destruction Procedures for pulling casing and casing destruction are provided in GT 11 To perform the activities written in GT 11, it will be necessary to attach the well casing to the drilling rig hydraulic feed or the hydraulic jack The appropriate method for accomplishing this will be determined by field personnel based on existing conditions at the particular well The RMRS site geologist will determine through cuttings examination when all annular materials have been reamed from the borehole

Overdrilling and Overcoring

Overdrilling and overcoring employ a hollow-stem auger (i e , overdrilling) or air-rotary coring bit (i e , overcoring) to remove annular materials from around the casing, isolating and freeing it for removal The only fundamental difference between the two methods is the drilling technique used Overdrilling, which is typically less time-consuming than overcoring, can be used only on relatively shallow wells where the casing is embedded in soft or unconsolidated materials Overcoring is used as necessary on deeper wells and/or where the casing is embedded in consolidated rock The decision on which of the

two methods to use will be made in the field by drilling crews In most situations, overdrilling may be used to a certain depth, at which time the drilling subcontractor will switch to overcoring

The five alluvial SVE wells will be over drilled to the total depth of the filter pack (see Table 2 1 2-1) The four bedrock wells were previously abandoned using the overdrilling method and removal of the conductor casing is now required, the grout within the conductor casing will be drilled out to the bottom of the conductor casing (see Table 2 1 2-1) The conductor casing will remain in the ground until subsequent removal during the soil excavation operations

Abandonment In-place

Wells that do not penetrate a confined hydrostratigraphic unit may be grouted as described in Section 5 2 3 of GT 11 Wells penetrating more than one aquifer or contaminant zone may also be abandoned with the casing left in-place providing that construction documentation indicates that the casing opposite each confining layer or between two contaminant zones has been properly grouted If the well is known to be nonviable due to absent or inadequate grouting, the casing in such intervals must be perforated or ripped The two Phase II wells (1987 and 22393) will be abandoned in-place by grouting Abandonment in-place shall consist of filling the casing interval with bentonite grout from well casing total depth to within 1- to 2-ft of ground surface The well casing will be cut off 1- to 2- ft of ground surface and a locking "J" cap or equivalent will be placed on the casing

2 1 3 Wellbore Grouting

After casing removal, abandoned wellbores will be grouted in accordance with the detailed procedures in OP GT 05, Plugging and Abandonment of Boreholes and modified below due to the soil remediation activities The five alluvial wells in Trench T-3 will be backfilled with bentonite and hydrated so as to not interfere with the soil excavation The four bedrock well conductor casings in Trench T-3 will not be backfilled, see Section 2 1 4, Surface Protection

2 1 4 Surface Protection

Surface protection features for abandoned wells are addressed in OP GT 11 This included the construction of a concrete slab at the surface of each abandoned well site This slab will require preparation of a form with inside diameter or dimensions at least 2-ft greater than the diameter of the wellbore The form will be placed to ground surface around the wellbore, and the ground surface within the form will be excavated to a depth of 4 to 6 in so that the final grade of the form is equal to or less than the surrounding ground surface The five alluvial well abandonments in Trench T-3 will only require placement of a stainless steel marker into a concrete plug The concrete plug will be placed to a maximum depth of 1-ft into the borehole The four conductor casings from the four T-3 bedrock wells will have either a locking "J" cap or some type of equivalent well cap placed on the conductor casing Excavated soil will not be allowed to fall into the wellbore A permanent stainless steel marker will be affixed to each concrete slab

2 2 WELL INSTALLATIONS

This section presents the new well installations to be installed during FY96 WARP Table 2 2-1 lists and Figures 1 2 2-1 and 1 2 2-2 locates the new groundwater monitoring wells planned for FY96 WARP Table 1 2 2-1 summarizes the siting rationale used for each new monitoring well Table 2 2-1 also lists the approximate total depth and screen interval for each location, final determinations to be made in the field Five groundwater monitoring wells are proposed in support of the IA decontamination and decommissioning activities (see Figure 1 2 2-1) These wells are located in the PA and peripheral industrial areas where unmonitored potential groundwater flow pathways exist to nearby drainages The three Tier II monitoring wells, two located in Woman Creek and one in South Walnut Creek, are proposed in support of routine groundwater monitoring activities (see Figure 1 2 2-2)

Table 2.2-1 New Groundwater Monitoring Wells - FY96 WARP

Well Number	Total Depth (ft)	Screen Interval (ft)
22596	34	20-32
22696	24	12-22
22796	14	2-12
22896	14	2-12
22996	14	2-12
23096	11	4-9
23196	10	3-8
23296	10	3-8

The FY96 WARP well borings will be drilled in accordance with OP GT 01, Logging Alluvial and Bedrock Material, OP GT 02, Drilling and Sampling Using Hollow-Stem Auger Techniques, and OP GT 04, Rotary Drilling and Rock Coring Decontamination and waste handling procedures pertaining to well installation are addressed in Sections 2 4 and 2 5

2.2 1 Pre-Drilling Activities

All wells planned for installation at the site will require prior documentation to the Office of the State Engineer, Colorado Division of Water Resources This will be implemented by comparison of the Well Installation Notification form provided in OP GT 06

Before drilling wells, well locations will be cleared in accordance with OP GT 10, Borehole Clearing, and marked in accordance with OP GT 02 A prework radiological survey will be conducted in accordance with OP FO 16, Field Radiological Measurements Required permits will be obtained as described in Section 2 6 All necessary H&S protocols will be followed in accordance with the RMRS WARP task-specific HASP

2.2 2 Borehole Drilling

Well boreholes will be drilled using hollow-stem auger techniques Detailed hollow-stem auger drilling and sampling procedures are provided in OP GT 02 Borehole samples collected during implementation of the Field Sampling Plan as described in Section 2 6, will be handled in accordance with OP FO 13, Containerization, Preserving, Handling and Shipping of Soil and Water Samples, and logged per OP GT 01 Detailed sample logging will be performed by the site geologist

2.2.3 Well Installation

Groundwater monitoring wells will be installed in accordance with OP GT 06, Monitoring Wells and Piezometer Installation, and constructed with 2-in diameter PVC casing and screen Monitoring wells will be completed in the UHSU using single casing well construction designs or as described below for the three Tier II wells (i e , 23096, 23196, and 23296) Well screens will be installed as near to the base of the alluvium as possible Penetration into bedrock of several feet by drilling and sampling the

underlying consolidated materials will be used to confirm the top of bedrock New monitoring wells will be land surveyed in accordance with OP GT 17, Land Surveying or standard RFETS global positioning system procedures

The three Tier II wells may require shorter surface protective casings and shorter screens due to the shallow depth to bedrock In addition, the Tier II wells will be double-cased and constructed similar to the procedures used during implementation of the FY94 WARP Work Plan (EG&G 1994) for wells downwind of the 903 pad to prevent potentially contaminated surface soil from entering the borehole These wells will be constructed with a 16 in diameter, mild steel, surface conductor casing to a depth of 18 to 24 in in accordance with OP GT 03, Isolating Bedrock from Alluvium with Grouted Surface Casing, using concrete instead of grout to avoid the potential for frost damage Surface soil samples and soil from the bottom of the surface casing will be collected However, these samples will be stored onsite to be analyzed at a later date if groundwater analyses are considered anomalous

2 3 GEOTECHNICAL BOREHOLE DRILLING AND SAMPLING

This section presents the geotechnical boreholes to be drilled during FY96 WARP for the low-level mixed hazardous waste management facility

2.3 1 Pre-Drilling Activities

Before drilling boreholes, all locations will be cleared in accordance with OP GT 10 and marked in accordance with OP GT 02 A prework radiological survey will be conducted in accordance with OP FO 16 Required permits will be obtained as described in Section 2 6 All necessary Health and Safety protocols will be followed in accordance with the RMRS WARP task-specific HASP

2 3 2 Borehole Drilling

Boreholes will be drilled using hollow-stem auger techniques at the locations in Figure 1 2 3-1 Detailed hollow-stem auger drilling and sampling procedures are provided in OP GT 02 Borehole samples collected during implementation of the Field Sampling Plan as described in Section 2 6, will be handled

in accordance with OP FO 13, and logged per OP GT 01 Detailed sample logging will be performed by the field supervisor

2 4 EQUIPMENT DECONTAMINATION

Equipment used for WARP field operations will be decontaminated in accordance with OP FO 03, General Equipment Decontamination, and OP FO 04, Heavy Equipment Decontamination Decontamination activities requiring the use of the RFETS Main Decontamination Facility (MDF) will be performed per the requirements of OP FO 12, Decontamination Facility Operations Other OPs cross-referenced in OP FO 03, OP FO 04, and OP FO 12 contain additional applicable equipment-specific decontamination guidance

Decontamination procedures will be implemented to minimize

- Potential Cross-Contamination
- Offsite Contaminant Migration
- Personnel Exposure from Improperly Decontaminated Equipment

The RMRS site geologist will be responsible for ensuring that all decontamination protocols specified in the OPs are followed

2 5 ENVIRONMENTAL MATERIAL HANDLING, LABELING, AND DISPOSAL

WARP field operations will generate liquid and solid environmental investigation-derived materials (IDM) Liquid materials include drilling fluids, decontamination and wash water, and residual groundwater Solid materials include drill cuttings, removed casing, surface soils, disposable personal

protective equipment (PPE), and plastic Handling and disposal of these materials will be conducted in accordance with the following OPs

- **OP FO.06, Handling of Personal Protective Equipment** — Applicable to personal protective equipment and plastic ground sheet used at work sites

- **OP FO.07, Handling of Decontamination Water and Wash Water** — Applicable to decontamination and wash water

- **OP FO.08, Handling of Drilling Fluids and Cuttings** — Applicable to drill cuttings, drilling fluids, surface soil, and residual groundwater displaced during well abandonment

- **OP FO.10, Receiving, Labeling, and Handling Environmental Material Containers** — Provides guidance for the procurement, labeling, and use of environmental material containers (i e , drums)

- **OP FO.23, Management of Soil and Sediment IDM** — Provides guidance for handling soil and sediment from the point of generation through the characterization process and includes the handling of drums in which these materials are contained

- **OP GT.02, Drilling and Sampling Using Hollow-Stem Auger Techniques** — Provides guidance for obtaining geochemical data to characterize environmental materials placed into drums

- **OP GT.11, Plugging and Abandonment of Wells** — Provides information on handling and disposal of removed casing and additional information on handling and disposal of displaced residual groundwater

The RMRS site geologist will be responsible for proper handling of environmental materials at the work sites, proper labeling of environmental material containers, and completion of required forms and documentation The field supervisor will be responsible for coordinating the removal and transfer of all environmental materials from the project work areas to the designated transfer area The data manager

will be responsible for entering appropriate location code numbers and sample numbers into a database compatible with input into RFEDS in accordance with OP FO 14 and Administrative Procedure 17 01, Records Capture and Transmittal for all Records

OP FO 23, Management of Soil and Sediment IDM, describes the conditions under which drill cuttings and annular materials will be contained in drums If the monitoring well to be installed or abandoned is located in an area of concern such as a radioactive management area (RCA), IHSS, a Potential Area of Concern (PAC), an Additional Area of Concern (AAC), or if field screening indicates that constituent concentrations are above the ambient levels as measured by field instruments, then all material brought to the surface will be drummed and composite sampled for waste determination

Well abandonments will use analytical data generated during previous soil sampling (OP GT 02) if located in any of the above referenced areas of concern and on the basis of results of field screening (OPs, FO 15, FO 16, and FO 23) Drill cuttings and well construction materials generated during abandonment will be stored and treated as part of Trench T-3 and Mound Site soil remediation operations, respectively

The RMRS field supervisor will ensure that the following duties are executed by subcontractor personnel

- Arranging for the appropriate drums to be collected from the wellsite and transferred to the appropriate storage area

- Ensuring waste materials are not commingled and are properly segregated (i e , PPE with other solid wastes)

- Ensuring drums are properly filled, labeled, and positioned in the field

- Ensuring all documentation is completed properly and a tracking system is implemented that shall account for each drum

- Assisting with periodic inspections of drums issued for WARP by RMRS

- Arranging for drum transfer to RMRS

2 6 FIELD SAMPLING PLAN

Plan and is intended to meet or exceed the general RFETS sampling and analytical requirements Specifically this field sampling plan covers the collection and analysis of waste characterization samples from the five monitoring wells in the PA, the geotechnical sampling and analysis for the five geotechnical borings Applicable OPs are OP GT 02, OP GT 04, and OP FO 13 All chemical laboratory work will be done according to the U S Environmental Protection Agency's (EPA's) Contract Lab Program (CLP) standards The CLP-type analysis is outlined in Version 3 of the General Radiochemistry and Routine Analytical Service Protocol (GRRASP)" (EG&G 1994)

2 6 1 Well Installations

Composite samples of drummed soils will be collected for waste characterization purposes for the five well installations in the industrial area It is expected that no more than one suite of waste characterization samples will be required for each separate well location These waste characterization soil samples will be analyzed for VOA by EPA-CLP SOW (see Table 1 of GRRASP, EG&G 1994), selected radionuclides, and target analyte list (TAL) metals by EPA-CLP SOW (see Table 37 of GRRASP, EG&G 1994) Specific analytes of radionuclide analysis will include a radiation screen, gross alpha, gross beta, uranium 233/234, 235, and 238, plutonium 239/240, and americium 241 Analysis for radioactive isotopes will only be conducted if field readings are greater than twice background which indicate the potential for radioactive contamination Under RFEDS the waste characterization soil samples will be labeled with the prefix "BP"

As stated in Section 2 2 3, surface soil samples and soil from the bottom of the surface casing will be collected from the three Tier II wells These samples will be stored onsite to be analyzed at a later date for radionuclides if groundwater analyses are considered anomalous Specific analytes for radionuclide analysis will include gross alpha, gross beta, uranium 233/234, 235, and 238, plutonium 239/240, and

americium 241 Under RFEDS the surface soil samples and soil from the bottom of the surface casing will be labeled with the prefix "SS"

Well development and groundwater sampling are not planned as part of the well installation activities These activities will be performed as part of routine monitoring operations under the RMRS GMP

2 6 2 Geotechnical Investigation

Representative geologic data and soil samples for geotechnical laboratory analysis will be collected from five boreholes planned at IHSS 165 in the PA Drilling will be conducted within a 20-ft radius of existing borings to avoid waste characterization costs The approximate location of these borings are presented in Figure 1 2 3-1 The final borehole locations will be selected by a RMRS geotechnical engineering subcontractor following an examination of available site geologic and geotechnical information

Boreholes will be drilled to projected depths of between 40- to 65-ft until unweathered bedrock is encountered One sample each of alluvial and weathered bedrock materials will be collected from each boring at depths to be determined by the RMRS geotechnical engineering subcontractor Alluvial samples will be analyzed for the following geotechnical parameters, unless otherwise directed by the RMRS geotechnical engineering subcontractor

1) Grain Size Distribution (American Society of Testing and Materials [ASTM] D422)

2) USCS Classification (ASTM D2487)

3) Atterberg Limits (ASTM 4318)

4) Moisture Content (ASTM 2216)

5) Density (D2937)

6) Unconfined Compression (D2166)

7) Compaction Characteristics (ASTM 698 – Standard Proctor)

8) Triaxial Shear Strength, confined (ASTM D4767)

9) Corrosivity (Hach colorimeter including sulfate content, Cl content, and hydronium ion concentration [pH])

10) Plate Bearing (ASTM 1883 – California Bearing Ratio)

For weathered bedrock, the following tests will be performed

1) Grain Size Distribution (ASTM D422)

2) USCS Classification (ASTM D2487)

3) Moisture Content (ASTM D4318)

4) Density (ASTM D2937)

5) Unconfined Compression (ASTM D2166)

6) Consolidation (ASTM D2435)

7) Swell Consolidation (ASTM D4546)

8) Triaxial Shear Strength, confined (ASTM D4767)

9) Corrosivity (Hach colorimeter including sulfate content, Cl content, and pH)

All geotechnical laboratory testing will be done according to ASTM standards by a Kaiser-Hill laboratory subcontractor

In addition to geotechnical samples, radiological screening samples will be taken and analyzed from all intervals selected for geotechnical testing Radioactive soil sample screening consists of screening for Gross Alpha and Gross Beta These analyses will assure that samples comply with offsite shipping and laboratory requirements

Laboratory data generated by the geotechnical investigation will be interpreted by the RMRS geotechnical engineering subcontractor and will be presented in a report that summarizes the results of the geotechnical testing program

2.7 PERMITS

Permits and procedures for authorizing intrusive work at RFETS are discussed in OP GT 10 Drilling activities will require obtaining soil disturbance approval as provided in OP GT 24, Approval Process for Construction Activities on or Near Individual Hazardous Substance Sites (IHSSs), and currently being revised as a Level 1 Procedure 1-F20-ER-EMR-EM 001, Environmental Approval Process for Construction Activities on or Near IHSSs Access permits are also required for work in some restricted areas The WARP HASP will outline access permits required due to H&S concerns A project-specific land use permit will also be required

Actions relating to the wells located in the floodplains that are proposed for installation shall be reviewed to maintain compliance with the National Environmental Policy Act (NEPA) and the requirements of 10 CFR 1021 and 10 CFR 1022

2 8 FIELD COMMUNICATIONS

RFETS field communications will follow protocols described in OP FO 11, Field Communications A short training session on the use of site telephones and radios will be conducted by RMRS Communication protocols and emergency signals will be included in the training In the event of an emergency, procedures outlined in the WARP HASP and the RFETS HASPP shall be followed

A WARP project office will be established in a trailer at RFETS This trailer is served by telephone Field teams will use two-way radios for communication with the field office and other field teams The

buddy system will be used during all field activities (i e , all work will be conducted in pairs or groups of personnel)

2 9 RECORDS AND REPORTS

Daily WARP field activity documentation will entail completion by the site geologists of field forms provided in the OPs Field data will be managed in accordance with OPs, FO 02 and FO 14 In addition, field activity daily logs shall be maintained by the geologists These logs will contain a chronological account of the day's activities, and shall include interpretations of the final subsurface conditions Particular attention shall be given to documenting the quantity of grout used in each borehole or well casing and the total drilling depth The groundwater level before abandonment shall be recorded, and any unusual conditions shall be documented At the end of each day, a signed copy of the daily logs shall be presented to the field supervisor for review and filing and a weekly transmittal will be sent to the RMRS Project Manager

A sample tracking spreadsheet will be maintained by RMRS for use in tracking sample collection and shipment

Project reporting for WARP will consist of the following

- **Daily Contact** — The field supervisor shall apprise the WARP project manager or designee of project progress on a daily basis

- **Weekly Reports** — During the course of field activities, weekly memos will be prepared by the WARP project manager for the RMRS project managers summarizing the progress of the project as it relates to their specific task and any problems encountered

- **Data Reports** — Field data will be input to RFEDS using a remote data entry module Data will be entered on a 3 5-in computer diskette and will be delivered on a timely basis Procedures for data quality control, verification, entry into RFEDS, archiving, and security will follow OP FO 14

- **WARP Report** — A report will be prepared following completion of WARP FY96 field activities which will detail the performance and results of the project

- **Notification Letters** — Copies of well abandonment logs and forms and well installation logs and forms for each well, along with a summary letter explaining the activities, will be delivered to Kaiser-Hill for submittal to DOE/Rocky Flats Field Office (RFFO)

- **State Well Abandonment Forms** — Copies of the State of Colorado Well Abandonment Forms for each abandoned well shall be filled out and submitted to Kaiser-Hill for submittal to DOE/RFFO upon completion of FY96 WARP field activities

- **State Well Permit Application Forms** — A Notice of Intent to Construct a Well for each new well shall be filled as specified in OP GT 06 Copies of the State of Colorado Well Permit Application Forms will be submitted to Kaiser-Hill for submittal to DOE/RFFO upon completion of FY96 WARP field activities

3.0 H&S

H&S requirements for WARP field operations are provided in the task-specific HASP prepared by RMRS The HASP is a project-specific document developed to address site task-specific issues such as

- Levels of Personal Protection
- Overall Hazard Estimate for the Various Work Areas
- Site Conditions and Material Characteristics (Including a Radiological Assessment)
- Work Area Control Zones
- Decontamination
- Emergency Procedures
- Personnel H&S Responsibilities
- Drilling Safety Protocols

The HASP incorporates elements of previous WARP Health and Safety Plans In addition, the HASP will comply with Occupational Safety and Health Administration (OSHA) regulations defined in 29 CFR 1910

The H&S supervisor will be responsible for ensuring that all personnel performing or supporting project field operations are cognizant of all H&S procedures The HSS and the site geologist will be responsible for ensuring that field personnel follow these procedures RMRS will provide a contaminant characterization for each work area before commencement of work in that area

4.0 QA ADDENDUM (QAA)

This section consists of the QAA for the FY96 WARP This QAA supplements the QAPP (RMRS 1995) This QAA identifies the site-specific QA controls applicable to the WARP activities described in Section 2 0

As stated previously, WARP consists of an annual maintenance program for the RFETS GMP The primary objectives of WARP are to properly abandon groundwater monitoring wells and piezometers that are no longer viable or needed as part of the GMP, to install new wells to be added to the GMP, and to install replacement wells or piezometers at locations where a nonviable but useful well or piezometer (i e , generates groundwater monitoring data that is used in the GMP) is removed The scope of the proposed FY96 WARP was described in Section 1 2

4 1 ORGANIZATION AND RESPONSIBILITIES

The overall organization of RMRS and ER, which is responsible for implementing the ER Program activities at RFETS, is presented in Section 1 0 of the QAPP Functional responsibilities for ER are also described in Section 1 0 of the QAPP The project-specific organization for the FY96 WARP is shown in Figure 1 2 The project specific staffing and description of responsibilities were discussed in Section 1 3

4 2 QA PROGRAM

The quality controls and requirements for WARP will be followed in accordance to the RMRS Quality Assurance Program Plan, 95-QAPP-001, Rev 0, October, 10, 1995

4 2.1 Training

Personnel H&S training requirements are identified in the WARP task-specific HASP RMRS and subcontractor staff working on the WARP shall be trained in, and familiar with, the ER OPs that are applicable to their assigned tasks and this work plan listed in Section 5 Evidence of completion of training will be recorded, with verifiable documentation, and submitted to the WARP project manager

before initiating the FY96 WARP activities described in this work plan RMRS and subcontractor personnel shall be qualified to perform the tasks they have been assigned

4 2 2 QA Reports to Management

A QA summary report will be prepared at the conclusion of the FY96 WARP activities by the RMRS ER QA program manager This report will include a summary of any field operation and sampling oversight inspections and surveillance conducted, and a report on data verification/validation results, as appropriate

4 3 DESIGN CONTROL AND CONTROL OF SCIENTIFIC INVESTIGATIONS

4 3 1 Design Control

The WARP Work Plan establishes the requirements and specifications for well and piezometer abandonment and replacement and collection of subsurface soil samples from the drilling and installation of replacement wells and piezometers As such, the FY96 WARP Work Plan is considered the environmental investigation control plan for the proposed WARP field activities

4 3 2 Data Quality Objectives

As stated previously, WARP is a maintenance program for the RFETS GMP Specific objectives of WARP are to

- Properly abandon nonviable wells in Trench T-3 (IHSS 110) and the Mound area (IHSS 113), install new or replacement wells where groundwater monitoring data is still needed (Industrial Area and Tier II monitoring wells),

- Provide geotechnical information for the proposed Low Level Waste Management Facility

- Collect subsurface soil samples from drilling new or replacement wells that will be analyzed to assist other projects to determine presence and extent of contamination

The primary data users and decisions makers of WARP include the technical staff of RMRS and subcontractors that are responsible for implementing the WARP activities, and the technical staff of RMRS, subcontractors, DOE, EPA, and Colorado Department of Public Health and Safety (CDPHE) that are responsible for collecting, reviewing, and interpreting data associated with the RFETS GMP and the IA IM/IRA Secondary decision makers include other project managers that will use analytical data from samples collected during the drilling of new or replacement wells to help determine the presence and extent of contamination associated with their projects

Existing GMP data was reviewed and evaluated to determine which of the existing wells and piezometers needed to be abandoned and replaced on a priority basis This discussion was presented in Section 1 3 Information from existing wells was also used to select the zones of completion and projected depths for new and replacement wells, as shown in Table 2 2-1

Based on the existing information and the objectives of WARP, data is needed to prevent groundwater and soil contamination through wells and piezometers, prevent intermixing of subsurface water through the well, conserve the hydraulic characteristics of hydrogeologic units, and minimize physical and contamination hazards to workers and the environment The types of data to be generated during implementation of WARP are described below

The monitoring wells within and around the T-3 Trench will no longer be functional for monitoring groundwater beneath the IHSS 110 due to the planned contaminant source removal of the trench Wells that are not within the path of the trench remediation will be abandoned in place while the wells within the trench will be completely removed Generated waste will be treated with the remediation wastes of the trench soils through the thermal disorption unit

IA IM/IRA monitoring wells will be installed as an early warning detection system during the decommissioning and decontamination (D&D) of the IA If a detection of increasing concentration of contamination in the wells is identified, appropriate measures will be taken to mitigate the potential for release in accordance to the Action Level Framework Plan (DOE 1996) Wastes generated during the installation of these wells will be analyzed for Resource Conservation and Recovery Act (RCRA) characteristics that includes TAL metals, volatile organic compounds (VOCs), and radionuclides If the

results do not meet the criteria for landfill disposal, then the waste will be analyzed in accordance to the Waste Acceptance Criteria for Envirocare

The Tier II groundwater monitoring wells will be installed to fill data gaps for the extent of groundwater contamination in the UHSU and to identify if additional action may warranted due to future migration of contamination If contaminant concentration exceeds the RFETS Tier II standards for groundwater, necessary action will be performed in accordance to the criteria outlined in the Action Level Framework Plan (DOE 1996) Figures 1 2 2-1 and 1 2 2-2 identify the area data gaps and proposed Tier II well locations Sampling and analysis will not be performed during the installation of the wells but will conducted through the Groundwater Management Program Specific OPs are identified in Section 2 2

Soil borings will be drilled between 40 and 65 ft in IHSS 165 (see Figure 2 6 2-1) to collect geotechnical data that will determine the suitability of supporting the proposed Low Level Waste Management facility (LLWM) The decision to build the structure sand its design will be based upon the results obtained from the ASTM standards listed in Section 2 6 2 Samples collected will be collected from alluvial and bedrock material for geotechnical testing and will be screened for radionuclides before shipment to an offsite laboratory

The field data to be generated during implementation of WARP field screening techniques and analysis (or measurements) using portable instruments The quality of field data will be controlled by adhering to the ER Operating Procedures (EG&G 1992b) identified previously in Section 2 0 and summarized below, in addition to the manufacturers specifications for use and calibration

The WARP field measurement data will include wellbore depths and diameters, depths to bedrock and water level in wells and piezometers, and depth of soil samples These measurements will be made and controlled in accordance with instructions contained in OP GT 02, Drilling and Sampling Using Hollow Stem Auger Techniques, OP, GT 03, Isolating Bedrock from Alluvium with Grouted Surface Casing Drill core from borings for replacement wells/piezometers will be logged according to OP GT 01, "Logging Alluvial and Bedrock Material " Electromagnetic and/or ground penetrating radar (GPR) measurements will be made of all wellbore locations for new or replacement wells as part of surface geophysical surveys conducted to detect areas where subsurface metal object might be located The use of geophysical equipment to generate electromagnetic or GPR data will be in accordance with

instructions specified in OP GT 10, "Borehole Clearing " The use of downhole geophysical logging tools will be in accordance with instructions specified in OP GT 15, "Geophysical Borehole Logging " Radiation contamination screening measurements will be made at all existing and proposed well locations in accordance with instructions specified in OP FO 16, "Field Radiological Measurements " Radiation and organic vapor screening measurements will also be made during drilling and sampling activities Organic vapor measurements will be made in accordance with instructions specified in OP FO 15, "Photoionization Detectors (PIDs) and Flame Ionization Detectors (FIDs) "

4.3.3 Sampling

The relative operating procedures to be followed during the implementation of this plan are listed in Section 5 References The analytical methods will be performed in accordance to the GRRASP and the waste acceptance criteria for Envirocare All geotechnical samples for the soil borings will follow the ASTM standards listed in Section 2 6 2

4 3 4 QC

Field sampling QC will consist of the collection and analysis of duplicate soil samples at the rate of 1 per 20 samples and preparation and analysis of an equipment rinsate blank for every twenty soil samples collected Precision and accuracy of the samples will be in accordance to the selected laboratories and/or per requirements of the Envirocare waste acceptance criteria Analytical laboratory QC for soil sample analyses shall be as specified in GRRASP (EG&G 1993b) Duplicate samples shall be analyzed for the same analytes of interest as regular (REAL) samples Equipment blanks shall be analyzed for the same target analytes as regular samples, however, radionuclide analysis of equipment blanks shall be limited to gross alpha, gross beta, gamma, and tritium A completeness goal of 100 percent is proposed for the program

4 3 5 Data Reduction, Verification, and Reporting

Field data generated during implementation of the WARP field activities shall be recorded on field data forms provided in the applicable OPs Data reduction, verification, and reporting of field data shall be

accomplished according to the instructions specified in OP FO 14, "Field Data Management "
Figure 4-1 "Data Flow for Analytical Data" illustrates the data management process

4 4 CONTROL OF PROCESSES

The overall processes of generating field data and collecting samples require control The processes are controlled by adhering to the WARP Work Plan and the operating and sampling procedures referenced

4 5 QA RECORDS

Field QA records will be controlled in accordance with OP FO 14, Field Data Management, EMD Administrative Procedure 3-21000-ADM-17 01, and ADM-5 14 Field QA records include the OPs data forms that are completed as a result of implementing the WARP field activities and copies of field logbooks This WARP Work Plan and any subsequent changes or revisions are also considered QA records

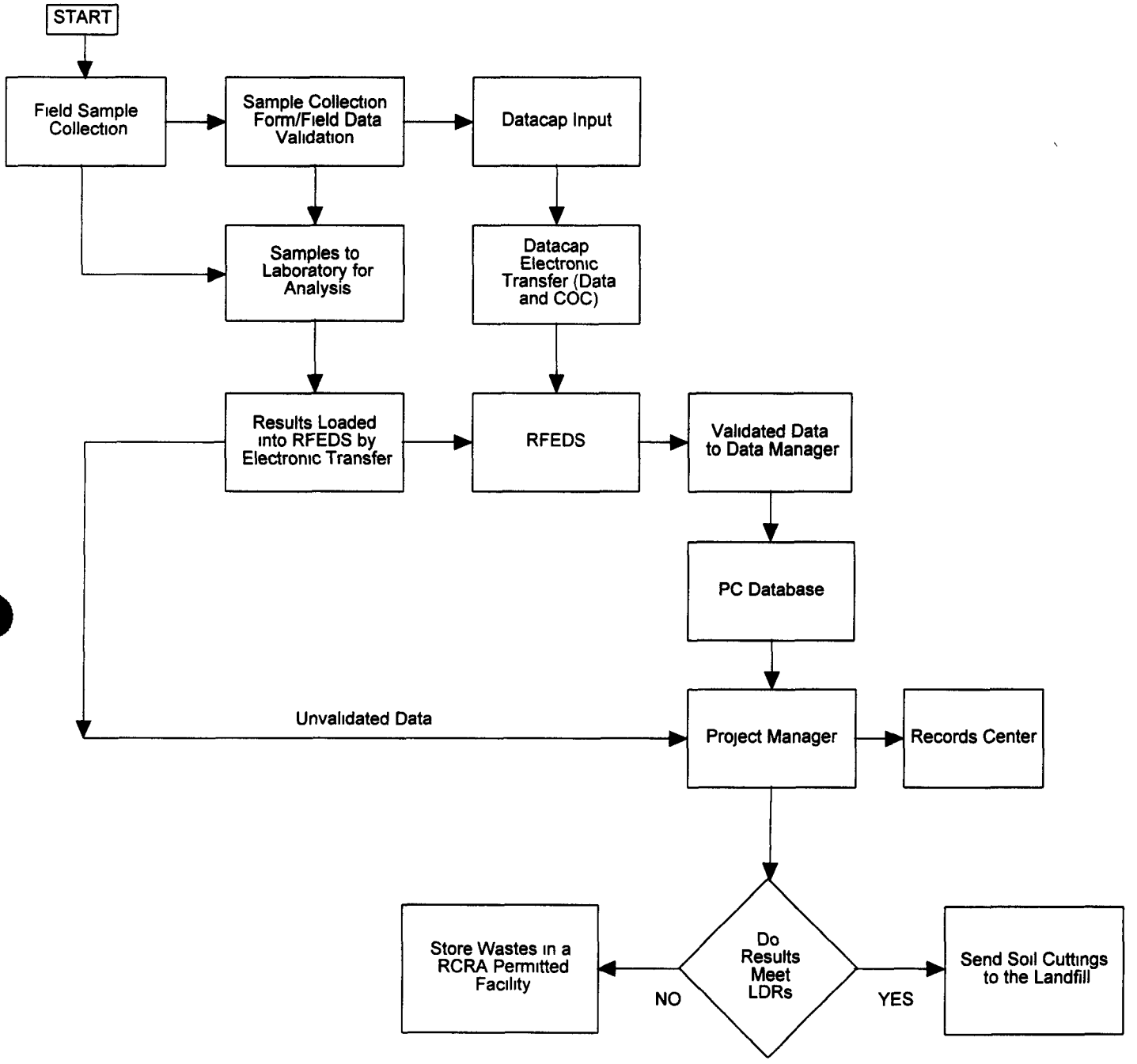
4.6 QUALITY VERIFICATION

A Readiness Review shall be conducted by the ER QA support manager before implementing the field activities described in Section 2 0 The readiness review will determine if all activity prerequisites have been met that are required to begin work The applicable requirements of the QAPP and this WARP Work Plan will be addressed

At least one management and one independent (i e , QA) assessment will be performed and documented during the implementation of this work plan Identified non-conformances and corrective actions will be tracked through the RFETS Commitments Management and Corrective Action Process (CMCAP), January 22, 1996

Figure 4-1

DATA FLOW FOR ANALYTICAL DATA



5.0 OPS

2-G01-ER-ADM-5 14 Use of Field Logbooks and Forms

2-G18-ER-ADM-17 01 Records Capture and Retrieval

5-21000-OPS-FO 03 General Equipment Decontamination

4-S02-ENV-OPS-FO 04 Heavy Equipment Decontamination

5-21000-OPS-FO 06 Handling of Personal Protective Equipment

5-21000-OPS-FO 07 Handling of Decontamination Water and Wash Water

4-K56-ENV-OPS-FO 08 Handling of Drilling Fluids and Cuttings

5-21000-OPS-FO 11 Field Communications

5-21000-OPS-FO 12 Decontamination Facility Operations

5-21000-OPS-FO 13 Containerizing, Preserving, Handling, and Shipping of Soil and Water Samples

5-21000-OPS-FO 14 Field Data Management

5-21000-OPS-FO 15 Photoionization Detectors and Flame Ionization Detectors

5-21000-OPS-FO 16 Field Radiological Measurements

4-F99-ENV-OPS-FO 23 Management of Soil and Sediment Investigative Derived Material

5-21000-OPS-GT 01 Logging Alluvial and Bedrock Material

5-21000-OPS-GT 02 Drilling and Sampling Using Hollow Stem-Auger Techniques

5-21000-OPS-GT 04 Rotary Drilling and Rock Coring

5-21000-OPS-GT 05 Plugging and Abandonment of Boreholes

5-21000-OPS-GT 06 Monitoring Wells and Piezometer Installation

5-21000-OPS-GT 10 Borehole Clearing

5-21000-OPS-GT 11 Plugging and Abandonment of Wells

5-21000-OPS-GT 15 Geophysical Borehole Logging

5-21000-OPS-GT 17 Land Surveying

5-21000-OPS-GT 24 Approval Process for Construction Activities at or Near Individual Hazardous Substances Sites

5-21000-OPS-GT 02 Drilling and Sampling Using Hollow Stem-Auger Techniques

5-21000-OPS-GT 04 Rotary Drilling and Rock Coring

6.0 REFERENCES

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