KAISER·HILL
COMPANY

RMRS Rocky Mountain Remediation Services, L.L.C.
...protecting the environment

Industrial Area Characterization and Remediation Strategy

RF/RMRS-99-419.UN

August 1999
Revision: Draft Final

REVIEWED FOR CLASSIFICATION/UCNI
By
Date

Industrial Area Characterization and Remediation Strategy

RF/RMRS-99-419.UN

Prepared by:

Rocky Mountain Remediation Services, L.L.C.
and
Kaiser-Hill Company, L.L.C.
Rocky Flats Environmental Technology Site
Golden, Colorado

August 1999
Revision: Draft Final

Marla C. Broussard
Manager, Characterization

8/12/99
Date

James H. Moore
Quality Assurance

8/12/99
Date

Table of Contents

Tables of Contents (continued)

List of Tables

List of Figures

List of Plates

List of Appendices

Acronyms

AL	action level
ALF	Action Levels and Standards Framework for Surface Water, Ground Water, and Soils
Am	americium
AME	Actinide Migration Evaluation
AR	Administrative Record
ASD	Analytical Services Division
BRA	Baseline Risk Assessment
BZ	Buffer Zone
CAB	Citizens Advisory Board
CAD/ROD	Corrective Action Decision/Record of Decision
CAMU	Corrective Action Management Unit
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CHWA	Colorado Hazardous Waste Act
CPB	Closure Plan Baseline
CRA	comprehensive risk assessment
D&D	Decontamination and Decommissioning
DOE	U.S. Department of Energy
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
FY	fiscal year
GIS	Geographic Information System
H&S	health and safety
HRR	Historical Release Report
IA	Industrial Area
IA Strategy	IA Characterization and Remediation Strategy
IASAP	IA Sampling and Analysis Plan
IHSS	individual hazardous substance site
IM/IRA	interim measure/interim remedial action
IMP	Integrated Monitoring Plan
MARSSIM	Multi-Agency Radiation Survey and Site Assessment Investigation Manual
NFA	no further action
NPL	National Priorities List
NPWL	new process waste lines
OPWL	original process waste lines
OU	operable unit
PAC	potential area of concern
PAM	proposed action memorandum
PCB	polychlorinated biphenyl

Acronyms (continued)

PCOC	potential contaminant of concern
PPE	personal protective equipment
Pu	plutonium
PVC	polyvinyl chloride
QA	quality assurance
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFCOLG	Rocky Flats Coalition of Local Governments
RFETS	Rocky Flats Environmental Technology Site
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RSOP	RFCA standard operating protocol
SAP	Sampling and Analysis Plan
SEP	Solar Evaporation Ponds
SOW	Statement of Work
SVOC	semivolatile organic compound
SWD	Soil Water Database
TRU	transuranic
U	uranium
UBC	under building contamination
VOC	volatile organic compound
WAC	waste acceptance criteria

1.0 Introduction

Environmental remediation of the Industrial Area is a major step toward closing RFETS in 2006.

Most of the remaining cleanup effort at the Rocky Flats Environmental Technology Site (RFETS or Site) will take place in the Industrial Area (IA), and will be the final major activity leading to Site closure. This IA Characterization and Remediation Strategy (IA Strategy) describes the path forward for closure of the IA Operable Unit (OU) at RFETS, and the integration of this effort with overall Site closure.

The current focus of remediation in the IA is the decommissioning of buildings and associated support structures. The IA Strategy addresses the integration of decommissioning and environmental remediation, but is focused on post-decommissioning remediation. This includes characterization and remediation of surface soil, subsurface soil, and groundwater outside of and beneath buildings.

The IA includes approximately 350 acres at the geographic center of RFETS illustrated on Figure 1. The IA is occupied by 400 buildings, other structures, roads, and utilities, and is where the bulk of RFETS mission activities took place between 1951 and 1989 (DOE, 1996). Most of the buildings and associated structures were used for historic processing activities associated with weapons production.

Materials defined as hazardous substances by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and materials defined as hazardous waste and hazardous constituents by the Resource Conservation and Recovery Act (RCRA) and/or Colorado Hazardous Waste Act (CHWA) have been released to the environment at various locations at RFETS. In the IA, these releases are identified at 194 individual hazardous substance sites (IHSSs), potential areas of concern (PACs), and under building contamination (UBC) sites as illustrated on Plate 1.

The bibliography in Appendix A presents sources for additional information on RFETS history, geology, hydrology, hydrogeology, and previous characterization and remediation reports.

1.1 Purpose and Objectives

The purpose of the IA Strategy is to provide a roadmap for final closure of the IA, and ensure full integration of remediation efforts, including facility decommissioning, characterization, remediation, and regulatory agency and stakeholder participation. The IA Strategy has been developed to provide the U.S. Department of Energy (DOE), Colorado Department of Public Health

The IA Strategy is the path forward for IA remediation.

and Environment (CDPHE), and U.S. Environmental Protection Agency (EPA) (Rocky Flats Cleanup Agreement [RFCA] Parties), and stakeholders with a clear understanding of the decisions that need to be made to close the IA. Because future decisions related to technical, regulatory, policy, and stakeholder issues will be based on complex information, the IA Strategy also discusses how information will be collected and used to facilitate those decisions.

The IA Strategy is not a decision document and does not provide detailed information about the Site, nor does it address all potential remediation issues. Specific objectives of the IA Strategy include the following:

- Define a closure approach consistent with the overall RFETS final 2006 closure strategy;
- Support a risk and dose assessment approach to describe the contribution of the IA to the overall RFETS final risk profile;
- Identify cost-effective remediation strategies that meet RFCA cleanup standards while minimizing generation of remediation waste;
- Ensure the performance of appropriate closure-driven characterization;
- Enable accurate forecasting of budget needs and baseline updates for closure of the IA OU;
- Ensure full integration and use of data from other Site programs; and
- Identify internal and regulatory challenges to closure.

1.2 IA Strategy

Remediation of the IA is an important part of overall Site closure as illustrated on Figure 2. Remediation of the Buffer Zone (BZ) is not included as part of the IA Strategy. After remediation activities in the BZ OU and IA OUs are complete, DOE will complete a comprehensive risk assessment (CRA) to verify that potential contamination remaining at RFETS is within acceptable risk levels as defined by CERCLA and implemented through RFCA. The CRA should support the final Corrective Action Decision/Record of Decision (CAD/ROD[s]) and the DOE recommendation to EPA and CDPHE to have RFETS delisted from the National Priorities List (NPL). The final CAD/ROD will include post-closure monitoring and operations requirements, including 5-year requirements for reviews of the Site, as necessary, to evaluate whether the remedies, including any institutional controls, are effective.

The IA remediation process must be streamlined to meet the accelerated schedules required for a 2006 closure, and complete the activities required to

support the final CRA, CAD/ROD(s), and recommendations to delist the Site from the NPL. To streamline the process, data collection and remediation activities, as required, must be efficient. Five key activities have been identified:

- Identify IHSS groups;
- Develop data quality objectives (DQOs) for environmental media;
- Develop a comprehensive Sampling and Analysis Plan (SAP);
- Conduct remedial actions, as needed; and
- Complete remedial actions.

Figure 3 presents the IA Strategy. The five key activities illustrated on Figure 3 are described within this IA Strategy in the context of major activities and policy decisions that provide a framework and guidance for making decisions, developing policy, and conducting actions. The activities bulleted above the key activities need to occur to support the strategy. Bullets below the strategic components identify key policy decisions needed to support the strategy. In addition to these key activities, there are either ongoing or planned key sitewide activities that will support RFETS closure. The sitewide activities are depicted above and below the main body of Figure 3 as Stewardship and Environmental Monitoring, and Sitewide Activities.

Strategy

Integrate regulatory and technical strategies to achieve 2006 closure through streamlining schedules and eliminating unnecessary or redundant efforts.

The major components of the IA Strategy are the (1) decision framework, (2) regulatory framework, (3) risk and dose assessment strategy, (4) integration strategy, and (5) technical strategy. The decision framework guides when and how decisions will be made during IA characterization and remediation. The regulatory framework describes key RFETS regulatory guidance as specified in RFCA. The risk and dose assessment strategy describes strategies that will be used to eliminate unnecessary activities and develop required information. The integration strategy includes coordination among all appropriate RFETS organizations and stakeholders. The technical strategy includes strategies that will be used to streamline and accomplish the technical work in the IA. By identifying and implementing strategies as illustrated on Figure 4, within the risk and dose assessment, project integration, and technical domains, the schedule will be streamlined to eliminate redundant efforts.

2.0 Decision Framework

Technical and regulatory decisions will be made throughout the closure process.

The decision framework, described in Figure 5 and Table 1, provides a guide for when and how decisions will be made during IA characterization and remediation. The goal for remediation of the IA is to achieve an endstate that is protective of human health and the environment. Decisions needed to reach this goal include final cleanup levels, final configuration of the IA, and appropriate characterization and remediation techniques.

Table 1
Industrial Area Decision Framework

Framework Element	Activity, Data, and Decision Details	Responsibility
• Use Future Land Use Scenario for the IA and Site	RFETS may be designated as either limited industrial use or open space. Currently, the RFCA land use scenario is guiding decisions.	RFCA Parties and Stakeholders
• Decide on Need for RFI/RIs	RFI/RIs may be needed for both the IA and BZ. One combined RFI/RI may be adequate, or there may not be a need for any RFI/RI.	RFCA Parties
• Decide on Need for Baseline Risk Assessments (BRA)	BRAs may be needed for both the IA and BZ.	RFCA Parties
• Decide on Applicability of MARSSIM	Is the MARSSIM approach applicable to the IA risk assessment?	DOE with Regulatory Agency Concurrence
• Evaluate Risk and Dose Assessment Methodology	Evaluate risk and dose assessment methodology in light of RFCA future land use, including exposure units and receptors. Use this information as input into DQO development.	DOE with Regulatory Agency Concurrence
• Develop IA DQOs and SAP	The overall IA DQO data requirements will guide the SAP.	DOE with Regulatory Agency Concurrence
• Do the SAPs meet IA DQOs?	If the IA Group SAP meets IA DQO decision requirements, characterization will begin.	DOE with Regulatory Agency Approval

12

Table 1 (continued)
Industrial Area Decision Framework

Framework Element	Activity, Data, and Decision Details	Responsibility
• Characterize IA Groups	Field sampling will characterize the IA Groups. Resulting analytical data will be used for remediation decisions, the RFI/RI, and CRA.	DOE
• Are PCOCs > RFCA Tier I values?	PCOCs greater than Tier I values will trigger an action decision. PCOCs less than Tier I values will trigger NFA document preparation.	DOE with Regulatory Agency Concurrence
• Evaluate Remediation Options	Remediation options will be evaluated to determine appropriate actions.	DOE with Regulatory Agency Concurrence
• Develop Decision Document	The decision document will describe the remedial action.	DOE with Regulatory Agency Approval
• Decide on Waste Storage Options	Waste storage options will be identified as necessary.	DOE
• Decide on Need for CAMU	A CAMU may be evaluated for additional waste storage.	DOE
• Apply Remedy	Appropriate remedial actions will be carried out.	DOE
• Perform Confirmation Testing	Samples will be collected and analyzed from remediated areas.	DOE

68

Table 1 (continued)
Industrial Area Decision Framework

Framework Element	Activity, Data, and Decision Details	Responsibility
• Are PCOCs < RFCA Tier I values?	If PCOCs are less than Tier I values, a decision on whether remediation goals have been achieved will be made.	DOE with Regulatory Agency Representatives
• Have Remediation Goals Been Achieved?	If remediation goals have been met, a closeout report will be prepared. If not, continued remediation may be required.	DOE with Regulatory Agency Concurrence
• Decide on Need for Caps or Covers	Caps or covers may be needed to reduce erosion and protect surface water resources.	DOE
• Develop Closeout Report	The closeout report will describe the remedial action and confirmation sampling results.	DOE with Regulatory Agency and Stakeholder Review
• Develop RFI/RI and CRA	The RFI/RI will describe the results of the characterization and baseline risks. The CRA will describe potential risks, if any, from the remediated area.	DOE
• Develop CAD/ROD	The CAD/ROD will describe closure of the IA and Site, and will be based on information in decision documents, the RFI/RI, and CRA.	DOE with Regulatory Agency and Stakeholder Review

Table 1 (continued)
Industrial Area Decision Framework

Framework Element	Activity, Data, and Decision Details	Responsibility
• Complete IA Closure	Closure of the IA and Site will result in recommendations to delist the Site from the NPL	RFCA Parties and Stakeholder Review

The decision framework incorporates and links regulatory decisions, data inputs, technical decisions, and IA activities. On Figure 5, diamonds represent decisions, circles are data inputs/or outputs, and rectangles are activities. Although the decision framework diagram does not provide actual dates for decisions or activities, it illustrates when decisions and activities occur in the process. All decisions, data inputs, and IA activities support closure of the IA.

Key decisions in the decision framework are (1) early decisions on risk assessment methodology; (2) decisions on waste storage issues; and (3) decisions that affect the RCRA Facility Investigation/Remedial Investigation (RFI/RI), CRA, and CAD/ROD. Decisions related directly to IA activities, such as the need for remediation at a specific IA Group, are integrated with the IA activities.

3.0 Regulatory Framework

RFCA is the RFETS regulatory framework that integrates CERCLA and RCRA corrective action obligations.

Because many of the IA and overall Site closure activities are regulatory requirements, a brief description of the regulatory framework is important to understand how IA activities fit in with overall Site closure.

The Rocky Flats Vision, presented in RFCA (Appendix 9), guides all Site activities. The Vision for RFETS includes:

- Achieving accelerated cleanup and closure of RFETS in a safe, environmentally protective manner, and in compliance with applicable state and federal environmental laws,
- Ensuring that RFETS does not pose an unacceptable risk to the citizens of Colorado or Site workers from either contamination or an accident, and
- Working toward the disposition of contamination, wastes, buildings, facilities, and infrastructure from RFETS consistent with community preferences and national goals.

RFCA, signed by DOE, EPA, and CDPHE on July 19, 1996, is consistent with the Vision and provides the regulatory framework for the cleanup of RFETS (DOE, 1996). RFCA streamlines remediation of the Site through accelerated actions that include characterization, remediation, and closure of IHSSs, PACs, and UBC sites in the IA. At the completion of all accelerated actions, DOE will prepare a no-further-action (NFA) CAD/ROD(s) that should support delisting of RFETS from the NPL.

RFCA provides the regulatory framework for DOE response obligations under CERCLA and corrective action obligations under RCRA. RFCA also provides the regulatory framework for activities not regulated under the

21

Federal Facility Compliance Act for treatment of mixed wastes generated by RFCA-regulated activities.

3.1 Site Closure

CERCLA and RCRA corrective action requirements must be met for Site closure.

Closure of the IA at RFETS is an important and pivotal step in total Site closure. The ability to close the IA on time will impact the entire RFETS closure process. In order to be closed and delisted from the NPL, specific studies must be conducted and specific documents must be developed under the RFCA process. Much of what needs to be accomplished is a combination of regulatory and technical requirements.

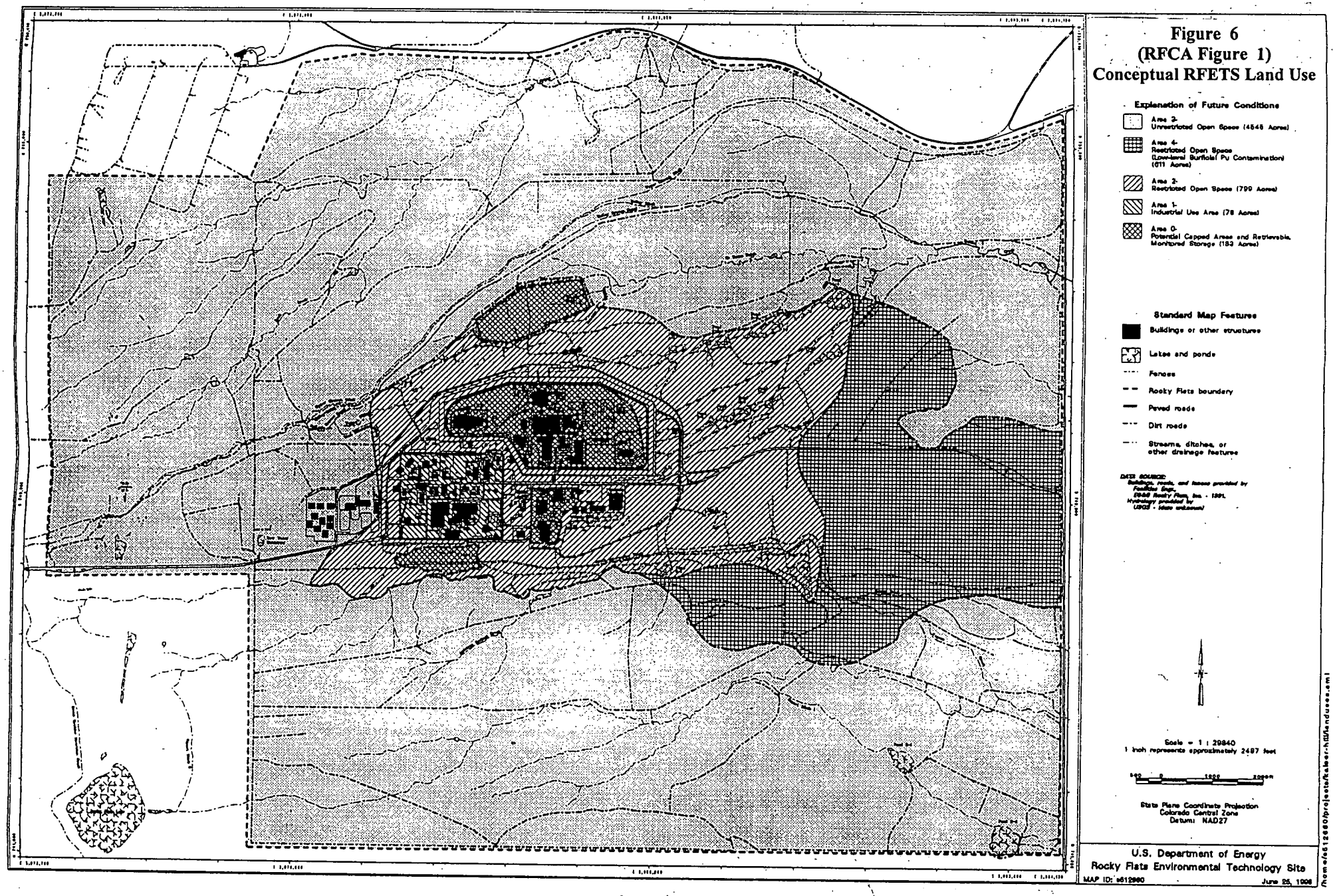
Specific requirements of the RFCA process include the following:

- Characterize the IA, as necessary, to make remediation decisions;
- Develop an RFI/RI document that describes the Site, contaminants, fate and transport, and risks;
- Develop a decision document for each accelerated action to describe the treatment and/or remediation;
- Remediate or treat wastes as necessary;
- Develop a closeout report for each IA Group that describes the remediation and/or treatment, and includes documentation that the IA Group has been remediated;
- Develop a CRA that includes risks from the IA and BZ;
- Ensure environmental compliance during remediation and closure; and
- Develop a CAD/ROD that describes post-closure actions at the Site.

3.2 Future Land Use

The IA Strategy incorporates the RFCA future conceptual land use scenario.

The current future conceptual land use scenario for RFETS is shown on the map in Figure 6, and described in RFCA Attachment 5, Figure 1, Action Levels and Standards Framework for Surface Water, Ground Water, and Soils (ALF). Of the total area shown on the map, 78 acres are identified as industrial use (southwestern corner of the current IA) and the rest are designated as open space. Cleanup actions, to date, have been consistent with this scenario.



4.0 Risk and Dose Assessment Strategy

The risk and dose assessment is a key component in IA and Site closure. This assessment will evaluate potential risks posed by the Site and be based on RFCA land use scenarios and protection of surface water quality. Post-remediation risk and dose will be evaluated in the CRA.

The risk and dose assessment strategy for the IA includes the following elements:

Strategy

Develop a risk assessment methodology that focuses on CRA requirements.

- Eliminate IA and BZ baseline risk assessments (BRAs), and calculate risk and dose at closure in the CRA. Baseline risks will be evaluated in the RFI/RI, if required;
- Adopt a risk and dose assessment methodology that can be used to guide IA sampling DQOs and strategy; and
- Consider using the Multi-Agency Radiation Survey and Site Assessment Investigation Manual (MARSSIM) in Environmental Restoration (ER) activities. MARSSIM contains guidance on demonstrating compliance during final radiological status surveys and is currently applied to facility decommissioning activities at RFETS.

4.1 Risk and Dose Assessment Methodology

Risk and dose assessment methodology will be based on the RFCA land use scenario.

Risk and dose assessment data needs will guide DQOs and IA sampling activities.

Risk and dose assessment methodology must be determined early in the remediation process, because data collected in the IA will also be used for the risk and dose assessments. The risk and dose assessment methodology will provide decision statements for the DQO process for characterization, remediation, and analysis tasks by providing information on:

- Exposure units and potential receptors, and
- Type, quantity, and quality of samples needed to assess statistical significance.

4.2 Comprehensive Risk Assessment

The CRA will determine onsite and offsite post-closure risks.

The purpose of the CRA is to quantify potential residual risks posed by the Site, and demonstrate that the endstate is protective of human health and the environment. The CRA will evaluate post-remediation risks from the IA as well as the BZ and will be designed to support an NFA CAD/ROD for the Site.

24

The CRA will address multiple exposure scenarios, pathways, and contaminants on a sitewide basis. Appropriate contaminant transport pathways will be evaluated including (1) subsurface soil to groundwater, (2) groundwater to surface water, (3) surface soil to surface water, and (4) surface soil to air. The exposure scenarios evaluated will include the residential exposure scenario.

Data generated by the IMP, AME, Land Configuration Design Basis, and Site Water Balance study will be used in the risk and dose assessment.

IA remediation data will be a primary source of data for the CRA; however, data from other projects will also be used. These projects include the Integrated Monitoring Plan (IMP), Actinide Migration Evaluation (AME), Land Configuration Design Basis, and Site Water Balance study.

4.2.1 Integrated Monitoring Plan

The IMP program was designed to integrate data collection requirements for groundwater, soil, surface water, air, and ecology in the IA, BZ, and around decommissioning and remediation projects. The IMP report describes monitoring activities and results on a yearly basis. Data generated as part of IMP activities will be used in making IA decisions and incorporated in the CRA. Data provided by IMP activities include:

The IMP provides information on environmental media in the IA and around decommissioning and remediation projects.

- Current groundwater, surface water, air, and ecological conditions at the Site and Site boundary, and around decommissioning and remediation projects,
- Soil contaminant distributions, and
- Groundwater plume definition and movement.

4.2.2 Actinide Migration Evaluation

The AME Team studies Pu, Am, and U sources and mobility at RFETS.

A multiyear AME Team has been established to study the behavior and mobility of actinides (plutonium [Pu], americium [Am], and uranium [U]) in surface water, groundwater, and soil. The goals of the AME are to determine (1) Pu, Am, and U sources, (2) Pu, Am, and U migration processes, (3) impacts of Pu, Am, and U migration on planned remediation, and (4) how actinide migration will affect post-closure surface water quality. This information will be used to help characterize current environmental conditions at RFETS, as input into remediation decisions, and to recommend a path forward for long-term protection of surface water quality during and after Site closure.

4.2.3 Land Configuration Design Basis

Geotechnical data needed for the final land configuration will be generated during the Land Configuration Design Basis study.

The removal of buildings and supporting infrastructure and recontouring and final grading of the entire Site is part of the Closure Plan Baseline (CPB). Information, such as seismic and slope stability data, required to design the

final land surface configuration for RFETS will be generated during the Land Configuration Design Basis study. The final configuration will be engineered to enhance protection of human health and the environment.

Several other ongoing studies and data gathering efforts will contribute vital information to the design criteria for final surface configuration. These include the AME, Site Water Balance study, and IMP. Information to support construction of a final topography will be combined with applicable portions of ongoing studies in the Land Configuration Design Basis.

4.2.4 Site Water Balance

The Site Water Balance study includes evaluation of current and future hydrology at RFETS.

A Site Water Balance that quantifies Site hydrology (surface water and groundwater) will be completed to support the CRA, final site configuration, and, along with AME information, long-term protection of surface water quality.

The Site Water Balance study will be implemented in two phases. Phase I will evaluate surface water hydrology to develop management options for final Site configuration and long-term surface water protection. The second phase will evaluate groundwater hydrogeology and impacts to surface water from current and future groundwater fluxes.

4.3 Data Quality Objectives

Strategy

Formulate DQOs that combine characterization, remediation, and Site closure requirements.

DQOs specify the quality and quantity of data needed to support decisions. The IA Strategy incorporates qualitative guidelines for developing DQOs that will support IA decisionmaking. Detailed DQOs will be developed as part of the IA Sampling and Analysis Plan (IASAP) and individual group sampling addenda. IA DQOs will focus on identifying the type, quantity, and quality of data needed to support specific decisionmaking needs as specified in RFCA.

The overall goals of IA remediation and Site closure are protection of human health and the environment and surface water quality. IA DQOs that will achieve this goal are the following:

- Collect appropriate data to support remediation decisions; and
- Collect appropriate data to support the CRA.

The IA Strategy DQOs will be used to guide future characterization and remediation decisions, and as a basis for more detailed DQOs required for the IASAP. The IA DQO strategy provides a starting point for refining (i.e., identifying existing data, specific data needs, and schedules) or expanding (i.e., adding specific decision rules, acceptable errors, and data collection design) the detailed DQOs for characterization and remediation of the IA. The detailed IA characterization and remediation DQOs will use appropriate current IMP DQOs as a basis for development.

5.0 Integration Strategy

Integration of decommissioning and ER activities has been accomplished through the 2006 CPB.

Remediation of the IA consists of decommissioning and ER activities integrated to enhance health and safety, environmental compliance, schedule efficiency, and cost effectiveness. Figure 7 illustrates major decommissioning and ER activities integrated into the overall closure project.

Site closure activities are scheduled to incorporate resource availability into scheduling and budgeting decisions. The CPB identifies decommissioning and ER activities, and contains the appropriate connections to indicate the necessary sequencing of projects required for 2006 closure. Linking the ER and decommissioning schedules achieves numerous efficiencies. This section describes project and Site integration and interfaces necessary to implement IA remediation.

Strategy

Integrate IA remediation activities with decommissioning activities.

5.1 Decommissioning

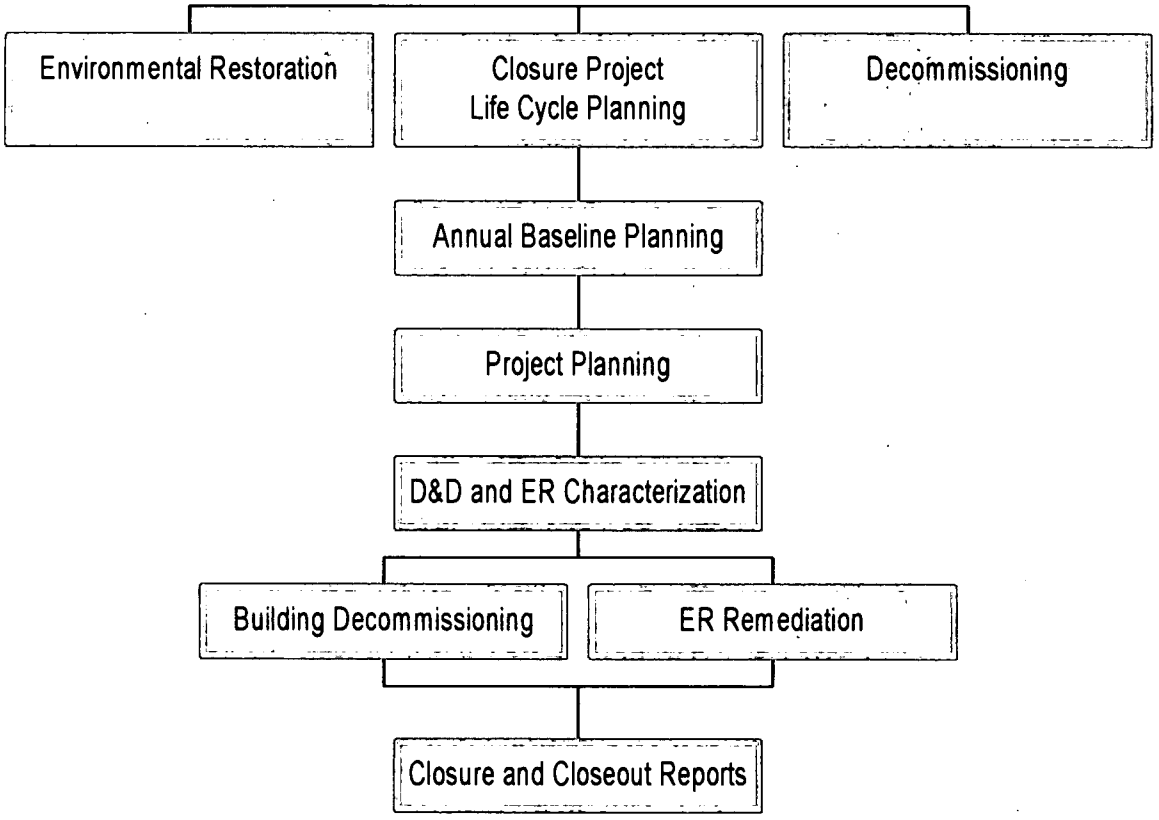
Approximately 90 percent of the potentially contaminated sites that may require remediation are associated with buildings or supporting infrastructure including roads, parking lots, and utilities. These sites cannot be remediated until removal of the building or infrastructure is substantially complete. Remediation activities dependent on decommissioning are integrated with decommissioning in the 2006 CPB. The ER schedule has been integrated with decommissioning schedules so that characterization activities start during building deactivation or decommissioning. Plate 2 illustrates the sequence of characterization, remediation, and closure of each IA Group for the accelerated 2006 closure.

Deactivation and decommissioning starts when the building mission ends; however, not all buildings require deactivation. Deactivation is the process of placing a building in a safe and stable condition, and can include removal of fuel, draining and/or de-energizing nonessential systems, removal of stored radiological and hazardous materials, and related actions (DOE, 1996). Decommissioning includes all activities that occur after deactivation, if required, including decontamination, dismantlement, demolition, and environmental restoration (DOE, 1996).

The decommissioning schedule is first driven by disposition of the highest-risk building, and then by available funding. ER activities dependent on decommissioning schedules follow the building risk-reduction design. ER activities that are not dependent on decommissioning are scheduled to maximize resource usage.

27

Figure 7
ER and Decommissioning Project Integration



28

Strategy

Use one subcontractor for decommissioning and remediation.

Whenever possible, the subcontractor with primary responsibility for building decommissioning will also be responsible for ER remediation. This strategy will reduce mobilization and demobilization time and costs, reduce procurement time, and streamline technical processes.

5.2 Integration with Site Organizations

Strategy

Integrate with all appropriate Site organizations.

Site organizations that will be significantly influenced by IA closure, and will require close integration with IA activities are the Waste Management Program, Analytical Services Division (ASD), and Procurement. Integration with these organizations begins in the life cycle planning phase for Site closure. Many other groups such as health and safety (H&S), radiological operations, radiological engineering, planning and integration, and site landlord services will have day-to-day responsibilities in IA activities. Additional support services throughout the Site will be used as needed to accomplish IA and Site closure. Figure 8 illustrates the anticipated level of effort for various Site organizations during IA remediation activities.

5.2.1 Waste Management Program

Integration with the Waste Management Program will be a key component in achieving 2006 closure. The Waste Management Program has responsibility for sitewide water operations and waste disposition. Groundwater or surface water generated as part of IA remediation will be dispositioned through Water Operations. The Waste Management Program will also provide procedures for sampling and containerizing waste, and arrange for storage or direct disposition of remediation-generated waste. The Waste Management Program will develop Waste Generating Instructions that will describe characterization, containerization, documentation, and labeling requirements.

Offsite versus onsite disposition is the preferred management option for wastes generated from IA remediation. Wastes will be properly characterized, packaged, and shipped offsite for final disposition at approved facilities.

Onsite treatment of waste may be considered in certain circumstances. Mixed RCRA characteristic wastes may be pretreated onsite to meet the various low-level disposal facility waste acceptance criteria (WAC). Listed wastes may be pretreated for shipping or WAC considerations; however, they will be managed as RCRA wastes for final disposition. Soil contaminated with hazardous constituents may be treated to meet RFCA put-back standards and returned to the remediation area. For example, it may be cost effective to treat volatile organic compound (VOC)-contaminated soil and return it to the remediation area. Treated soil must, however, meet RFCA radionuclide put-back action levels (ALs) before being returned to the remediation area.

ER remediation of the IA will generate significant volumes of hazardous, low-level, and low-level mixed wastes in the form of contaminated soil and

Figure 8
Anticipated Level of Effort for Integrated Industrial Area Remediation

Site Organization	Planning	Characterization	Remediation	Decision Documents	Site Closure Activities
Analytical Services Division	○	◇	◇		
Communications	◇	◇	◇	◇	◇
Data Management	●	◇	◇	◇	◇
Decommissioning	◇	◇	◇	●	▫
Emergency Response	▫	◇	◇		
Environmental Restoration	◇	◇	◇	◇	◇
Fire Department	▫	◇	◇		
Health and Safety	●	◇	◇	▪	▪
Legal	●	▪	■	◇	●
Nuclear Safety	▫	▪			
Planning and Integration	○	▪	▪	▪	▪
Procurement	○	▪	▪		
Quality Assurance	○	◇	◇	◇	◇
Radiological Safety	○	◇	◇	■	▪
Records Management	○	⊙	⊘	◇	◇
Regulatory Compliance	◇	●	●	●	●
Security	▫	◇	◇		
Site Facilities	●	◇	◇		
Traffic	▫	◇	◇		
Waste Management Program	●	▪	●	●	

◇	Intense
●	Moderate
▫	Low

associated contaminated debris such as broken pipe, asphalt, and personal protective equipment (PPE). Estimated types and volumes of remediation wastes by fiscal year (FY) are summarized on Figure 9. Generation of transuranic (TRU) waste from ER remediation is not anticipated. However, if TRU waste is generated during ER remediation, it will be dispositioned through the existing RFETS TRU Waste Program.

Strategy

Identify and plan for waste storage challenges.

Temporary onsite storage capacity for low-level and low-level mixed waste is currently 9,921 and 14,865 cubic meters, respectively. These limits will be exceeded in FY05 and FY06, respectively. Potential strategies to ensure that waste volume does not become a limiting issue include:

- Package IA wastes for immediate disposition;
- Identify other potential offsite disposal options (this may not be within the control of RFETS);
- Identify and manage waste streams with no current disposition options; and
- Re-evaluate the need for a Corrective Action Management Unit (CAMU) for storage of wastes generated by IA remediation. A CAMU designed for storage of all types of remediation waste, including "orphan waste" (>10 and < 100 nanocuries per gram of Pu and Am), would also provide temporary storage for IA remediation waste.

5.2.2 Analytical Services Division

The volume of decommissioning, characterization, remediation, and WAC analytical samples will increase dramatically.

Currently, approximately 55,000 environmental, waste management, and decommissioning samples are managed by ASD each year. This number will increase dramatically in response to increased decommissioning, characterization, and remediation efforts. Figure 10 illustrates the anticipated number of surface and subsurface soil samples that will be required for IA characterization and remediation activities. Additional decommissioning and waste management samples will also be required. ASD estimates the number of samples will dramatically increase from the current rate of 55,000 samples per year to well over 100,000 per year by FY03. This number is expected to increase even more significantly in FY04.

Strategy

Identify and eliminate potential ASD resource challenges.

The volume of decommissioning and ER data that will be collected over the next several years will be of a larger magnitude and collected in a shorter time span than during any previous sampling efforts at RFETS. Key challenges associated with the anticipated sample volume are (1) laboratory capacity, (2) data validation capacity, and (3) sample management capacity. To keep pace with ER needs, capacity in each of these areas will likely need to be increased.

Figure 9
Industrial Area Remediation Projected Waste Volumes

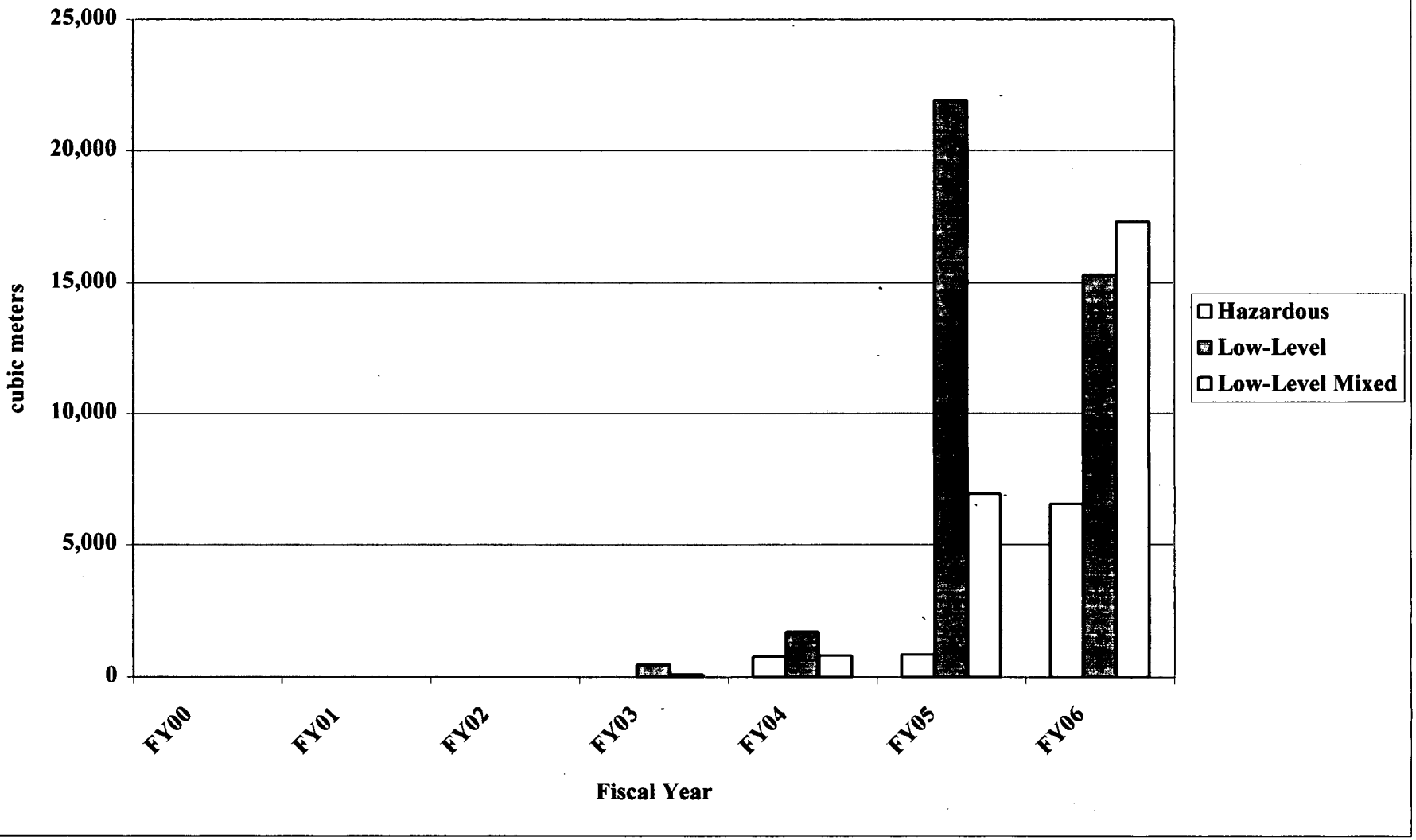
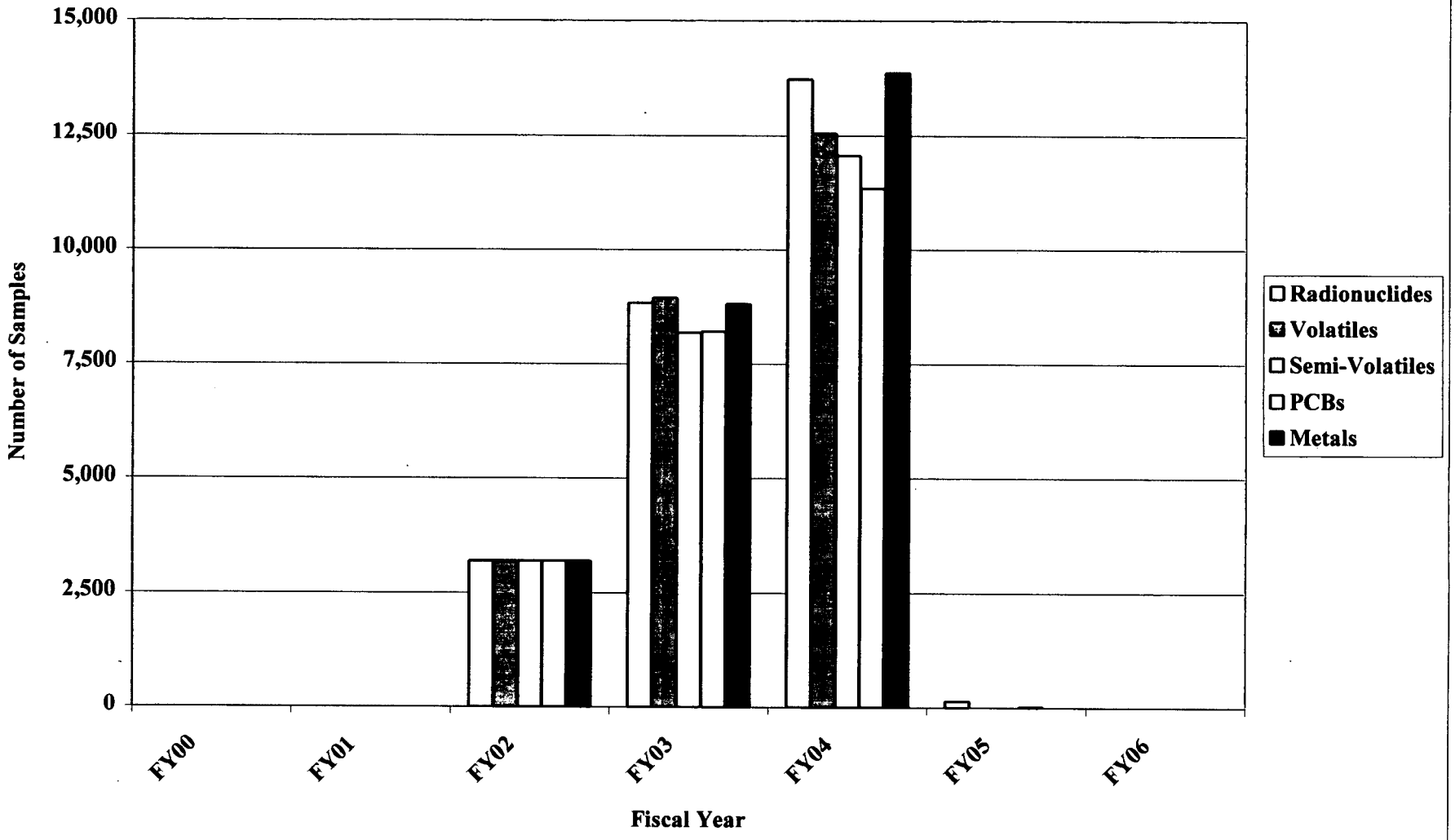


Figure 10
Industrial Area Projected Characterization and Remediation Soil Samples



Strategy

Identify additional laboratory and data validation capacity.

Potential strategies to ensure adequate capacity include the following:

- Evaluate ASD to identify and address potential challenges within the next two years;
- Identify, audit, and procure additional offsite laboratory capacity within the next two years so that capacity is in place when needed;
- Develop additional onsite laboratory capacity; and
- Identify additional data validation resources.

5.2.3 Procurement

The RFETS Procurement process has been designed to provide the Site with qualified subcontractors who can meet and exceed the technical, quality assurance (QA), and cost goals of 2006 closure. To provide the required characterization and remediation services for the Site, the IA project team (see Section 5.2.5) will provide a detailed Statement of Work (SOW) for each IA Group characterization and remediation. The SOW will include, at a minimum, clearly defined technical scope, QA requirements, personnel qualification requirements, and schedule requirements. The IA project team will work closely with Procurement to ensure the SOW is accurate and complete.

Strategy

Eliminate redundant procurements.

Strategic options that will reduce procurement time and eliminate redundant efforts include the following:

- The SOW development process will be streamlined through the use of general characterization and remediation SOWs that can be modified to address specific IA Group needs;
- Additional streamlining of the process may be accomplished by combining decommissioning and ER procurements, and selecting key subcontractors able to complete design-build, decommissioning, characterization, and remediation or treatment. These subcontractors will be used for the majority of the work; and
- The opportunity for assigning a construction management firm to manage remediation subcontracting, scheduling, and change orders will be reviewed.

5.2.4 Resource Strategies

The scope of IA remediation activities over the next several years will impact all Site operations. The increase in the number of remediation projects will result in a need for additional technical and management resources. It is

anticipated that remediation resource needs will increase as deactivation needs decrease. Additional resources that will be needed throughout the Site include, but are not limited to, the following:

- ER—environmental engineers, project managers, field crews, and equipment,
- H&S—RFETS-qualified health and safety professionals,
- Radiological safety—RFETS-qualified Radiological Control Technicians,
- Data management—data management specialists to handle the large amount of data that will be entering the system,
- QA—QA professionals for planning, field, data, and technical QA, and
- Community relations—community relations specialists to coordinate and lead stakeholder information meetings .

Strategy

Retain key employees and train new employees in advance of the work curve.

Retaining knowledgeable staff, and recruiting and training new staff for a project with a limited life will challenge Site resources. The following strategies will be initiated:

- Retain key employees who have valuable knowledge and experience working at RFETS. A plan is being developed to provide incentives to key employees through the 2006 closure;
- Use decommissioning staff as appropriate. This strategy will help retain Site knowledge and streamline decommissioning and ER integration;
- Hire and train staff 3 to 6 months in advance of the work curve. Much of the staff will be required to have RFETS-specific training and will also need to become familiar with RFETS technical and regulatory requirements; and
- Work with other DOE sites to "borrow" uniquely qualified staff as necessary.

Strategy

Communicate with all appropriate RFETS organizations, regulatory agencies, and stakeholders.

5.2.5 Project Communication

The complexities of IA remediation and its dependency on many RFETS organizations will require consistent and appropriate communication. Communication can always be improved and will be continuously addressed. Potential strategies include the following:

- Integrate ER and decommissioning staff into IA Group remediation project teams. This will provide total interaction, involvement, and integration from decommissioning through closure, and provide experienced staff for future projects. Project team members will be assigned different levels of responsibility during various phases of each project.

  The project teams will include:

  - ASD
  - Data Management
  - Decommissioning
  - Regulatory Compliance
  - ER
  - Facility Operations
  - H&S
  - Planning and Integration
  - QA
  - Regulatory Agencies (see Section 6.3.5)
  - Waste Management Program;

- Integrate other key sitewide organizations that will provide direction, support, and/or oversight of the project teams. These organizations include, but are not limited to, the following:

  - Community Relations
  - Site Landlord Services
  - Legal
  - Radiological Engineering
  - Radiological Operations
  - Security
  - Water Operations; and

- Make communication a Site priority. Site priorities become part of the Site culture and everyday working experience.

Strategy

Enhance the collaborative process.

5.3 Stakeholder Involvement

Stakeholder input is essential to closure of the IA. Stakeholder input into the IA Strategy is solicited and received through a variety of public forums including:

- IA Focus Group Meetings,
- The Citizens Advisory Board (CAB),
- Decontamination & Decommissioning Focus Group Meetings,

- The Rocky Flats Water Working Group, and
- The Rocky Flats Coalition of Local Governments (RFCOLG).

There will be continuing interaction with stakeholders throughout remediation of the IA. These opportunities for interaction will include, but not necessarily be limited to, stakeholder review and comment on the following:

- Proposed RFCA milestones and target activities,
- Proposed action memoranda (PAMs), interim measures/interim remedial actions (IM/IRAs), or RFCA standard operating protocols (RSOPs),
- Proposed Plan, and
- CAD/ROD.

6.0 Technical Strategy

Characterization and remediation of IA Groups are the major technical activities that will need to be conducted in the IA to achieve Site closure. Strategies that protect human health and the environment, and reduce time and cost yet remain focused on meeting IA DQOs, will be implemented.

6.1 Grouping of Sites

Strategy

Group IHSSs, PACs, and UBC sites into the decommissioning project structure.

The 194 IHSSs, PACs, and UBC sites in the IA were consolidated into 58 IA Groups using the following criteria:

- Dependency on decommissioning activities,
- Decommissioning schedule,
- Physical proximity to decommissioning activities and/or each other, and
- Potential contaminants of concerns (PCOCs).

This grouping provides a consistent scheduling mechanism centered on the decommissioning schedule, and results in the ability to streamline decision document and sampling activities. The IA Groups were defined using the following decision criteria:

(1) Can characterization of the UBC site be combined with other UBC sites based on similar PCOCs, schedule, or proximity?

(2) Is characterization or potential remediation of the IHSS, PAC, original process waste lines (OPWL), or tank dependent on decommissioning activities because of its proximity to UBC sites or other infrastructure elements?

(3) Is the IHSS or PAC of such a high priority that it must be characterized or remediated immediately?

(4) Is the IHSS, PAC, UBC site, OPWL, or tank an NFA site?

The consolidated IA Groups, along with their building decommissioning dependency and grouping strategy, are listed in Table 2 and illustrated on Plate 3.

Since 1995, the RFCA ER Ranking has been used to address high-risk sites before low-risk sites. Because most of the high-risk sites have been addressed or are scheduled for action, future remedial actions will be addressed through the IA grouping. This approach allows IA remediation to be integrated with decommissioning, and also makes optimal use of resources. Through the decommissioning program, RFETS will address high-risk sites by removing nuclear materials and associated buildings.

6.1.1 No-Further-Action Sites

There are 60 potential NFA sites in 35 IA Groups. Some NFA sites have been designated in stand-alone groups (100-3, 100-5, 300-2, 300-5, 300-6, 500-2, 500-6, 500-7, 600-2, 600-3, 600-5, 600-6, 700-6, 700-8, 700-10, 700-12, 900-3, and 900-4&5). The remaining NFA sites were grouped within other IA Groups using the criteria listed above. This grouping of NFA sites allows for schedule flexibility and streamlining. Stand-alone NFA groups are flexible schedule components, whereas characterization of NFA sites within groups is accomplished as part of a larger effort resulting in streamlining of decision documents and characterization.

Potential NFA sites were designated based on current PCOC information for the IHSSs, PACs, and UBC sites. All potential NFA sites will be characterized and subsequently documented in the Annual Update to the Historical Release Report (HRR), as specified in RFCA Attachment 6.

6.2 Characterization Strategies

Strategy

Begin characterization during deactivation or decommissioning.

Characterization of the IA is required as part of the remediation process to: (1) identify NFA sites, (2) identify IA Groups that require remediation, (3) determine the size and type of remediation, and (4) provide data for the CRA. Because one of the goals of the IA Strategy is to streamline schedules to meet 2006 closure, characterization will begin during deactivation or decommissioning of associated buildings or infrastructure items as described in Section 5.1.

Groups that are not dependent on decommissioning activities have been scheduled for characterization based on resource availability.

Table 2
Industrial Area Groups

IHSS Group	Description	IHSS/PAC/UBC	Decommissioning Dependency	Grouping Logic
000-1	Solar Ponds	000-101	Building 778	Grouped together because of proximity and association with the Solar Evaporation Ponds
	Effluent Line	700-149.1		
	Effluent Line	700-149.2		
	Triangle Area	165		
	S&W Contractor Yard	000-176		
	ITS Water Spill (formerly 000-502)	900-1310		
000-2	OPWL	000-121	Infrastructure Removal	All are part of the same IHSS consisting of OPWLs that are not associated with buildings
	Valve Vault West of Building 707	700-123.2		
	Building 123 Process Waste Line Break	100-602		
	Tank 29 - OPWL	000-121		
	Tank 31 - OPWL	000-121		
	Low-Level Radioactive Waste Leak	700-127		
	Process Waste Line Leaks	700-147.1		
	Radioactive Site 700 Area	700-162		
000-3	Sanitary Sewer System	000-500	Infrastructure Removal	Grouped together because all are IHSSs/PACs that extend across IA
	Storm Drains			
	Old Outfall - Building 771	700-143		
	Central Avenue Ditch Caustic Leak	000-190		
000-4	New Process Waste Line		Infrastructure Removal	NPWL are separated out from other lines because they may have been in use longer
100-1	UBC 122 - Medical Facility	UBC 122	Building 122	Grouped together with UBCs because tank is adjacent to building
	Tank 1 - OPWL - Underground Stainless Steel Waste Storage Tank	000-121		
100-2	UBC 125 - Standards Laboratory	UBC 125	Building 125	No associated IHSSs/PACs
100-3	Building 111 Transformer PCB Leak	100-607	Building 111	Not near any other IHSSs/PACs/UBCs
100-4	UBC 123 - Health Physics Laboratory	UBC 123	None	Grouped with UBC because of proximity and building spills
	Waste Leaks	100-148		
	Building 123 Bioassay Waste Spill	100-603		
	Building 123 Scrubber Solution Spill	100-611		
100-5	Building 121 Security Incinerator	100-609	None	Contains unique PCOCs

Potential NFAs are shaded

Table 2 (continued)
Industrial Area Groups

IHSS Group	Description	IHSS/PAC/UBC	Decommissioning Dependency	Grouping Logic
300-1	Oil Burn Pit #1	300-128	Building 335	Grouped together because of proximity and overlap
	Lithium Metal Site	300-134(N)		
	Solvent Burning Grounds	300-171		
300-2	UBC 331 - Maintenance	UBC 331	Building 333	Grouped because of D&D dependence, proximity, and overlap
	Lithium Metal Destruction Site	300-134(S)		
300-3	UBC371 - Plutonium Recovery	UBC 371	Building 371	Not grouped with other UBCs to allow flexibility in the D&D schedule
300-4	UBC 374 - Waste Treatment Facility	UBC 374	Building 374	Not grouped with 300-3 to allow flexibility in the D&D schedule
300-5	Inactive D-836 HW Tank	300-206		Not grouped – Potential NFA
300-6	Pesticide Shed	300-702		Not grouped – Potential NFA, and is not near other sites
400-1	UBC 439 - Radiological Survey	UBC 439	Building 439	Not grouped so that UBC is not dependent on other building decommissioning
400-2	UBC 440 - Modification Center	UBC 440	Building 440	Not grouped so that UBC was not dependent on other building decommissioning
400-3	UBC 444 - Fabrication Facility	UBC 444	Buildings 444 and 447	Grouped together because of D&D dependence and proximity
	UBC 447 - Fabrication Facility	UBC 447		
	West Loading Dock Building 447	400-116.1		
	Cooling Tower Pond West of Building 444	400-136.1		
	Cooling Tower Pond East of Building 444	400-136.2		
	Buildings 444/453 Drum Storage	400-182		
	Inactive Building 444 Acid Dumpster	400-207		
	Inactive Buildings 444/447 Waste Storage Site	400-208		
	Transformer, Roof of Building 447	400-801		
	Beryllium Fire - Building 444	400-810		
	Tank 4 - OPWL Process Waste Pits	000-121		
	Tank 5 - OPWL Process Waste Tanks	000-121		
	Tank 6 - OPWL Process Waste Floor Sump and Foundation Drain Floor	000-121		
	South Loading Dock Building 444	400-116.2		
400-4	Miscellaneous Dumping, Building 460 Storm Drain	400-803	Buildings 439, 440, 444, and 447	Grouped together because of proximity
	Road North of Building 460	400-804		

Potential NFAs are shaded

Table 2 (continued)
Industrial Area Groups

IHSS Group	Description	IHSS/PAC/UBC	Decommissioning Dependency	Grouping Logic
400-5	Sump #3 Acid Site (Southeast of Building 460)	400-205	Building 460	Grouped together because of proximity, and to add flexibility to schedule
	RCRA Tank Leak in Building 460	400-813		
	RCRA Tank Leak in Building 460	400-815		
400-6	Radioactive Site South Area	400-157.2	Buildings 460, 439, 440, 444, and 447	Not grouped to allow flexibility in schedule
400-7	UBC 442 - Filter Test Facility	UBC 442	Buildings 442 and 443	Grouped together because of D&D dependence and proximity
	Radioactive Site North Area	400-157.1		
	Building 443 Oil Leak	400-129		
	Sulfuric Acid Spill Building 443	400-187		
400-8	UBC 441 - Office Building	UBC 441	Building 441	Grouped together because of D&D dependence and proximity
	Underground Concrete Tank	400-122		
	Tank 2 - Concrete Waste Storage Tank	000-121		
	Tank 3 - Concrete Waste and Steel Waste Storage Tanks	000-121		
400-10	Sandblasting Area	400-807		Grouped together because of proximity
	Fiberglass Area West of Building 664	600-120.2		
	Radioactive Site West of Building 664	600-161		
500-1	Valve Vaults 11.12.13	300-186	PA fence, Building 374	Grouped together because of D&D dependence and proximity
	Scrap Metal Storage Site	500-197		
	North Site Chemical Storage Site	500-117.1		
500-2	Radioactive Site Building 551	500-158	Building 551	D&D dependent
500-3	UBC 559 - Service Analytical Laboratory	UBC 559	Buildings 559 and 561	Grouped together because of D&D dependence
	UBC 528 - Temporary Waste Holding Building	UBC 528		
	Radioactive Site Building 559	500-159		
	Tank 7 - OPWL - Active Process Waste Pit	000-121		
	Tank 33 - OPWL - Process Waste Tank	000-121		
	Tank 34 - OPWL - Process Waste Tank	000-121		
	Tank 35 - OPWL - Building 561 Concrete Floor Sump	000-121		
500-4	Middle Site Chemical Storage	500-117.2		Not D&D dependent and unlike nearby IHSSs
500-5	Transformer Leak - 558-1	500-904		Not grouped because PCOCs different from surrounding IHSSs
500-6	Asphalt Surface Near Building 559	500-906		Not grouped - Potential NFA

Potential NFAs are shaded

Table 2 (continued)
Industrial Area Groups

IHSS Group	Description	IHSS/PAC/UBC	Decommissioning Dependency	Grouping Logic
500-7	Tanker Truck Release of Hazardous Waste from Tank 231B	500-907		Not grouped - Potential NFA
600-1	Temporary Waste Storage - Building 663	600-1001	Building 663	D&D dependent
600-2	Storage Shed South of Building 334	400-802	T452A,B,F, and G Trailers	Not grouped - Potential NFA
600-3	Fiberglass Area North of Building 664	600-120.1	Building 668	Not grouped - Potential NFA
600-4	Radioactive Site Building 444 Parking Lot	600-160		Not D&D dependent
600-5	Central Avenue Ditch Cleaning	600-1004		Not grouped - Potential NFA
600-6	Former Pesticide Storage Area	600-1005		Not grouped - Potential NFA not near other sites
700-1	Identification of Diesel Fuel in Subsurface Soil	700-1115	Building 708	D&D dependent but not associated with major 700 area buildings
700-2	UBC 707 - Plutonium Fabrication and Assembly	UBC 707	Buildings 707 and 731	Grouped because of D&D dependence and proximity
	UBC 731 - Building 707 Process Waste	UBC 731		
	Tank 11 – OPWL - Building 731	000-121		
	Tank 30 – OPWL - Building 731	000-121		
700-3	UBC 776 - Original Plutonium Foundry	UBC 776	Buildings 776, 777, 778, and 701	Grouped because of D&D dependence, proximity, and PCOC similarities
	UBC 777 - General Plutonium Research and Development	UBC 777		
	UBC 778 - Plant Laundry Facility	UBC 778		
	UBC 701 - Waste Treatment Research and Development	UBC 701		
	Solvent Spills West of Building 730	700-118.1		
	Radioactive Site 700 Area No.1	700-131		
	Radioactive Site West of Building 771/776	700-150.2(S)		
	Radioactive Site South of Building 776	700-150.7		
	French Drain North of Building 776/777	700-1100		
	Tank 9 - OPWL - Two 22,500-Gallon Concrete Laundry Tanks	000-121		
	Tank 10 - OPWL - Two 4,500-Gallon Process Waste Tanks	000-121		
	Tank 18 - OPWL - Concrete Laundry Waste Lift Sump	000-121		
	Solvent Spills North of Building 707	700-118.2		
	Sewer Line Overflow	700-144(N)		
	Sewer Line Overflow	700-144(S)		
	Transformer Leak South of Building 776	700-1116		
	Radioactive Site Northwest of Building 750	700-150.4		

Potential NFAs are shaded

Table 2 (continued)
Industrial Area Groups

IHSS Group	Description	IHSS/PAC/UBC	Decommissioning Dependency	Grouping Logic
700-4	UBC 771 - Plutonium and Americium Recovery Operations	UBC 771	Buildings 771, 774, 770, and T771G	Grouped because of D&D dependence, proximity, and PCOCs
	UBC 774 - Liquid Process Waste Treatment	UBC 774		
	Radioactive Site West of Buildings 771/776	700-150.2(N)		
	Radioactive Site 700 North of Building 774 (Area 3) Wash Area	700-163.1		
	Radioactive Site 700 Area 3 Americium Slab	700-163.2		
	Abandoned Sump Near Building 774 Unit 55.13 T-40	700-215		
	Hydroxide Tank, KOH, NaOH Condensate	700-139(N)(b)		
	30,000 Gallon Tank (68)	700-124.1		
	14,000 Gallon Tank (66)	700-124.2		
	14,000 Gallon Tank (67)	700-124.3		
	Holding Tank	700-125		
	Westernmost Out-of-Service Process Waste Tank	700-126.1		
	Easternmost Out-of-Service Process Waste Tank	700-126.2		
	Tank 8 - OPWL - East and West Process Tanks	000-121		
	Tank 12 - OPWL - Two Abandoned 20,000-Gallon Underground Concrete Tanks	000-121		
	Tank 13 - OPWL - Abandoned Sump - 600 Gallons	000-121		
	Tank 14 - OPWL - 30,000-Gallon Concrete Underground Storage Tank (68)	000-121		
	Tank 15 - OPWL - Two 7,500-Gallon Process Waste Tanks (34W, 34E)	000-121		
	Tank 16 - OPWL - Two 30,000-Gallon Concrete Underground Storage Tanks (66, 67)	000-121		
	Tank 17 - OPWL - Four Concrete Process Waste Tanks (30, 31, 32, 33)	000-121		
	Tank 36 - OPWL - Steel Carbon Tetrachloride Sump	000-121		
	Tank 37 - OPWL - Steel-Lined Concrete Sump	000-121		
	Caustic/Acid Spills Hydrofluoric Tank	700-139.2		
	Concrete Process Waste Tank 7,500-Gallon (31)	700-146.1		
	Concrete Process Waste Tank 7,500-Gallon (32)	700-146.2		
	Concrete Process Waste Tank 7,500-Gallon (34W)	700-146.3		
	Concrete Process Waste Tank 7,500-Gallon (34E)	700-146.4		
	Concrete Process Waste Tank 7,500-Gallon (30)	700-146.5		
	Concrete Process Waste Tank 7,500-Gallon (33)	700-146.6		
	Radioactive Site North of Building 771	700-150.1		
	Radioactive Site Between Buildings 771 and 774	700-150.3		
700-5	UBC 770 - Waste Storage Facility	UBC 770	Building 770	Not dependent on 771/774, dependent on 770

Potential NFAs are shaded

Table 2 (continued)
Industrial Area Groups

IHSS Group	Description	IHSS/PAC/UBC	Decommissioning Dependency	Grouping Logic
700-6	Buildings 712/713 Cooling Tower Blow Down	700-137	Building 713	Grouped together because potential NFAs and proximity
	Caustic/Acid Spills Hydroxide Tank Area	700-139.1(S)		
700-7	UBC 779 - Main Plutonium Components Production Facility	UBC 779	Buildings 779 and 727	Grouped together because of D&D dependence on 779
	Building 779 Cooling Tower Blowdown	700-138		
	Radioactive Site South of Building 779	700-150.6		
	Radioactive Site Northeast of Building B779	700-150.8		
	Transformer Leak - 779-1/779-2	700-1105		
	Tank 19 - OPWL - Two 1,000-Gallon Concrete Sumps	000-121		
	Tank 20 - OPWL - Two 8,000-Gallon Concrete Sumps	000-121		
	Tank 38 - OPWL - 1,000-Gallon Steel Tanks	000-121		
700-8	750 Pad-Pondcrete/Saltcrete Storage	700-214	750 Pad Tents	D&D dependent potential NFA
700-10	Laundry Tank Overflow - Building 732	700-1101		Not grouped - Potential NFA and different PCOC
700-11	Bowman's Pond	700-1108		Grouped together because of proximity and potential for early action
	Hydroxide Tank, KOH, NaOH Condensate	700-139.1(N) (a)		
700-12	Process Waste Spill - Portal 1	700-1106		Not grouped - Potential NFA
800-1	UBC 865 - Materials Process Building	UBC 865	Building 865	Grouped together because of D&D dependence
	Building 866 Spills	800-1204		
	Building 866 Sump Spill	800-1212		
	Tank 23 - OPWL	000-121		
800-2	UBC 881 - Laboratory and Office	UBC 881	Building 881	Grouped together because of D&D dependence
	Building 881, East Dock	800-1205		
	Tank 24 - OPWL - Seven 2,700-Gallon Steel Process Waste Tanks	000-121		
	Tank 32 - OPWL - 131,160-Gallon Underground Concrete Secondary Containment Sump	000-121		
	Tank 39 - OPWL - Four 250-Gallon Steel Process Waste Tanks	000-121		
800-3	UBC 883 - Roll and Form Building	UBC 883	Building 883	Grouped together because of D&D dependence
	Valve Vault 2	800-1200		
	Tank 25 - OPWL - 750-Gallon Steel Tanks (18, 19)	000-121		
	Tank 26 - OPWL - 750-Gallon Steel Tanks (24, 25, 26)	000-121		
	Radioactive Site South of Building 883	800-1201		

Potential NFAs are shaded

Table 2 (continued)
Industrial Area Groups

IHSS Group	Description	IHSS/PAC/UBC	Decommissioning Dependency	Grouping Logic
800-4	UBC 886 - Critical Mass Laboratory	UBC 886	Building 886	Grouped together because of D&D dependence
	Tank 21 - OPWL - 250-Gallon Concrete Sump	000-121		
	Tank 22 - OPWL - Two 250-Gallon Steel Tanks	000-121		
	Tank 27 - OPWL - 500-Gallon Portable Steel Tank	000-121		
	Radioactive Site #2 800 Area Building 886 Spill	800-164.2		
800-5	UBC 887 - Process and Sanitary Waste Tanks	UBC 887	Building 887	Grouped together because of D&D dependence
	Building 885 Drum Storage	800-177		
800-6	UBC 889 - Decontamination and Waste Reduction	UBC 889	Building 889	Grouped together because of D&D dependence
	Radioactive Site 800 Area Site #2 Building 889 Storage Pad	800-164.3		
	Tank 28 - Two 1,000-Gallon Concrete Sumps	000-121		
	Tank 40 - Two 400-Gallon Underground Concrete Tanks	000-121		
900-1	UBC 991 - Weapons Assembly and R&D	UBC 991	Building 991	Grouped together because of D&D dependence
	Radioactive Site Building 991	900-173		
	Radioactive Site 991 Steam Cleaning Area	900-184		
	Building 991 Enclosed Area	900-1301		
900-3	904 Pad, Pondcrete Storage	900-213	904 Tents	Not grouped - Potential NFA not near other sites
900-4&5	S&W Building 980 Contractor Storage Facility	900-175		Grouped together because of potential NFAs and proximity
	Gasoline Spill Outside of Building 980	900-1308		
SW-2	Original Landfill	SW115		Grouped together because of proximity
	Water Treatment Plant Backwash	SW196		

Potential NFAs are shaded

Characterize as necessary to define remediation constraints and provide data for the CRA.

A comprehensive SAP for the IA, (the IASAP) will be developed, instead of individual SAPs for each IA Group. Addenda for the individual IA Groups will be prepared as necessary. This strategy will provide an overall IASAP that includes:

- DQOs for characterization and remediation sampling,
- Sampling methods and protocols,
- Data analysis methods and protocols,
- QA methods and protocols, and
- H&S methods and protocols.

The IASAP addenda will address group-specific information including (1) sampling location, (2) sample quantity, (3) sampling methods, (4) required analytes, (5) required QA samples and procedures, (6) analytical methods, (7) data aggregation methods, (8) data analysis methods, and (9) data management methods.

Strategy

Optimize sampling activities and only sample once.

Because the goal of sampling at the IA Groups is to provide data for remediation decisions and the CRA, the IASAP will be developed to:

- Avoid sampling activities that do not contribute to remedial planning,
- Use innovative sampling technologies, where appropriate,
- Use ER/decommissioning lessons learned at RFETS and other sites,
- Combine IA Groups where possible for increased schedule streamlining and cost savings,
- Identify areas that require remediation, and
- Provide appropriate data for closure decisions.

Strategy

Use existing data whenever possible to eliminate redundant sampling efforts.

IA Group characterization strategy includes using existing data (validated analytical data, historic data, and decommissioning data) whenever possible to reduce the required number of samples. The sample number reduction process includes the following tasks:

- Compare existing validated analytical data to RFCA ALs (this activity will be conducted in FY00 and FY01 before characterization activities);
- Develop DQOs for sampling at the IA Groups;
- Identify data gaps by IA Group; and
- Evaluate decommissioning data for usability.

6.3 Remediation Strategy

The goal of IA remediation is to achieve an endstate that is protective of human health and the environment. To achieve this goal, remediation options will be selected based on (1) effectiveness in achieving remediation goals, (2) availability, and (3) cost effectiveness. Remediation options and strategies will incorporate innovative technologies and lessons learned from remediation projects at RFETS and other sites, as appropriate.

Strategy

Combine IA Group remediation activities whenever possible.

Although individual remediation strategies will be developed for each IA Group, efforts will be made to combine IA Group remediations to make optimal use of Site resources. Remediation projects will be grouped (1) by similar remedial actions, (2) by proximity to other remediation projects, (3) by similar PCOCs, (4) to streamline schedules, or (5) to maximize resources.

Potential remediation strategies can include the following:

- NFA decisions,
- Removal and offsite disposition,
- Caps and covers, and
- Plume remediation.

6.3.1 No Further Action

Strategy

Excavate and package for immediate disposition.

An NFA justification will be used when analytical results are less than RFCA Tier II ALs, and will be considered when analytical results are less than RFCA Tier I ALs. NFA documentation will be in accordance with RFCA Attachment 6.

6.3.2 Removal and Offsite Disposition

The preferred option for contaminated soil in the IA is excavation and immediate disposition offsite. This option is effective and meets the goal of the 2006 closure. Contaminated soil areas will be identified and excavated. The material will be placed in lined roll-offs or encased in polyethylene according to disposal site WAC. Soil will be sampled, characterized, and prepared for shipment to approved facilities. Section 5.2.1 describes other options for the disposition of remediation waste.

The decision to use caps or covers for part of the IA will be made based on data from characterization, the IPM, AME, Land Configuration Design Basis, and Site Water Balance study.

6.3.3 Caps and Covers

Future land use and surface water quality protection influence decisions related to the RFETS endstate goal of protecting human health and the environment, cleanup levels, and post-closure conditions for the IA. Although the RFETS Vision (RFCA, Appendix 9) committed to cleanup of the Site where possible and to the extent feasible, the ability to remediate the Site to background levels is neither technically nor financially achievable at this time.

Capping or covering areas of the Site, in combination with other remediation, is a potential strategy for achieving the endstate goal.

Cap and cover designs can vary considerably. Engineered caps use multiple layers of soil and aggregate including water-impermeable clay, as well as geomembranes to protect underlying materials. Soil covers rely on the principle of evapotranspiration rather than impermeability to achieve the same objective. Soil covers can vary in thickness from a few inches to several feet.

The decision to cap or cover parts of the IA has not yet been made. Current information indicates that a post-remediation cover could enhance the ability to meet the endstate goal in the Solar Evaporation Ponds (SEP) area and 700 Area. This decision will be based on the results of further characterization and information from the IMP, AME, Land Configuration Design Basis, and Site Water Balance study.

6.3.4 Plume Remediation

Strategy

Remediate plumes using reactive barriers, source removal, and monitored natural attenuation.

Remediation of groundwater plumes at RFETS is driven by the unique geologic characteristics at the Site. These characteristics include a shallow, low-volume groundwater underlain by thick claystone with low permeability. Groundwater moves from west to east along the claystone layer, and surfaces in the eastern portions of the Site. Although these characteristics render some remediation technologies ineffective, they enhance others.

A three-part strategy is being used for groundwater plume remediation. First, plumes that pose an immediate threat to surface water are remediated using reactive barrier systems. Reactive barriers employ a subsurface impermeable barrier wall to intercept a plume and direct it downgradient to a flow-through reactor vessel. The reactor vessel contains media that reduces contaminants to precipitates or innocuous forms that flow out of the vessel. The media, containing precipitates, is periodically replaced and dispositioned as remediation waste.

Plumes that pose an immediate threat to surface water are those that have migrated outside the IA into the inner BZ. These plumes have been characterized, and the final reactive barrier to remediate them will be installed by the end of 1999. Plumes still confined to the IA may be single or commingled multiple plumes. Although the outer boundaries of the plume complex have been well documented, individual plumes have not been fully identified. As characterization and remediation of the IA progresses, the IA plume complex will become better understood. If data indicate that a threat to surface water exists, a single reactive barrier will be installed to remediate the plume complex.

The second part of the groundwater plume remediation strategy is to remediate the source contributing to the plume, assuming the source is still

present. One VOC source has been identified in the IA that may be contributing to the IA plume complex. This source will be remediated when access to the area becomes possible following decommissioning of the buildings in the area.

The third part of the groundwater plume remediation strategy is to remediate using monitored natural attenuation. Natural attenuation relies on natural processes such as biodegradation to break down contaminants in groundwater. Information from monitoring wells managed under the IMP suggests that natural breakdown of VOCs is occurring at the Site. Wells installed in locations of potential plumes, as well as identified plumes that pose no current threat to surface water, will be monitored to track movement and concentrations of contaminants. Monitored natural attenuation will serve as the remedy for these plumes, unless and until information indicates the plumes are a threat to surface water.

The current plume remediation strategy could be modified as more information on subsurface conditions is developed, or as new technologies become available.

6.3.5 Decision Documents

IA characterization and environmental remediation decision documents that are currently developed include PAMs, IM/IRAs, SAPs, and closeout reports. These documents have been scheduled in the 2006 CPB for each IA Group. Figure 11 illustrates the current ER decision document schedule (see Section 6.1 for a discussion of IHSS, PAC, and UBC site grouping). As the schedule indicates, requirements for regulatory agency review and/or approval of ER decision documents will increase dramatically in FY02 through FY06.

Strategy

Develop an RSOP for remediation.

Because many decision documents will be developed and reviewed, the process will be streamlined to ensure IA closure in 2006. Potential options for streamlining the decision document process include the following:

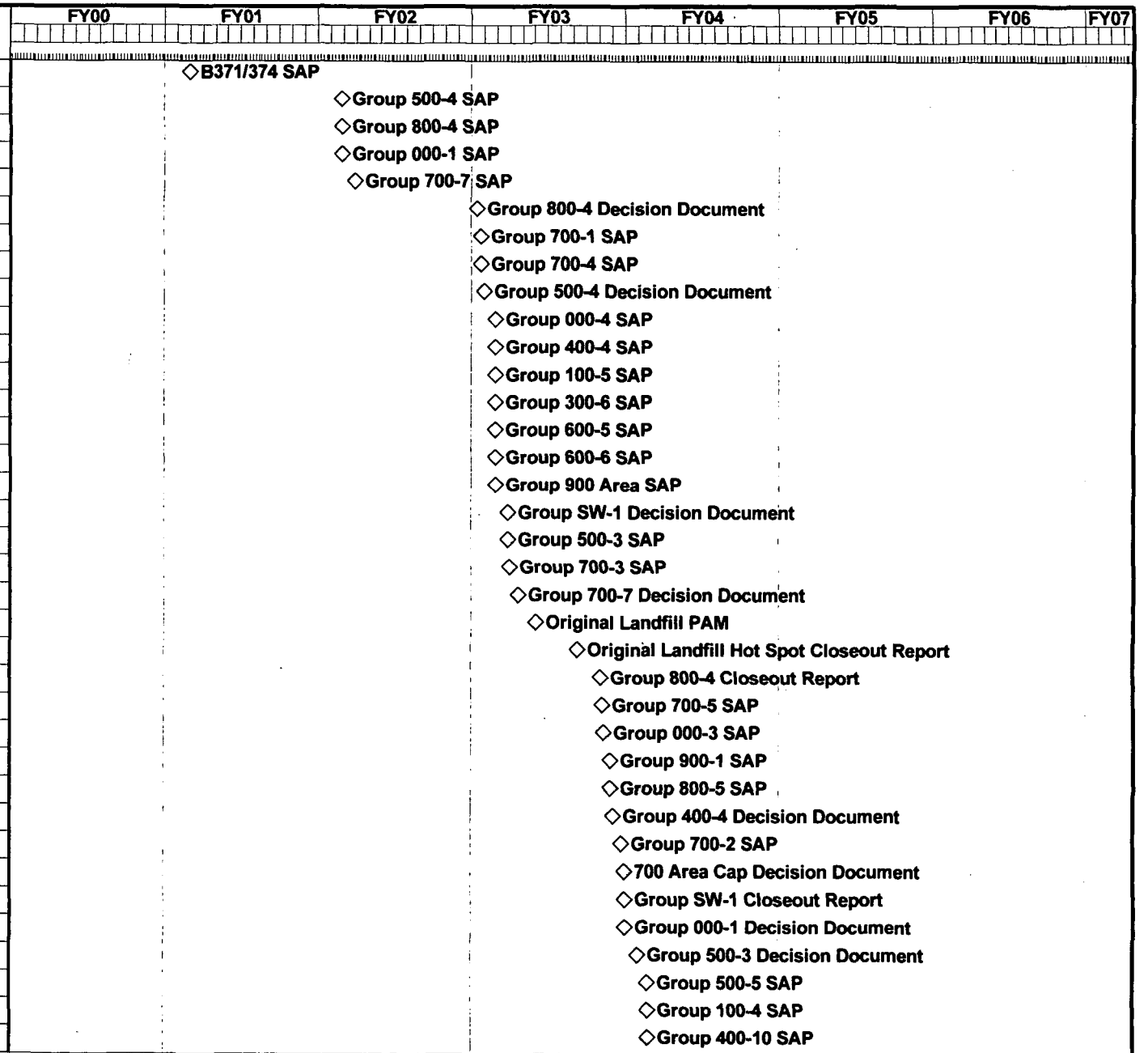
Strategy

Work with regulatory agencies to streamline the review process.

- Develop an RSOP for remediation similar to current RFCA decommissioning RSOPs. The RSOP, once approved by the regulatory agencies, will streamline document preparation and review. Projects may be remediated using an RSOP. Under this approach, a letter to the regulatory agencies would identify the location of remediation areas, depth of remediation, and confirmation sampling activities. A RFCA decision document will be required only for those remediation issues not already addressed in the approved RSOP; and

- Include CDPHE and EPA staff on IA project teams. These staff will review documents and work with the project teams to resolve issues and enhance communication between agencies and Site staff. This strategy

Activity Description	Early Finish
B371/374 SAP	28NOV00*
Group 500-4 SAP	27NOV01*
Group 800-4 SAP	27NOV01*
Group 000-1 SAP	27NOV01*
Group 700-7 SAP	26DEC01*
Group 800-4 Decision Document	15OCT02*
Group 700-1 SAP	23OCT02*
Group 700-4 SAP	23OCT02*
Group 500-4 Decision Document	29OCT02*
Group 000-4 SAP	25NOV02*
Group 400-4 SAP	25NOV02*
Group 100-5 SAP	25NOV02*
Group 300-6 SAP	25NOV02*
Group 600-5 SAP	25NOV02*
Group 600-6 SAP	25NOV02*
Group 900 Area SAP	25NOV02*
Group SW-1 Decision Document	26DEC02*
Group 500-3 SAP	26DEC02*
Group 700-3 SAP	30DEC02*
Group 700-7 Decision Document	20JAN03*
Original Landfill PAM	04MAR03*
Original Landfill Hot Spot Closeout Report	11JUN03*
Group 800-4 Closeout Report	05AUG03*
Group 700-5 SAP	06AUG03*
Group 000-3 SAP	11AUG03*
Group 900-1 SAP	25AUG03*
Group 800-5 SAP	26AUG03*
Group 400-4 Decision Document	03SEP03*
Group 700-2 SAP	24SEP03*
700 Area Cap Decision Document	29SEP03*
Group SW-1 Closeout Report	30SEP03*
Group 000-1 Decision Document	30SEP03*
Group 500-3 Decision Document	30OCT03*
Group 500-5 SAP	25NOV03*
Group 100-4 SAP	25NOV03*
Group 400-10 SAP	25NOV03*



Project Start 01OCT99
Project Finish 31OCT06
Data Date 01OCT99
Run Date 11AUG99

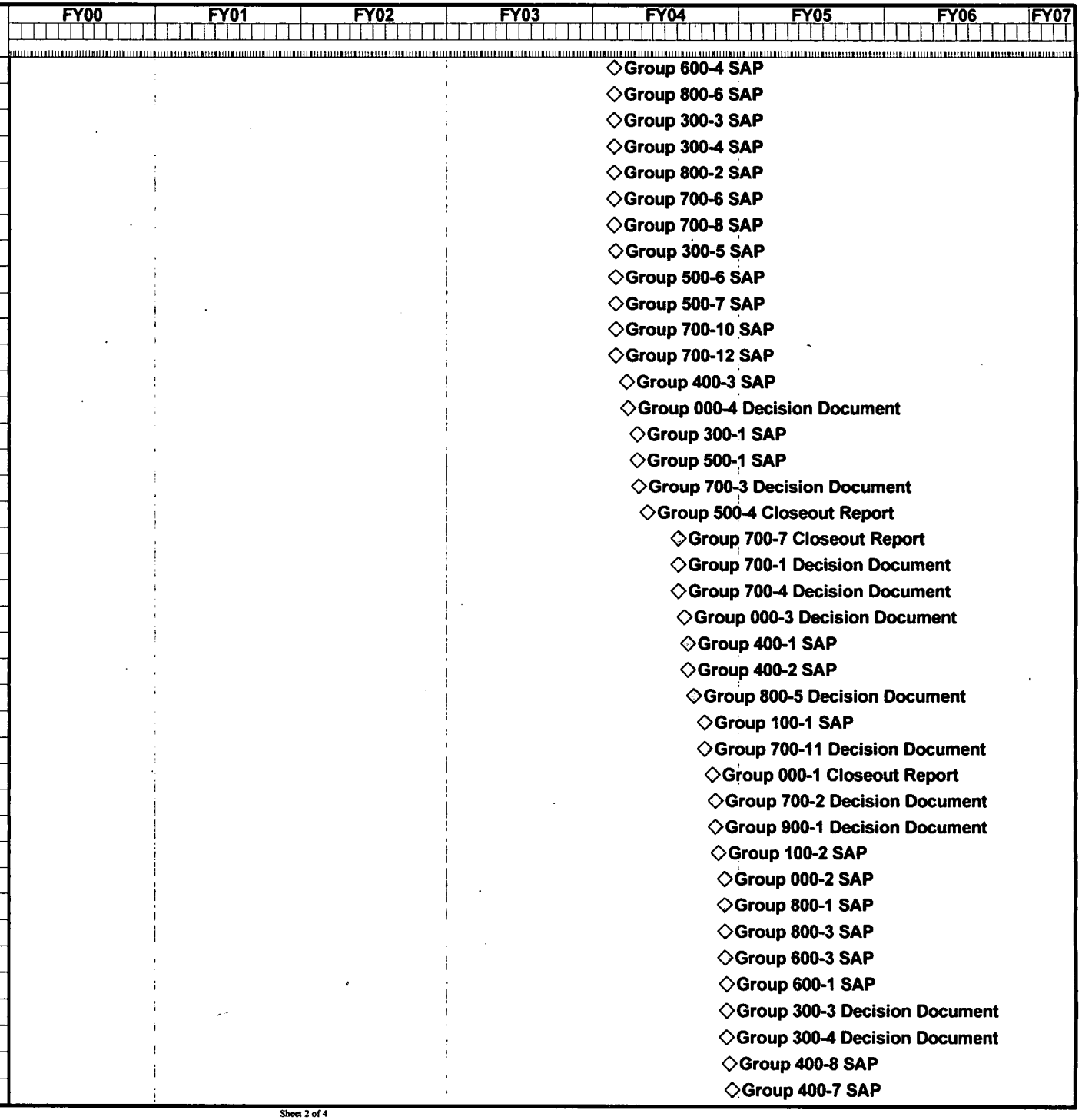
Early Bar
Progress Bar
Critical Activity

AGCY

Sheet 1 of 4

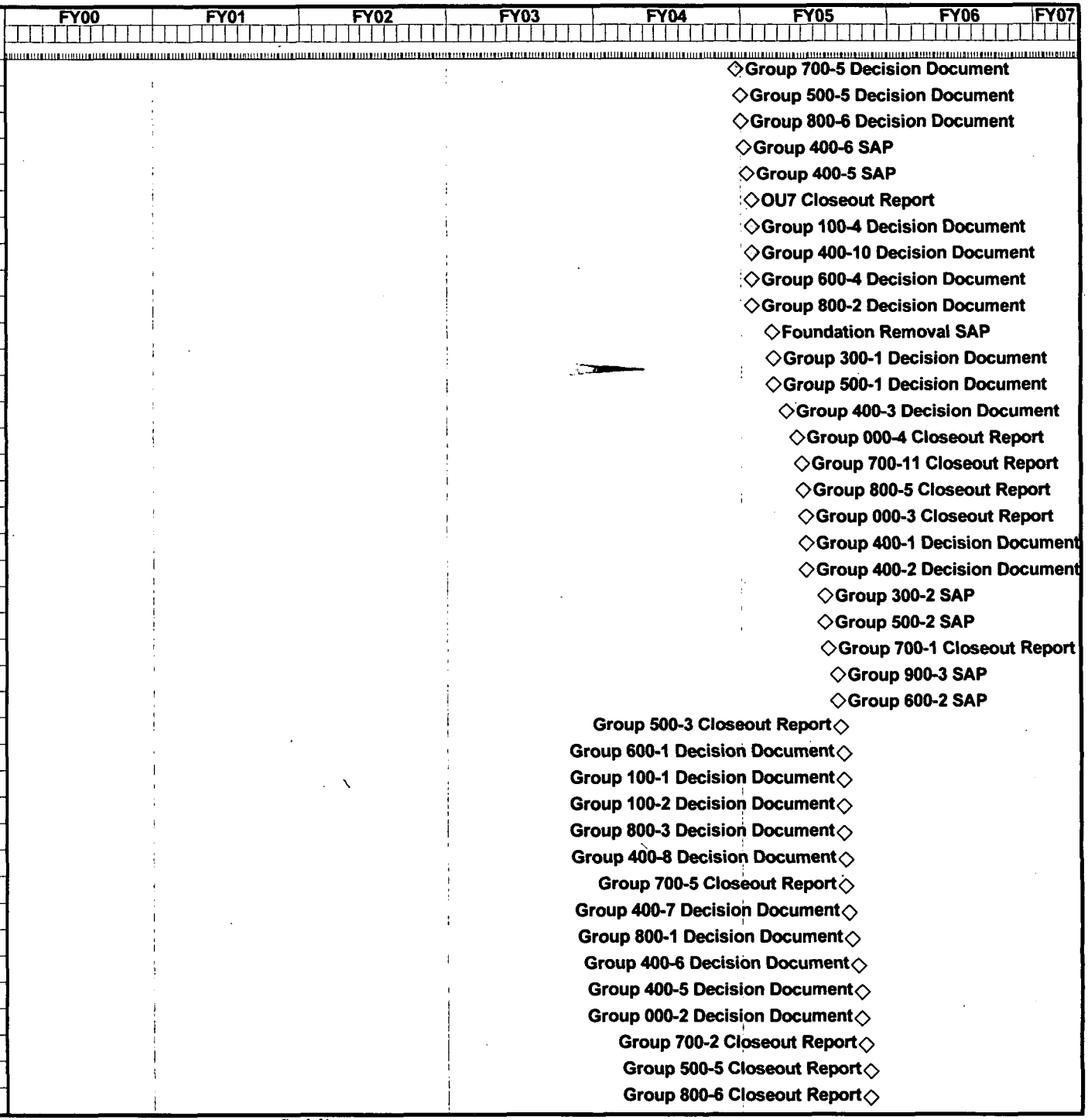
Figure 11
Draft Final Industrial Area
Decision Document Schedule

Activity Description	Early Finish
Group 600-4 SAP	25NOV03*
Group 800-6 SAP	25NOV03*
Group 300-3 SAP	25NOV03*
Group 300-4 SAP	25NOV03*
Group 800-2 SAP	25NOV03*
Group 700-6 SAP	25NOV03*
Group 700-8 SAP	25NOV03*
Group 300-5 SAP	26NOV03*
Group 500-6 SAP	26NOV03*
Group 500-7 SAP	26NOV03*
Group 700-10 SAP	26NOV03*
Group 700-12 SAP	26NOV03*
Group 400-3 SAP	26DEC03*
Group 000-4 Decision Document	29DEC03*
Group 300-1 SAP	19JAN04*
Group 500-1 SAP	19JAN04*
Group 700-3 Decision Document	22JAN04*
Group 500-4 Closeout Report	16FEB04*
Group 700-7 Closeout Report	03MAY04*
Group 700-1 Decision Document	04MAY04*
Group 700-4 Decision Document	04MAY04*
Group 000-3 Decision Document	17MAY04*
Group 400-1 SAP	25MAY04*
Group 400-2 SAP	25MAY04*
Group 800-5 Decision Document	09JUN04*
Group 100-1 SAP	07JUL04*
Group 700-11 Decision Document	08JUL04*
Group 000-1 Closeout Report	27JUL04*
Group 700-2 Decision Document	03AUG04*
Group 900-1 Decision Document	04AUG04*
Group 100-2 SAP	11AUG04*
Group 000-2 SAP	25AUG04*
Group 800-1 SAP	25AUG04*
Group 800-3 SAP	25AUG04*
Group 600-3 SAP	26AUG04*
Group 600-1 SAP	01SEP04*
Group 300-3 Decision Document	01SEP04*
Group 300-4 Decision Document	01SEP04*
Group 400-8 SAP	07SEP04*
Group 400-7 SAP	16SEP04*

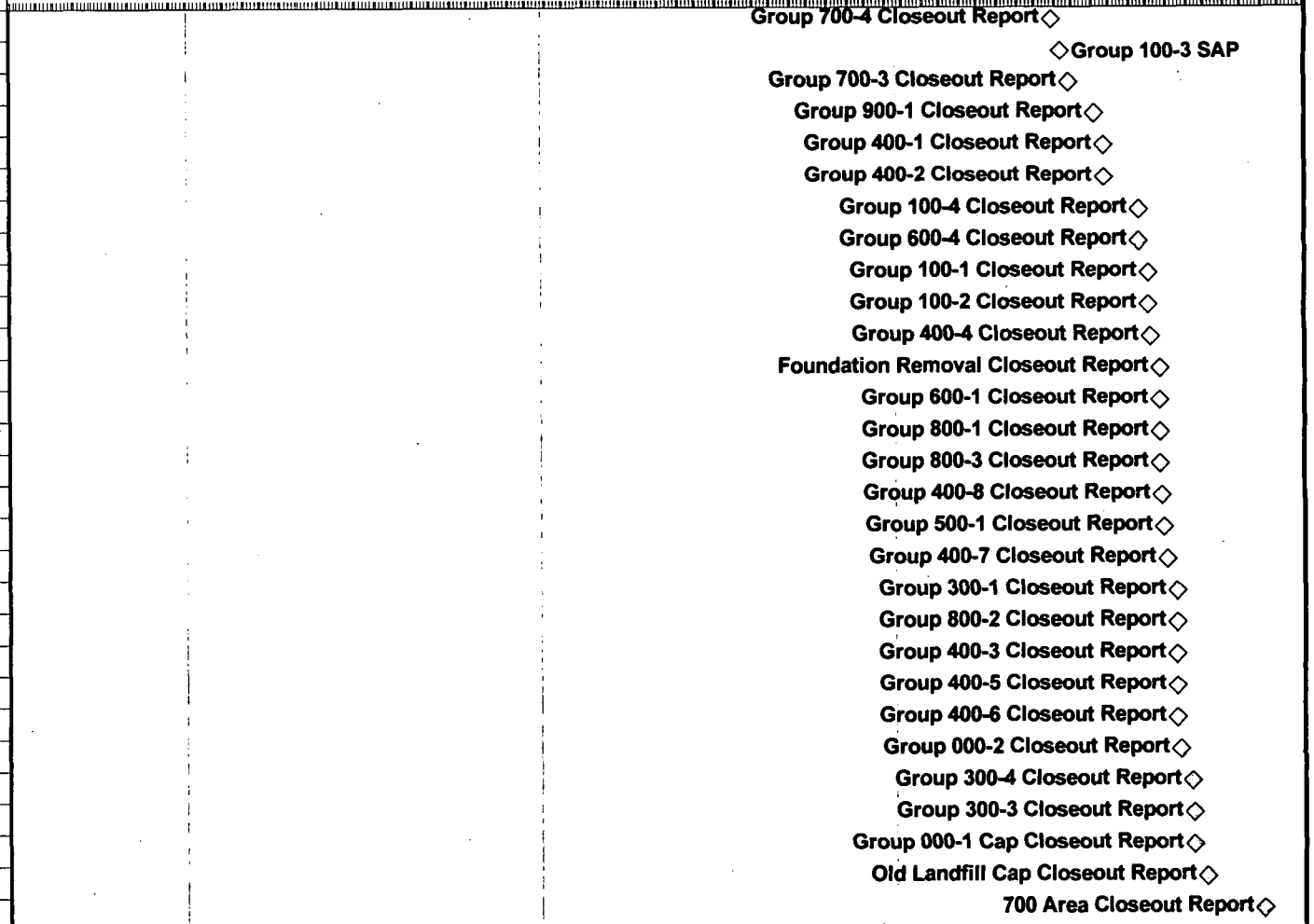


57

Activity Description	Early Finish
Group 700-5 Decision Document	20SEP04*
Group 500-5 Decision Document	01OCT04*
Group 800-6 Decision Document	01OCT04*
Group 400-6 SAP	07OCT04*
Group 400-5 SAP	14OCT04*
OU7 Closeout Report	28OCT04*
Group 100-4 Decision Document	28OCT04*
Group 400-10 Decision Document	28OCT04*
Group 600-4 Decision Document	28OCT04*
Group 800-2 Decision Document	28OCT04*
Foundation Removal SAP	17DEC04*
Group 300-1 Decision Document	20DEC04*
Group 500-1 Decision Document	20DEC04*
Group 400-3 Decision Document	19JAN05*
Group 000-4 Closeout Report	15FEB05*
Group 700-11 Closeout Report	25FEB05*
Group 800-5 Closeout Report	03MAR05*
Group 000-3 Closeout Report	09MAR05*
Group 400-1 Decision Document	10MAR05*
Group 400-2 Decision Document	10MAR05*
Group 300-2 SAP	26APR05*
Group 500-2 SAP	26APR05*
Group 700-1 Closeout Report	02MAY05*
Group 900-3 SAP	26MAY05*
Group 600-2 SAP	26MAY05*
Group 500-3 Closeout Report	02JUN05*
Group 600-1 Decision Document	09JUN05*
Group 100-1 Decision Document	09JUN05*
Group 100-2 Decision Document	09JUN05*
Group 800-3 Decision Document	09JUN05*
Group 400-8 Decision Document	14JUN05*
Group 700-5 Closeout Report	15JUN05*
Group 400-7 Decision Document	23JUN05*
Group 800-1 Decision Document	29JUN05*
Group 400-6 Decision Document	15JUL05*
Group 400-5 Decision Document	22JUL05*
Group 000-2 Decision Document	22JUL05*
Group 700-2 Closeout Report	02AUG05*
Group 500-5 Closeout Report	15AUG05*
Group 800-6 Closeout Report	15AUG05*



Activity Description	Early Finish
Group 700-4 Closeout Report	18AUG05*
Group 100-3 SAP	09SEP05*
Group 700-3 Closeout Report	23SEP05*
Group 900-1 Closeout Report	17NOV05*
Group 400-1 Closeout Report	05DEC05*
Group 400-2 Closeout Report	05DEC05*
Group 100-4 Closeout Report	15FEB06*
Group 600-4 Closeout Report	15FEB06*
Group 100-1 Closeout Report	07MAR06*
Group 100-2 Closeout Report	07MAR06*
Group 400-4 Closeout Report	09MAR06*
Foundation Removal Closeout Report	30MAR06*
Group 600-1 Closeout Report	30MAR06*
Group 800-1 Closeout Report	30MAR06*
Group 800-3 Closeout Report	30MAR06*
Group 400-8 Closeout Report	04APR06*
Group 500-1 Closeout Report	05APR06*
Group 400-7 Closeout Report	13APR06*
Group 300-1 Closeout Report	02MAY06*
Group 800-2 Closeout Report	02MAY06*
Group 400-3 Closeout Report	04MAY06*
Group 400-5 Closeout Report	05MAY06*
Group 400-6 Closeout Report	05MAY06*
Group 000-2 Closeout Report	11MAY06*
Group 300-4 Closeout Report	05JUN06*
Group 300-3 Closeout Report	06JUN06*
Group 000-1 Cap Closeout Report	07JUN06*
Old Landfill Cap Closeout Report	06JUL06*
700 Area Closeout Report	31OCT06*



will reduce review time because the regulatory agencies and Site staff will agree on sampling and remediation actions up front, potential issues will be identified and resolved, and agency input will be written into the decision document.

6.4 Remediation Challenges

Remediation challenges include OPWL, NPWL, sanitary sewers, storm drains, and UBC sites.

There are several areas in the IA that present significant technical challenges: the OPWL, new process waste lines (NPWL), other underground pipelines, and UBC sites. Innovative sampling and remediation technologies and lessons learned from characterization, remediation, and decommissioning projects at RFETS and other sites will be incorporated into remediation strategies as appropriate.

6.4.1 Underground Pipeline Systems

The underground pipeline systems include the OPWL, NPWL, sanitary sewer systems and storm drains. The unique challenges associated with these systems that will affect remediation are discussed below.

Original Process Waste Lines

OPWL and NPWL will be incorporated into IHSS, PAC, and UBC site remediations, where possible.

The OPWL is a network of tanks, underground pipelines, and aboveground pipelines that were used to transport and temporarily store aqueous chemical and radioactive process wastes (Plate 3). The OPWL potentially transported a variety of wastes including acids, bases, solvents, radionuclides, metals, oils, polychlorinated biphenyls (PCBs), biohazards, paints, and other chemicals (DOE, 1995).

The OPWL network originally consisted of approximately 35,000 feet of pipeline. Parts of the OPWL have been converted to NPWL or other systems (fire plenum deluge system), and will be characterized as part of those systems. The current OPWL system contains approximately 28,638 feet. Approximately 13,317 feet of pipeline will be characterized and remediated as a single project in IA Group 000-2. The remaining 15,321 feet will be characterized and remediated as part of other IA Groups. Table 3 summarizes the OPWL pipelines.

Challenges to remediation of OPWL, NPWL, sanitary sewers, and storm drains are:

- *Extent,*
- *Location,*
- *Composition,*
- *Undocumented leaks, and*
- *Many potential waste streams and PCOCs.*

New Process Waste Lines

The NPWL consists of pipelines, tanks, and valve vaults that overlap extensively with the OPWL (Figure 12). The NPWL transports low-level aqueous waste to the liquid waste treatment facility in Building 374. Based on Site utility maps, it is estimated that 6,300 feet of pipeline will require characterization. This estimate does not include sections of pipeline that overlap with the OPWL.

Table 3
OPWL Pipelines

Segment Name	Length (feet)	IHSS Grouping	Location
121-P26	2,750	000-1	700 Area (also referred to as IHSS 149.1 and 149.2)
121-P47	135	000-1	700 Area
121-P48	0	000-1	700 Area
121-P49	85	000-1	700, 900 Areas
121-P50	105	000-1	900 Area
121-P57	0	100-1	Building 122
121-P06	1,300	000-2	Building 881
121-P11	175	000-2	700, 800 Areas (also referred to as IHSS 147.1)
121-P12	510	000-2	700 Area (also referred to as IHSS 123.2 and 147.1)
121-P13	0	000-2	700 Area (also referred to as IHSS 123.2 and147.1)
121-P15	785	000-2	700 Area (also referred to as IHSS 123.2)
121-P16	170	000-2	500, 700 Areas
121-P21	386	000-2	Building 774
121-P25	562	000-2	700 Area
121-P27	185	000-2	Building 774
121-P28	128	000-2	700 Area (also referred to as IHSS 127)
121-P29	197	000-2	700 Area (also referred to as IHSS 127)
121-P35	142	000-2	700 Area
121-P36	599	000-2	700, 900 Areas
121-P37	1,449	000-2	700, 900 Areas
121-P38	800	000-2	700, 900 Areas
121-P39	1,817	000-2	900 Area
121-P40	232	000-2	900 Area
121-P41	1,537	000-2	700 Area
121-P43	100	000-2	700 Area
121-P44	0	000-2	700 Area
121-P45	130	000-2	700 Area
121-P46	0	000-2	700 Area
121-P58	90	000-2	Building 703
121-P59	0	000-2	Building 703
121-P60	180	000-2	180 ft; Building 774
121-P61	70	000-2	Building 774
121-T-29	0	000-2	Tank T-29
121-P57	0	100-1	Building 122
121-P01	180	100-4	Building 123
121-P02	452	100-4	Building 123
121-P03	162	100-4, 400-8	Building 441
121-P52	280	400-7	Building 443
121-P05	1,561	400-8	Building 444
121-P17	1,130	500-3	Building 559
121-P18	0	500-3	Building 559
121-P62	42	500-3	Building 559
121-P14	648	700-2	700 Area (also referred to as IHSS 123.2)

Table 3 (continued)
OPWL Pipelines

Segment Name	Length (feet)	IHSS Grouping	Location
121-P19	603	700-2	Building 707
121-P20	499	700-3	700 Area
121-P30	0	700-3	Building 777
121-P32	907	700-3	Building 776
121-P51	170	700-3	Building 778
121-P22	1,205	700-4	Building 771
121-P23	410	700-4	Building 771
121-P24	306	700-4	Building 771
121-P31	167	700-4	Buildings 771, 774
121-P33	140	700-4	700 Area
121-P56	170	700-4	Buildings 771, 774
121-P34	198	700-4, 000-2	700 Area
121-P42	213	700-7	700 Area
121-P10	1,190	800-1, 800-6	Buildings 865/889
121-P07	440	800-2	Building 881
121-P08	0	800-2	Building 881
121-P53	78	800-2	Building 881
121-P54	138	800-2	Building 881
121-P55	158	800-2	Building 881
121-P09	504	800-3	Building 883
121-P63	100	800-4	Building 886
121-P64	65	800-4	Building 886
121-P65	80	800-4	Building 828
121-P66	50	800-4	Building 886

36

Sanitary Sewer System

The sanitary sewer system consists of approximately 36,480 feet of pipeline, and 25 valve vaults, pump vaults, and similar structures that will require characterization (Figure 12). This estimate includes only main pipelines. The rest of the pipelines will be characterized with UBC sites or other IHSSs or PACs. No previous characterization of the sanitary sewer system exists.

The sanitary sewer system has been used for the transport, storage, and treatment of sanitary wastes since 1952. Historically, waste streams other than typical sanitary wastes have been discharged to the sanitary sewer system, including a variety of chemical and radioactive wastes from laboratories, process buildings, and laundries. Additionally, hazardous and radioactive liquids from spills and accidental discharges have entered the sanitary sewer system. Historic discharges to the system include acids, bases, beryllium, chromic acid, chromium, film processing chemicals, laundry waste, nitrates, oils, paint, radionuclides, solvents, sulfuric acid, and tritium (DOE, 1992).

Storm Drains

There are 239 storm drains at RFETS as shown on Figure 12. Of these, 139 require characterization as part of IHSS Group 000-3. The remaining 100 storm drains will be characterized with associated buildings and other IA Groups. Storm drains may have been exposed to contaminated liquids because of spills, fires, contaminated surface water runoff, and contaminated sediments. Potential wastes that have been documented in storm drains are silver paints (DOE, 1992).

Strategy

Remediate contaminated pipelines and soil; stabilize in place non-contaminated pipelines.

Strategy

Focus on remediating contaminated soil, rather than locations of OPWL, NPWL, and utility pipeline leaks.

Remediation Strategies

The key remediation strategy for the OPWL, NPWL, sanitary sewer system, and storm drains is to remediate contaminated soil, process lines, and other pipelines, and stabilize in place those segments with contaminant concentrations below RFCA ALs. Because it is not clear where or when pipelines may have broken and leaked, characterization at these IA Groups will focus on identifying contaminated soil and specific areas of concern, rather than on the integrity and precise location of each pipeline leak.

Issues that add to the complexity of characterizing and remediating the OPWL, NPWL, sanitary sewer system, and storm drains are:

- Extent and size of systems,
- Systems under buildings, roads, and other infrastructure,

- Conflicting information on pipeline locations and use,
- Pipelines collocated with other utilities,
- Varying or unknown pipeline depths,
- Various pipeline compositions (polyvinyl chloride [PVC], stainless steel, cement asbestos, cast iron, Saran-lined steel, vitrified clay, ribbed hose fiberglass, reinforced epoxy pipe, black iron, polyethylene, glass, and Schedule 40 steel),
- Documented leaks and releases from many pipelines, or pipelines listed as leaking with no supporting evidence, and
- Many potential waste streams and PCOCs.

Remediation of the OPWL, NPWL, sanitary sewer system, and storm drains requires development of innovative approaches that achieve cost-effective results. Potential strategies for characterization and remediation of these systems may include the following elements:

Strategy

Develop OPWL, NPWL, and utility remediation approaches based on lessons learned at other sites.

- Consult with the DOE Office of Science and Technology staff to explore innovative sampling and remediation techniques;
- Use commercially available, proven pipe locating methods to locate pipelines;
- Develop a statistical sampling approach that includes a bias toward areas where potential leaks are documented, but also achieves statistical coverage;
- Conduct a cost/benefit analysis of sampling methods to determine which sampling strategy provides the most information for the least cost; and
- Use Geoprobe sampling methods rather than excavation to reduce costs, schedule, and H&S concerns.

6.4.2 Under Building Contamination

There are 31 designated UBC sites in the RFETS IA (see Table 2). Past and current operations in these buildings have included production and waste management activities. These buildings have been designated as UBC sites because there have been documented spills or releases in the buildings or routine operations may have lead to contamination (DOE, 1992). OPWL, NPWL, and sanitary sewer segments beneath the buildings will also need to be investigated for remediation. Accurate drawings of the systems beneath

most buildings are not always available, and the location, length, and composition of the pipelines are not always known. Issues associated with characterization of these UBC sites include the following:

- Potentially unknown spills, releases, and contamination,
- OPWL and other utilities beneath buildings,
- More than one type of pipeline beneath building,
- Unknown conditions,
- Free-standing water beneath buildings,
- Basements below the water table,
- Additional PCOCs because of associated IHSSs,
- Potentially wide range of PCOCs,
- Accessibility, and
- Structural integrity of foundations.

Strategy

Characterize UBC sites early, where appropriate.

Characterization of UBC will begin during deactivation as soon as building floors and slabs are accessible, usually during the last 50 percent of the effort. The timing of characterization will be determined on a building-by-building basis as safety and security allows. Characterization techniques will include soil sampling by drilling through building slabs. Technical challenges will include developing plans that (1) include OPWL, NPWL, and sanitary sewer lines beneath buildings; (2) do not impact other Site utilities (e.g., alarms and security systems); and (3) incorporate the characterization needs of associated IHSSs and PACs. For buildings not requiring deactivation, characterization will begin as early in the decommissioning phase as possible, usually during decontamination.

Early characterization to determine the presence or absence of hazardous substances at UBC sites is being initiated at some facilities. The first effort is at UBC sites 371 and 374, where operational history suggests there is clean soil beneath the buildings. If it is determined that Buildings 371 and 374 are free of UBC, these buildings will be left in place to support the closure mission for an additional 1½ years. In addition, lessons learned from early UBC site characterization will provide opportunities for refinement of integration and characterization activities and schedules. Early characterization may include drilling through concrete floors and basements, directional drilling, and sampling drains and valve vaults.

6.5 Data Management

IA data needs to be managed to ensure acceptable data.

The data management function is critical to closure of the IA and Site. Data relied on must be technically defensible and acceptable to the regulatory agencies. These data must be managed and accurately validated so that the analytical results, as well as sampling locations, can be evaluated. These data will be used to:

- Determine existing data gaps,
- Enable comparison to RFCA ALs,
- Determine the lateral and vertical extent of contamination and required remediation,
- Support NFA determinations, and
- Support the CRA and CAD/ROD analyses.

6.5.1 Existing Data

Existing data are being compiled from a variety of sources.

A key IA strategy is to use as much existing data as possible. As part of the IA Strategy, existing analytical and documented spill and leak data are being compiled. These data will be used to provide information on PCOCs in IA Groups and identify potential data sources. They will form the basis for a comprehensive data compilation and data gap analysis to be conducted as part of IA efforts over the next 2 years.

Data are being collected from a number of existing sources. Examples of analytical data sources include the following:

- ER documents (RFI/RI reports, data summaries, Sitewide reports, HRRs from 1992 to 1998),
- RCRA Contingency Implementation Plans,
- Electronic records for groundwater monitoring wells, surface water and sediment sampling stations, and boreholes in the IA, and
- Soil disturbance permits.

Additional data that contain information on spills and leaks are being compiled from a variety of sources. Examples of these sources include Incident Reports, Occurrence Reports, and Radiological Incident Reports. A review of sitewide document titles and Geographic Information System (GIS) map titles is being conducted to identify additional data sources.

These data will be used to identify IHSSs, PACs, and UBC sites that have not been characterized. Validated surface soil, subsurface soil, groundwater, and surface water data are being collected for each IHSS, PAC, and UBC site. Data quality and data gap analyses will be conducted during the comprehensive data compilation task in FY00 and FY01.

6.5.2 Comprehensive Data Compilation

A comprehensive data compilation task will be conducted during the next 2 years.

The comprehensive data compilation task includes data collection, usability assessment, and data gap analysis. This task will provide a comprehensive and consistent set of existing data for use in the IASAP, NFA justifications, and Site closure documents.

The data usability assessment will evaluate existing records using the following criteria:

- Are these data valid and of known quality to meet DQOs?
- Are these data critical to IA decision documents?
- Are these data critical to the understanding of the IA?
- Are these data critical to determining remediation strategy?
- Do these data decrease the number of new IA samples required?
- Will these data be necessary for the CRA?

After the data usability assessment has been completed, a data gap analysis will be conducted to determine whether additional data are needed to support remediation decisions and decision documents.

6.5.3 New Data

New data collected during IA characterization activities will be managed to ensure that a comprehensive, consistent, and defensible set of data is available for making remediation decisions and using in decision documents.

IA characterization and remediation data will undergo data assessment that consists of review, verification, and validation. Verification is a graded process to assess both compliance of the data package with project requirements and acceptability of the data. Validation is defined as inspection of the data package contents for compliance with project requirements and validity.

6.5.4 Data Management Challenges

Strategy

Transfer Site databases to a common platform.

The Site data management system is a critical component in achieving 2006 closure. The ability to provide users with accurate and complete information will expedite the development of decisions, decision documents, the CRA, and CAD/ROD.

Potentially useful data generated by a number of Site organizations exist in databases across the Site. These data are not always easy to access nor are they compatible with Soil Water Database (SWD) or GIS formats. To evaluate and apply these data sources to Site closure activities, all site databases will be transferred to a common platform. This will facilitate the

integration of information among decommissioning, ER, and other Site organizations that collect potentially relevant data.

Soil Water Database

The SWD is the repository for Site environmental data, and contains between 3 and 4 million analytical records. These data include field parameters and analytical results for characterization and remediation projects, ongoing monitoring programs, and other miscellaneous projects. The usability of SWD to IA and Site closure can be enhanced by initiating the following approaches:

Strategy

Organize the SWD so it becomes the Site closure database.

- Eliminate redundant data from the SWD;
- Identify existing data that cannot be used in decisionmaking, and eliminate it from further consideration in the existing data compilation. These data include data known to be unusable because of field contamination, validation errors, or laboratory errors;
- Organize the database so that only data needed to support the CRA and other Site closure documents are represented. This organized database will contain final analytical data from remediated areas, characterization data from NFA sites, and applicable groundwater and surface water analytical data;
- Enhance the process for data collection, labeling, data entry, and coding to ensure long-term usability; and
- Enhance the data labeling system to include meaningful locations (IHSS, PAC, UBC site, and IA Group) by considering user needs. This will enable quick data searches by location, and will integrate with the GIS spatial data engine.

Geographic Information System

Strategy

Enhance GIS so that project managers and staff have access to information.

GIS provides a visual analysis of PCOCs so that areas of concern and remediation volumes can be identified and calculated. GIS is a valuable, cost-effective tool. Existing and new data must be easily transferred to the GIS mapping system. Two GIS programs are being evaluated and tested that will allow effective and efficient database interfacing, as well as provide real time analysis capability to RFETS users: ARCVIEW and the Spatial Database Engine. These two new tools will greatly enhance the ability of the data user to quickly visualize and use available data.

In order for data to correlate and interface with mapping systems, it must be in a systematic format with associated location coordinates. More importantly, the data validation protocol will need to be firmly in place so that analytical

measurements taken for characterization and remediation purposes will agree with the mapping information.

7.0 Summary

The IA Strategy describes key decisions, activities, and strategies to achieve IA closure as part of the Site 2006 closure. The decision framework incorporates decisions, data inputs, and activities into a logical structure that maps key decisions.

Key strategies for closure of the IA are streamlining regulatory and technical processes, integrating site schedules and functions, consolidation of IHSSs, PACs, and UBC sites into IA Groups, and eliminating potential resource roadblocks. IA activities and strategies are focused on achieving the goal of 2006 closure, as well as protection of human health and the environment.

During 2000, several IA Strategy activities will be initiated, including the following:

- Developing risk and dose assessment methodology,
- Developing DQOs,
- Developing the IASAP,
- Beginning early characterization at Buildings 371 and 374,
- Compiling existing data, and
- Evaluating potential ASD challenges.

As RFETS staff continues to decommission buildings, evaluate results of ongoing projects, and encounter new challenges, IA strategies will evolve. Existing strategies will be refined, and new strategies will be developed in response to lessons learned and new challenges. This information will be presented in an annual addendum to this IA Strategy.

8.0 References

DOE, 1992, *Historical Release Report for the Rocky Flats Plant*, Rocky Flats Plant, Golden, CO.

DOE, 1995, *Technical Memorandum No. 1, Addendum to the Phase I RFI/RI Work Plan Field Sampling Plan*, Rocky Flats Environmental Technology Site, Golden, CO.

DOE, 1996, *Final Rocky Flats Cleanup Agreement*, Rocky Flats Environmental Technology Site, Golden, CO.

TARGET SHEET

Plate 1:
IHSS, PAC, UBC Map

Map ID: 99-0382

August 7, 1999

TARGET SHEET

Plate 2: IA Strategy, FY03-07: Accelerated Closure Program

Map ID: 99-0847

July 12, 1999

TARGET SHEET

Plate 3:
IA Strategy Groups

Map ID: 99-03407

August 2, 1999

Appendix A

BIBLIOGRAPHY

Bibliography

Environmental Monitoring

City of Broomfield, City of Arvada, City of Westminster, City of Northglenn, City of Thornton, Colorado Department of Public Health and Environment, Department of Energy, Rocky flats Field Office, U.S. Environmental Protection Agency, Kaiser-Hill Team, 1998, *Integrated Monitoring Plan Background Document FY98/FY99 Rocky Flats Environmental Technology Site*, October.

EG&G, Rocky Flats, Inc., 1990, *Rocky Flats Environmental Monitoring Report 1989, Golden, Colorado.*

EG&G Rocky Flats, Inc., 1991, *Rocky Flats Environmental Monitoring Report 1990, Golden, Colorado.*

EG&G Rocky Flats, Inc., 1992, *Rocky Flats Plant Site Environmental Report, January-December 1991, Golden, Colorado,* April.

EG&G Rocky Flats, Inc., 1993, *Rocky Flats Plant Site Environmental Report, January through December 1992, Golden, Colorado.*

EG&G Rocky Flats, Inc., 1994, *Rocky Flats Environmental Monitoring Report 1993, Golden, Colorado.*

RMRS, 1997, *Annual Report Interim Measures/Interim Remedial Action for the Industrial Area at the Rocky Flats Environmental Technology Site, Golden Colorado,* March.

RMRS, 1998, *Annual Report Interim Measures/Interim Remedial Action for the Industrial Area at the Rocky Flats Environmental Technology Site, Golden Colorado,* March.

Rockwell International, 1975, *Annual Environmental Monitoring Report, January-December 1974, Rocky Flats Plant, Golden, Colorado*, Report RFP-ENV-74.

Rockwell International, 1976, *Annual Environmental Monitoring Report, January-December 1975, Rocky Flats Plant, Golden, Colorado*, Report RFP-ENV-76.

Rockwell International, 1978, *Annual Environmental Monitoring Report, January-December 1977, Rocky Flats Plant, Golden, Colorado*, Report RFP-ENV-74.

Rockwell International, 1980, *Annual Environmental Monitoring Report, January-December 1979, Rocky Flats Plant, Golden, Colorado*, Report RFP-ENV-79.

Rockwell International, 1981, *Annual Environmental Monitoring Report, January-December 1980, Rocky Flats Plant, Golden, Colorado*, Report RFP-ENV-80.

Rockwell International, 1982, *Annual Environmental Monitoring Report, January-December 1981, Rocky Flats Plant, Golden, Colorado*, Report RFP-ENV-81.

Rockwell International, 1983, *Annual Environmental Monitoring Report, January-December 1982, Rocky Flats Plant, Golden, Colorado*, Report RFP-ENV-82.

Rockwell International, 1984, *Annual Environmental Monitoring Report, January-December 1983, Rocky Flats Plant, Golden, Colorado*, Report RFP-ENV-83.

Rockwell International, 1985, *Annual Environmental Monitoring Report, January-December 1984, Rocky Flats Plant, Golden, Colorado*, Report RFP-ENV-84.

Geochemistry

EG&G Rocky Flats, Inc., 1992, *Background Geochemical Characterization Report, Rocky Flats Plant, Golden, Colorado:* Prepared for the U.S. Department of Energy, Golden, Colorado, September.

EG&G Rocky Flats, Inc., 1993, *Background Geochemical Characterization Report for 1993, Rocky Flats Plant, Golden, Colorado.*

EG&G Rocky Flats, Inc., 1993, *Groundwater Geochemistry of Rocky Flats Plant, Golden, Colorado*, December.

EG&G Rocky Flats, Inc., 1995, *Groundwater Geochemistry Report for the Rocky Flats Environmental Technology Site, Final report, Volume III of the Sitewide Geoscience Characterization Study, Golden, Colorado*, January.

Geology

EG&G Rocky Flats, Inc., 1991, *Geologic Characterization Report for the Rocky Flats Plant, Golden, Colorado*, July.

EG&G Rocky Flats, Inc., 1992, *Phase II Geologic Characterization Data Acquisition Report: Task 6 - Surface Geologic Mapping of the Rocky Flats Plant and Vicinity, Jefferson and Boulder Counties, Colorado, Golden, Colorado*, March.

EG&G Rocky Flats, Inc., 1995, *Geologic Characterization Report for the Rocky Flats Environmental Technology Site, Volume I of the Sitewide Geoscience Characterization Study, Golden, Colorado,* March.

Hydrogeology

EG&G Rocky Flats, Inc., 1990, *1989 Annual RCRA Groundwater Monitoring Report for Regulated Units, Rocky Flats Plant, Golden, Colorado*, March.

EG&G Rocky Flats, Inc., 1991, *1990 Annual RCRA Groundwater Monitoring Report for Regulated Units at Rocky Flats Plant, Golden, Colorado,* March.

EG&G Rocky Flats, Inc., 1992, *1991 Annual RCRA Groundwater Monitoring Report for Regulated Units at Rocky Flats Plant, Golden, Colorado,* March.

EG&G Rocky Flats, Inc., 1993, *1992 Annual RCRA Groundwater Monitoring Report for Regulated Units at the Rocky Flats Plant, Golden, Colorado.*

EG&G Rocky Flats, Inc., 1994, *1993 Annual RCRA Groundwater Monitoring Report for Regulated Units at the Rocky Flats Plant, Golden, Colorado.*

EG&G Rocky Flats, Inc., 1995, *Hydrogeologic Characterization Report for the Rocky Flats Environmental Technology Site, Volume II of the Sitewide Geoscience Characterization Study,* April.

EG&G Rocky Flats, Inc., *1994, Final 1993 Well Evaluation Report, Rocky Flats Plant, Golden, Colorado.*

Historical Release Reports

DOE, 1992, *Final Historical Release Report for the Rocky Flats Plant, Golden, Colorado,* June.

EG&G Rocky Flats, Inc. 1992, *1st Quarterly Update to the Historical Release Report for the Rocky Flats Plant*: U.S. Department of Energy, Golden, Colorado, September.

EG&G Rocky Flats, Inc., 1993, *Quarterly Update for October 1, 1992 through January 1, 1993 Historical Release Report for the Rocky Flats Plant:* U.S. Department of Energy, Golden, Colorado, January.

EG&G Rocky Flats, Inc., 1993, *Quarterly Update for January 1, 1993 through April 1, 1993 Historical Release Report for the Rocky Flats Plant: U.S. Department of Energy, Golden, Colorado*, April.

71

EG&G Rocky Flats, Inc., 1993, *Quarterly Update for April 1, 1993 through July 1, 1993 Historical Release Report for the Rocky Flats Plant*: U.S. Department of Energy, Golden, Colorado, July.

EG&G Rocky Flats, Inc., 1993, *Quarterly Update for July 1, 1993 through October 1, 1993 Historical Release Report for the Rocky Flats Plant*: U.S. Department of Energy, Golden, Colorado, October.

EG&G Rocky Flats, Inc., 1994, *Quarterly Update for October 1, 1993 through January 1, 1994 Historical Release Report for the Rocky Flats Plant:* U.S. Department of Energy, Golden, Colorado, January.

EG&G Rocky Flats, Inc., 1994, *Quarterly Update for January 1, 1994 through March 31, 1994 Historical Release Report for the Rocky Flats Plant*: U.S. Department of Energy, Golden, Colorado, March.

EG&G Rocky Flats, Inc., 1994, *Quarterly Update for April, 1994 through June 30, 1994 Historical Release Report for the Rocky Flats Plant*: U.S. Department of Energy, Golden, Colorado, July.

EG&G Rocky Flats, Inc., 1994, *Quarterly Update for July 1, 1994 through September 30, 1994 Historical Release Report for the Rocky Flats Plant:* U.S. Department of Energy, Golden, Colorado, October.

EG&G Rocky Flats, Inc., 1995, *Quarterly Update for September 1, 1994 through December 31, 1994 Historical Release Report for the Rocky Flats Plant*: U.S. Department of Energy, Golden, Colorado, January.

EG&G Rocky Flats, Inc., 1995, *Quarterly Update for January 1, 1995 through March 31, 1995 Historical Release Report for the Rocky Flats Plant*: U.S. Department of Energy, Golden, Colorado, April.

EG&G Rocky Flats, Inc., 1995, *Quarterly Update for April 1, 1995 through June 30, 1995 Historical Release Report for the Rocky Flats Plant*: U.S. Department of Energy, Golden, Colorado, August.

RMRS, 1998, *Annual Update for August 1, 1997 through August 1, 1998 Historical Release Report for the Rocky Flats Environmental Technology Site,* RF/RMRS-98-269.UN, September.

Industrial Area

U.S. Department of Energy, 1994, *Proposed IM/IRA Decision Document for the Rocky Flats Industrial Area, Rocky Flats Plant, Golden, Colorado,* November.

Operable Units

DOE, 1992, *Final Phase I RFI/RI Work Plan, Solar Evaporation Ponds (Operable Unit 4), Rocky Flats Plant, Golden, Colorado*, January.

DOE, 1992, *Final Phase I RFI/RI Work Plan for Original Process Waste Lines (Operable Unit 9), Rocky Flats Plant, Golden, Colorado Golden*, Colorado, February.

DOE, 1992 *Final Phase I RFI/RI Work Plan, Rocky Flats Plant, Other Outside Closures (Operable Unit No. 10)* May.

DOE, 1992, *Phase I RFI/RI Work Plan, Rocky Flats Plant 400/800 Area (Operable Unit No. 12), Golden Colorado*, September.

DOE, 1992, *No Further Action Justification Document, Rocky Flats Plant Low-Priority Sties, (Operable Unit 16) Rocky Flats Plant, Golden, Colorado,* October.

DOE, 1994, *Final Phase I RFI/RI Report Operable Unit No. 4, Rocky Flats Plant, Golden, Colorado.*

DOE, 1994, *Phase I RFI/RI Work Plan for Operable Unit No. 8 700 Area. Rocky Flats Plant, Golden, Colorado*, October.

DOE, 1995, *Phase I RFI/RI Report Operable Unit No. 15, Inside Building Closures, Rocky Flats Environmental Technology Site, Golden, Colorado,* January.

DOE, 1995, *Operable Unit No. 4 Solar Evaporation Ponds IM/IRA Environmental Assessment Decision Document, Rocky Flats Plant, Golden, Colorado*, February.

DOE, 1995, *Corrective Action Decision/Record of Decision OU15: Inside Building Closures, Rocky Flats Environmental Technology Site, Golden Colorado*, August.

RMRS, 1999, *Draft Final Solar Ponds Plume Decision Document* RF/RMRS-98-286. UN. April.

Regulatory

DOE, Colorado Department of Public Health and the Environment, U.S. Environmental Protection Agency, 1996, *Final Rocky Flats Cleanup Agreement,* July.

Risk Assessment

Colorado Department of Health, 1992, *Health Studies on Rocky Flats Phase I: Historical Public Exposures*

Colorado Department of Human Health and the Environment Health *Studies on Rocky Flats The Rocky Flats Dose Reconstruction Project,*

	Phase II Toxicity Assessment and Risk Characterization
Soils	*Proposed Path Forward for the Actinide Migration Studies, June 1997, Development of Conceptual Model of Potential Pathways for Migration.* May.
	Summary of Existing Data on Actinide Migration at the Rocky Flats Environmental Technology Site. September.
Surface water	EG&G Rocky Flats, Inc., 1991, *Draft 1989 Surface Water and Sediment Geochemical Characterization Report, Rocky Flats Plant,* Golden, Colorado.
	EG&G Rocky Flats, Inc., 1992, *1989 Surface-Water and Sediment Geochemical Characterization Report, Final:* April.
	EG&G Rocky Flats, Inc., 1992, *1990 Surface Water and Sediment Geochemical Characterization Report, Rocky Flats Plant, Golden, Colorado,* March.
	EG&G Rocky Flats, Inc., *1993, Event-Related Surface-Water Monitoring Report, Rocky Flats Plant, Water Years 1991 and 1992*: November.
Waste Management	EG&G Rocky Flats, Inc., 1991, Waste *Stream and Residue Identification and Characterization.*
	RMRS, *Corrective Action Management Unit Interim Measure/Interim Remedial Action Decision Document and Application Support Document for containerized Storage at RFETS, Golden, Colorado,* August.
Public Involvement	*Rocky Flats Site-Wide Integrated Public Involvement Plan.* March 1998.

TARGET SHEET

Plate 1:

IHSS, PAC, UBC Map

Map ID: FY99-99-0382

August 7, 1999

DOE/RFFO CERCLA Administrative Record: IA-A-000204

TARGET SHEET

Plate 2:

IA Strategy Accelerated Closure Program: FY 2001 Through FY 2007

Map ID: 99-0647

July 12, 1999

TARGET SHEET

Plate 3:

IA Strategy Groups

Map ID: 99-0340

July 12, 1999

DOE/RFFO CERCLA Administrative Record: IA-A-000204

000105404

ER/WM&I DDT

RFCA Milestone		
Source/Driver: (Name & Number from ISP, RFCA Milestone, Mgmt. Action, Corres. Control, etc.)	**Closure #:** (Outgoing Correspondence Control #, if applicable)	**Due Date**
S. P. Serreze/M. C. Broussard **Originator Name**	J. H. Moore **Quality Assurance Approval**	J. W. Patterson **Contractor Manager(s)**
Lane Butler **Kaiser-Hill Program Manager(s)**	Alan Rodgers **Kaiser-Hill Director**	

Document Subject:

TRANSMITTAL OF THE "DRAFT FINAL INDUSTRIAL AREA CHARACTERIZATION AND REMEDIATION STRATEGY, RF/RMRS-99-419.UN" - JWP-039-99

KH-00003NS1A August 13, 1999

Discussion and/or Comments:

Attached please find twenty (20) copies of *the* ***"Draft Final Industrial Area Characterization and Remediation Strategy RF/RMRS-99-419.UN"*** for transmittal to Kaiser-Hill. As per direction from DOE to Kaiser-Hill, twenty-five (25) copies were delivered to DOE on August 12, 1999 (as well as electronic files), for distribution to EPA, CDPHE, CAB and the Reading Rooms.

Comments have been received from the Industrial Area Strategy Working Group (DOE, Kaiser-Hill, RMRS, EPA, CDPHE) and have been incorporated into this document. After public review, comments are due back from the stakeholders and agencies by Monday, September 13, 1999.

If you have any questions concerning this transmittal, please contact Susan Serreze at extension 2677.

pw

Attachments:
As Stated (20)

cc:
M. C. Broussard
A. C. Crawford
S. P. Serreze
RMRS Records GBC

1/14

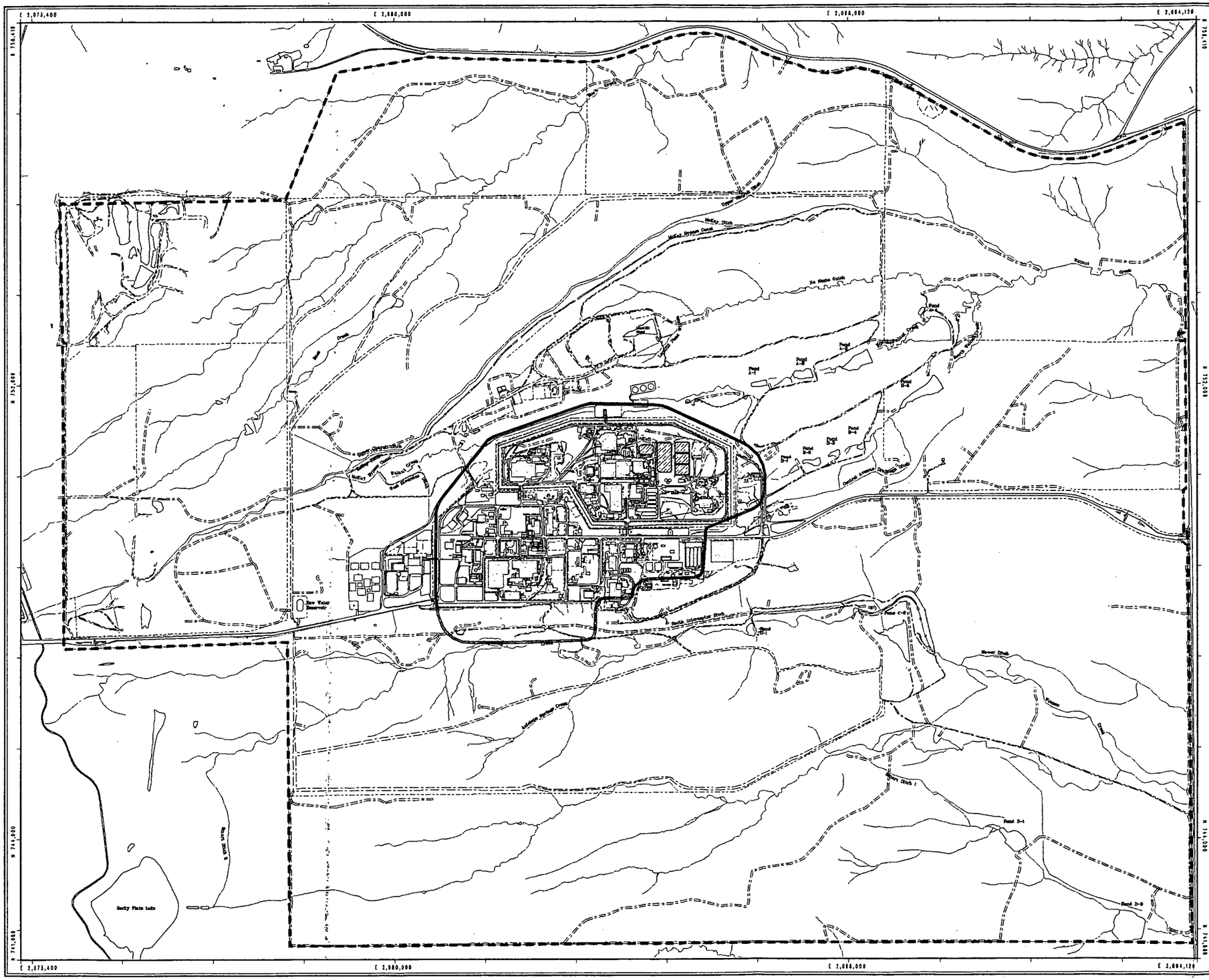


Figure 1

Rocky Flats Environmental Technology Site

EXPLANATION

Standard Map Features

- Buildings and other structures
- Solar evaporation ponds
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Rocky Flats boundary
- Paved roads
- Dirt roads

DATA SOURCE:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs. 1/95

N

Scale = 1 : 21330
1 inch represents approximately 1778 feet

500 0 1000 2000ft

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.
Geographic Information Systems Group
Rocky Flats Environmental Technology Site
P.O. Box 464
Golden, CO 80402-0464

MAP ID: 99-0382 August 11, 1999

NT_Srv w:/projects/fy99/99-0382/detail_site_b.aml

Figure 2
Site Closure Strategy

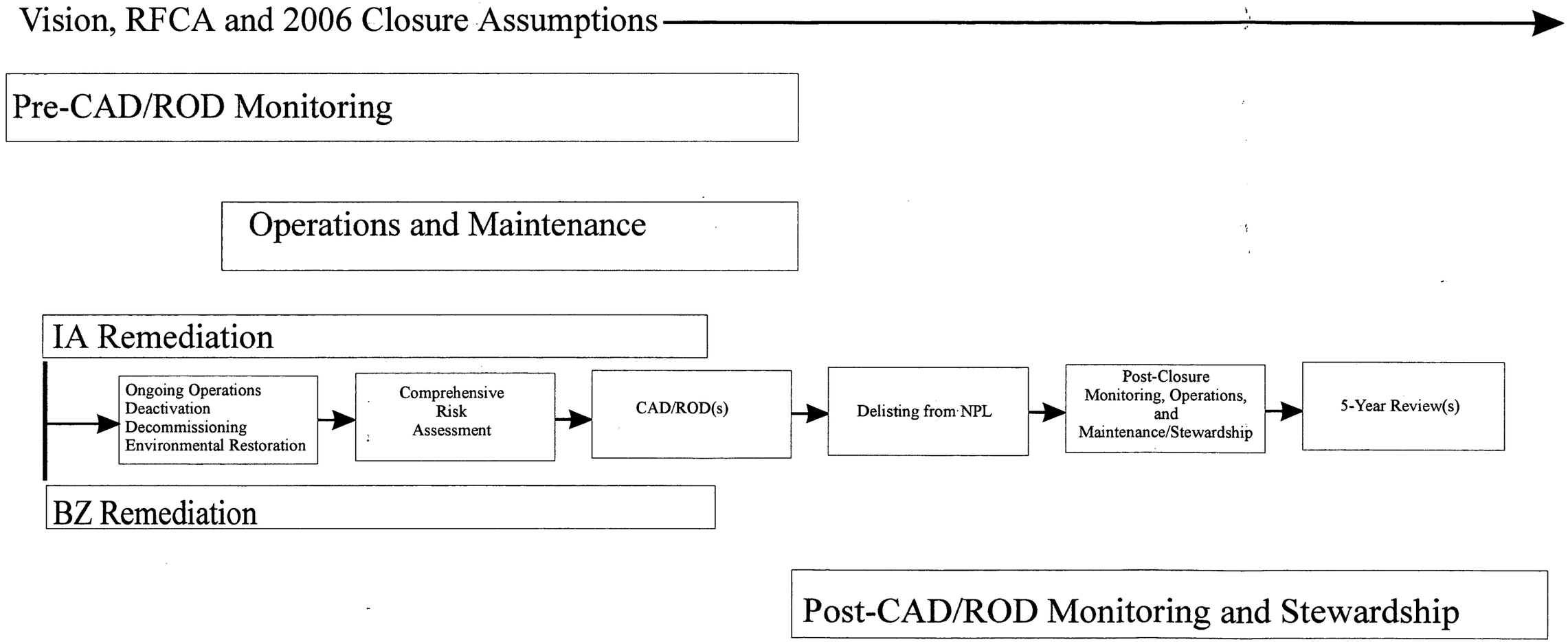


Figure 3 Industrial Area Strategy

Stewardship and Environmental Monitoring — Surface Water, Groundwater, Soil, Ecology, Air, Meteorology

Key Activities to Support the IA Strategy

Identify IHSS Groups — 1999	Develop DQOs for Environmental Media — 2000	Develop Comprehensive SAP — 2000	Conduct Remedial Actions — 2002- 2006	Complete Remedial Actions — 2006
○ Maintain consistency with decommissioning schedule ○ Maintain flexibility between decommissioning and ER to change sequence, if needed, to be protective of human health and the environment ○ Integrate decommissioning and ER ○ Identify sequence of building remediation	○ Decommissioning DQOs in D&D Characterization Protocols (radionuclides, chemicals, RLC, in process characterization, Pre-Demolition Survey) ○ Environmental media DQOs should support: Characterization Remediation Confirmation sampling CRA Integration with IMP ○ Maximize data usability	○ Maintain data ○ Use Final Status Survey Plan ○ Review existing data ○ Identify data gaps ○ Use data of sufficient quality ○ Identify sufficient laboratory capacity and analytical protocols ○ Develop IA group sampling addenda	○ Building Remediation Options: No Action Mothball Reuse Remove ○ Environmental Media Remediation Options: NFA Excavation/Removal Treatment Stabilize and Cover Natural Attenuation ○ Maintain documents in AR	○ Status of AR ○ CRA complete

Key Policy Decisions to Support the IA Strategy

○ Remove foundations to 3 feet during decommissioning ○ Shift in approach from addressing highest ER risk to highest building priority and opportunity while still being protective of surface water quality ○ Identify proper skill mix	○ Develop DQOs based on RFCA anticipated land use ○ Develop CRA methodology to support final CAD/ROD ○ Determine applicability of MARSSIM		○ Develop RSOP for remediation ○ Find appropriate waste disposition facilities ○ Adhere to document review schedules ○ Recontouring the Site will be necessary ○ Update NFA process in RFCA Attachment 6 ○ Decide on need for retrievable storage or onsite disposal (CAMU)	

Sitewide Activities:

Integrated Monitoring Plan
Monitor and evaluate environmental media Sitewide and around decommissioning and remediation projects. 2000 - 2006

Actinide Migration Evaluation
Evaluate actinide sources and mobility. Use in CRA and management strategies. Ongoing

Land Configuration Design Basis
Collect geotechnical data for use in final land surface design. 2000

Site Water Balance
Evaluate surface water and groundwater hydrology. Use in cap design and other management actions. 2002

Figure 4
Industrial Area Strategy Elements

Strategy:
Integrate regulatory and technical strategies to achieve 2006 closure through streamlining schedules and eliminating unnecessary or redundant efforts.

Risk and Dose Assessment Strategy

Strategy: Develop a risk assessment methodology that focuses on CRA requirements.

Strategy: Formulate DQOs that combine characterization, remediation, and Site closure requirements.

Integration Strategy

Strategy: Integrate IA remediation activities with decommissioning activities.

Strategy: Use one subcontractor for decommissioning and remediation.

Strategy: Integrate with all appropriate Site organizations.

Strategy: Identify and plan for waste storage challenges.

Strategy: Identify and eliminate potential ASD resource challenges.

Strategy: Identify additional laboratory and data validation capacity.

Strategy: Eliminate redundant procurements.

Strategy: Retain key employees and train new employees in advance of the work curve.

Strategy: Communicate with appropriate RFETS organizations, regulatory agencies, and stakeholders.

Strategy: Enhance the collaborative process.

Technical Strategy

Characterization and Remediation

Strategy: Group IHSSs, PACs, and UBC sites into the decommissioning project structure.

Strategy: Begin characterization during deactivation.

Strategy: Optimize sampling activities and only sample once.

Strategy: Use existing data whenever possible to eliminate redundant efforts.

Strategy: Combine IA Group remediation activities whenever possible.

Strategy: Excavate and package for immediate disposition.

Strategy: Remediate plumes using reactive barriers, source removal, and monitored natural attenuation.

Strategy: Develop an RSOP for remediation.

Strategy: Work with regulatory agencies to streamline the review process.

Strategy: Remediate contaminated pipelines and soil; stabilize in place noncontaminated pipelines.

Strategy: Focus on remediating contaminated soil rather than the location of pipeline leaks.

Strategy: Develop OPWL, NPWL, and utility remediation approaches based on lessons learned at other sites.

Strategy: Characterize UBCs early, where appropriate.

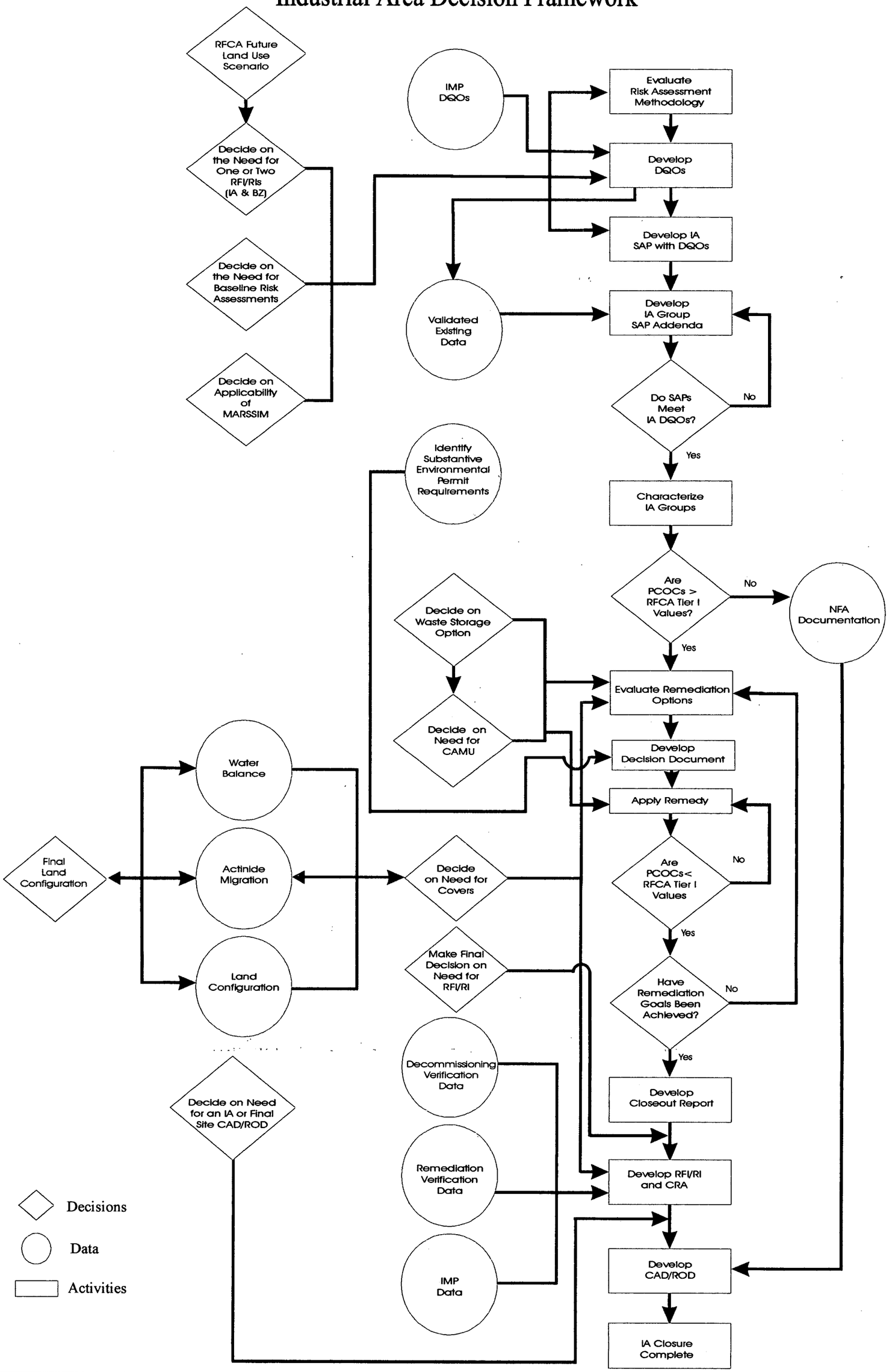
Data Management

Strategy: Transfer Site databases to a common platform.

Strategy: Organize SWD so it becomes the Site Closure Database.

Strategy: Enhance the GIS system so that project managers and staff have access to information.

Figure 5
Industrial Area Decision Framework



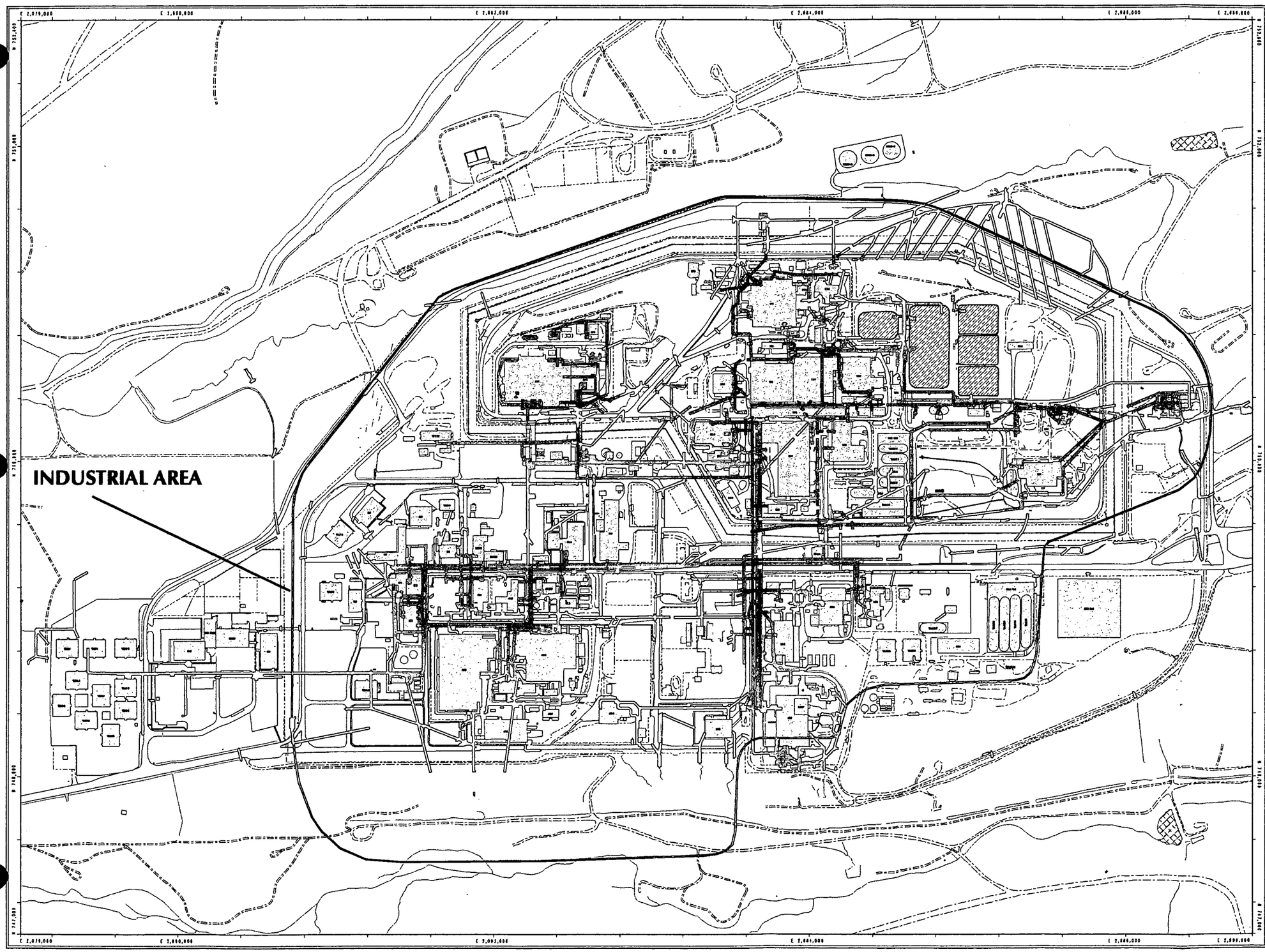


Figure 12

IA Strategy Groups for New Process Waste Lines (NPWL), Sanitary Sewer System and Storm Drains

IHSS Groupings

- New Process Waste Lines - 000-4
- Storm Drains - 000-3
- Sanitary Sewer System - 000-3

Other Map Features

- Buildings and other structures
- Solar evaporation ponds
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Paved roads
- Dirt roads
- Industrial Area Operable Unit Boundary

DATA SOURCE:

The utilities (above-ground and underground) information was supplied by EG&G Facilities Department in DXF format, Aug 1993. The GIS Department created ARC coverages (data layers) from the DXF files and converted the data from Rocky Flats Coordinate system to State Plane Coordinate system.
NOTE: This data HAS NOT BEEN edited or coded (with attributes information).
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSI, Las Vegas.
Digitized from the orthophotographs. 1/95

200 0 400 800ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

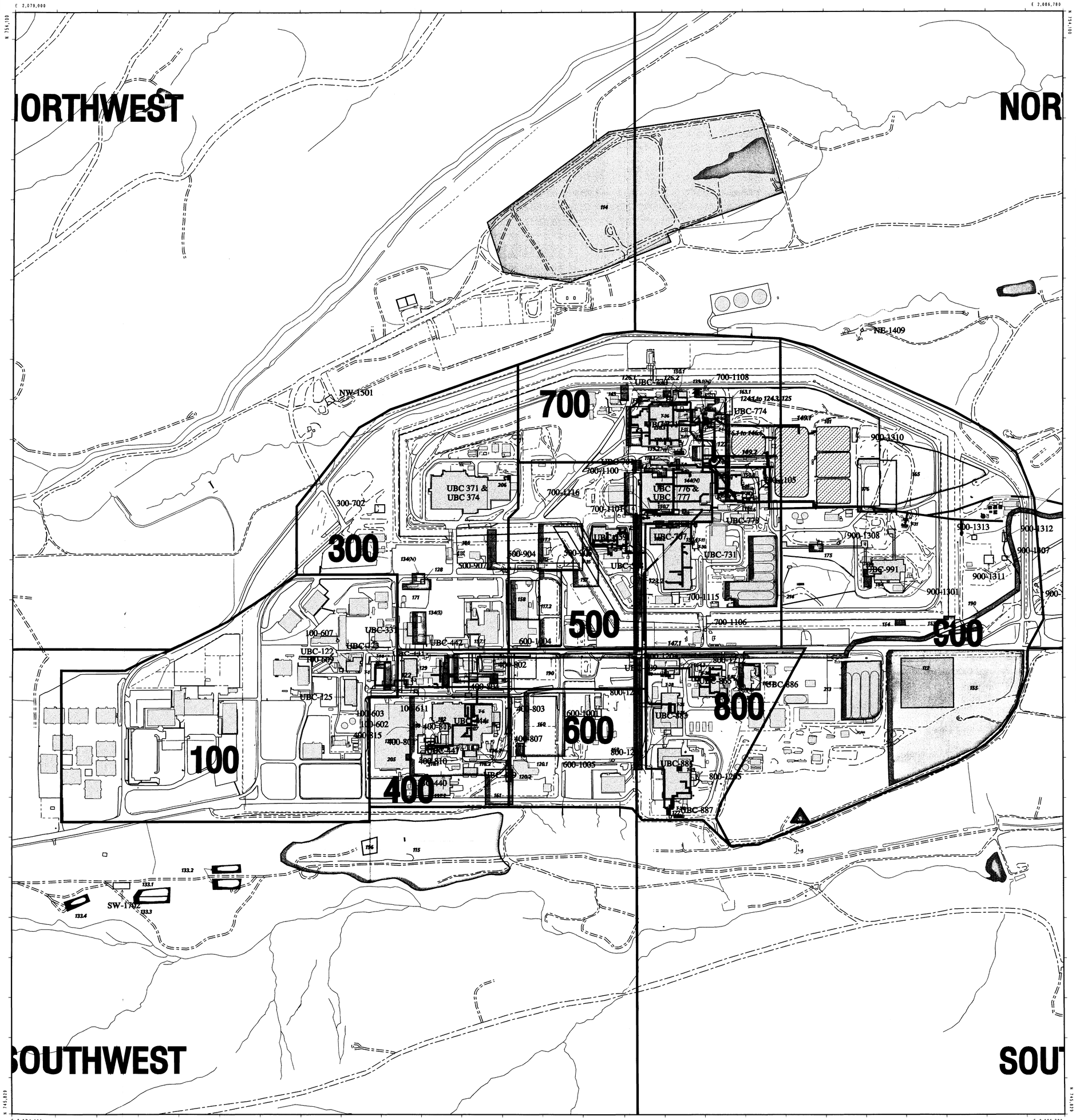
RMRS Rocky Mountain Remediation Services, L.L.C.
Geographic Information Systems Group
Rocky Flats Environmental Technology Site
P.O. Box 464
Golden, CO 80402-0464

MAP ID: 99-0382-IA-STRAT-NPWL August 10, 1999

NT_SVR w:/projects/fy99/99-0382/ia-strategy-npwl.aml

Plate 1

IHSS, PAC, UBC Map



Industrial Area Operable Units

- Industrial Area OU

Buffer Zone Operable Units

- Buffer Zone OU
- Operable Unit 5
- Operable Unit 7
- Tanks of Concern
- Foamed & Stabilized Tanks (Source Removed - Interim Status)
- Remaining Tanks
- Process Waste IHSS Locations (Former OU 9 IHSSs)
- Original Process Waste Lines
- Location of Original Process Waste Lines which may have been removed.
- UBC-559 Under Building Contamination Potential Area of Concern
- 900-1310

EXPLANATION

Standard Map Features

- Buildings and other structures
- Solar evaporation ponds
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Paved roads
- Dirt roads

DATA SOURCE:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSI, Las Vegas. Digitized from the orthophotographs. 1/95

Scale = 1 : 3070
1 inch represents approximately 256 feet

250 0 500 1000ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by:
RMRS
Rocky Mountain Remediation Services, L.L.C.
Geographic Information Systems Group
Rocky Flats Environmental Technology Site
P.O. Box 464
Golden, CO 80402-0464

MAP ID: 99-0382

August 07, 1999

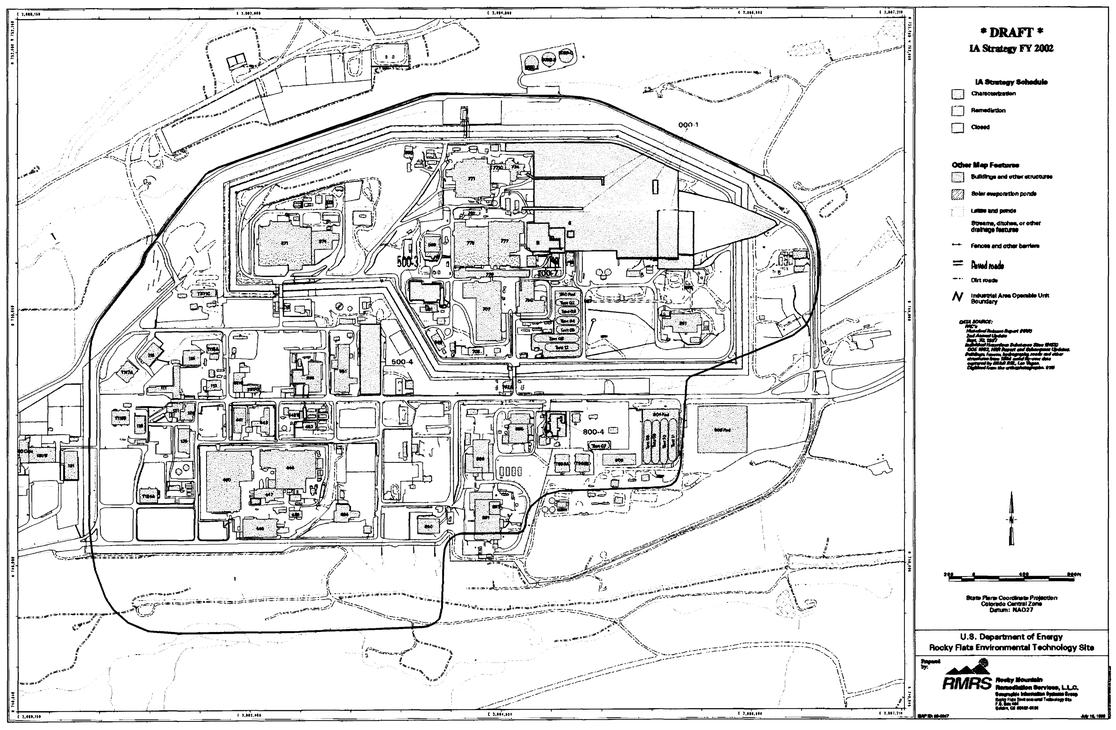
IA-A-000204

Rocky Mountain
Remediation Services, L.L.C.
Rocky Flats Environmental Technology Site
P.O. Box 464
Golden, CO 80402-0464

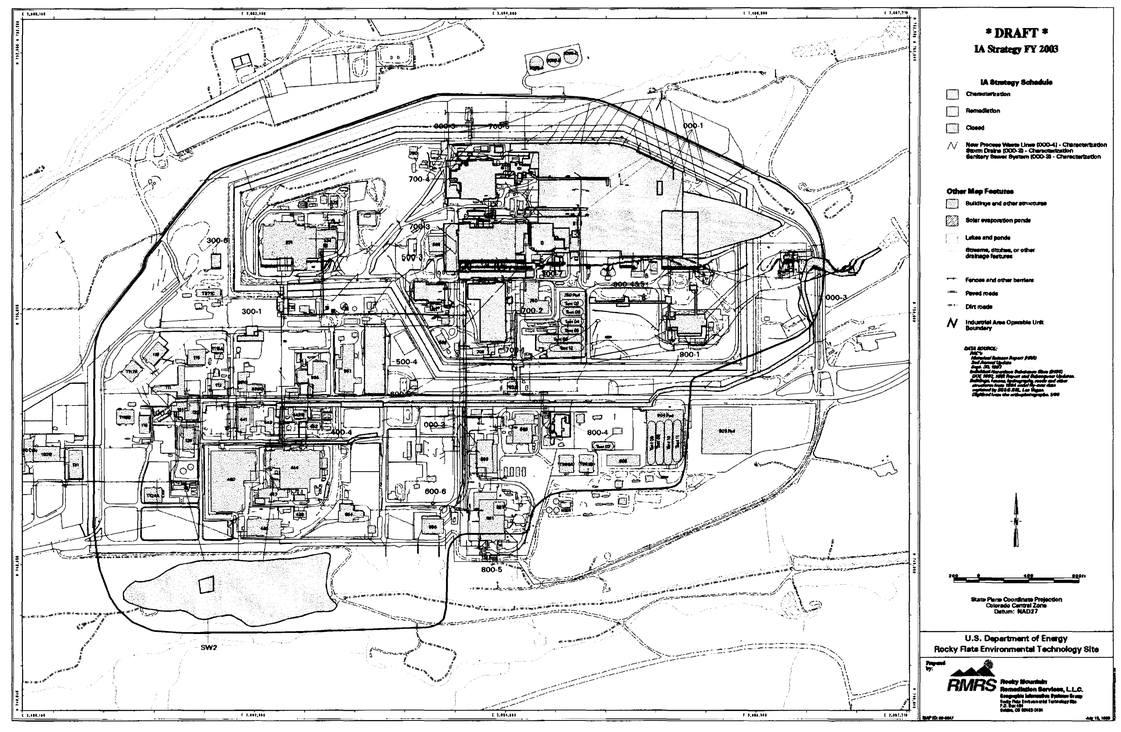
Plate 2

IA Strategy
Accelerated Closure Program

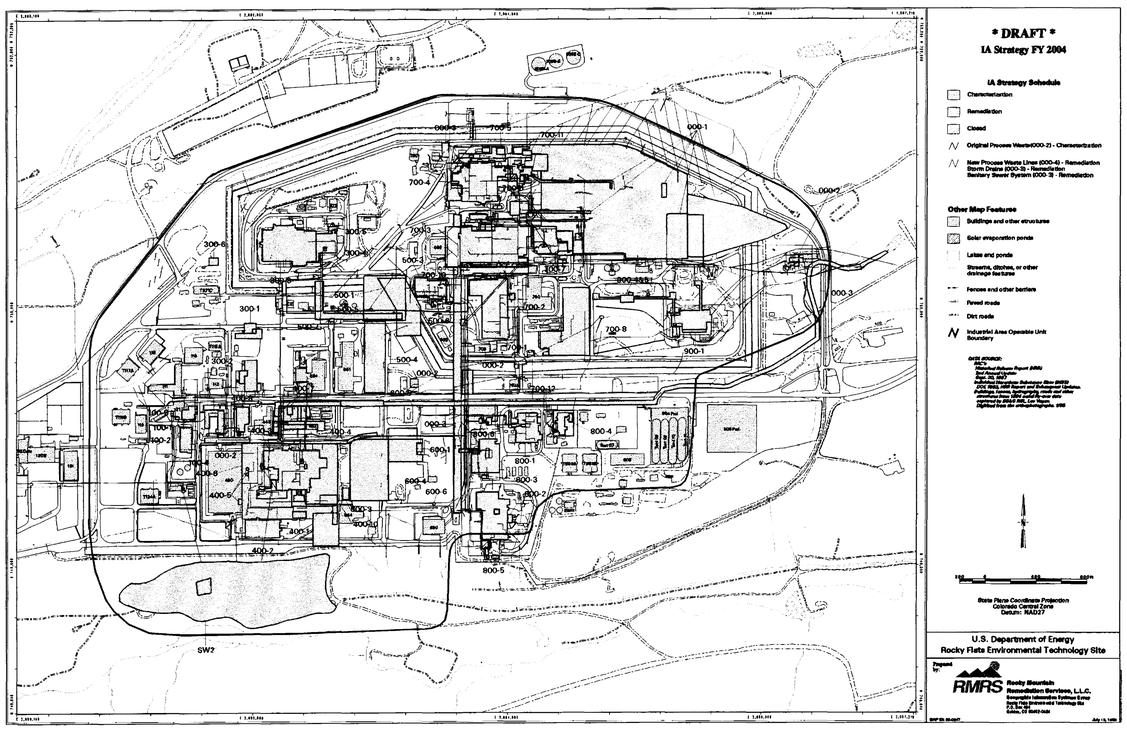
FY 2002



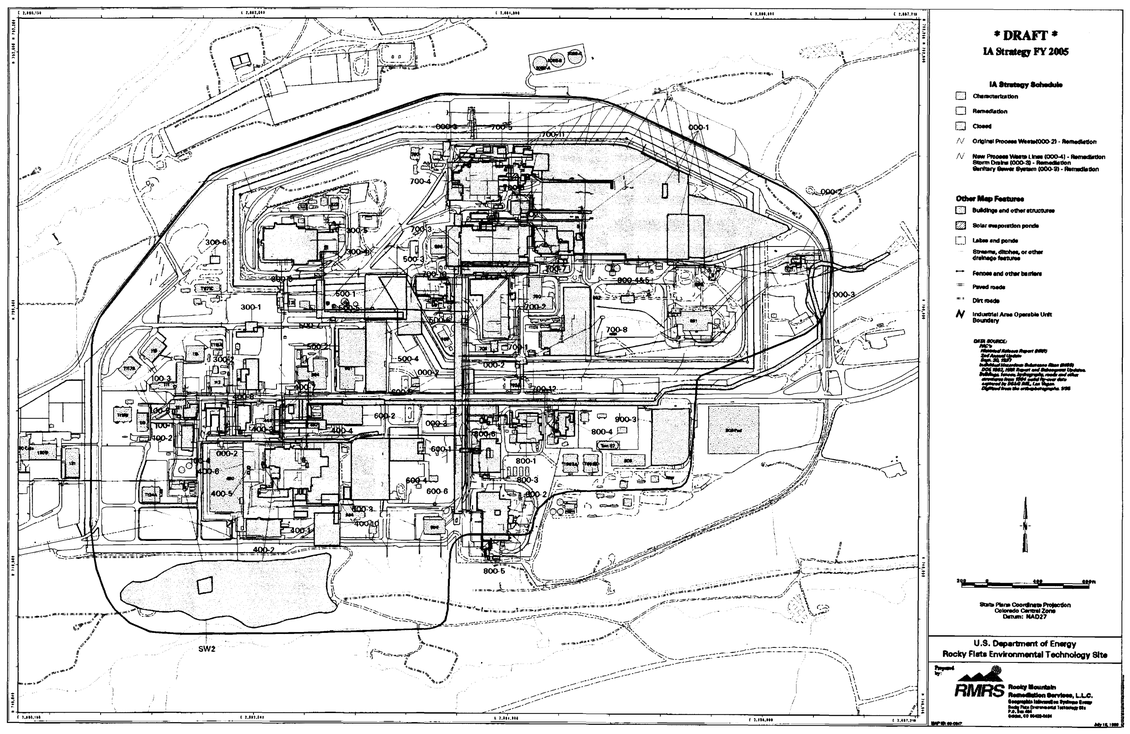
FY 2003



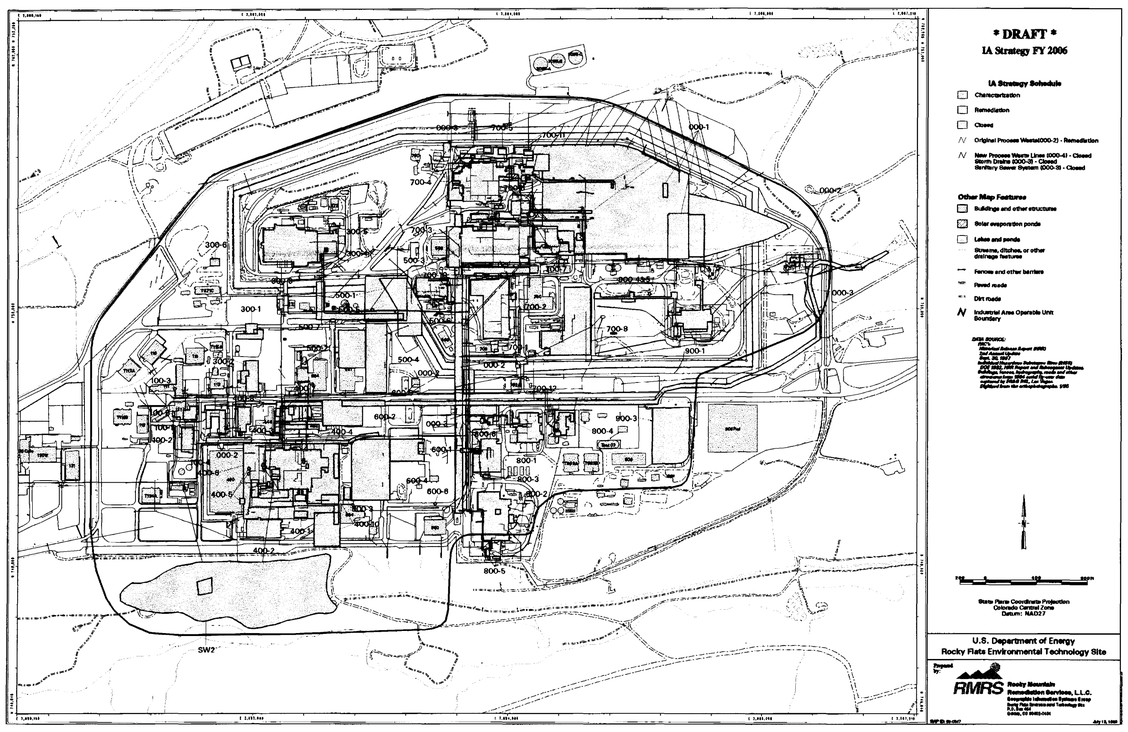
FY 2004



FY 2005



FY 2006



FY 2007

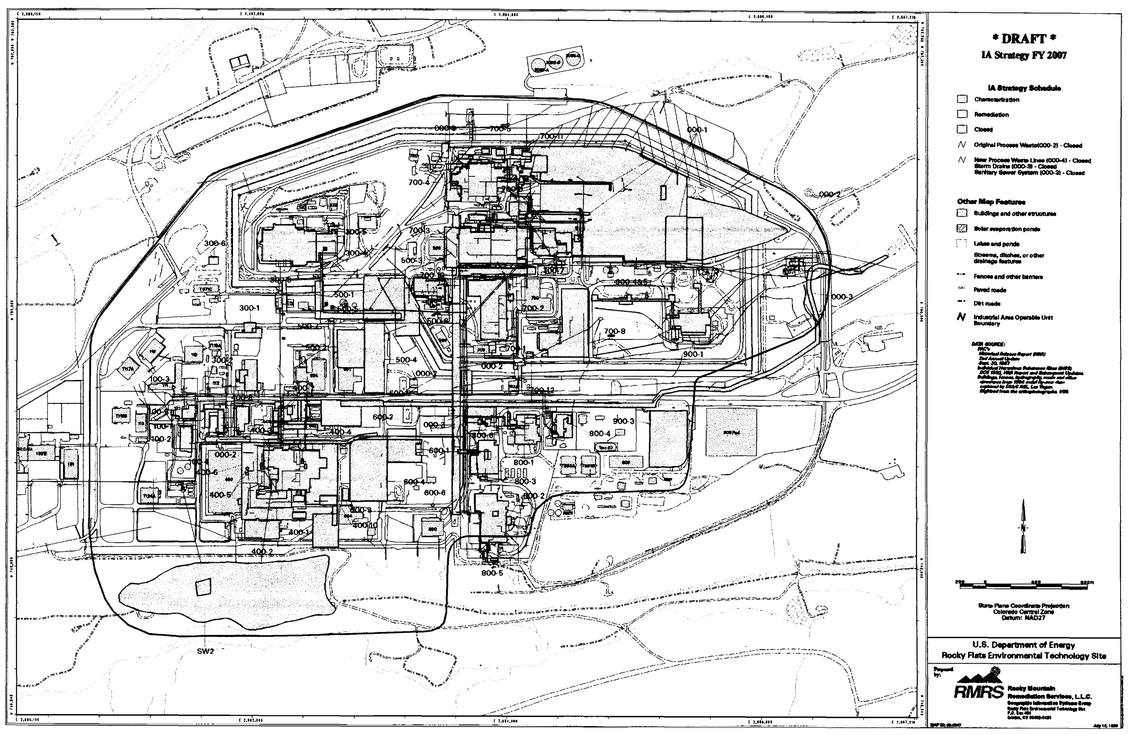


Plate 3
IA Strategy Groups

BUFFER ZONE

INDUSTRIAL AREA

SW2

IHSS Groupings

000-1	500-7
000-2	600-1
000-3	600-2
100-1	600-3
100-2	600-4
100-3	600-5
100-4	600-6
100-5	700-1
300-1	700-2
300-2	700-3
300-3	700-4
300-4	700-5
300-5	700-6
300-6	700-7
400-1	700-8
400-2	700-10
400-3	700-11
400-4	700-12
400-5	800-1
400-6	800-2
400-7	800-3
400-8	800-4
400-10	800-5
500-1	800-6
500-2	900-1
500-3	900-3
500-4	900-4&5
500-5	SW-2
500-6	

Other Map Features

- Buildings and other structures
- Solar evaporation ponds
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Paved roads
- Dirt roads
- Industrial Area Operable Unit Boundary
- Original Process Waste Lines
- Location of Original Process Waste Lines which may have been removed.

DATA SOURCE:
RACS
Historical Release Report (HRR)
2nd Annual Update
Sept. 30, 1992
Individual Hazardous Substance Sites (IHSS)
DOE 1992, HRR Report and Subsequent Updates.
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas.
Digitized from the orthophotographs. 1/95

Scale = 1 : 3600
1 inch represents 300 feet

100 0 200 400 ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by:
RMRS Rocky Mountain Remediation Services, L.L.C.
Geographic Information Systems Group
Rocky Flats Environmental Technology Site
P.O. Box 464
Golden, CO 80402-0464

MAP ID: 99-0340 August 02, 1999

IA-A-000204