# Industrial Area Characterization and Remediation Strategy

Rocky Mountain Remediation Services, L.L.C.
and
Kaiser-Hill Company, L.L.C.

Rocky Flats Environmental Technology Site

September 1999

REVIEWED FOR CLASSIFICATION/UCNI
By B. W. Hoffman
Date 9-29-99
U/NU

# Table of Contents


1.0 INTRODUCTION ..... 1

1.1 Purpose and Objectives ..... 1
1.2 IA Strategy ..... 3

2.0 REGULATORY FRAMEWORK ..... 5

3.0 DECISION FRAMEWORK ..... 7

3.1 Site Closure ..... 7
3.2 Future Land Use ..... 13

4.0 CHARACTERIZATION AND REMEDIATION APPROACH ..... 13

4.1 Grouping of Sites ..... 16

4.1.1 No-Further-Action Sites ..... 16

4.2 Integration with Decommissioning ..... 24
4.3 Risk and Dose Assessment Approach ..... 26

4.3.1 Risk and Dose Assessment Methodology ..... 26
4.3.2 Comprehensive Risk Assessment ..... 27
4.3.3 Data Quality Objectives ..... 29

4.4 Characterization Approach ..... 29
4.5 Remediation Approach ..... 30

4.5.1 No Further Action ..... 31
4.5.2 Removal and Offsite Disposition ..... 31
4.5.3 Caps and Covers ..... 32
4.5.4 Plume Remediation ..... 32
4.5.5 Groundwater and Surface Water ..... 33
4.5.6 Decision Documents ..... 34

4.6 Characterization and Remediation Challenges ..... 34

4.6.1 Underground Pipeline Systems ..... 34
4.6.2 Under Building Contamination ..... 44

4.7 Data Management ..... 45

4.7.1 Existing Data ..... 46
4.7.2 Comprehensive Data Compilation ..... 46

# Table of Contents (continued)

4.7.3 New Data ..... 47
4.7.4 Data Management Challenges ..... 47

5.0 PROJECT INTERFACES ..... 48

5.1 Health and Safety ..... 49
5.2 Waste Management Program ..... 51
5.3 Analytical Services Division ..... 53
5.4 Procurement ..... 55
5.5 Resource Strategies ..... 55
5.6 Project Communication ..... 56
5.7 Stakeholder Involvement ..... 57

6.0 SUMMARY ..... 58

7.0 REFERENCES ..... 58

# List of Tables

Table 1 Industrial Area Decision Framework ....9
Table 2 Industrial Area Groups ....17
Table 3 OPWL Pipelines ....40

# List of Figures

Figure 1 Rocky Flats Environmental Technology Site ....2
Figure 2 Site Closure Strategy ....4
Figure 3 Industrial Area Strategy Elements ....6
Figure 4 Industrial Area Decision Framework ....8
Figure 5 Conceptual RFETS Land Uses ....14
Figure 6 Industrial Area Strategy ....15
Figure 7 Decommissioning and ER Project Integration ....25
Figure 8 Industrial Area Decision Document Schedule ....35
Figure 9 IA Strategy Groups for New Process Waste Lines, Sanitary Sewer System, and Storm Drains ....42
Figure 10 Anticipated Level of Effort for Integrated IA Remediation ....50
Figure 11 Industrial Area Projected Remediation Waste Volumes ....52
Figure 12 Industrial Area Projected Characterization and Remediation Samples ....54

# List of Plates

Plate 1 IHSS, PAC, UBC Map
Plate 2 IA Strategy Groups
Plate 3 IA Strategy Accelerated Closure Program

# List of Appendices

Appendix A Bibliography
Appendix B Comment Response
Appendix C Annual Updates

# 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 |
| ARAR | applicable or relevant and appropriate requirement |
| ASD | Analytical Services Division |
| BZ | Buffer Zone |
| CAA | Clean Air Act |
| 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 Project 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 |
| HASP | Health and Safety Plan |
| 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 |
| ISMS | Integrated Safety Management System |
| MARSSIM | Multi-Agency Radiation Survey and Site Assessment Investigation Manual |
| MNA | monitored natural attenuation |
| NEPA | National Environmental Policy Act |
| NFA | no further action |
| NPL | National Priorities List |
| NPWL | new process waste lines |
| OPWL | original process waste lines |
| OU | operable unit |
| PA | Protected Area |

## Acronyms (continued)

| | |
|---|---|
| PAC | potential area of concern |
| PAM | proposed action memorandum |
| PCB | polychlorinated biphenyl |
| PCOC | potential contaminant of concern |
| PPE | personal protective equipment |
| Pu | plutonium |
| PVC | polyvinyl chloride |
| QA | quality assurance |
| QC | quality control |
| R&D | research and development |
| RCRA | Resource Conservation and Recovery Act |
| RFCA | Rocky Flats Cleanup Agreement |
| RFCLOG | 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 |
| 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 IA 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 (including that beneath buildings).

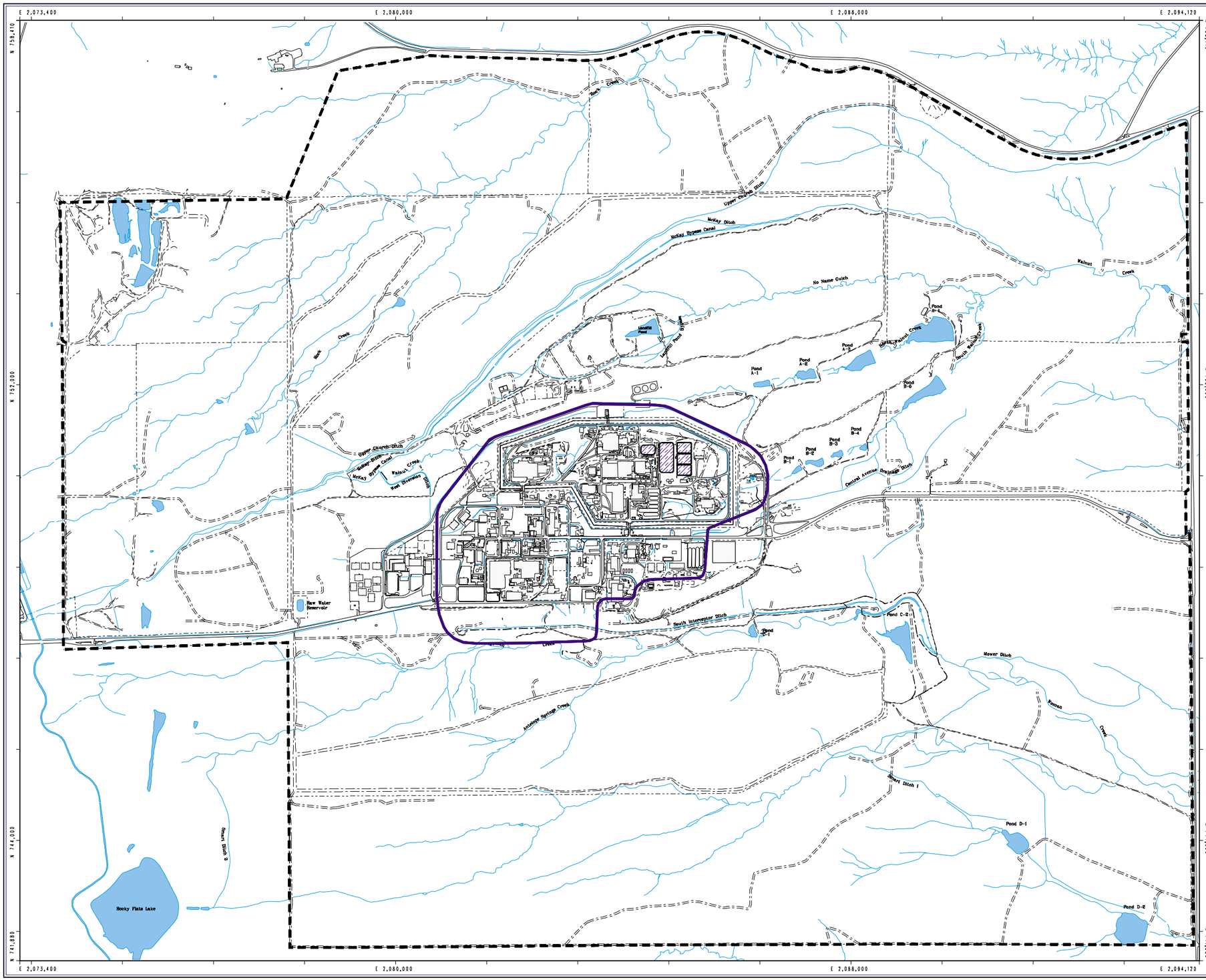
The IA includes approximately 350 acres at the geographic center of RFETS, as illustrated on Figure 1. The IA is occupied by 400 buildings, other structures, roads, and utilities, and is where the bulk of RFETS mission activities took place between 1951 and 1989 (DOE, 1996). Most of the buildings and 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 were 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, and hydrogeology, and lists 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




# Figure 1

## Rocky Flats Environmental Technology Site

### EXPLANATION

**Standard Map Features**

- Buildings and other structures
- Solar Evaporation Ponds (SEP)
- 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 flyover 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

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

September 29, 1999

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

***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 the 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:

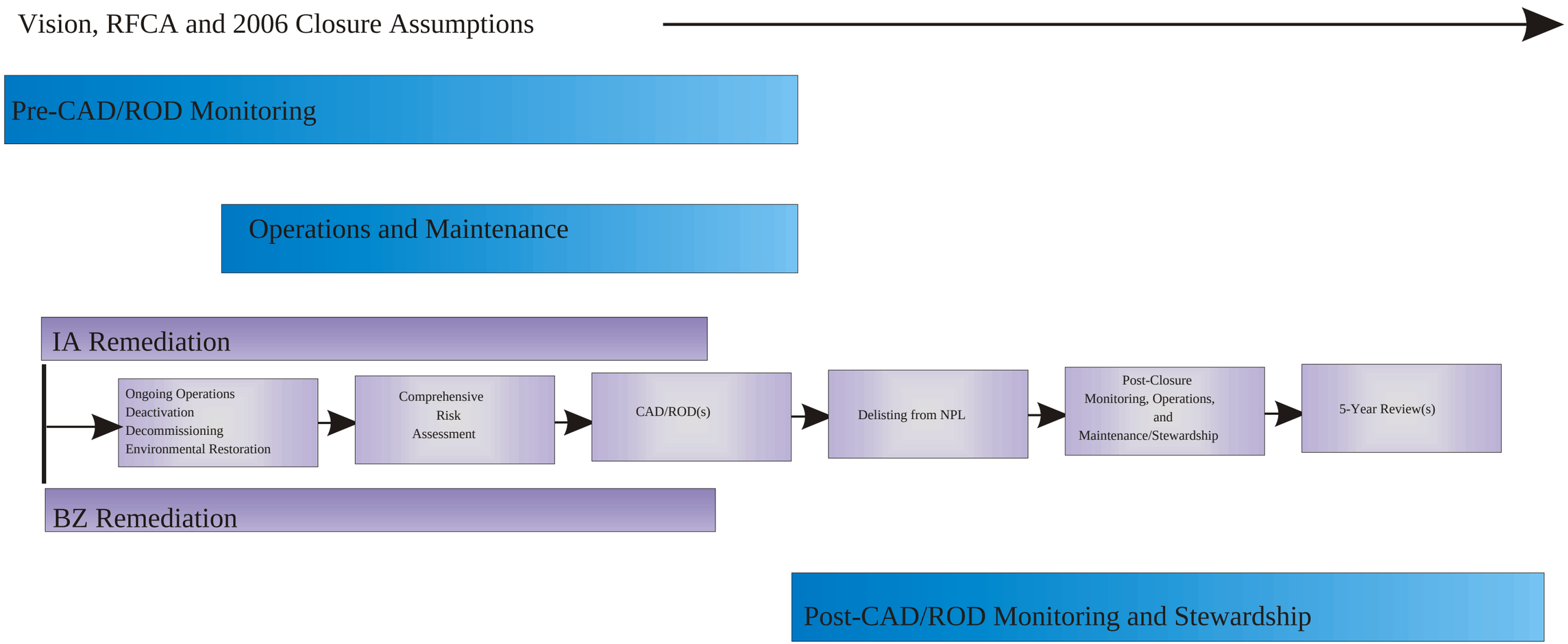
- Define a closure approach consistent with the overall RFETS final 2006 closure strategy;
- Support a risk and dose assessment approach to describe the contribution of the IA to the overall RFETS final risk profile;
- Identify cost-effective remediation strategies that meet RFCA cleanup standards while minimizing generation of remediation waste;
- Ensure the performance of appropriate closure-driven characterization;
- Ensure that characterization and remediation do not pose unacceptable risks to the citizens of Colorado or Site workers;
- 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. Site closure, as illustrated on Figure 2, includes remediation of the IA and Buffer Zone (BZ), and development of a RCRA Facility Investigation/Remedial Investigation (RFI/RI), comprehensive risk assessment (CRA), and Corrective Action Decisions/Records of Decision (CAD/ROD[s]). IA remediation will be conducted simultaneously with BZ remediation.

After remediation activities are complete, DOE will develop a 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 CAD/ROD(s) and DOE recommendation to EPA and

Figure 2
Site Closure Strategy



CDPHE to have RFETS delisted from the National Priorities List (NPL). The final CAD/ROD(s) will include post-closure monitoring and operations requirements, including 5-year requirements for reviews of the Site to evaluate whether the remedies, including any institutional controls, are effective.

**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) regulatory framework, (2) decision framework, (3) characterization and remediation approach, and (4) project interfaces. The regulatory framework describes key RFETS regulatory guidance as specified in RFCA. The decision framework guides when and how decisions will be made during IA characterization and remediation. The characterization and remediation approach includes strategies to streamline and accomplish the technical work in the IA. The project interfaces component describes approaches for coordination among all appropriate RFETS organizations and stakeholders. IA strategies are summarized in Figure 3 and discussed in the appropriate section.

## 2.0 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, 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 to support delisting of RFETS from the NPL.

Figure 3
Industrial Area Strategy Elements

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

## *Characterization and Remediation*

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

Strategy: Integrate IA remediation activities with decommissioning activities.

Strategy: Use one subcontractor for demolition and remediation.

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

Strategy: Begin characterization during deactivation or decommissioning.

Strategy: Optimize sampling activities and only sample once.

Strategy: Use existing data whenever possible to eliminate redundant sampling 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 sites early, where appropriate.

## *Risk Assessment*

Strategy: Develop risk and dose assessment methodologies for open space and industrial use scenarios.

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

## *Data Management*

Strategy: Transfer Site databases to a common platform.

Strategy: Organize the SWD so that it becomes the Site closure database.

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

## *Project Interface*

Strategy: Integrate with all appropriate Site organizations.

Strategy: Use railroad transportation to reduce the impact to local roads.

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 all appropriate RFETS organizations, regulatory agencies, and stakeholders.

Strategy: Enhance the collaborative process.

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

## 3.0 Decision Framework

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

The decision framework, described in Figure 4 and Table 1, provides a guide for when and how decisions will be made during IA characterization and remediation. The IA remediation goal 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.

The decision framework incorporates and links regulatory decisions, data inputs, technical decisions, and IA activities (Figure 4). Although the decision framework 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 RFI/RI, CRA, and CAD/ROD(s). Decisions related directly to IA activities, such as the need for remediation at a specific IA Group, are integrated with the IA 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 toward total Site closure. The ability to close the IA on time will impact the entire RFETS closure process. In order for the Site to be closed and delisted from the NPL, specific analyses 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 and contaminants;
- Develop a decision document for each accelerated action to describe the treatment and/or remediation;
- Remediate the IA and/or treat wastes as necessary;

Figure 4
Industrial Area Decision Framework

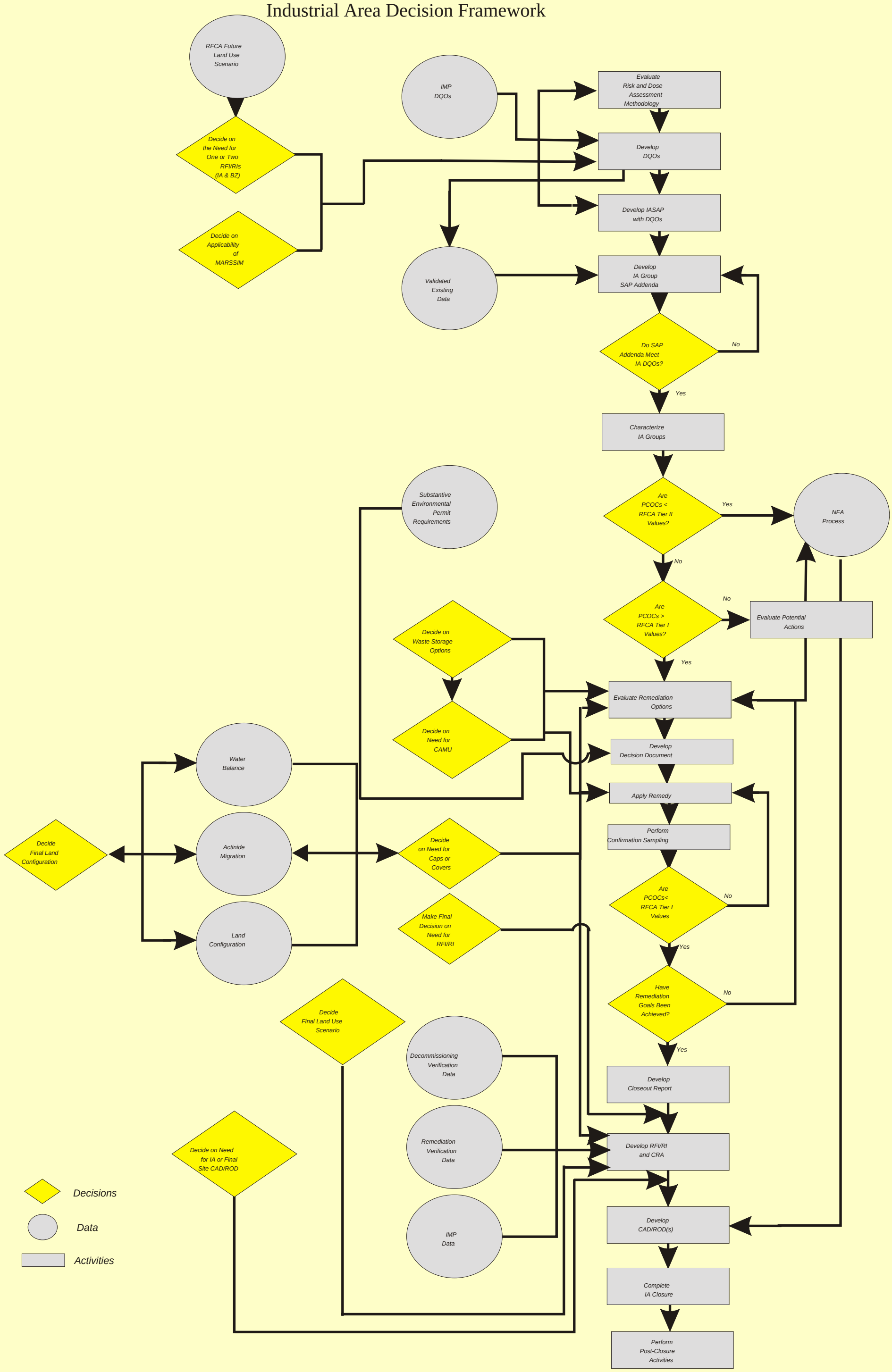


**Table 1**
**Industrial Area Decision Framework**

| 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 Applicability of MARSSIM | Evaluate whether the MARSSIM approach is 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 Approval |
| • Evaluate whether the SAP addenda meet IA DQOs | If the IA Group SAP addenda meets IA DQO decision requirements, characterization will begin. | DOE with Regulatory Agency Approval |

**Table 1 (continued)**
**Industrial Area Decision Framework**

| Framework Element | Activity, Data, and Decision Details | Responsibility |
|---|---|---|
| • Characterize IA Groups | Field sampling will be used to characterize the IA. Resulting analytical data will be used for remediation decisions, the RFI/RI, and the CRA. | DOE |
| • Compare PCOCs to RFCA ALs | Exposure areas with PCOCs greater than Tier I values will trigger an action decision.<br>Exposure areas with PCOCs less than Tier II values will trigger the NFA process.<br>Exposure areas with PCOCs less than Tier I and greater than Tier II values will be evaluated for potential action decisions. | 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 and Stakeholder Review |
| • 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 |

**Table 1 (continued)**
**Industrial Area Decision Framework**

| Framework Element | Activity, Data, and Decision Details | Responsibility |
|---|---|---|
| • Perform Confirmation Sampling | Samples will be collected and analyzed from remediated areas. | DOE |
| • 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 |
| • Evaluate Whether Remediation Goals Have 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 Approval and Stakeholder Review |
| • Develop RFI/RI and CRA | The RFI/RI will describe results of the characterization and baseline risks. The CRA will describe potential risks, if any, from the remediated area. | DOE |
| • Develop CAD/ROD(s) | The CAD/ROD (s) will describe closure and post-closure activities of the IA and Site, and will be based on information in decision documents, the RFI/RI, and the CRA. | DOE with Regulatory Agency Approval 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 |
| • Perform Post-Closure Activities | Post-closure activities include ongoing operations, monitoring, and 5-year reviews. | DOE with Regulatory Agency Review |

- Develop a closeout report for each accelerated action that describes the remediation and/or treatment, and includes documentation that the accelerated action has been performed;
- Develop NFA justifications, as appropriate;
- Develop a CRA that includes risks from the IA and BZ;
- Ensure the safety of the workers and public, as well as environmental compliance during remediation and closure; and
- Develop a CAD/ROD(s) 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 Figure 5, 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 remaining area is designated as open space. Cleanup actions, to date, have been consistent with this scenario.

The RFCA Parties and stakeholders are currently discussing future land use of RFETS, and a final decision has not been made. DOE will develop risk assessment methodologies and data quality objectives (DQOs) to accommodate several land uses (see Section 4.3).

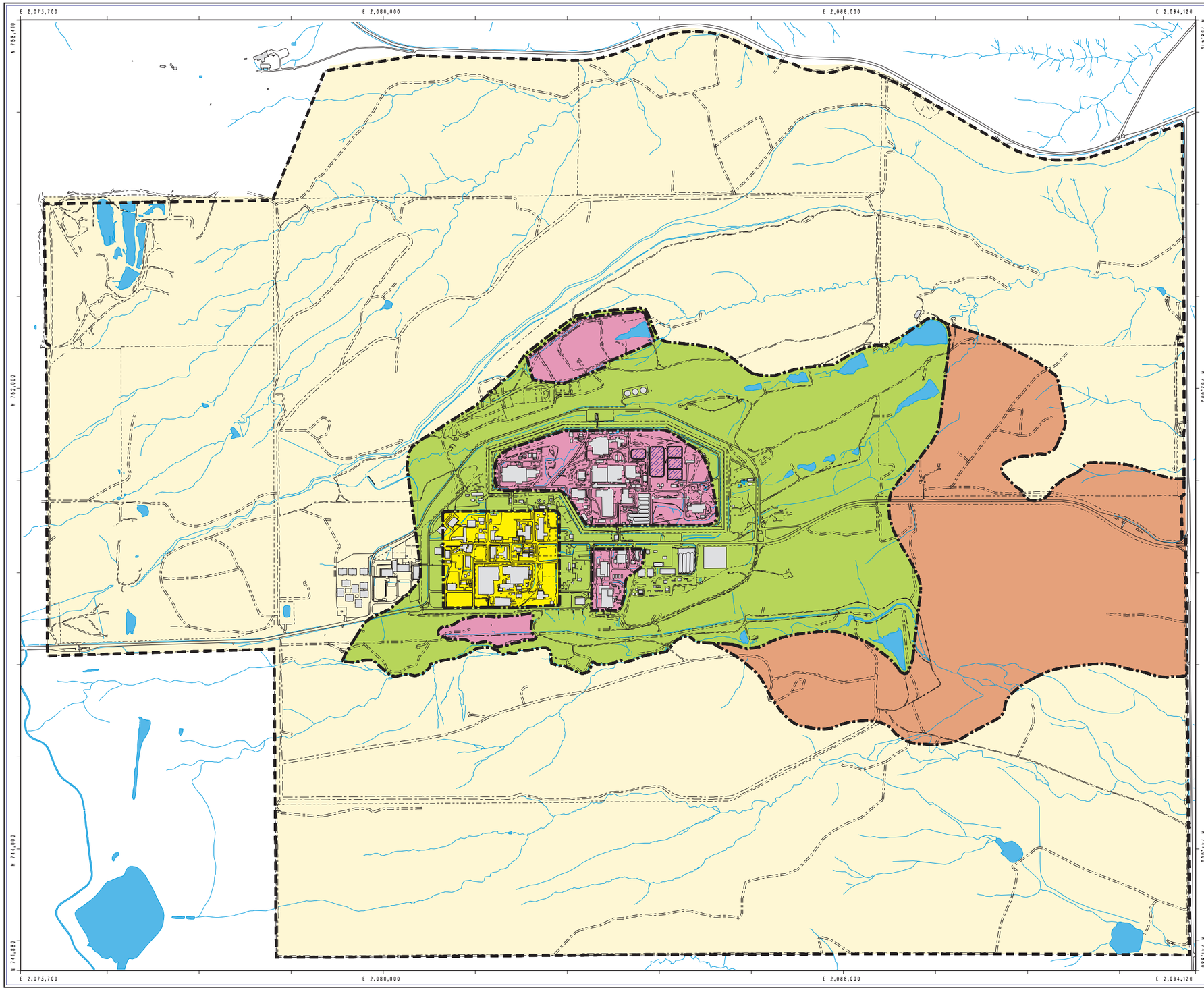
# *4.0 Characterization and Remediation Approach*

**Strategy**

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

The overall strategy is presented on Figure 6. The IA Strategy combines technical activities with sitewide activities and policy decisions that provide a framework and guidance for making decisions, developing policy, and conducting key IA activities. Key IA activities, shown in the middle of Figure 6, are supported by the bulleted activities above and important policy decisions below. Ongoing or planned sitewide activities that support IA and RFETS closure are shown above and below the main body of Figure 6 as Stewardship and Environmental Monitoring, and Sitewide Activities.

The major technical activities that will be conducted to achieve Site closure are characterization and remediation of the IA. Strategies that protect human health and the environment, and reduce time and cost yet remain focused on meeting IA DQOs, will be implemented. These strategies are built around the grouping of IHSSs, PACs, and UBC sites, and their integration with the decommissioning.




# Figure 5
# (RFCA Figure 1)
# Conceptual RFETS Land Use

## EXPLANATION

- Area 3- Unrestricted Open Space (4545 Acres)
- Area 4- Restricted Open Space (Low-level Surficial Pu Contamination) (611 Acres)
- Area 2- Restricted Open Space (799 Acres)
- Area 1- Industrial Use Area (78 Acres)
- Area 0- Potential Capped Areas and Retrievable, Monitored Storage (183 Acres)

## Standard Map Features

- Buildings and other structures
- Solar Evaporation Ponds (SEP)
- 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 flyover data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs, 1/95*

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

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: 99-0427

September 29, 1999

NT_Svr w:/projects/fy99/99-0427/landuses.aml

# Figure 6 Industrial Area Strategy

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

## Key Activities to Support the IA Strategy

### Identify IHSS Groups (1999)

- Maintain consistency with decommissioning schedule
- Maintain f lexibility between decommissioning and ER to change sequence, as needed, to be protective of human health and the environment
- Integrate decommissioning and ER
- Identify sequence of building remediation

### Develop DQOs for Environmental Media (2000)

- Integrate environmental DQOs from the IMP and D&D Characterization Protocols, where appropriate
- Develop environmental media DQOs to support:
  - Characterization
  - Remediation
  - Confirmation sampling
  - CRA
- Maximize data usability

### Develop Comprehensive SAP (2000)

- 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

### Conduct Remedial Actions (2002 - 2006)

- Consider building remediation:
  - No Action
  - Mothball
  - Reuse
  - Remove
- Evaluate e nvironmental media remediation options:
  - NFA
  - Excavation/Removal
  - Treatment
  - Stabilize and Cover
  - Natural Attenuation
- Maintain documents in AR

### Complete Remedial Actions (2006)

- Verify status of AR
- Complete CRA

## Key Policy Decisions to Support the IA Strategy

- Shift 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(s)
- Determine applicability of MARSSIM

- Develop RSOP for remediation
- Find appropriate waste disposition facilities
- Adhere to document review schedules
- Recontour Site
- 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

## 4.1 Grouping of Sites

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 concern (PCOCs).

This grouping provides a consistent scheduling mechanism centered on the decommissioning schedule, and enables streamlining of 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 a potential NFA site?

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

Since 1995, the RFCA Environmental Restoration (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.

### 4.1.1 No-Further-Action Sites

There are 60 potential NFA sites in 35 IA Groups. Some NFA sites were 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,

# Table 2
# Industrial Area Groups

| IA 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 Solar Evaporation Ponds |
| | Effluent Line | 700-149.1 | | |
| | Effluent Line | 700-149.2 | | |
| | Triangle Area | 900-165 | | |
| | 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 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 from other lines because they may have not been in use as long |
| **100-1** | UBC 122 - Medical Facility | UBC 122 | Building 122 | Grouped together with UBC sites 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/UBC sites |
| **100-4** | UBC 123 - Health Physics Laboratory | UBC 123 | None | Grouped with UBC sites 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

| IA 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** | UBC 371 - Plutonium Recovery | UBC 371 | Building 371 | Not grouped with other UBC sites 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 site |
| **300-6** | Pesticide Shed | 300-702 | | Not grouped - potential NFA site, not near other sites |
| **400-1** | UBC 439 - Radiological Survey | UBC 439 | Building 439 | Not grouped so that UBC site is not dependent on other building decommissioning |
| **400-2** | UBC 440 - Modification Center | UBC 440 | Building 440 | Not grouped so that UBC site 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

| IA 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 site |

Potential NFAs are shaded

# Table 2 (continued)
# Industrial Area Groups

| IA 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 site |
| **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 site |
| **600-3** | Fiberglass Area North of Building 664 | 600-120.1 | Building 668 | Not grouped - potential NFA site |
| **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 site |
| **600-6** | Former Pesticide Storage Area | 600-1005 | | Not grouped - potential NFA site 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

| IA 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 7,500-Gallon Waste Tank (31) | 700-146.1 | | |
| | Concrete Process 7,500-Gallon Waste Tank (32) | 700-146.2 | | |
| | Concrete Process 7,500-Gallon Waste Tank (34W) | 700-146.3 | | |
| | Concrete Process 7,500-Gallon Waste Tank (34E) | 700-146.4 | | |
| | Concrete Process 7,500-Gallon Waste Tank (30) | 700-146.5 | | |
| | Concrete Process 7,500-Gallon Waste Tank (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

| IA Group | Description | IHSS/PAC/UBC | Decommissioning Dependency | Grouping Logic |
|---|---|---|---|---|
| **700-6** | Buildings 712/713 Cooling Tower Blowdown | 700-137 | Building 713 | Grouped together because of potential NFA sites 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 Building 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 site |
| **700-10** | Laundry Tank Overflow - Building 732 | 700-1101 | | Not grouped - potential NFA site 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 site |
| **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

| IA 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 site not near other sites |
| **900-4&5** | S&W Building 980 Contractor Storage Facility | 900-175 | | Grouped together because of potential NFA sites 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

900-3, and 900-4&5). The remaining potential 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 IA 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.

## 4.2 Integration with Decommissioning

***The 2006 CPB integrates decommissioning and ER activities.***

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. Activities are scheduled to incorporate resource availability into scheduling and budgeting decisions. The Closure Project Baseline (CPB) identifies decommissioning and ER activities, and contains the appropriate connections to indicate the necessary sequencing of projects required for 2006 closure.

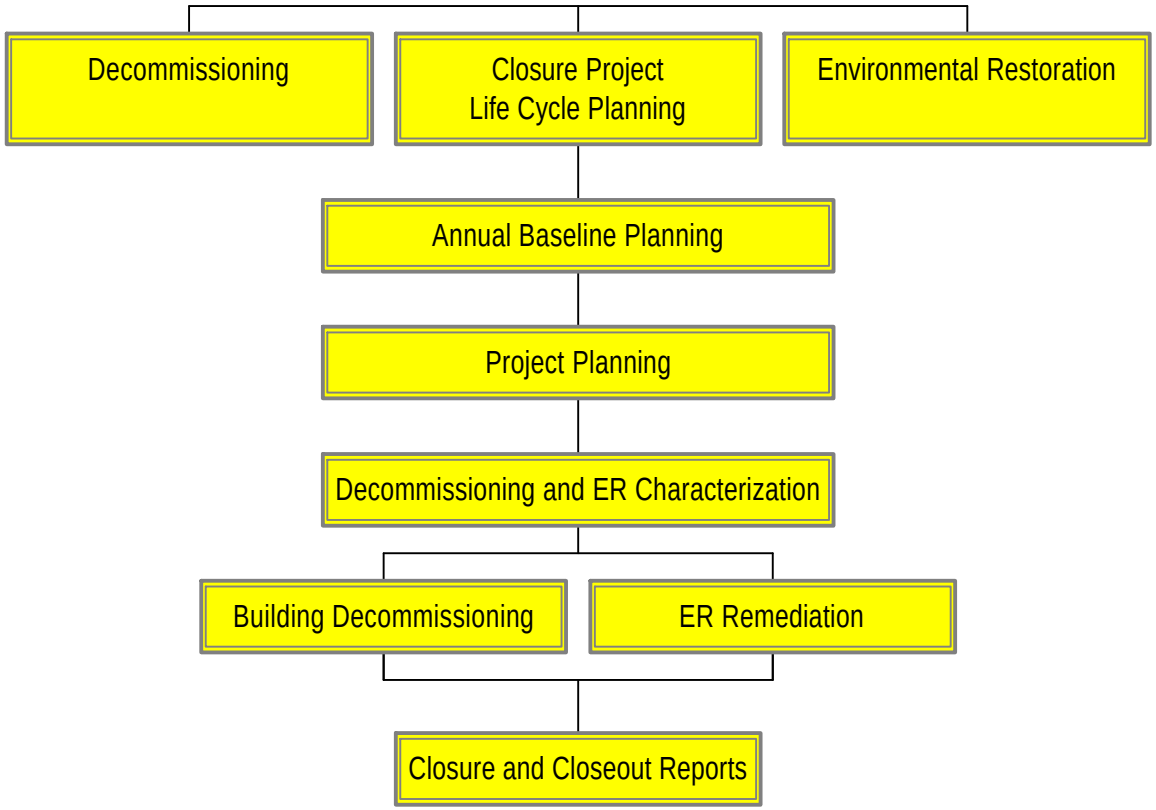
**Strategy**

Integrate IA remediation activities with decommissioning activities.

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. Consequently, remediation activities dependent on decommissioning are integrated with decommissioning in the 2006 CPB. The ER schedule is integrated with decommissioning schedules so that characterization activities start during building deactivation or decommissioning. Plate 3 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). Sampling during deactivation or decommissioning will allow soil characterization before building removal and excavation.

# Figure 7
# Decommissioning and ER Project Integration



**Strategy**

Use one subcontractor for demolition and remediation.

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.

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

## 4.3 Risk and Dose Assessment Approach

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 will be based on RFCA land use scenarios and protection of surface water quality. Risk and dose assessment methodologies for open space and industrial use of the IA will be developed. Post-remediation risk and dose will be evaluated in the CRA.

**Strategy**

Develop risk and dose assessment methodologies for open space and industrial use scenarios.

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

- 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 ER activities. MARSSIM contains guidance on demonstrating compliance during final radiological status surveys and is currently applied to facility decommissioning activities at RFETS.

**Strategy**

Develop a risk assessment methodology that focuses on CRA requirements.

### 4.3.1 Risk and Dose Assessment Methodology

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:

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

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

### 4.3.2 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 support an NFA CAD/ROD for the Site.

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. Exposure scenarios evaluated will include offsite impacts.

***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.

#### Integrated Monitoring Plan

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

The IMP program was designed to integrate data collection requirements for groundwater, soil, surface water, air, and ecology in the IA and 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:

- 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.

#### Actinide Migration Evaluation

***The AME Group analyzes Pu, Am, and U sources and mobility at RFETS.***

A multiyear AME Group was established to analyze 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 answer the following questions:

(1) What are the important actinide migration sources and migration processes that account for recent surface water quality standard exceedences?

(2) What will be the impacts of actinide migration on planned remedial actions? To what level do sources need to be cleaned up to protect surface water from exceeding action levels for actinides?

(3) How will actinide migration affect surface water quality after Site closure (or what soil action levels will be sufficiently protective of surface water over the long term)?

(4) What is the long-term actinide migration and will it impact downstream areas (e.g. accumulation)?

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.

## Land Configuration Design Basis

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

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 the IA closure goal of protection of human health and the environment.

Several other ongoing studies as well as National Environmental Policy Act (NEPA) and ecological analyses will contribute vital information to the design criteria for final surface configuration. These include the IMP, AME, and Site Water Balance study. Applicable information from these studies will be incorporated to support design of a final topography.

## 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. Phase II will evaluate groundwater hydrogeology and impacts to surface water from current and future groundwater fluxes. Data generated during this study will be used in the CRA and Land Configuration Design Basis.

### 4.3.3 Data Quality Objectives

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.

**Strategy**

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

The overall goal of IA remediation and Site closure is protection of human health and the environment. IA data requirements to achieve this goal are the following:

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

The IA data requirements will drive future characterization and remediation activities, and provide a basis for the 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 incorporate appropriate current IMP and decommissioning DQOs.

## 4.4 Characterization Approach

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

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

A comprehensive Sampling and Analysis Plan (SAP) for the IA (the IASAP) will be developed instead of individual SAPs for each IA Group. IASAP addenda for the individual IA Groups will be prepared as necessary. The IASAP will include:

- DQOs for characterization and remediation sampling;
- Sampling and analysis methods and protocols;
- Data analysis methods and protocols;
- Data management methods;

- Quality assurance (QA) and quality control (QC) methods and protocols; and
- Health and Safety Plan (HASP).

The IASAP addenda will address group-specific information including (1) sampling location, (2) sample quantity, (3) sampling methods, (4) required analytes, and (5) required QA samples and procedures.

**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 remediation 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 action levels (ALs) (this activity will be conducted in Fiscal Year [FY]00 and FY01 before characterization activities);
- Develop DQOs for sampling at the IA Groups;
- Compare existing data to DQOs to determine data gaps; and
- Evaluate decommissioning data for usability.

## 4.5 Remediation Approach

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 nine CERCLA criteria:

- Overall protection of human health and environment;

- Compliance with applicable or relevant and appropriate requirements (ARARs);
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume;
- Short-term effectiveness;
- Implementability;
- Cost;
- State acceptance; and
- Community acceptance (EPA, 1988).

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 options 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 options can include the following:

- NFA;
- Removal and offsite disposition;
- Caps and covers; and
- Plume remediation.

***Fugitive dust emissions may require additional regulatory permits.***

Substantial amounts of particulate emissions may be generated by remediation projects. Emissions at these levels have the potential to raise a variety of Clean Air Act (CAA) permitting, emission control, and monitoring issues that may need to be negotiated with the regulatory agencies. The IA project team will interface with IMP staff to ensure that onsite and Site boundary monitoring requirements are observed. Fugitive dust potential will be evaluated to determine whether additional monitoring or mitigation activities are needed.

### 4.5.1 No Further Action

NFA will be proposed 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.

### 4.5.2 Removal and Offsite Disposition

The preferred option for contaminated soil in the IA is excavation and immediate disposition offsite. This option is effective and efficient and meets

**Strategy**

Excavate and package for immediate disposition.

the goal of 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 waste acceptance criteria (WAC). Soil will be sampled, characterized, and prepared for shipment to approved facilities. Section 5.2 describes other options for the disposition of remediation waste.

### 4.5.3 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 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.

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

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 long-term maintenance considerations, as well as results of further characterization and information from the IMP, AME, Land Configuration Design Basis, and Site Water Balance study.

### 4.5.4 Plume Remediation

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.

Remediation of groundwater plumes is guided by a three-part strategy. The elements of the strategy apply individually or in combination depending on the situation. First, plumes that pose an immediate threat to surface water are remediated using reactive barrier systems. Reactive barriers use 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 breakdown products that flow out of

the vessel. The media, containing precipitates, is periodically replaced and dispositioned as remediation waste.

**Strategy**

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

Plumes that pose an immediate threat to surface water are those that have migrated from 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 in 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 the plume complex is a threat to surface water, the threat will be mitigated by reactive barrier technology.

The second part of the groundwater plume remediation strategy is to remediate the source contributing to the plume, if the source is still present. One volatile organic compound (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 groundwater using monitored natural attenuation (MNA). 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.

EPA provides the decision framework and technical guidelines for implementation of the MNA remediation option (EPA, 1999). Consistent with EPA guidance, MNA will be considered as a component of the total remedy, as the total remedy itself, or as a follow-up measure.

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

### 4.5.5 Surface Water and Groundwater

The IA project team will coordinate with the RFETS Surface Water and Groundwater Groups during implementation of the IA Strategy. During remediation, surface water and groundwater will be monitored at points of evaluation defined in the IMP. If analytical results indicate values above RFCA ALs, the evaluation of elevated values, potential subsequent sampling, and potential mitigation actions will be conducted as part of the IA activities and integrated with IMP requirements.

### 4.5.6 Decision Documents

**Strategy**

Develop an RSOP for remediation.

IA characterization and environmental remediation decision documents currently developed include proposed action memoranda (PAMs), interim measures/interim remedial actions (IM/IRAs), SAPs, and closeout reports. These documents have been scheduled in the 2006 CPB for each IA Group. Figure 8 illustrates the current ER decision document schedule. As the schedule indicates, requirements for regulatory agency review and/or approval of ER decision documents will increase dramatically in FY02 through FY06.

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:

- Develop a RFCA Standard Operating Protocol (RSOP) for remediation of the IA similar to current RFCA decommissioning RSOPs. The RSOP, after review by stakeholders and approved by the regulatory agencies, will serve as the single decision document for remediation of ER sites. Under this approach, a letter to the regulatory agencies will identify specific remedial actions, including the location, 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

**Strategy**

Work with regulatory agencies to streamline the review process.

- 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 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.

## 4.6 Characterization and Remediation Challenges

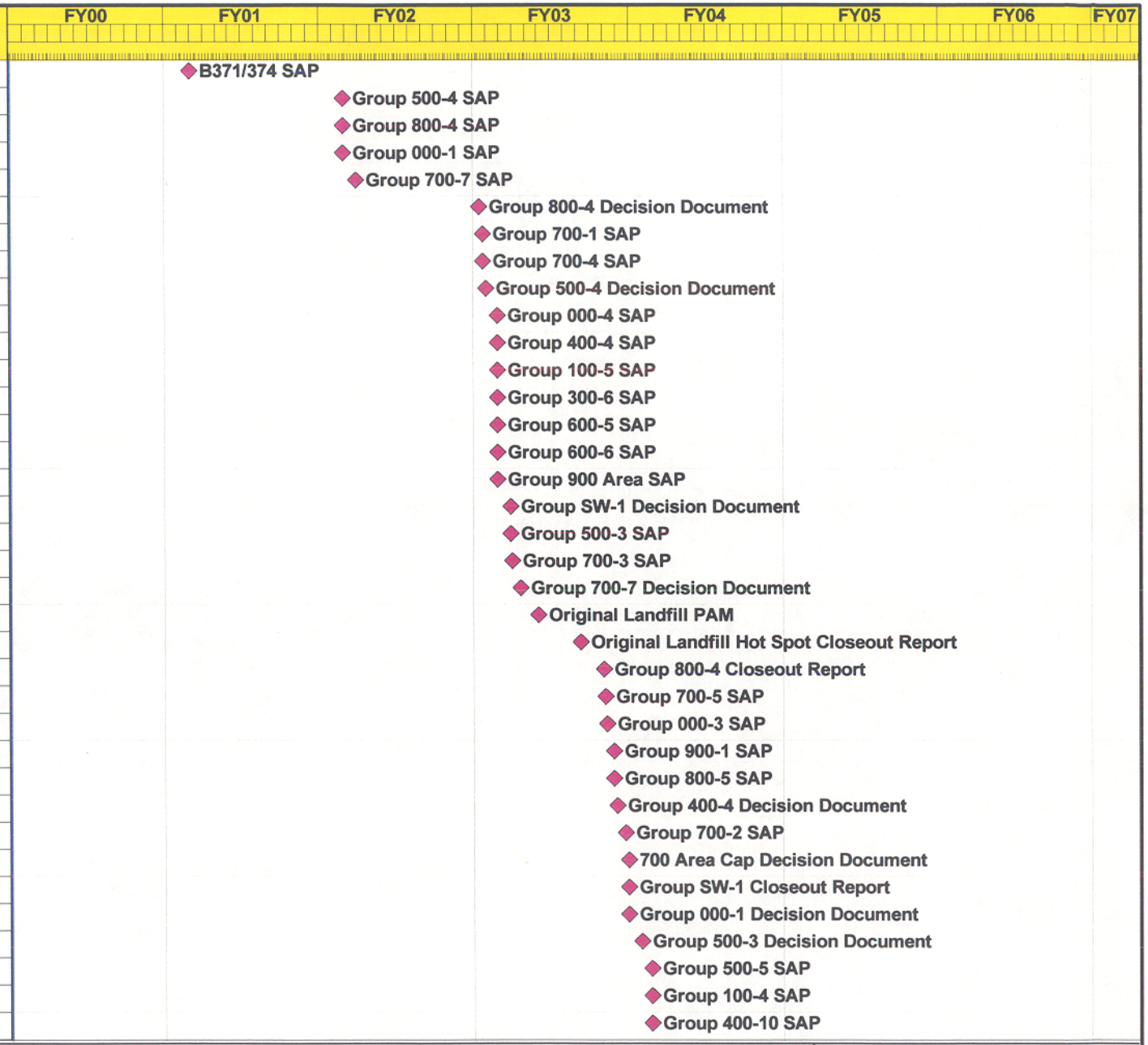
***Remediation challenges include OPWL, NPWL, sanitary sewers, storm drains, and UBC sites.***

Several areas in the IA present significant technical challenges, including 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.

### 4.6.1 Underground Pipeline Systems

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

| 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 | 24SEP99 |

Early Bar
Progress Bar
Critical Activity

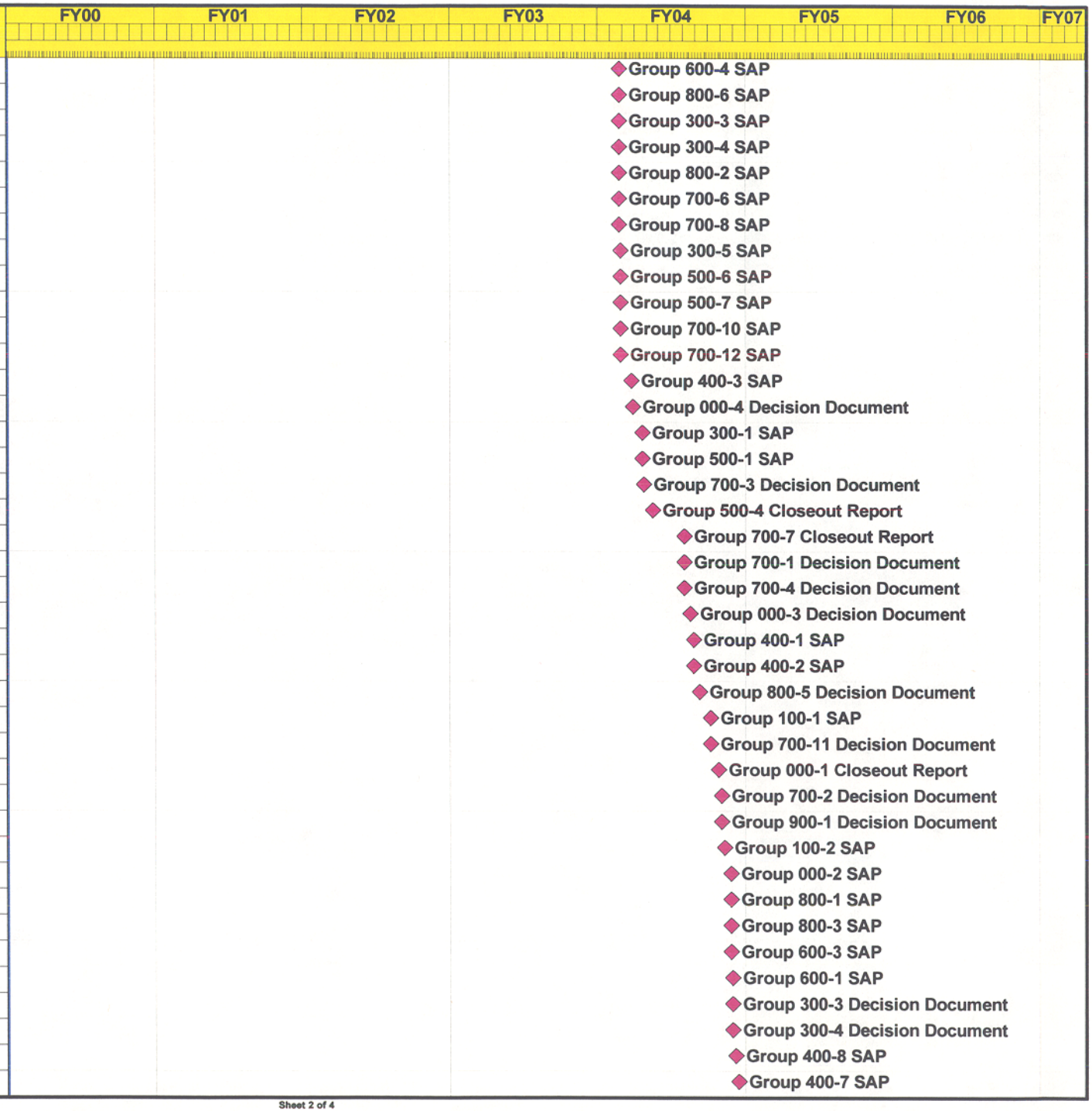
© Primavera Systems, Inc.

AGCY

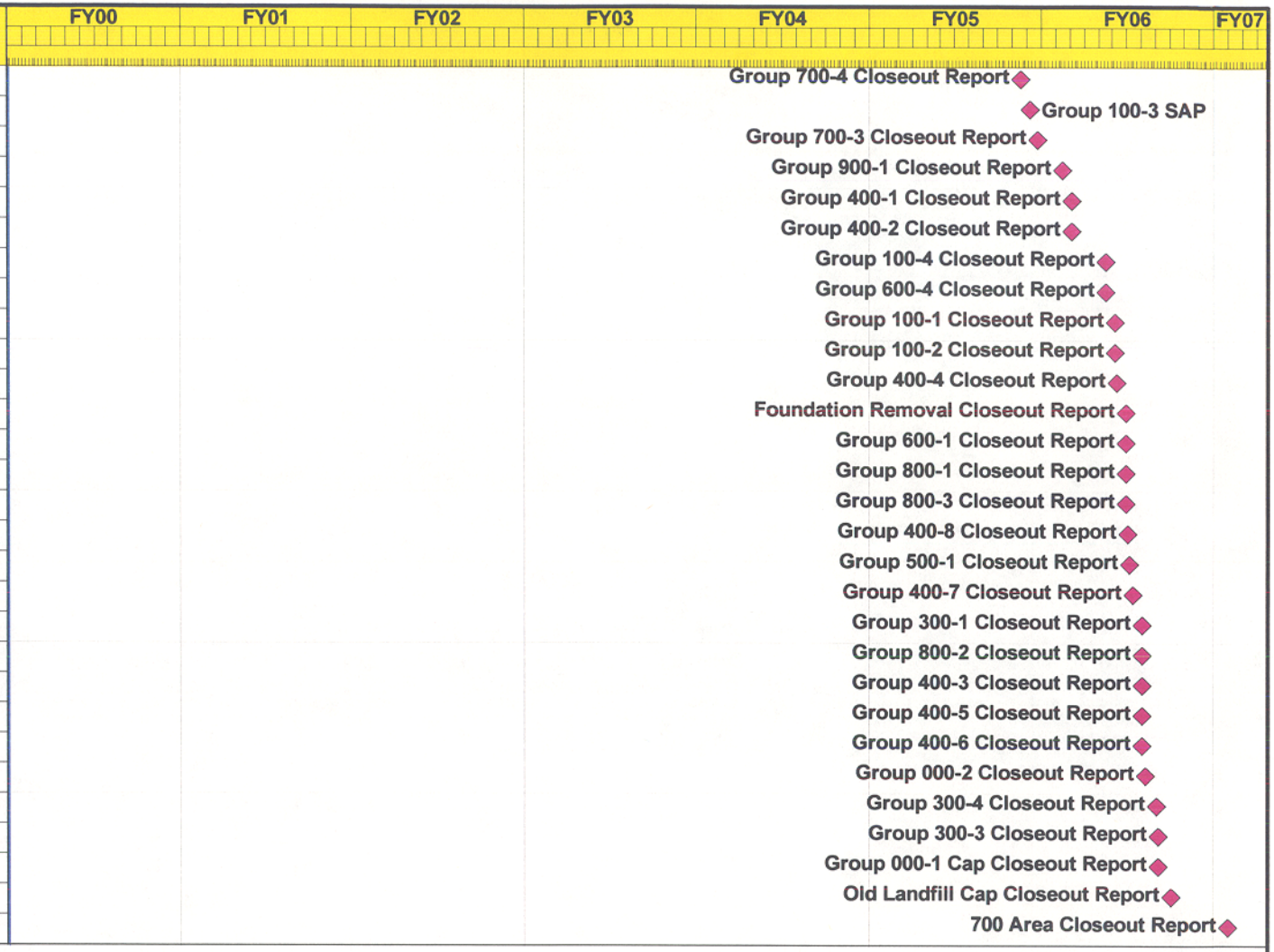
Sheet 1 of 4

**Figure 8**
**Industrial Area**
**Decision Document Schedule**

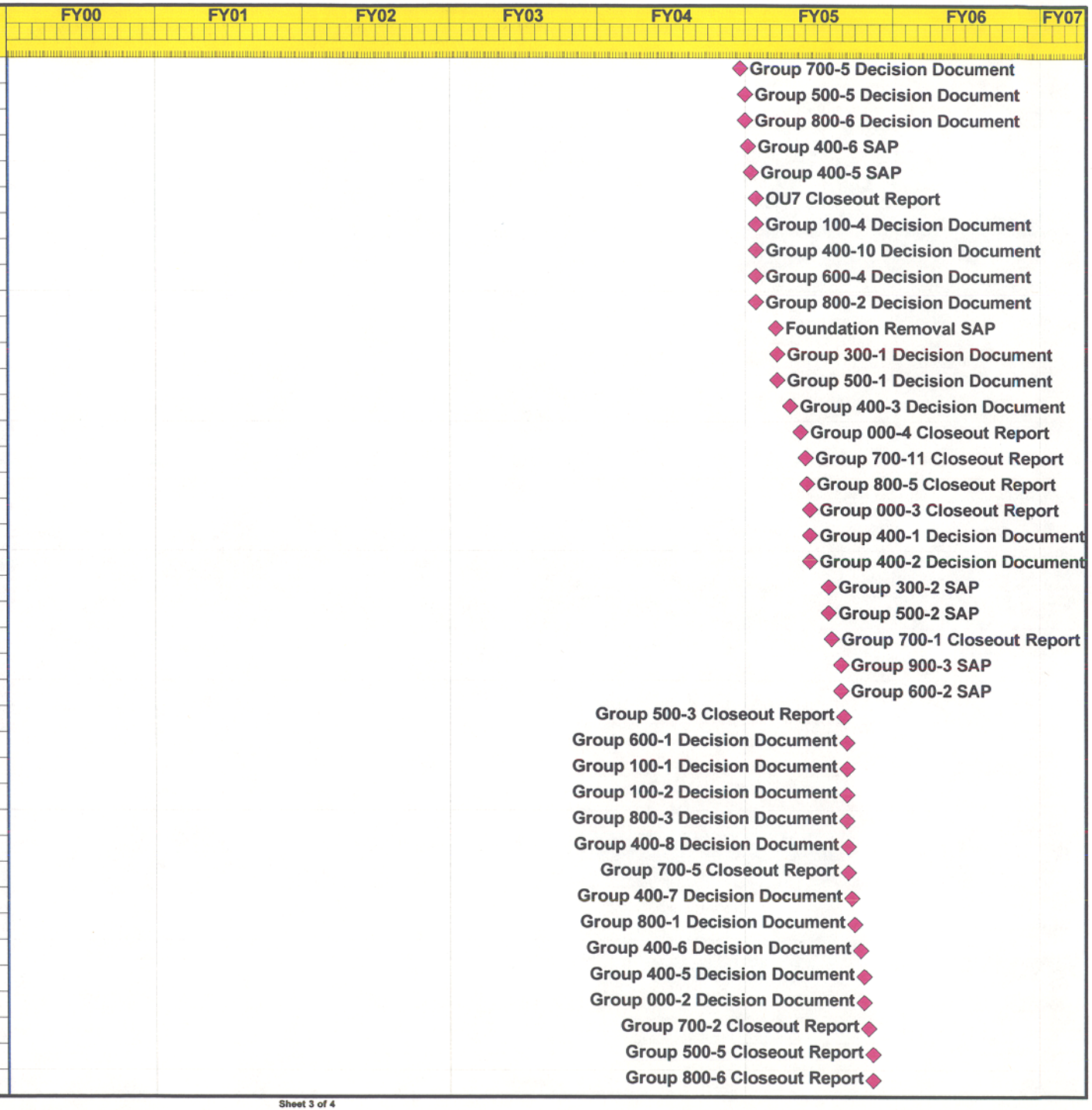
| Activity Description | Early Finish |
|---|---|
| Group 600-4 SAP | 25NOV03* |
| Group 800-6 SAP | 25NOV03* |
| Group 300-3 SAP | 25NOV03* |
| Group 300-4 SAP | 25NOV03* |
| Group 800-2 SAP | 25NOV03* |
| Group 700-6 SAP | 25NOV03* |
| Group 700-8 SAP | 25NOV03* |
| Group 300-5 SAP | 26NOV03* |
| Group 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* |



| 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* |



| 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* |



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

## Original Process Waste Lines

OPWL is a network of tanks, underground pipelines, and aboveground pipelines used to transport and temporarily store aqueous chemical and radioactive process wastes (Plate 2). OPWL potentially transported a variety of wastes including acids, bases, solvents, radionuclides, metals, oils, polychlorinated biphenyls (PCBs), biohazards, paints, and other chemicals (DOE, 1994).

The OPWL network originally consisted of approximately 35,000 feet of pipeline. Parts of the OPWL were converted to NPWL or other systems (e.g., fire plenum deluge system), and will be characterized as part of those systems. The current OPWL system contains approximately 28,638 feet of pipeline. 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 of pipeline will be characterized and remediated as part of other IA Groups. Table 3 summarizes the OPWL pipelines.

## New Process Waste Lines

NPWL, illustrated in Figure 9, consists of pipelines, tanks, and valve vaults that overlap extensively with OPWL. NPWL transports low-level aqueous waste to the liquid waste treatment facility in Building 374. Based on Site utility maps, it is estimated that approximately 6,300 feet of pipeline will require characterization. This estimate does not include sections of pipeline that overlap with OPWL.

## 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 9). This estimate includes only main pipelines. Remaining pipelines will be characterized with UBC sites or other IHSSs or PACs. No previous characterization of the sanitary sewer system exists.

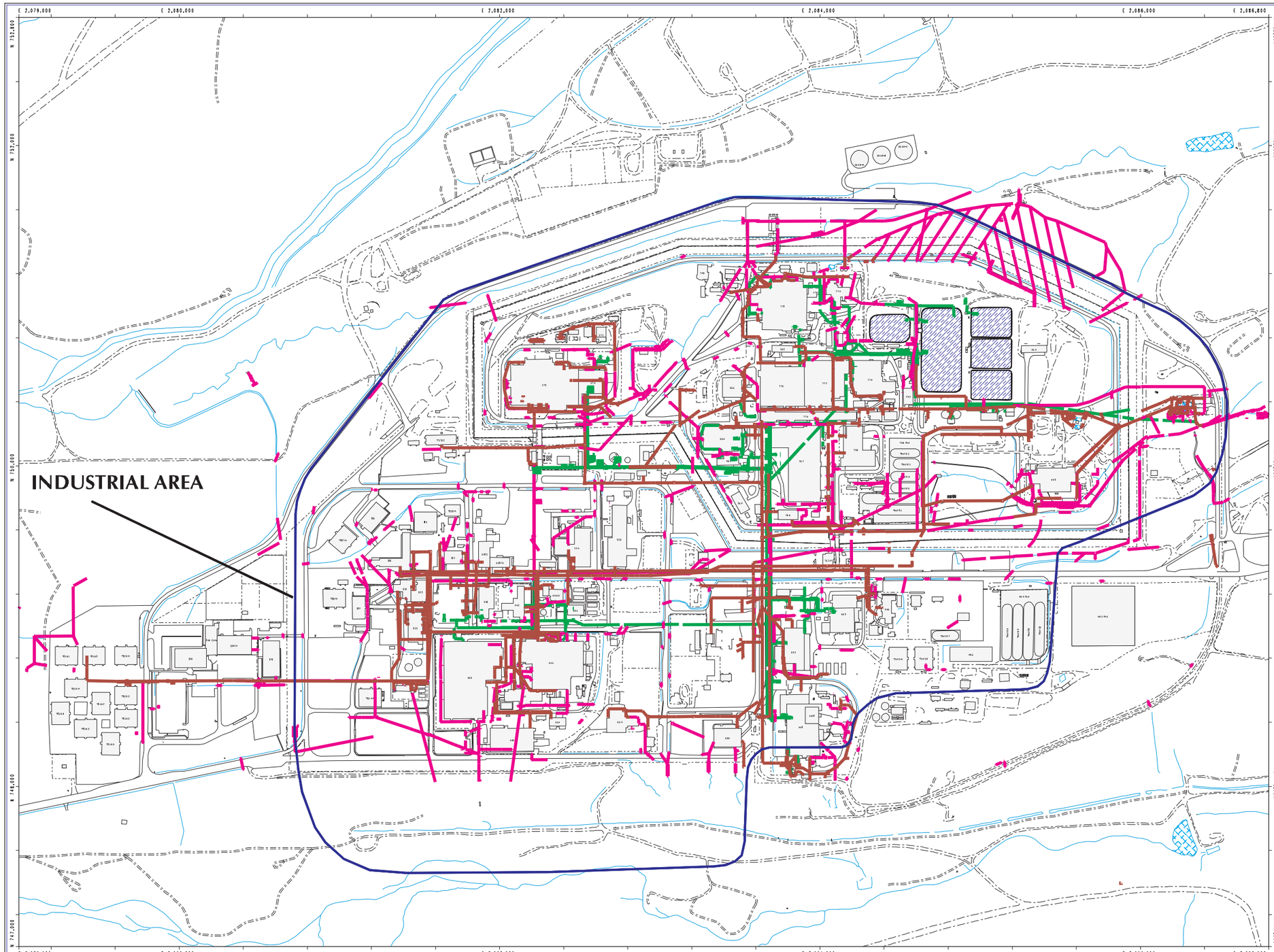
The sanitary sewer system has been used for the transport, storage, and treatment of sanitary wastes since 1952. Historically, waste streams other than typical sanitary wastes have been discharged to the sanitary sewer system, including a variety of chemical and radioactive wastes from laboratories,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

**Table 3**
**OPWL Pipelines**

| Segment Name | Length (feet) | IA Grouping | Location |
|---|---|---|---|
| 121-P26 | 2,750 | 000-1 | 700 Area (also referred to as IHSSs 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 and 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 and 800 Areas (also referred to as IHSS 147.1) |
| 121-P12 | 510 | 000-2 | 700 Area (also referred to as IHSSs 123.2 and 147.1) |
| 121-P13 | 0 | 000-2 | 700 Area (also referred to as IHSSs123.2 and147.1) |
| 121-P15 | 785 | 000-2 | 700 Area (also referred to as IHSS 123.2) |
| 121-P16 | 170 | 000-2 | 500 and 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 and 900 Areas |
| 121-P37 | 1,449 | 000-2 | 700 and 900 Areas |
| 121-P38 | 800 | 000-2 | 700 and 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) | IA 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 and 774 |
| 121-P33 | 140 | 700-4 | 700 Area |
| 121-P56 | 170 | 700-4 | Buildings 771 and 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 |




# Figure 9

## 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 (SEP)
- 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 corrected 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 RSL, Las Vegas.*
*Digitized from the orthophotographs. 1/95*

Scale = 1 : 7720
1 inch represents approximately 643 feet

200 0 400 800ft

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-IA-STRAT-NPWL

September 29, 1999

NT_Svr w:/projects/fy99/99-0382/ia-strategy-npw.aml

## Storm Drains

There are 239 storm drains at RFETS as shown on Figure 9. Of these, 139 require characterization as part of IA 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 noncontaminated pipelines.

## Remediation Strategies

The key remediation strategy for OPWL, NPWL, the 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.

**Strategy**

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

Issues that add to the complexity of characterizing and remediating OPWL, NPWL, the 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;
- Pipelines and utility corridors are potential groundwater migration pathways;
- 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.

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

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

**Strategy**

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

Remediation of OPWL, NPWL, the 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:

- Consult with the DOE Office of Science and Technology 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 adequate sampling coverage;
- Use Site Water Balance and other groundwater data to help define data needs and remediation options;
- 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 health and safety (H&S) concerns.

### 4.6.2 Under-Building Contamination

There are 31 designated UBC sites in the IA (Table 2). Past and current operations in these buildings have included production and waste management activities. These buildings were designated as UBC sites because of documented spills or releases in the buildings or routine operations that may have resulted in contamination (DOE, 1992). OPWL, NPWL, sanitary sewer segments and storm and foundation drains 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 or foundations below the water table or the top of bedrock;
- Additional PCOCs because of associated IHSSs;
- Potentially wide range of PCOCs;

- Accessibility; and
- Structural integrity of foundations.

Characterization of UBC sites will begin during deactivation as soon as building floors and slabs are accessible, usually during the last 50 percent of deactivation. 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 or directional drilling. Technical challenges will include developing plans that (1) include OPWL, NPWL, sanitary sewer lines and storm and foundation drains 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.

**Strategy**

Characterize UBC sites early, where appropriate.

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, the 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.

## 4.7 Data Management

***IA data must 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. The data must be managed and accurately validated so that the analytical results, as well as sampling locations, can be evaluated. The 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.

### 4.7.1 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. The data 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 were 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 was conducted to identify additional data sources.

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.

### 4.7.2 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 the data valid and of known quality to meet DQOs?
- Are the data critical to IA decision documents?
- Are the data critical to the understanding of the IA?

- Are the data critical to determining remediation strategy?
- Do the data decrease the number of new IA samples required?
- Will the 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.

### 4.7.3 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 will consist of inspecting the data package contents for compliance with project requirements and validity.

### 4.7.4 Data Management Challenges

**Strategy**

Transfer Site databases to a common platform.

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

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 the SWD to IA and Site closure can be enhanced by initiating the following approaches:

- 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;

**Strategy**

Organize the SWD so that it becomes the Site closure database.

- 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 GIS.

### Geographic Information System

**Strategy**

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

GIS is a valuable, cost-effective tool for remediation that provides a visual analysis of PCOCs so that areas of concern and remediation volumes can be identified and calculated, respectively. 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 must be firmly in place so that analytical measurements taken for characterization and remediation purposes agree with the mapping information.

## 5.0 Project Interfaces

**Strategy**

Integrate with all appropriate Site organizations.

Site organizations that will be significantly influenced by IA closure, and will require close interaction with IA activities are H&S, the Waste Management Program, Analytical Services Division (ASD), and Procurement. Interaction with these organizations begins in the life cycle planning phase for Site closure. Many other groups such as 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 10 illustrates the anticipated level of effort for various Site organizations during IA remediation activities.

## 5.1 Health and Safety

***H&S is an RFETS priority.***

The protection of Site workers and the surrounding community is a priority at RFETS. Worker safety is maintained through implementation of the Integrated Safety Management System (ISMS), which includes five key elements:

- Define scope of work;
- Analyze hazards;
- Develop and implement controls;
- Perform work within controls; and
- Provide feedback and continuous improvement.

Protection of surrounding communities is maintained by RFETS routine and special monitoring programs through the IMP. Groundwater, surface water, air, and ecology are monitored on a routine basis. Additional monitoring is conducted around decommissioning and remediation projects to detect potential releases before they can move offsite.

Characterization and remediation of the IA will create new H&S challenges that could affect Site workers and surrounding communities. These will include, but will not be limited to, the following:

- Excavation and removal of slabs and foundations around UBC sites will disturb potentially contaminated soil;

- Remediation will consist of excavating significant volumes of soil;

- Concurrent decommissioning, characterization, and remediation projects will challenge H&S resources, as well as increase the potential for industrial accidents; and

- Offsite disposal of contaminated soil may result in a significant increase in truck traffic along local roads.

The number of decommissioning, characterization, and remediation projects ongoing each year will increase considerably by the year 2002 and will continue increasing until 2006. The increase in projects, and consequently heavy machinery and equipment required for decommissioning and remediation, will impact H&S staff participation and oversight requirements demanding additional vigilance by both H&S staff and workers.

**Figure 10**
**Anticipated Level of Effort for Integrated Industrial Area Remediation**

| Site Organization | Planning | Characterization | Remediation | Decision Documents | Site Closure Activities |
|---|---|---|---|---|---|
| **Analytical Services Division** | ● | ◆ | ◆ | NA | NA |
| **Communications** | ◆ | ◆ | ◆ | ◆ | ◆ |
| **Data Management** | ● | ◆ | ◆ | ◆ | ◆ |
| **Decommissioning** | ◆ | ◆ | ◆ | ● | ■ |
| **Emergency Response** | ■ | ◆ | ◆ | NA | NA |
| **Environmental Restoration** | ◆ | ◆ | ◆ | ◆ | ◆ |
| **Fire Department** | ■ | ◆ | ◆ | NA | NA |
| **Health and Safety** | ● | ◆ | ◆ | ■ | ■ |
| **Human Resources** | ◆ | ● | ● | ■ | ■ |
| **IMP - Groundwater and Surface Water** | ● | ● | ● | ● | ● |
| **Legal** | ● | ■ | ■ | ◆ | ● |
| **Nuclear Safety** | ■ | ■ | NA | NA | NA |
| **Planning and Integration** | ● | ■ | ■ | ■ | ■ |
| **Procurement** | ● | ■ | ■ | NA | NA |
| **Quality Assurance** | ● | ◆ | ◆ | ◆ | ◆ |
| **Radiological Safety** | ● | ◆ | ◆ | ■ | ■ |
| **Records Management** | ● | ● | ● | ◆ | ◆ |
| **Regulatory Compliance** | ◆ | ● | ● | ● | ● |
| **Security** | ■ | ◆ | ■ | NA | NA |
| **Site Facilities** | ● | ◆ | ◆ | NA | NA |
| **Stewardship** | ● | ● | ● | ◆ | ◆ |
| **Traffic** | ■ | ◆ | ◆ | NA | NA |
| **Waste Management Program** | ● | ■ | ● | ● | NA |

| | |
|---|---|
| ◆ | Intensive |
| ● | Moderate |
| ■ | Low |
| NA | Not Applicable |

**Strategy**

Use railroad transportation to reduce the impact to local roads.

The volume of soil that will be excavated and removed from the Site will increase to almost 30,000 cubic meters in FY05 and 40,000 cubic meters in FY06. Transportation of this material will have a significant impact on local roads and communities. Transportation impacts may be mitigated by using railroad transportation whenever possible. This may include consideration of expanding onsite rail lines.

## 5.2 Waste Management Program

**Strategy**

Identify and plan for waste storage challenges.

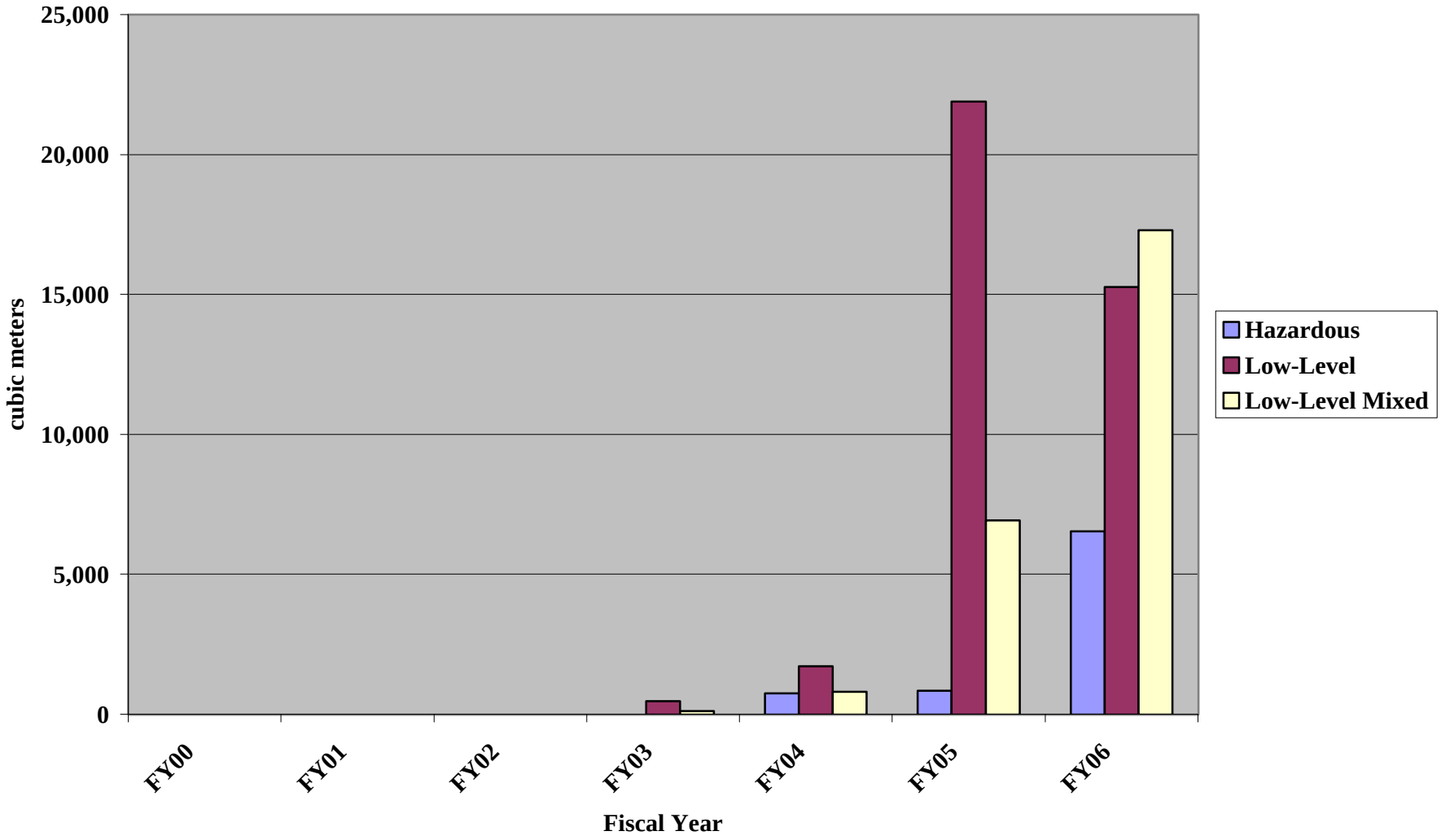
The Waste Management Program interface will be a key component in achieving 2006 closure. The Waste Management Program has responsibility for sitewide water operations and waste disposition. Groundwater or surface water generated as part of IA remediation will be dispositioned through Water Operations. 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.

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 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 VOC-contaminated soil and return it to the remediation area. Treated soil must, however, meet RFCA radionuclide put-back 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 associated contaminated debris, such as broken pipe, asphalt, and personal protective equipment (PPE). Estimated types and volumes of remediation wastes by FY are summarized on Figure 11. 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.

Offsite disposal immediately following remediation is the preferred option for wastes generated from IA remediation. Wastes will be properly characterized, packaged, and shipped offsite for final disposition at approved facilities. However, temporary onsite storage might be required to accommodate fluctuations in waste generation.

**Figure 11**
**Industrial Area Projected Remediation Waste Volumes**



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
- Reevaluate 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.

***Temporary onsite waste storage may be necessary if disposal sites are unavailable.***

## 5.3 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 12 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 samples per year by FY03. This number is expected to increase even more significantly in FY04.

**Strategy**

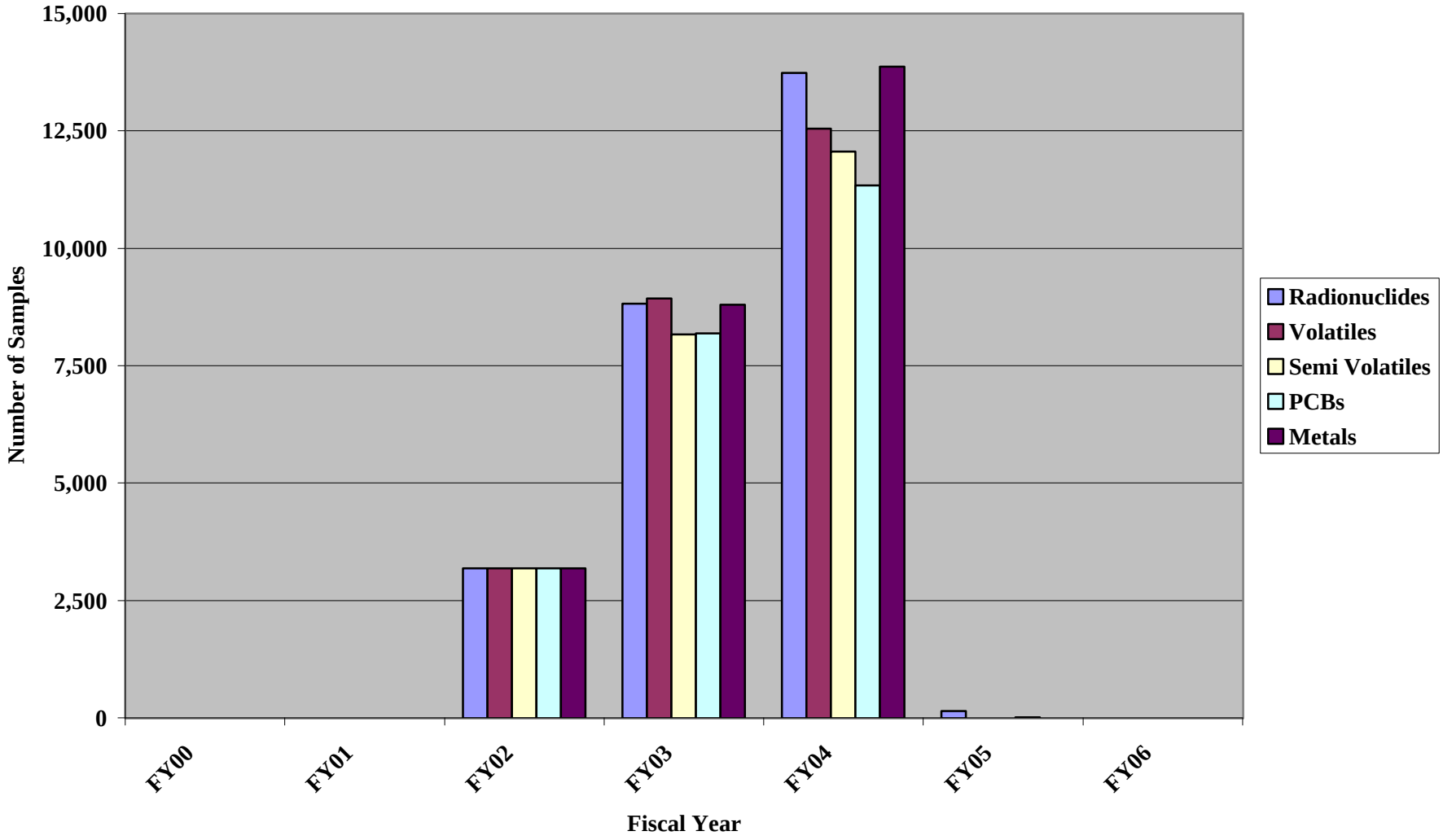
Identify and eliminate potential ASD resource challenges.

The volume of decommissioning and ER data that will be collected over the next several years will be of a larger magnitude, and collected within 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 need to be increased.

Potential strategies to ensure adequate capacity include the following:

Evaluate ASD to identify and address potential challenges within the next 2 years;

**Figure 12**
**Industrial Area Projected Characterization and Remediation Soil Samples**



**Strategy**

Identify additional laboratory and data validation capacity.

- Identify, audit, and procure additional offsite laboratory capacity within the next 2 years so that capacity is in place as needed;
- Develop additional onsite laboratory capacity; and
- Identify additional data validation resources.

## 5.4 Procurement

The RFETS Procurement process has been designed to provide the Site with qualified subcontractors who can meet and exceed the technical, QA/QC, and cost goals of 2006 closure. To provide the required characterization and remediation services for the Site, the IA project team (see Section 5.6) will provide a detailed Statement of Work (SOW) for each IA Group characterization and remediation. The SOW will include, at a minimum, a clearly defined technical scope, QA/QC 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 eliminate redundant efforts and reduce procurement time include the following:

- The SOW development process will be streamlined through 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 perform 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.

## 5.5 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 decommissioning and 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 H&S 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; and
- QA/QC—QA/QC professionals for planning, field, data, and technical QA/QC.

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:

**Strategy**

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

- Retain key employees who have valuable knowledge and experience working at RFETS. A plan is being developed to provide incentives to retain key employees through the 2006 closure;
- Use decommissioning staff as appropriate. This strategy will help retain Site knowledge and streamline decommissioning and ER integration; and
- 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 need to become familiar with RFETS technical and regulatory requirements.

## 5.6 Project Communication

**Strategy**

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

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
- ER
- Facility Operations
- H&S
- QA
- Regulatory Agencies
- Regulatory Compliance
- Stewardship and Post-Closure Monitoring
- Waste Management Program;

- Interface with 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
  - Groundwater
  - Legal
  - Planning and Integration
  - Radiological Engineering
  - Radiological Operations
  - Security
  - Site Landlord Services
  - Surface Water
  - 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.

## 5.7 Stakeholder Involvement

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

- IA Focus Group Meetings;
- The Citizens Advisory Board (CAB);
- Decontamination and Decommissioning (D&D) Focus Group Meetings;
- The Rocky Flats Water Working Group; and
- The Rocky Flats Coalition of Local Governments (RFCLOG).

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:

- IA Focus Group Meetings;
- Proposed RFCA milestones and target activities;
- PAMs, IM/IRAs, or RSOPs;
- Proposed Plan, and
- CAD/ROD.

## 6.0 Summary

The IA Strategy describes key decisions, activities, and strategies to achieve IA closure as part of the 2006 Site 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; consolidating 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.

Several IA Strategy activities will be initiated in FY00, including the following:

- Developing risk and dose assessment methodology;
- Developing DQOs;
- Developing the IASAP;
- Compiling existing data; and
- Evaluating potential ASD challenges.

***The IA Strategy will be updated annually.***

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 annual updates to this IA Strategy (to be inserted in Appendix C).

## 7.0 References

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

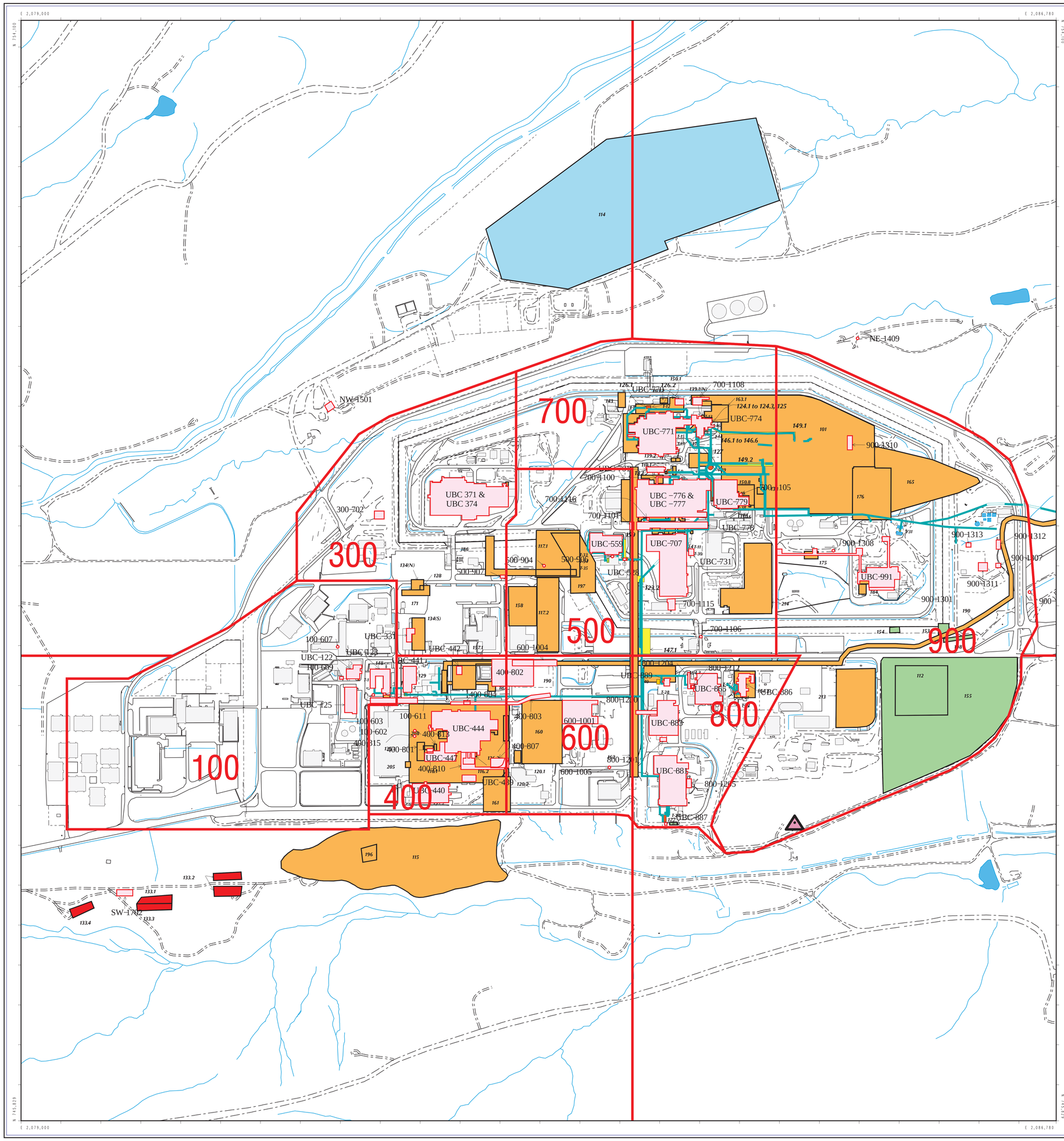
DOE, 1994, *Technical Memorandum No. 1, Addendum to the Phase I, Volume II – Pipelines, RFI/RI Work Plan Field Sampling Plan, Final Draft, Rocky*

*Flats Environmental Technology Site (Operable Unit No. 9)*, Rocky Flats Environmental Technology Site, Golden, CO.

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

EPA, 1988, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final*, EPA 540 G-89 004, OSWER Directive 9355.3-01, Office of Emergency and Remedial Response, Washington, D.C.

EPA, 1999, *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites*, OSWER Directive 9200.4-17P, Office of Solid Waste and Emergency Response, Washington, D.C.




# 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 (SEP)
- 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 RSL, 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

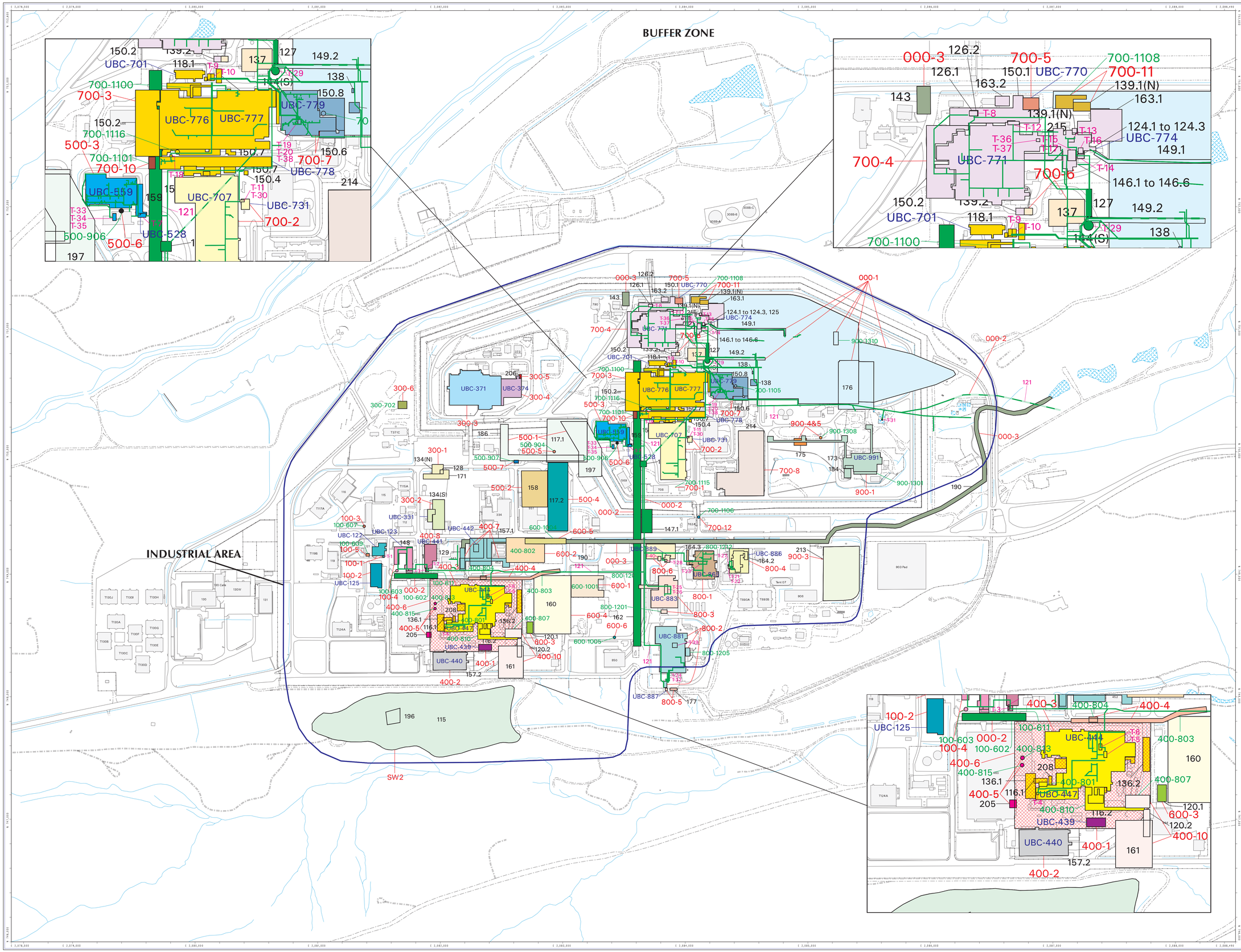
U.S. Department of Energy
Rocky Flats Environmental Technology Site

Prepared by:


**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: 99-0427
September 29, 1999




# Plate 2

## IA Strategy Groups

### EXPLANATION

**IHSS Groupings**

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

**Standard Map Features**

- Buildings and other structures
- Solar Evaporation Ponds (SEP)
- 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:***
*PAC's*
*Historical Release Report (HRR)*
*2nd Annual Update*
*Sept. 30, 1997*
*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 400ft

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: 99-0427

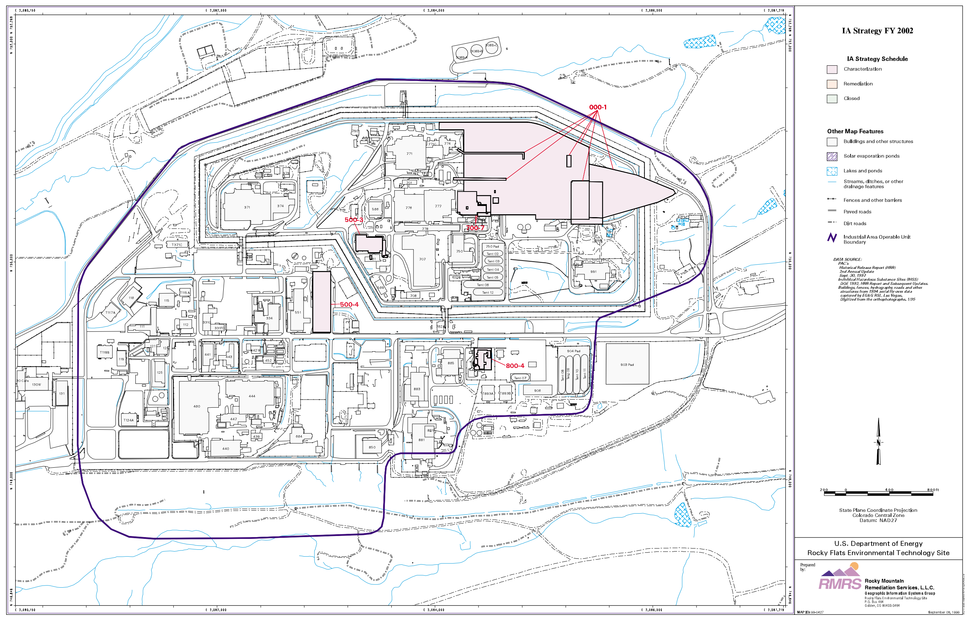
September 29, 1999

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

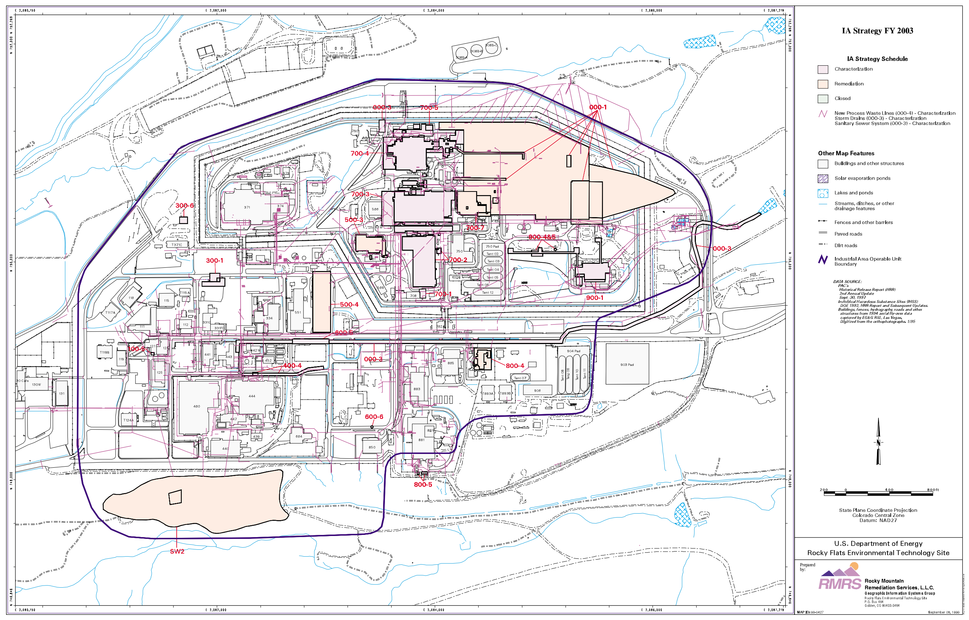
# Plate 3

# IA Strategy
# Accelerated Closure Program

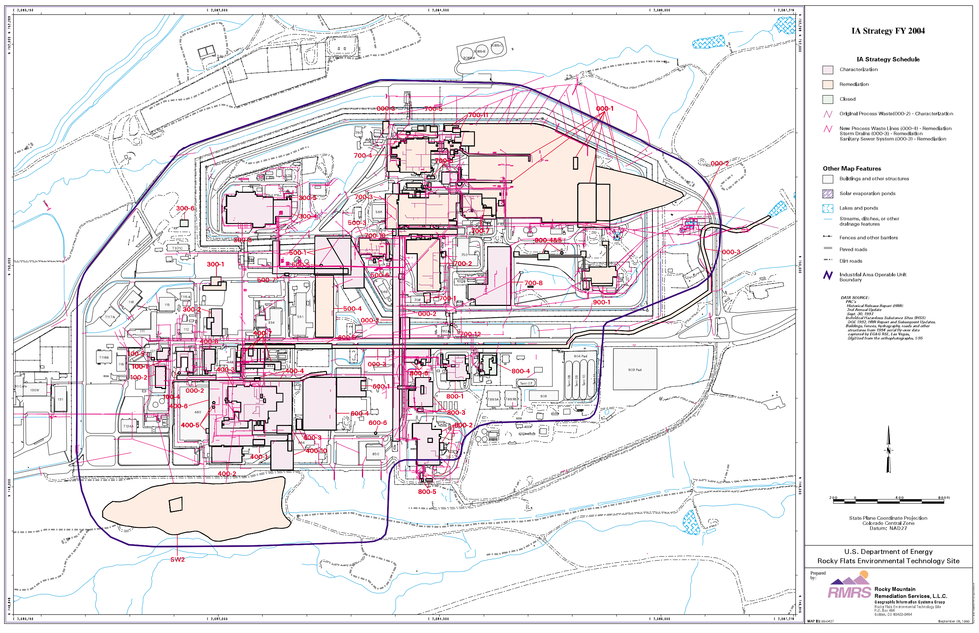
## FY 2002



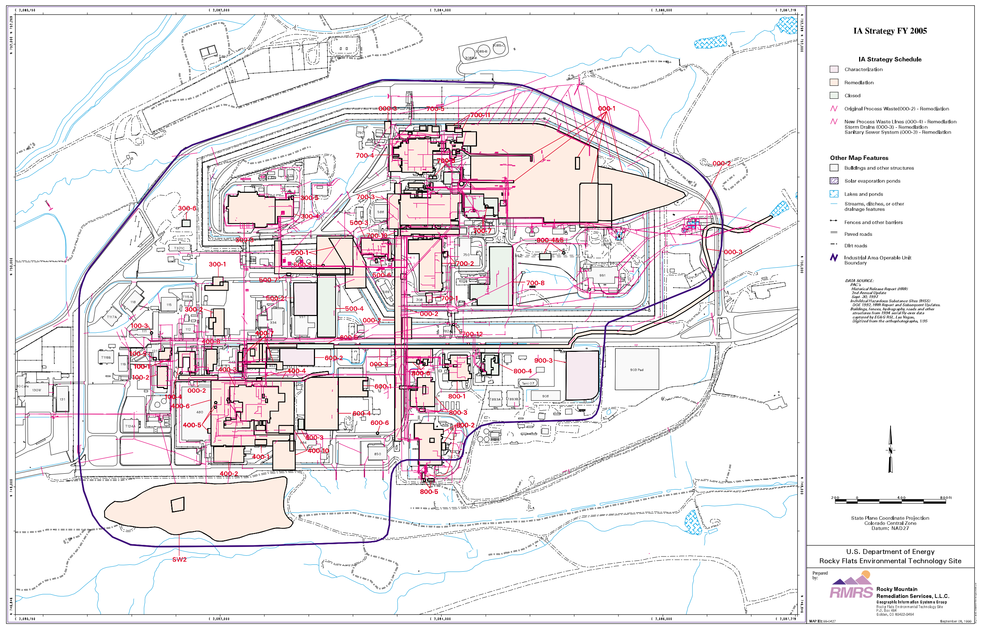

## FY 2003



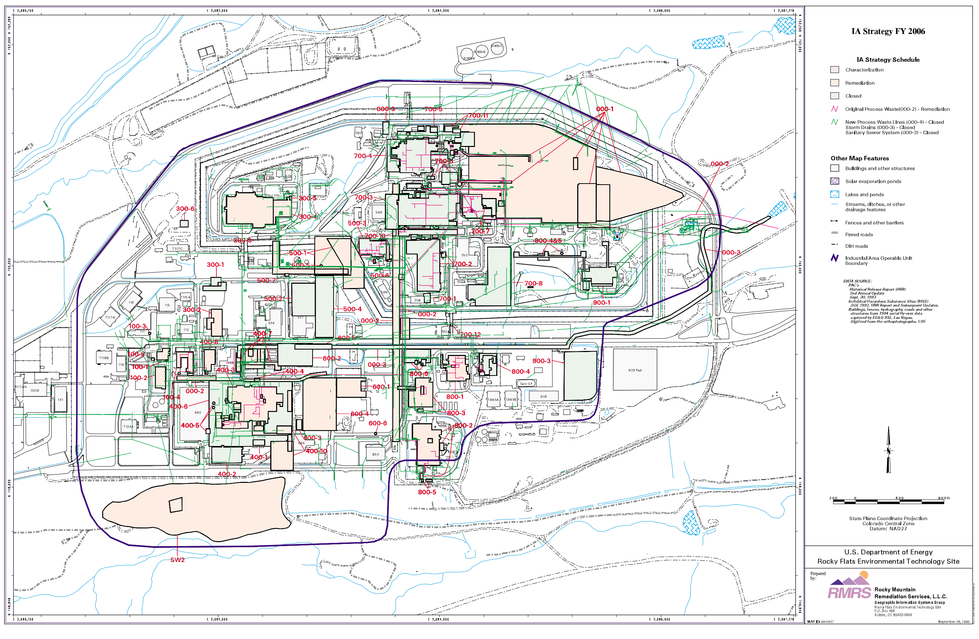

## FY 2004



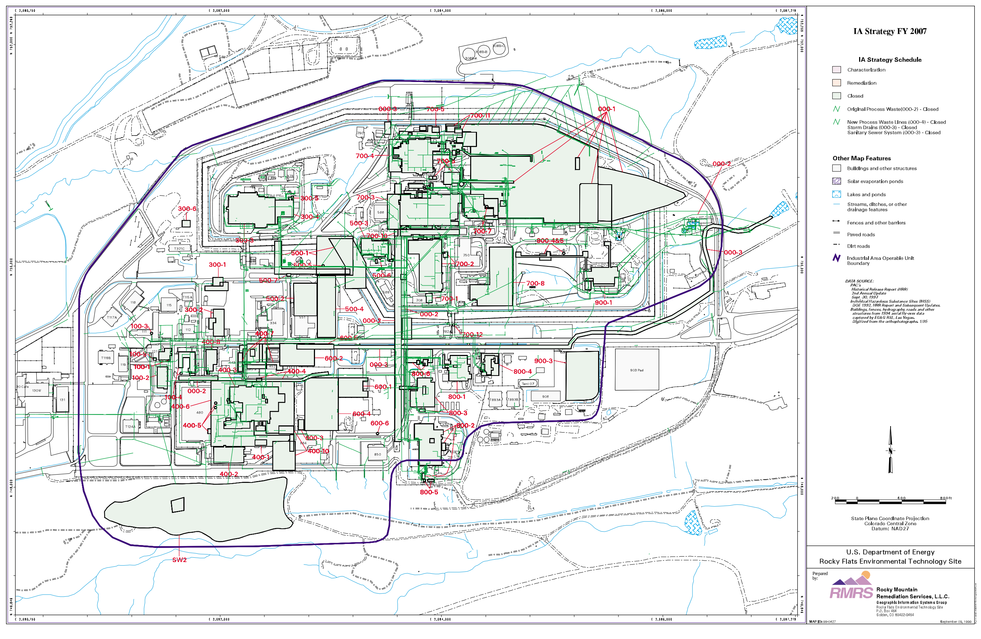

## FY 2005




## FY 2006




## FY 2007




NT_svr w:/projects/fy99/99-0427/poster.aml.aml

# 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.

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 Apri1, 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 Sites, (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, Was*te 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.

# Appendix B

# Comment Response

# Comment Response Industrial Area Characterization and Remediation Strategy

November 1999

| Comment | | Response |
|---|---|---|
| ***City of Westminster*** | | |
| **1** | Westminster has reviewed the Industrial Area Characterization and Remediation Strategy and congratulates the Department of Energy and Kaiser-Hill for the innovative approach that they have taken to address the cleanup of this highly contaminated area. The Strategy appears to be well thought out and planned. The City realizes that it is not a decision document, but rather a living document which provides a framework for the closure of the Industrial Area, and that its goal is to achieve an endstate that is protective of human health and the environment and surface water quality. However, the document does not address measures that will be taken to protect worker and community safety and protection. | Text was added to Section 1.1, page 3 and Section 4.5, page 31, and a new Section 5.1, was added to address this comment. |
| **2** | The Strategy is lacking in contingency planning. Many assumptions related to the Industrial Area cleanup are based on decisions and actions that will not occur at Rocky Flats. Key to these decisions is Savannah River's ability to receive, treat, and store the plutonium that is in building 371 at the Site, as well as provide an adequate packing can for the material. Transuranic waste removal to WIPP could also negatively impact the schedule. Westminster urges the Department of Energy to keep Congress informed as to the progress in reaching the 2006 goal in order to ensure that funding for cleanup will not dry up if assumptions in the 2006 Baseline are not realized. | The U.S. Department of Energy (DOE) Rocky Flats Field Office is cognizant of external issues that have the potential to impact the Rocky Flats Environmental Technology Site (RFETS) closure schedule. The offsite disposition of nuclear materials and remediation wastes are certainly important schedule factors. These issues are national in scope and continue to command the attention of DOE Headquarters and Congress. |
| **3** | The document has many methods for streamlining processes for regulatory approval and decision document development, and notes that many key policy decisions will be developed. The public process seems to be left out on many of the important decisions that will be made related to Industrial Area cleanup. Of the 21 items listed under the Industrial Area Decision Framework on Page 9, Stakeholder review is only listed under the final elements, which include developing a closeout report and a CAD/ROD. | Through the provisions of the Rocky Flats Cleanup Agreement (RFCA), and supported by other planning tools including the Industrial Area (IA) Characterization and Remediation Strategy (IA Strategy), DOE intends to provide the public with opportunities for timely participation in closure decisions and strategies for the IA. RFCA is explicit regarding requirements for stakeholder input to all remedial action plans prior to approval by the regulatory agencies. The Closure Project Baseline (CPB) provides for stakeholder |

| | | |
|---|---|---|
| | | review in the preparation of these documents, and stakeholder participation is implied where the documents are described in the IA Strategy. As the comment points out, the IA Strategy describes many streamlining options that will be examined, as well as policy issues that will require resolution. Just as with the IA Strategy document itself, DOE intends to involve the public in these important efforts. Opportunities for involvement will occur through forums including focus groups, the Citizens Advisory Board, the Water Working Group, and the Rocky Flats Coalition of Local Governments. |
| **4** | The Department of Energy is urged not to bypass important community and local government input in order to achieve the 2006 Accelerated Cleanup goal. Including stakeholders in the integration strategy is not sufficient. The Department of Energy is reminded that including stakeholders on the front end of decisions, rather than on the back end, results in public acceptance, and saves time and money. Westminster requests that the Rocky Flats Coordinator be allowed to observe and provide comments at the meetings of the Industrial Area Group Remediation Project teams. | See response to Comment 3. |
| **5** | See Figure 5, entitled Industrial Area Decision Framework under the section entitled Final Land Configuration. The chart does not contain a circle for the radionuclide soil action levels which are currently under review. It would seem that this important circle should be contiguous to the Actinide Migration circle. The final cleanup levels for the Industrial Area will be impacted not only by the Actinide Migration studies, but also the outcome of the current Radionuclide Soil Action Level Oversight Panel review. | Figure 5, which is Figure 4 in the final document, represents a technical decision framework. While other inputs such as policy, regulatory changes, and oversight conclusions certainly influence the direction of closure, they are assumed within the context of data inputs, activities, and decisions. RFCA Tier I and Tier II cleanup levels apply regardless of assigned values. |
| **6** | One of the strategies listed for accelerating the cleanup of the Industrial Area is to optimize sampling by only sampling once, avoiding sampling activities that do not contribute to remedial planning, and to use innovative sampling technologies where appropriate. Westminster urges the Department of | DOE does not intend to “short cut” the sampling process. However, DOE will continue to focus on maximizing the efficiency and effectiveness of the sampling process. Accordingly, DOE will develop a comprehensive sampling |

| | | |
|---|---|---|
| | Energy not to take short-cuts on remediation sampling even though we realize it is costly. Standard sampling and analysis protocols should be utilized for characterization and documentation of completed actions. | and analysis plan for the IA to minimize redundancy and ensure the quality of analytical data. The standard Data Quality Objectives (DQO) process will be used to develop the IA Sampling and Analysis Plan (SAP). This SAP will provide a standard sampling and analysis process for pre-remedial sampling and confirmatory sampling following completion of the remedial action. |
| **7** | Under the Industrial Area Strategy, section 1.2, paragraph 1, the last sentence states that 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. Westminster is under the impression that the 5-year review was required under CERCLA and would be performed. Please provide further information. | Text was corrected in Section 1.2, page 5. |
| **8** | Under the Waste Management Program section, paragraph 3, the strategy states that 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. The City of Westminster requests that it be provided an opportunity to comment on proposed new methods for the onsite treatment of wastes other than those currently in use at the site. | Onsite waste treatment methods, if applicable, as well as the storage, management, and final disposition of remediation waste must be addressed in remedial action decision documents under RFCA. These documents are subject to public review prior to approval by the regulatory agencies. |
| **9** | Section 6.3 under Remediation Strategy states that remediation options will be selected based on effectiveness in achieving remediation goals, availability and cost effectiveness. There is no mention of worker safety, downwind community or environmental protection as being one of the important considerations in the selection of remediation options. | The remediation approach in Section 6.3 (Section 4.5 in the final document) was modified to incorporate the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process for evaluating remedial actions. See response to Comment 1 regarding safety. |
| **10** | The City of Westminster does not support use of caps and covers in lieu of remediating contaminated areas. A cost benefit analysis including the cost of alternatives and the long-term cost of institutional controls associated with | Capping or covering areas of the Site, in combination with other remediation, is a potential strategy for achieving the endstate goal. As a remedial action, the decision document |

| | | |
|---|---|---|
| | all cleanup alternatives needs to be included for any remedy selection at Rocky Flats. | for a proposed cap or cover would address the cost and effectiveness of the preferred remedial action, as well as alternative actions. The analysis includes long-term considerations. |
| **11** | Decision documents under section 6.3.5 states that the potential options for streamlining the decision document process include developing an RSOP for remediation similar to the current Rocky Flats Cleanup Agreement RSOPS. The strategy further states that 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. The community was very concerned about the lack of supporting documents for the rubbleization RSOP process. In order to accelerate cleanup the public must be provided with supporting documentation and involved in decisions at the beginning of a process. Decide, disseminate and defend cleanup decisions is not an acceptable process. Remedy selection decisions need to have community and local government review and input. | DOE understands that a RFCA Standard Operating Protocol (RSOP) for remediation of the IA would be a major decision document. It is anticipated that if DOE pursues the RSOP option, significant predevelopment planning would be required. DOE intends to provide opportunity for public input in the up-front planning process. |
| **12** | Remediation strategies for the original process waste lines, new process waste line, sanitary sewer system and storm drains are to remediate contaminated soil, process lines, and other pipelines and stabilize in place those segments with contaminant concentrations below RFCA Action Levels. The Industrial Area Task Force final recommendation was that all utility and process lines be removed so that Rocky Flats was available for any future use that the community deemed appropriate. Westminster does not support leaving contaminated piping in place. | See response to Comment 42. |

| | | |
|---|---|---|
| **13** | The Industrial Area Strategy is ambitious and provides a framework to begin working on the most difficult and costly part of the cleanup of Rocky Flats. The City of Westminster considers itself as a partner with the Department of Energy for the safe, accelerated cleanup and closure of the Site and looks forward to working with you to achieve this goal. | No response is required. |
| ***Rocky Flats Citizens Advisory Board*** | | |
| **14** | The Industrial Area Characterization and Remediation Strategy (IACRS) is a document that must be finalized to meet an end of the Fiscal Year milestone. The strategy is meant to provide a roadmap to the closure of the Industrial Area. The strategy target is closure by 2006 with an endstate that is protective of human health and the environment. The site hopes to achieve this goal by maximizing cost/schedule efficiency using project integration, optimizing characterization and remediation by consolidation of contaminated sites and by minimizing waste generation. | No response is required. |
| **15** | The Industrial Area Characterization and Remediation Strategy (IACRS) states that the Data Quality Objectives for the Integrated Monitoring Plan for Rocky Flats will be used as the basis for developing the objectives for the Industrial Area Sampling and Analysis Plan (IASAP). The strategy does not provide information as to how this task will be accomplished. RFCAB requests further information from the Department of Energy as to how this will be accomplished. | The IA Strategy was modified to clarify the DQO relationship between IA remediation and the Integrated Monitoring Plan (IMP). An Environmental Restoration (ER)-IMP Special Projects team will develop the IASAP DQOs early in Fiscal Year (FY) 2000. |
| **16** | The document does not identify the IASAP as a document for which the site will seek stakeholder input. RFCAB recommends that the IASAP be distributed to stakeholders to receive their input, in addition to decision documents, RFCA Standard Operating Protocols, proposed plans, milestones, and the CAD/ROD. | DOE understands that an IASAP represents a major element of IA closure documentation. DOE intends to provide opportunity for public input in the up-front planning phase, as well as during document development. |
| **18** | RFCAB recommends that the document discuss how the site will address worker safety, downwind community protection, and environmental protection when making remedial action decisions. | See response to Comment 1. |
| **19** | Remediation technical strategies for the original process waste lines, new | See response to Comment 42. |

| | | |
|---|---|---|
| | process waste lines, sanitary sewer systems, and storm drains are to remediate contaminated soil, process lines, and other pipelines and stabilize in place those segments with contaminant concentrations below RFCA Action Levels. RFCAB recommends that the possibility of removal of all utility and process lines from the site be evaluated, as necessary, with regulator and stakeholder participation. | |
| **20** | The decision framework lists the Actinide Migration Studies, the Site Water Balance Study, and the Land Configuration Design Basis as key data inputs into decisions. RFCAB recommends that the independent review of the Soil Action Levels by the Radionuclides Soil Action Level Oversight Panel be included as a data input into the decision framework. | See response to Comment 5. |
| **21** | The strategy states that onsite treatment of waste may be considered in certain circumstances. Mixed RCRA characteristic waste may be pretreated onsite to meet the various low-level disposal facility waste acceptance criteria. RFCAB requests that it be provided an opportunity to comment on proposed new methods for the onsite treatment of wastes. | See response to Comment 8. |
| **22** | The document suggests that the site will use existing data to the maximum extent possible to cut down on characterization requirements for new samples. RFCAB recommends that the site not rely solely on historical data for the characterization of any IA group. New samples should be taken at each remediation site. | See response to Comment 6. |
| **23** | In the introduction, the document states that the CERCLA five-year reviews for the site will be conducted “as necessary” and will be included as post-closure monitoring and operations requirements in the CAD/ROD. It is the understanding of RFCAB that CERCLA requires five-year reviews for all contaminated sites with residual contamination, and would not be performed “as necessary.” RFCAB requests that the site explain the use of “as necessary” in this context. | See response to Comment 7. |
| **24** | Monitored Natural Attenuation (MNA) is suggested as the third stage to groundwater plume remediation. The Industrial Area is known to have | Section 4.5.4, pages 32 and 33 was modified to address this comment. |

| | | |
|---|---|---|
| | groundwater plumes, and it is understood by RFCAB that the site intends to install a single passive reactive barrier to treat the plumes before they become available to surface water. RFCAB also understands that the source of the contaminated plumes will be removed to reduce the continued contribution of more contaminants. And finally, what remains in the plume will be remediated using MNA. The site does not however indicate what guidelines will be used for the decisions to use MNA as a remedial action. Should the site deem MNA necessary, RFCAB recommends that the site select or create guidance on the use of MNA as a remedial option, and that the selection or creation of such guidance be open to review, comment and participation by regulators and stakeholders. | |
| **25** | The document also suggests that the site intends to assemble multi-organization IA Group Remediation Project Teams with representatives from a number of the site organizations (i.e.; the Waste Management Program, the Analytical Services Division, Procurement, and others). RFCAB recommends that the site include in those groups individuals responsible for post-closure maintenance and monitoring planning. It is important that each of the remediation plans that are developed consider the post-closure implications of the actions. An individual from the Site Technology Coordination Group should also be included to identify relevant new technologies. The use of new technologies, as they are appropriate, could help to reduce expenditures on cleanup, minimize waste generation, and accelerate schedules while also allowing greater cleanup. | The IA Strategy was modified to include the stewardship function in the project interface section. Figures 2 and 6 illustrate stewardship and other activities associated with remediation and post-closure maintenance and monitoring.<br><br>Examination of new technologies with potential advantages to the Site is an important element of the remediation strategy. Interfacing with the Site Technology Coordination Group representative, as well as staff from the DOE Office of Science and Technology, is ongoing and will continue. The IA Project Teams will rely on the Site Technology Coordination Group to keep them informed about potential new technologies. For remediations in which new or innovative technologies will be considered, a Site Technology Coordination Group member will be represented on the IA Project Team**.** Annual Updates to the IA Strategy will summarize all new-technology activities for the reporting year, as well as planned activities for the upcoming year. |

| | | |
|---|---|---|
| **26** | RFCAB also recommends that the site involve stakeholders in the meetings of the IA Group Remediation Project Teams. Just as the participation of regulators in the planning of activities will assist in the streamlining of the regulatory approval process, so too will the involvement of stakeholders throughout the planning processes assist in the streamlining of the public comment process. This attendance will allow stakeholders to view the same information as those that propose remedial actions in decision documents. | The project teams are composed of technical, regulatory and other support staff charged by DOE with the responsibility of performing the day-to-day tasks necessary to achieve closure of the Site. One of the tasks is to ensure opportunities for public participation in the decisionmaking process as described in RFCA. See the response to Comment 3 for a discussion of these opportunities. |
| ***Colorado Department of Public Health and the Environment*** | | |
| **27** | The Colorado Department of Public Health and Environment has reviewed the above document and finds it to be well written and organized. Our responses to this document are captured in general comments noted below and specific comments in the attachment to this letter. We are encouraged that RFETS is attempting to develop strategies for implementing closure of Rocky Flats by FY06, and have directed our comments to successful implementation of closure.<br><br>Our general comments fall under four topics: the data quality objectives process, the groundwater remediation strategy, use of action levels, and basis of evaluation for remediation. Concerns related to each of these topics are presented below and in the specific comments attached. | No response is required. |
| **28** | **Data Quality Objectives Process**. This draft of the strategy reflects a greater integration of the IA Strategy with the ongoing data quality objectives (DQO) process used to determine the monitoring necessary at the site. However, we are concerned that the strategy reflects the implementation of a DQO process as an additional step to be performed rather than an integral component of the strategy. As we envision this process, and believe it to be used currently, the DQO process is the vehicle for identifying and prioritizing drivers for characterization, remediation and post-remediation activities. Linkage of the drivers to characterization defines the data required for remediation decision-making, which is also the | DOE understands the DQO process and the importance of developing DQOs that serve characterization and remediation objectives, as well as pre- and post-closure requirements. DQOs for characterization and remediation of the IA will be linked to those for compliance monitoring for surface water. The drivers for characterization, remediation, and monitoring will integrate at the appropriate levels to ensure that they support the Comprehensive Risk Assessment (CRA) and the final Corrective Action Decision/Record of Decision (CAD/ROD). |

| | | |
|---|---|---|
| | basis for determining post-remediation monitoring and controls. We suggest that rather than changing specific parts of the document, CDPHE staff will emphasize this issue in the early stages of DQO implementation this fall. | |
| **29** | **Groundwater Remediation Strategy**. Section 6.4 discusses the plume remediation strategy and reflects an advanced state of decision making regarding groundwater remediation. The decisions reflected in this section need to be compiled into a coherent strategy for groundwater that can be reviewed and approved by the regulators and possibly the public. The approach reflects an understanding of the site hydrogeology that may not be substantiated until the water balance study is completed, and appears to determine specific remediation alternatives prior to identification of problems, and development and evaluation of alternatives. This information would be an appropriate appendix to the IA Strategy. | The IA Strategy does not contain decisions. DOE is aware of the current state of understanding of the hydrology of the Site, as well as the decisionmaking process for implementing remedial actions. The plume remediation strategy reflects responses to groundwater problems that have already been identified and addressed, as well as DOE's best engineering judgment based on current knowledge. As the IA Strategy describes, the plume remediation strategy is subject to modification as new information is developed. |
| **30** | **Use of Action Levels**. There is some confusion in the document about the use of Tier I and II action levels. Specific comments attached suggest the correct use of these levels: however; an additional set of action levels will be defined from those levels needed to protect surface water. We suggest that the document reflect that several action levels could be determined to apply to a given contamination problem, and that in different cases, different action levels would be the controlling driver. The DQO process will provide structure for this relationship. | Table 1 and Figure 4 were modified to correct the confusion regarding Tier I and Tier II action levels. Although it may be necessary to perform remediation beyond action levels in soil for radionuclides to protect surface water, this issue will be addressed as measurement uncertainties within the DQO process for the IASAP. Several different action levels can be addressed in the DQO process. |
| **31** | **Basis of Evaluation for Remediation**. The document concludes that the basis for evaluation of remediation alternatives will be the IHSS Groupings. While this is expected to be the case for source-driven action levels, surface water protection action levels may need to be evaluated on a watershed basis. Until the surface water action levels are defined, it would be prudent to provide some flexibility in alternative development and evaluation, specifically in areas where surface soil contamination may be a contributor to surface water. | The remediation approach in Section 4.5 was modified to incorporate the CERCLA process for evaluating remedial options. The IA Strategy does not identify grouping of individual hazardous substance sites (IHSSs) as a basis for evaluation of remedial alternatives. Rather, grouping of IHSSs, potential areas of concern (PACs), and under building contamination (UBC) sites acknowledges the influence of the decommissioning effort on remediation of the IA. Release sites are grouped to facilitate and enhance |

| | | |
|---|---|---|
| | | scheduling, decisionmaking, characterization and remediation. Grouping of release sites does not preclude evaluation of other factors such as surface water protection that might influence development of remedial alternatives. |
| **32** | Table 1 (page 10) This table identifies "characterize IA Groups" as a framework element. As stated in Section 6.2, another characterization requirement is to provide data for the CRA, which may become the driver for much of any additional sampling. | Requirements for characterization of areas outside IA Groups will be addressed within the DQO process for the IASAP. |
| **33** | Table 1 (pages 9-12) The responsibilities for the following framework elements should be modified since all three documents require agency approval:<br>• Develop IA DQOs and SAP — DOE with Regulatory Agency Approval<br>• Develop Closeout Report — DOE with Regulatory Agency Approval and Stakeholder Review<br>• Develop CAD/ROD — DOE with Regulatory Agency Approval and Stakeholder Review | Text was modified as suggested in Table 1, pages 9 – 12 to address this comment. |
| **34** | Table 1 (Page 10) The framework element, "Are PCOCs>RFCA Tier I values?, should be revised to state, "Compare PCOCs to RFCA action levels." The second column could state, "Exposure areas with PCOCs>Tier I values will trigger an action decision. Exposure areas with PCOCs<Tier II values will trigger the NFA process. Exposure areas with PCOCs<Tier I and >Tier II values will be evaluated for potential action decisions." NFA justification for exposure areas below Tier II levels is mentioned in Section 6.3.1, but is ignored in this table. This table implies that no actions are required for areas below Tier I levels when in fact, RFCA specifies requirements for Tier II exceedences. | Text was modified as suggested in Table 1, page 10, to address this comment. |
| **35** | Figure 5 (page 8) The concepts mentioned in Comment # 2 also need to be captured in the flow diagram in Figure 5. This diagram should also include a box labeled, "Post-Closure Activities" below or in place of the "IA Closure | Text was modified as suggested in Figure 4, page 8, to address this comment. |

| | | |
|---|---|---|
| | Complete" box. This could also be added as a final framework in Table 1. | |
| **36** | Table 1 (page 11) The final framework element, "Develop CAD/ROD," should state that, "The CAD/ROD will describe closure and post-closure activities of the IA and the Site,…." | Text was modified as suggested in Table 1, page 12, to address this comment. |
| **37** | Section 3.1 (page 14) The No-Further-Action justification process should be identified as a "requirement of the RFCA process". | Text was modified as suggested in Section 3.1, page 13, to address this comment. |
| **38** | Section 3.2 (page 14) The statement referring to the 78 acres identified on Figure 6 as industrial use is accurate, but is inconsistent with the recent decision by the RFCA Project Coordinators. That decision should be documented and reference here. | Text was modified in Section 3.2, page 13, to address this comment. |
| **39** | Section 6.3 (page 39) Three remediation selection criteria are stated here. It would be more appropriate to include CERCLA's 9 Evaluation Criteria for Analysis of Remedial Alternatives. | Text was modified as suggested in Section 4.5, page 31, to address this comment. |
| **40** | Section 6.3.3 (page 40) The last paragraph in this section should state that the decision to cap or cover parts of the IA will include consideration of the need for perpetual maintenance. | Text was modified as suggested in Section 4.5.3, page 32, to address this comment. |
| **41** | Section 6.2.4 (page 40) The final sentence in the third paragraph in this section presupposes the remedy for the IA plume complex. As stated in the previous sentence, the data to support a remedy selection are not yet available (or at least has not been presented to the regulatory agencies). It is also preliminary to assume that a single reactive barrier will suffice to remediate a complex plume that appears to be heading in several different directions. | Section 4.5.4, pages 32 and 33 was modified to address this comment. |
| **42** | Section 6.4 (page 46) This section mentions employing "innovative sampling and remediation technologies" to address the underground pipeline systems. Removing most or all of this piping seems to be a much more efficient and cost-effective plan. Once the pipes are removed, efforts can focus on characterizing the fill material in the utility corridors and assessing this material's potential to serve as future pathways for contaminated groundwater. This strategy is also consistent with the concept of leaving the | DOE will continue to examine innovative sampling and remediation technologies that have the potential to enhance achievement of remediation goals in the most cost-effective manner. There is no evidence at this time that removal of most or all of the tens of thousands of feet of pipeline is necessary to achieve an endstate that is protective of human health and the environment. Also, there is no evidence that |

| | | |
|---|---|---|
| | Site available for the most future uses possible. | removal of most or all of the pipelines is a more efficient and cost-effective plan. If substantiated by future information, removal of most or all underground pipelines (original process waste lines [OPWL], new process waste lines [NPWL], storm drains, and sanitary sewers) as a remediation strategy is not precluded. See the response to Comment 53 regarding future uses. |
| **43** | Section 6.4.2 (page 52) Modify the sixth bullet to state, "Basements <u>or foundations</u> below the water table <u>or top of bedrock</u>,". | Text was modified as suggested in Section 4.6.2, page 44, to address this comment. |
| **44** | Section 6.5.4 (page 54) This section should include the idea that an accurate and complete data base must be maintained beyond the CAD/ROD for post-closure activities. | Text was modified in Section 4.7.4, page 47, to address this comment. |
| Additional Comments – CDPHE | | |
| **45** | Section 4.2 (page 17) The 2nd paragraph in this section states that, "the exposure scenarios evaluated will include the residential exposure scenario." This implies that the CRA will include a residential scenario along with industrial and open space scenarios. This statement should be explained to clarify whether DOE intends to use CRA to justify unrestricted release of portions of the Site. | Text was modified in Sections 4.3, page 26; and 4.3.2, page 27 to address this comment. |
| **46** | Section 5.1 9 (page 19) Because the D&D activities described in this section will involve contact with soils, the timing and frequency of soil sampling must be sufficient to adequately protect the workers. This sampling must also adequately characterize excavated soils that may be moved during D&D activities. | Sampling required to ensure worker or community safety at and near decommissioning projects is assessed in two ways: (1) the project-specific health and safety plan that describes potential site hazards and mitigation measures; and (2) the readiness review process, which includes management and independent review of the project before it is implemented. Additionally, sampling will be conducted as part of IA Group characterization. |
| **47** | Section 6.2 (p.38) The list of elements in the IASAP includes QA, but should also include "QC". Unvalidated data has been a problem in the past and should be specifically addressed in the IASAP. | Text was modified as suggested in Section 4.4, page 30 to address this comment. |

| | | |
|---|---|---|
| **48** | Section 6.4.1 (page 51) The groundwater study, to be completed in 2002, will provide important information to help determine migration pathways and contaminant migration pathways and contaminant migration direction. This study should be included in the discussion of potential strategies. | Text was modified in Section 4.6.1, page 43 to address this comment. |
| **49** | Section 6.4.2 "Storm drains/foundation drains" are left out of the 4th sentence of the first paragraph (p.51) and the 4th sentence of the 2nd paragraph (p.52). | Text was modified as suggested in Section 4.6.2, page 44, and 45 to address this comment. |
| ***City of Broomfield*** | | |
| **50** | The City of Broomfield appreciates the opportunity to review and comment on the Draft Industrial Area Characterization and Remediation Strategy (IA Strategy). A number of the assumptions contained in the strategy do not yet have regulator or stakeholder buy-in for various reasons. What is the process by which assumptions become decisions? How can Broomfield be involved in that process? As the site develops these assumptions and provides the details necessary to fully evaluate the planned activities, the City of Broomfield expects that the IA Strategy will be modified as necessary to incorporate the needs and concerns of the community. | The IA Strategy does not contain explicit assumptions. However, the IA Strategy is reflected in the CPB that does contain Site assumptions that address the spectrum of closure activities. Rather than these Site assumptions becoming decisions, assumptions influence the evolution of strategies into closure actions by means of the RFCA decisionmaking process. As DOE implements the IA Strategy, opportunity for public input to the decisionmaking process will be provided. See the response to Comment 3 for further discussion. The IA Strategy will be modified as necessary to reflect changes implemented through RFCA processes including public participation. Closure actions pursuant to the IA Strategy as well as modifications, will be summarized and issued as annual updates to be inserted in Appendix C of the document. |
| **51** | The IA Strategy states that some streamlining of the review process is needed in order to meet the accelerated cleanup schedule. The City of Broomfield is concerned that this will compromise the public's ability to provide meaningful review and comment. For example, even though the City of Broomfield specifically requested the customary 45-day comment period for review of this draft IA Strategy, DOE was only able to provide a 30-day comment period due to their obligation to meet a regulatory milestone. This places a substantial burden on local governments, RFCLOG, | See response to Comment 3. |

| | | |
|---|---|---|
| | and stakeholders. In most cases, it does not allow entities, especially those with a board or council, to adequately review and comment on these important documents. Broomfield believes that this compromises meaningful public involvement and violates the intent of paragraph 281 of the Rocky Flats Cleanup Agreement (RFCA). Allowing community representatives to attend and provide comments during development meetings for the various IA Strategy-related documents would allow for the community's concerns to be evaluated and incorporated earlier in the decision-making process, thus streamlining the review process. The public must continue to be involved, informed, and allowed to participate in the revisions to the IA Strategy as it is updated. | |
| **52** | 3.1 Site Closure<br>Broomfield believes that specific requirements of the RFCA closure process must also include:<br>• Removal of all hazardous and radioactive wastes from the site.<br>• No long-term burial of hazardous and radioactive waste of any kind at the site.<br>• No exceedance of water quality standards off the site, and no exceedances on site after closure. | As expressed in RFCA Attachment 9, DOE expects to reach a closure endstate that generally achieves the goals of the Rocky Flats Vision. The Vision and the main body of RFCA address the disposition of waste and protection of water quality. The RFCA provisions and processes, including public participation, will be applied to develop specific decisions related to these important items. |
| **53** | 3.2 Future Land Use<br>The City of Broomfield is concerned about the final end state of the Industrial Area and Buffer Zone at the Rocky Flats Environmental Technology Site (RFETS). Due to the large degree of uncertainty regarding the ability of engineering and institutional controls to prevent future generations from inadvertently becoming exposed to residual contamination at the site, the site must be cleaned up to be protective of all uses. RFCA and the IA Strategy must be fundamentally revised from the current cleanup goal of supporting limited industrial and open space uses to the community's cleanup goal of all uses. The current plan of leaving contaminated soils in place and designating up to 2,000 acres as "restricted use open space" is not | DOE recognizes that future land use for the Site requires additional consultation with stakeholders. The IA Strategy was modified (Figure 4 and Section 3.2) to indicate this recognition. |

| | | |
|---|---|---|
| | acceptable. The continued migration of plutonium to adjacent off-site properties and the community is not an acceptable remediation endstate. | |
| **54** | 4.0 Dose and Risk Assessment Strategy<br>The City of Broomfield can not support eliminating the Industrial Area and Buffer Zone baseline risk assessments since no justification to eliminate them has been provided. How can risk reduction be measured with no baseline to compare it with? | In a traditional CERCLA approach, baseline risk assessments are performed as part of the Resource Conservation and Recovery Act (RCRA) Facility Investigation/Remedial Investigation (RFI/RI) prior to initiation of remedial action. Under the RFCA approach at RFETS, all remediation is performed as accelerated actions prior to the RFI/RI. Action levels, which are related to risk, are mediated by consideration of surface water protection to form the basis for action. The modified RFI/RI, prepared after all remedial actions are completed, will contain a comprehensive risk assessment that measures the effectiveness of the actions. |
| **55** | 4.3 Data Quality Objectives<br>The IA Strategy states that Data Quality Objectives (DQOs) will be the basis of the IA Sampling and Analysis Plan (IASAP). The IASAP is a document that will have a major impact on how the IA is characterized, but is not listed as one of the documents that will be made available for public review and comment. The City of Broomfield believes that a document of this importance should at a minimum, be subject to public review and comment. Furthermore, Broomfield believes that this process could be streamlined by involving stakeholders in the development of the DQOs and IASAP. | See response to Comment 16. |
| **56** | 5.2.1 Waste Management<br>Current plans show that the majority of waste will be generated during FY05 and FY06 (figure 9). This plan seems to increase the likelihood that waste could be stored onsite after 2006. Broomfield believes that the final CAD/ROD for the site should not be adopted until all waste has been removed from the site. | Both RFCA and the 2006 CPB assume that all waste will be removed from the Site. However, it is recognized that waste disposal facilities are not currently available for some RFETS wastes. Although DOE and the RFCA Parties are and will continue to jointly pursue identification of disposal facilities for RFETS waste, it is possible that receiver sites for all waste will not be identified prior to completion of all |

| | | |
|---|---|---|
| | | required response actions. If this occurs, waste without a receiver site will be stored at RFETS until such time as a site is identified. If waste is left onsite, the final CAD/ROD will address this condition and state that waste will be removed offsite for disposal when an appropriate facility becomes available. |
| **57** | 5.3 Stakeholder Involvement<br>The inclusion of stakeholders in the meetings of the IA Group Remediation Project Teams would help streamline the public comment process by allowing stakeholders the opportunity to obtain relevant information and buy-in before decisions are finalized. Development of the detailed documents referenced by the IA Strategy and revisions to the IA Strategy should be made by a Working Group which includes representatives from each of the local governments. | See responses to Comments 3 and 25. |
| **58** | 6.2 Characterization Strategy<br>The characterization strategy is very brief and makes providing detailed comments difficult at this time. Apparently the details regarding how the Industrial Area will be characterized will be provided later in the IA Sampling and Analysis Plan (IASAP). Issues such as how under-building foundation contamination will be detected and remediated remain major topics of discussion but have not been addressed here. Broomfield requests that stakeholders have an opportunity to review and comment on the IASAP. | See response to Comment 16. |
| **59** | 6.3 Remediation Strategy<br>Protective soil action levels must be established to prevent any additional airborne contamination from migrating offsite. The City of Broomfield expects that once the RSAL review has been completed that the results will be formalized in the ALF of RFCA. Cleanups should be conducted in such a way that does not constrain future cleanup efforts if soil action levels are lowered or new technology becomes available. | DOE's current remediation strategy does not constrain future cleanup options. |
| **60** | The City of Broomfield supports the IA Strategy of removing contaminated | All RFETS remediation wastes are disposed at appropriately |

| | | |
|---|---|---|
| | soils for immediate off-site disposal. Contaminated soils should only be placed in permitted radiological waste facilities. | permitted facilities. |
| **61** | The City of Broomfield can not support the use of caps or covers at this time because DOE has not yet developed much of the information needed to make decisions regarding the use of caps at the site. The City of Broomfield needs more information from DOE regarding: (1) the situations in which caps or covers will be considered, (2) the design criteria for caps and covers, and (3) the anticipated operation and maintenance requirements. | As Section 4.5.3 of the IA Strategy points out, the decision to employ a cap(s) or cover(s) in the IA has not been made. As the comment correctly points out, there is insufficient information at this time to make that decision. The Solar Evaporation Ponds in the IA is a RCRA unit, and is mandated under RFCA to be closed by means of capping. DOE believes that a cap or cover, in combination with other remediation, is a potential strategy for the 700 Area. Section 4.5.3 describes the information still required before a decision and/or conceptual design can be considered for either project. |
| **62** | Monitored natural attenuation is planned as the remedial method for contaminated groundwater that poses no threat to surface water. USEPA natural attenuation guidance has additional requirements that have not been provided in the IA Strategy. One of the major elements of the USEPA program that is not included in the IA Strategy is that ongoing groundwater monitoring must demonstrate that contaminant levels in the groundwater are decreasing. During development and release of the monitored natural attenuation guidance, USEPA stressed that to get public acceptance for just monitoring groundwater and not conducting cleanup activities, entities must demonstrate that groundwater cleanup goals would still be achieved in a reasonable amount of time. USEPA stated that a "reasonable amount of time" would be approximately the same amount of time that it would take for a more active remedial approach to achieve cleanup. Have all of the elements of DOE's Monitored Natural Attenuation program been provided in the IA Strategy? | Section 4.5.4, pages 32 and 33 was modified to address this comment. |
| **63** | The majority of remediation activities will occur after most buildings have been dismantled. Remediation activities are planned for FY04, FY05, and | DOE and RFETS contractors understand the resource challenges that will be faced over the next several years, and |

| | | |
|---|---|---|
| | FY06 as shown in the Decision Document Schedule (Figure 11). Delaying the majority of remediation until the last 3 years of the project may place an enormous burden on available resources including qualified personnel, equipment, and transportation. How has DOE addressed these issues? Is there a document that outlines this information. Broomfield would like to request a copy of this information. | are formulating plans to address this issue. |
| **64** | 6.4 Remediation Challenges<br>The City does not support the IA Strategy of stabilizing non-contaminated buried pipes in place. All buried utilities should be removed. Even if the pipes content are not contaminated, the pipes themselves can act as conduits for groundwater and contaminant migration. The City of Broomfield does not support the IA Strategy to not determine the integrity and location of each leak along each pipeline. Broomfield could support this strategy if all piping is uncovered, screened for contamination, and removed. Then leak detection becomes irrelevant. | See response to Comment 42. |
| **65** | Although Under Building Contamination has a designated sub-section under the Remediation Challenges section, this information should have been provided in the Characterization Strategy section and there is no discussion on potential remediation approaches. There is no UBC remediation information to comment on at this time. Broomfield requests that stakeholders have an opportunity to review and comment on the UBC remediation plans as the information becomes available. | The title of Section 6.4 (Section 4.6 in the final document) was changed to Characterization and Remediation Challenges. UBC sites primarily present a characterization challenge, which is why detail regarding the integration of characterization with the decommissioning effort is included. The Characterization Approach (Section 4.4) confines discussion to the planned overall strategy for IA characterization with a focus on cost effectiveness in support of remediation goals. Remediation of UBC sites is a strategic issue related to cost, schedule and health and safety. The IA Strategy acknowledges this issue in the various narratives, figures, and plates that demonstrate the integration of remediation with the decommissioning effort. UBC site remediation planning will be a component of the decision documents for their respective IA Groups. |

| | | |
|---|---|---|
| **65** | 6.5 Data Management<br>The City of Broomfield supports the integration of all analytical data into a common platform as long as existing information is not compromised. The proposed common platform is intended to allow the integration of information among decommissioning, ER and other Site organizations. | Integration of all analytical data will not compromise existing information. |
| **66** | Thank you for the opportunity to comment on this important document. The City of Broomfield expects that we will continue to be involved, informed, and allowed to participate in the revisions to the IA Strategy as it is updated annually. | No response is required. |