

**A Working Group
Product of**

RF/ER-96-0037

**Broomfield
CDPHE
DOE
EPA
Kaiser-Hill
Northglenn
RMRS
Thornton
Westminster**

**Integrated Water Management Plan
for the Rocky Flats
Environmental Technology Site**

Final



August 1996

**DOCUMENT CLASSIFICATION
REVIEW WAIVER PER
CLASSIFICATION OFFICE**

A-SW-002283

RF/ER-96-0037

**FINAL
1996**

**Integrated Water Management Plan
for the
Rocky Flats Environmental Technology Site**

A Working Group of

City of Broomfield

City of Northglenn

City of Thornton

City of Westminster

Colorado Department of Public Health and Environment

Department of Energy

Environmental Protection Agency, Region VIII

Kaiser-Hill

Rocky Mountain Remediation Services

August 1996

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	Water Management Vision	1
1.2	Evolution of Plan	2
1.3	Roles and Responsibilities	2
	1.3.1 DOE and Site Contractor	3
	1.3.2 EPA and CDPHE	3
	1.3.3 Downstream Municipal Water Users	4
1.4	Action Level and Standards Framework	5
2.0	WATER MANAGEMENT AT RFETS	5
2.1	Key Components of Effective RFETS Water Management	5
2.2	Water Management Activities	5
2.3	Water Management by Geographic Area	6
3.0	IDENTIFICATION OF UNRESOLVED ISSUES	6
4.0	IMPORTANT NEAR-TERM WATER MANAGEMENT ACTIVITIES	7
	References	11
	Appendix A – Abbreviations and Acronyms	A-1
	Appendix B – Description of Water Management Plans and Strategies	B-1

FIGURES

Figure 1	Key Components of Effective of RFETS Water Management	13
Figure 2	RFETS Water Management by Programs	14
Figure 2A.1	Water Management by Locations	15
Figure 2A.2	Water Management Programs by Location	16

TABLES

Table 1	Relationship of Ongoing Water Management Programs	17
Table 2	Interaction of Water Management Activities/Information	20

1.0 INTRODUCTION

The Department of Energy (DOE), the Environmental Protection Agency (EPA), and the Colorado Department of Health and Environment (CDPHE) negotiated the Rocky Flats Cleanup Agreement (RFCA) to guide the cleanup of the Rocky Flats Environmental Technology Site (RFETS or the Site). As part of the RFCA (Appendix 5), a Surface Water and Groundwater Working Group (Group) was created and tasked to develop an Integrated Water Management Plan. The Group is composed of representatives from the DOE, EPA, CDPHE, Kaiser-Hill (K-H), Rocky Mountain Remediation Services (RMRS) and the Cities of Broomfield, Northglenn, Thornton, and Westminster. The purpose of the Integrated Water Management Plan (as stated in the RFCA, Appendix 5), is to develop consensus recommendations to the decision-makers regarding decisions and actions related to water quality at, or downstream of RFETS.

The IWMP is organized into the following sections: Section 1.0, Introduction, presents the overall objectives of the Group and the Water Management Vision; Section 2.0, Water Management at RFETS, provides a model for water management, outlines the current water management plans and strategies, and summarizes plans by source area; Section 3.0, Identification of Information Needs, identifies unresolved issues related to water management; Section 4.0, Near-Term Water Management Activities, provides an outline for implementing each management action that is presented in the model.

Appendix A provides an acronym list for this document. Appendix B provides a summary of each water management plan or program at the Site.

1.1 WATER MANAGEMENT VISION

In keeping with the spirit of the RFCA Preamble and the Rocky Flats Vision, the Group developed a Water Management Vision to guide this IWMP. The RFCA Vision states that the quality of water supplies of the communities surrounding Rocky Flats will be protected and that the water leaving the Site after cleanup activities have been completed will be acceptable for any use. To support this goal, the Group agreed that this IWMP should:

- Identify the actions necessary to protect water quality and the watershed and recommend programmatic activities to effectively manage water resources at RFETS.
- Provide a comprehensive management tool to implement DOE's long-term commitment for protecting water and related ecological resources.
- Provide an integrated response to existing and evolving cleanup and Site closure activities and establish a management linkage between modifications to cleanup plans, Site closure activities, and overall water management activities.
- Maintain and guide a long-term partnership between local governments, DOE, EPA, CDPHE, and the site contractor and establish a management tool providing an iterative and responsive process for interagency water management planning at and downstream from RFETS.

- Protect the quality of surface water leaving the Site so that downstream water quality will meet standards for aquatic life, recreation, and agricultural uses during active remediation and any use following completion of active remediation.
- Promote pollution prevention, water conservation, and innovative treatment technologies in water management at RFETS.
- Promote reliable controls and monitoring to protect water quality during cleanup, decontamination and decommissioning (D&D) activities, and long-term storage of radioactive materials.
- Work towards a long-term and fully protective program for passive and natural flow conditions.
- Encourage a long-term water-use strategy in regard to anticipated diminished flows and impact to ecological resources.
- Encourage protection of surface water and ecological resources as key elements of soil and groundwater cleanup.
- Support compliance with the requirement that onsite groundwater not be used for any purpose unrelated to Site cleanup activities, as stated in the Preamble to the RFCA.
- Promote institutional controls necessary to protect water uses.

1.2 EVOLUTION OF THE PLAN

For the IWMP to effectively meet the changing needs of RFETS as site closure activities proceed, it must evolve with the Site. As a result, the Working Group recommends that the IWMP be updated annually, as needed, until site closure activities have been finalized. This will facilitate stakeholder involvement in changes to water management programs and also allow input to prioritization issues that affect water management and quality.

1.3 ROLES AND RESPONSIBILITIES

Because water management at RFETS affects the entire watershed (Big Dry Creek Basin) and is guided by a number of different operational plans and regulatory requirements, many different agencies share a role in water management. These agencies include DOE and the RFETS site contractor, EPA and CDPHE, and downstream water users (including the Cities of Broomfield, Northglenn, Thornton and Westminster). The Group (which includes members from the Agencies and downstream water users) will strive for consensus recommendations to the decision-makers regarding any decisions and actions related to water quality at, or impacted by, RFETS as specified in Appendix 5 of RFCA. The group has included among these decisions a consensus proposal on use classifications and water quality standards to submit to the Colorado Water Quality Control Commission (CWQCC) by August, 1996. As part of developing this IWMP, each agency identified a list of their roles and responsibilities as related to water management at RFETS. These roles and responsibilities are presented below.

1.3.1 DOE and Site Contractor

- Perform plutonium stabilization, environmental restoration, and D&D activities in accordance with RFCA and the Vision.
- Plan and conduct cleanup activities to accomplish the goals of RFCA and the Vision and subsequently reduce Site risk.
- Consult with agencies and downstream water users regarding major operational changes in accordance with procedures and protocols.
- Manage emergency operations and promote timely communication with downstream water users in accordance with procedures and protocols.
- Accomplish agreed-upon data quality objectives (DQOs) and provide timely and efficient data distribution to stakeholders for project-specific and environmental monitoring activities.
- Provide cost-effective water management operations at RFETS consistent with the requirements of the RFCA and other applicable regulations.
- Evaluate impacts of water management changes on ecological resources.
- Prepare plans and reports, complete projects in accordance with approved schedules.
- Maintain and enhance an open relationship between downstream water users and RFETS.
- Determine and communicate adequate funding requirements to support water management at RFETS.
- Coordinate watershed improvements and pond operation programs.

1.3.2 EPA and CDPHE

- Perform environmental monitoring, evaluate, and publish the results.
- Evaluate periodic monitoring reports (surface water and groundwater) against Action Levels and Standards Framework (ALF) for Surface Water, Ground Water, and Soils action levels, and NPDES permit requirements, and identify trends and the need to evaluate sources and actions.
- Work with DOE to scope and execute additional source investigations as required.
- Recommend and evaluate changes to monitoring programs when and as required.

- Review and approve required decision documents for early actions and remedial actions.
- Perform field oversight during conduct of actions to determine compliance with Decision Documents and applicable regulations.
- Provide oversight of operation/alteration/shutdown of existing groundwater control/treatment systems and any future systems.
- Oversee sitewide groundwater compliance and remedial action modeling.
- Initiate compliance activities if groundwater agreements to protect surface water are exceeded.
- Stormwater – Evaluate event-related monitoring data from the Industrial Area (IA) perimeter and points in drainages above terminal ponds against ALF. Make determinations on required actions and work with DOE to implement them.
- Pond Operations – Approve an acceptable Pond Operations Plan. Oversee the implementation of the plan and participate in pond discharge approvals and monitoring.
- Wastewater and stormwater – Reissue, administer and enforce NPDES permit.
- Administer wetlands banking agreement and make determinations of required mitigation efforts.
- Oversee ecological characterization, habitat enhancement, and restoration work.
- Provide regulatory and nonregulatory technical review and assist in the development of standards and applicable or relevant and appropriate requirements (ARAR) determinations.
- Collaborate with the downstream water users and the public to enhance interaction with DOE.
- EPA, under the interagency cooperation responsibilities for the Endangered Species Act, will need to consult with the U.S. Fish and Wildlife Service on the modifications to the reissued NPDES permit on effects to ecological resources.

1.3.3 Downstream Municipal Water Users

- Communicate with DOE regarding existing and anticipated changes to downstream municipal water quantity and quality programs which may be inconsistent with upstream operations and uses.
- Communicate with DOE regarding concerns they may have about proposed changes to

RFETS that may impact the planning for, or operation of, water management facilities owned or controlled by the users.

- Co-develop and implement emergency response procedures and notification protocols related to nonroutine events affecting downstream water quality.
- According to the language in the draft RFCA, municipal water users have a shared responsibility with DOE and other parties to develop consensus-based changes to water quality standards to the extent possible for consideration by the CWQCC.

1.4 ACTION LEVELS AND STANDARDS FRAMEWORK

ALF sets up the process of evaluating and protecting water quality at the Site. The ALF is included in Attachment 5 of RFCA.

2.0 WATER MANAGEMENT AT RFETS

The objective of this section is to familiarize the reader with current RFETS water management operations. First, an overview of water management is presented in the form of a conceptual model. This model identifies the overall strategy of water management at RFETS. Then, an identification of the current water management programs and strategies is presented to familiarize the reader with the different water management plans/programs at RFETS. Finally, a cross-reference of each management plan to the water management subject area is given.

2.1 KEY COMPONENTS OF EFFECTIVE RFETS WATER MANAGEMENT

One purpose of the IWMP is to communicate to the stakeholders decisions and actions related to water quality at, or impacted by, RFETS. This is achieved by identifying and promoting implementation of water management actions. Management actions critical to water management at RFETS are presented in Figure 1, *Key Components of Effective Water Management*, (page 13). As illustrated in Figure 1, the overall goal of water management at RFETS is to protect human health and ecological resources through the implementation of a variety of management actions.

2.2 WATER MANAGEMENT ACTIVITIES

Each management action presented in Figure 1 is related to one or more of four water management groups at RFETS as illustrated in Figure 2 (page 14). These four groups are:

- Surface Water
- Groundwater
- Wastewater Treatment
- Site Closure Activities

Integrated water monitoring is an activity within each of these groups. Each of these groups is responsible for a number of different water management activities. As an example, the Surface Water group is responsible for the following: NPDES Discharge and Stormwater Permit; Pond Operations; Future Water Use Projections; and Downstream Water User's Plans. Appendix B presents the content and purpose of each plan outlined in Figure 2.

2.3 WATER MANAGEMENT BY GEOGRAPHIC AREA

To facilitate the understanding of water management practices at RFETS, a breakdown of water management actions by geographic area is presented in Figures 2A.1 and 2A.2. These figures present water management activities from upstream sources to downstream discharge points. These areas are: Industrial Area, Pond Area, Boundary Area, and Impacted Downstream Areas. Table 1 provides a cross reference of each water management plan to the water management subject area.

3.0 IDENTIFICATION OF UNRESOLVED ISSUES

The working group has identified and is continuing to resolve the following issues:

- **Issue No. 1:** Controlled Detention — Should the Site use controlled detention during the cleanup phase?

A controlled detention mode of surface water discharge is being considered at RFETS. Surface water is currently discharged from the Site in a batch-and-release mode using Ponds A-4, B-5 and C-2. Flows in and out of an individual pond, generally Pond A-4, are shut off, thereby isolating the pond's water from the rest of the pond network. A sample of the water is collected and, if sample results indicate water quality standards and goals are met, the "batch" of water is pumped out of the pond to a stream that flows off the Site. DOE envisions a future water management mode that will discharge to the individual creeks below the ponds and employ outlet works at all terminal ponds. This controlled detention water management at the Site is proposed in the draft Pond Operations Plan (POP) which focuses upon integrating operations with Option-B water-supply protection projects being completed downstream of the Site. Under controlled detention a pond would be configured to have water flowing into the pond at the same time that water is flowing out of the pond and off the Site. The inflow and outflow rates will be controlled to achieve an established efficiency for removing specific contaminants from the water. The timing and need for this transition is an unresolved issue.

- *PROs:* Controlled detention would maintain high water-quality control for radionuclides by providing a moderated discharge from the terminal ponds at water levels that would enhance sedimentation of particulates in storm water. This water management approach will reduce operating water levels in terminal ponds which will improve dam safety and increase the availability of storage for contaminated flows during storm and spill events. Movement to a controlled detention operation of the ponds is dependent upon institution of other actions to maintain adequate protection of downstream water supplies and other uses.

- **CONs:** The Site currently operates in a batch-and-release mode because it provides a high level of confidence in water quality control. In the controlled detention mode, if contamination reaches the ponds undetected, it would be released downstream. There is concern about the Site's ability to detect and prevent contaminated releases to the WWTP and pond system.
- **Subissue:** Bypassing of WWTP flows, which currently discharge to Pond B-3, around the B series ponds into Walnut Creek would reduce batch frequencies, make storage more frequently available for storms and spills, and simplify operations. Timely detection of contaminant releases to the WWTP is a concern.
- **Issue No. 2:** Can the Site obtain funding in a timely fashion to remediate/contain nonemergency but high-priority contamination sources on the watershed? DOE's position is that Site funding will be reallocated to deal with significant environmental problems. Other parties are not in agreement that funding will be available.
- **Issue No. 3:** Is the fate and transport of plutonium in the environment well known and understood by the Site? If not well known and understood, contamination could be mobilized outside of, or in a mode not addressed by established controls. The Site has formed an expert panel composed of both DOE and outside experts to review existing data on plutonium migration. The expert panel will recommend by September, 1996 whether or not there is sufficient information available to determine if and how much plutonium is migrating, what the pathways are, and what engineering controls can be put in place to curtail plutonium migration to the extent that it is occurring or can occur.
- **Issue No. 4:** What is DOE's long-term obligation with regard to operation and maintenance of Woman Creek Reservoir? DOE and the Standley Lake Cities are currently discussing these issues.

If the working group is unable to resolve any of these issues, the Resolution of Dispute process outlined in RFCA will be used.

4.0 IMPORTANT NEAR-TERM WATER MANAGEMENT ACTIVITIES

The intermediate to long-term strategy for RFETS water management is defined in the Rocky Flats Vision statement, mapped out in ongoing planning of the Accelerated Site Action Plan (ASAP) and the 10-Year Plan, and the ALF of the RFCA. As depicted in Figure 1, fulfillment of the strategy will be achieved through cost-effective management actions in several key areas to protect downstream water supplies and limit risks to human health and ecological resources. As charted in Table 2, these actions will occur through the implementation and outputs of the network of in-place and developing water management activities at RFETS. In the near-term (FY96 and 97), the actions which are necessary to continue progress toward implementation of the water management strategy are listed below. In the ensuing months, the Group will provide comments and concerns on these activities to the budget

decision-makers.

- **Manage Groundwater to Protect Surface Water**
 - Complete current site-closure planning activities under the 10-Year Plan by 10/96 to establish the priority of cleanup actions for groundwater plumes and provide an initial planning basis for funding and implementation of groundwater cleanup.
 - Complete additional field work in FY97 to support the basis for groundwater cleanup.
 - Conduct a demonstration project focusing on the preferred technology for plume remediation in FY97 for a high priority groundwater plume. Fund monitoring of the demonstration so that data can be assessed to determine whether or not the technology should be used for remediating all contaminated plumes.
- **Manage Groundwater and Surface Water to Protect Ecological Resources**
 - Complete current site-closure planning activities under the 10-Year Plan by 10/96, estimate future stream flows and the capability of these reduced flows to sustain wetlands and critical habitats, and communicate this information to stakeholders.
- **Manage Site Detention Ponds in a Safe Configuration to Protect Dam Integrity and Water Quality**
 - DOE will propose a draft logic diagram and timeline on steps required to transition from a batch-and-release mode of operation to a controlled detention mode of surface-water discharge so that activities that are prerequisites to pond operation changes are identified, progress can be tracked, and downstream water users can plan responses to changed stream-flows downstream of the Site. DOE will work with regulatory agencies and downstream water users to reach agreement on the transition.
 - Complete pond construction activities, including the B5 and C2 standpipes in FY97 to facilitate dam safety, water quality, and reduced operating costs.
 - Continue and complete ditch and dam maintenance, including the south interceptor ditch (SID) repairs, B2 outlet works and dam safety improvements by 9/97.
- **Manage Process Wastewater Treatment/Disposition at B374/Alternate Wastewater Treatment System (AWTS) to be Protective of Surface Water**
 - Complete planning for a cost-effective AWTS (Wastewater Treatment, page B-6) to replace the Building 374 wastewater treatment system by 10/96.

- Continue to enforce the waste acceptance criteria for Building 374 and its potential replacement (i.e., the AWTS) to maintain the ability of the facilities to meet a maximum discharge limit for plutonium and americium of 0.15 pCi/L.
- Manage Incidental Waters to Protect WWTP and Surface Water
 - Continue inspection and field measurements of incidental waters to determine if they pose a threat to surface water.
- Manage Internal Waste Streams to Protect WWTP and Surface Water
 - Complete the Drain Identification Study in FY96.
 - Continue to use the general pretreatment regulations (40 CFR 403) as guidelines in the control of internal waste streams.
 - Enforce sampling requirements and operational restrictions on nonprocess, nondomestic discharges to the WWTP (See Internal Waste Streams Program page B-2) to meet all waste acceptance criteria.
- Manage Sanitary Wastewater Treatment/Disposition at B995 to be Protective of Surface Water
 - Complete Phase III WWTP improvements in FY98 to allow storage of treated wastewater during upset conditions.
- Implement Accelerated Cleanup Actions and Watershed Improvements to Control Sources
 - Implement cleanup of sources that have been targeted and prioritized based on their potential for impact upon groundwater and surface water. Conduct source cleanups consistent with available budget and in compliance with ALF.
 - Control potentially contaminated runoff from each source cleanup action using specified Best Management Practices (BMPs).
 - Transport contaminated groundwater generated from each removal action to the appropriate treatment facility.
 - Implement watershed improvements in FY96 and FY97 to control radiological constituents in surface runoff.

- Practice Spill Control BMPs, Stormwater Pollution Prevention, and Maintenance Monitoring to Protect Surface Water
 - Continue to implement SPCC/BMP plans and programs to prevent or minimize the potential for releases of toxic materials or hazardous substances from the Site.
 - Continue the stormwater monitoring program to assess the environmental consequences of D&D and environmental restoration activities at the Site and to provide early warning of potential or actual releases to surface waters in excess of RFCA action levels.
 - Implement an integrated and cost-effective groundwater and surface water monitoring program for RFCA compliance.

In addition to the near-term water management activities listed above, coordination and communication among DOE and RFETS contractors, the regulatory agencies EPA and CDPHE, and the Cities which manage and deliver water supplies to downstream users will continue. The cooperative effort which produced this IWMP will be fostered through the following water management process improvements:

- The Water Management Group will highlight the importance of the anticipated activities listed above and communicate these preferences to Site management for consideration in the annual budgeting process. The Group anticipates reconvening to review the priorities of activities in future years.
- The network of water management plans and activities at RFETS, and related communication and coordination with the agencies and Cities will be streamlined, including simplifying lines of program control, and establishing a single point-of-contact management approach and liaison with the agencies and downstream water users.

The above water management process improvements will be achieved by (1) the continuing work of a water management core team coordinated by the RFETS point-of-contact; (2) updating of the IWMP to incorporate process improvements and changes brought on by accomplishments of the Site water management activities; and (3) reconvening of the Water Management Group on an as-needed basis to review progress and reissue updates of the IWMP.

REFERENCES

EG&G, Rocky Flats, Inc., *Federal Facilities Compliance Agreement Sewage Treatment Plant Compliance Plan*, Golden, Colorado, July 1990.

EG&G, Rocky Flats, Inc., *Groundwater Protection and Monitoring Plan for the Rocky Flats Plant*, Golden, Colorado, November 1991.

EG&G, Rocky Flats, Inc., *Vadose Zone Monitoring Plan*, Approved by the U.S. Environmental Protection Agency, June 1991.

EG&G, Rocky Flats, Inc., *Chromic Acid Incident Plan*, Approved by the U.S. Environmental Protection Agency, October 1992.

EG&G, Rocky Flats, Inc., *Scope of Work for Comprehensive Tank Management Plan*, Revision 1, July 1993.

EG&G, Rocky Flats, Inc., *Draft Stormwater Pollution Prevention Plan*, in response to draft NPDES permit renewal of February 1994.

EG&G, Rocky Flats, Inc., *Emergency Response Plan for Failure of Dams A-4, B-5, or C-2*, 1-A25-5500-06.08, Golden, Colorado, June 1995.

Kaiser-Hill Company, L.L.C., *Phase II - Choices for Rocky Flats; Accelerated Site Action Project, Draft Revision 1*, Golden, Colorado, February 1996.

Rocky Mountain Remediation Services, L.L.C., *Final Proposed Action Memorandum for the Remediation of Individual Hazardous Substance Site 109, Ryan's Pit*, RF/ER-95-0097.UN, Golden, Colorado, August 1995.

Rocky Mountain Remediation Services, L.L.C., *Sitewide Wastewater Treatment Strategy*, Golden, Colorado, September 1995.

Rocky Mountain Remediation Services, L.L.C., *Spill Prevention Control and Countermeasures/Best Management Practices Plan*, Golden, Colorado, Revised, September 1995.

Rocky Mountain Remediation Services, L.L.C., *Pond Operations Plan*, Golden, Colorado, December 1995.

Rocky Mountain Remediation Services, L.L.C., *Proposed Action Memorandum for Source Removal at Trenches T-3 and T-4, IHSSs 110 and 111.1*, RF/ER-95-111.UN, Golden, Colorado, January 1996.

Rocky Mountain Remediation Services, L.L.C., *Groundwater Conceptual Plan for the Rocky Flats Environmental Technology Site*, RF/ER-95-0121.UN, Golden, Colorado, March 1996.

Rocky Mountain Remediation Services, L.L.C., *Surface Water Management Drain Identification Study Project Plan*, May 1996.

U.S. Environmental Protection Agency, Region VIII, NPDES Permit CO-0001333, *Authorization to Discharge Under the National Pollutant Discharge Elimination System*, Denver, Colorado, December 1984.

U.S. Environmental Protection Agency, Region VIII and the State of Colorado, *Rocky Flats Interagency Agreement*, January 1991.

U.S. Environmental Protection Agency, Region VIII and the U.S. Department of Energy, *National Pollutant Discharge Elimination System Federal Facilities Compliance Agreement*, FFCA-CWA-90-1, March 1991.

U.S. Environmental Protection Agency, Region VIII and the State of Colorado, *Draft Rocky Flats Cleanup Agreement*, March 14, 1996.

U.S. Geological Survey, *Water Balance/Pond Depletion Study*, 1995.

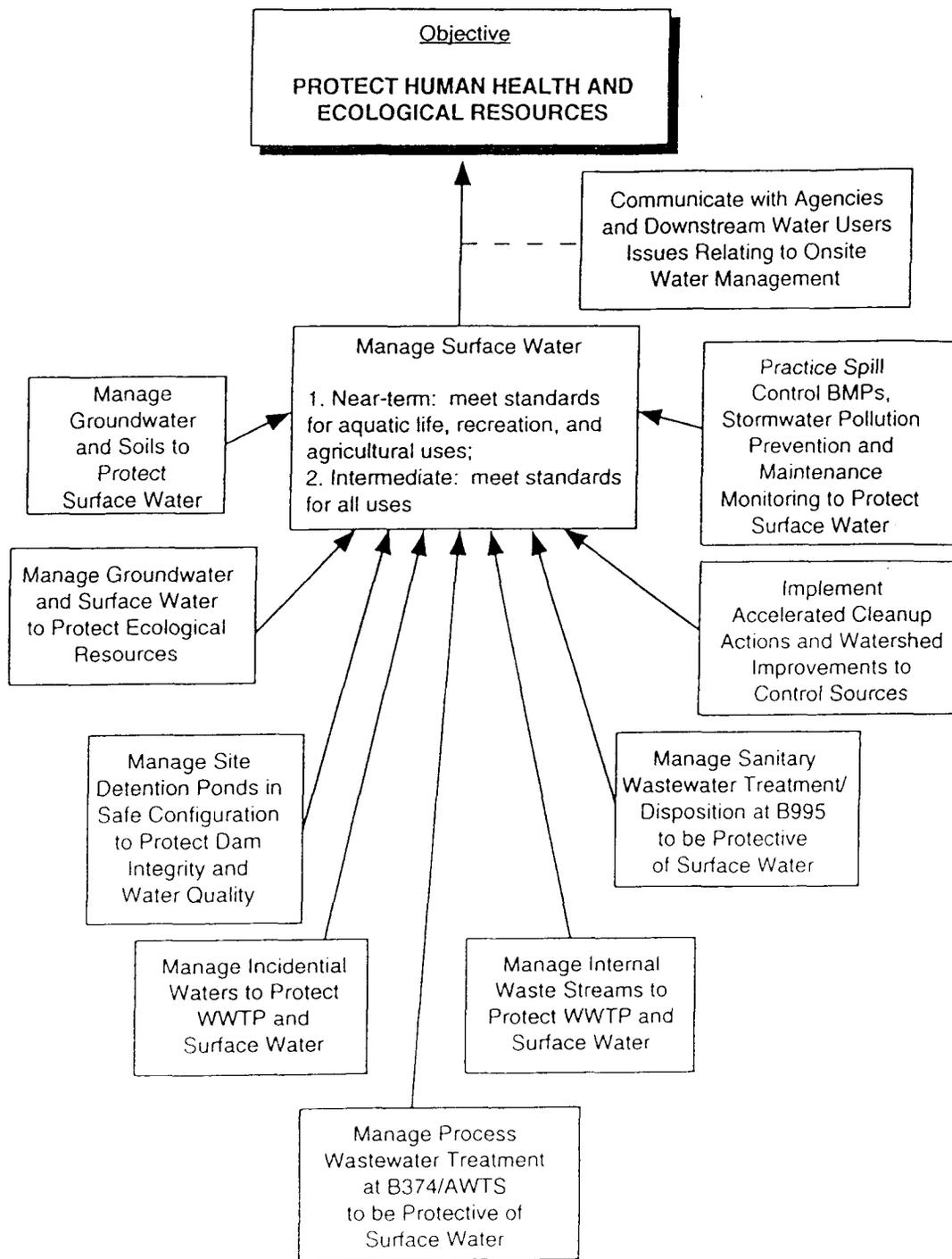


Figure 1 - Key Components of Effective RFETS Water Management

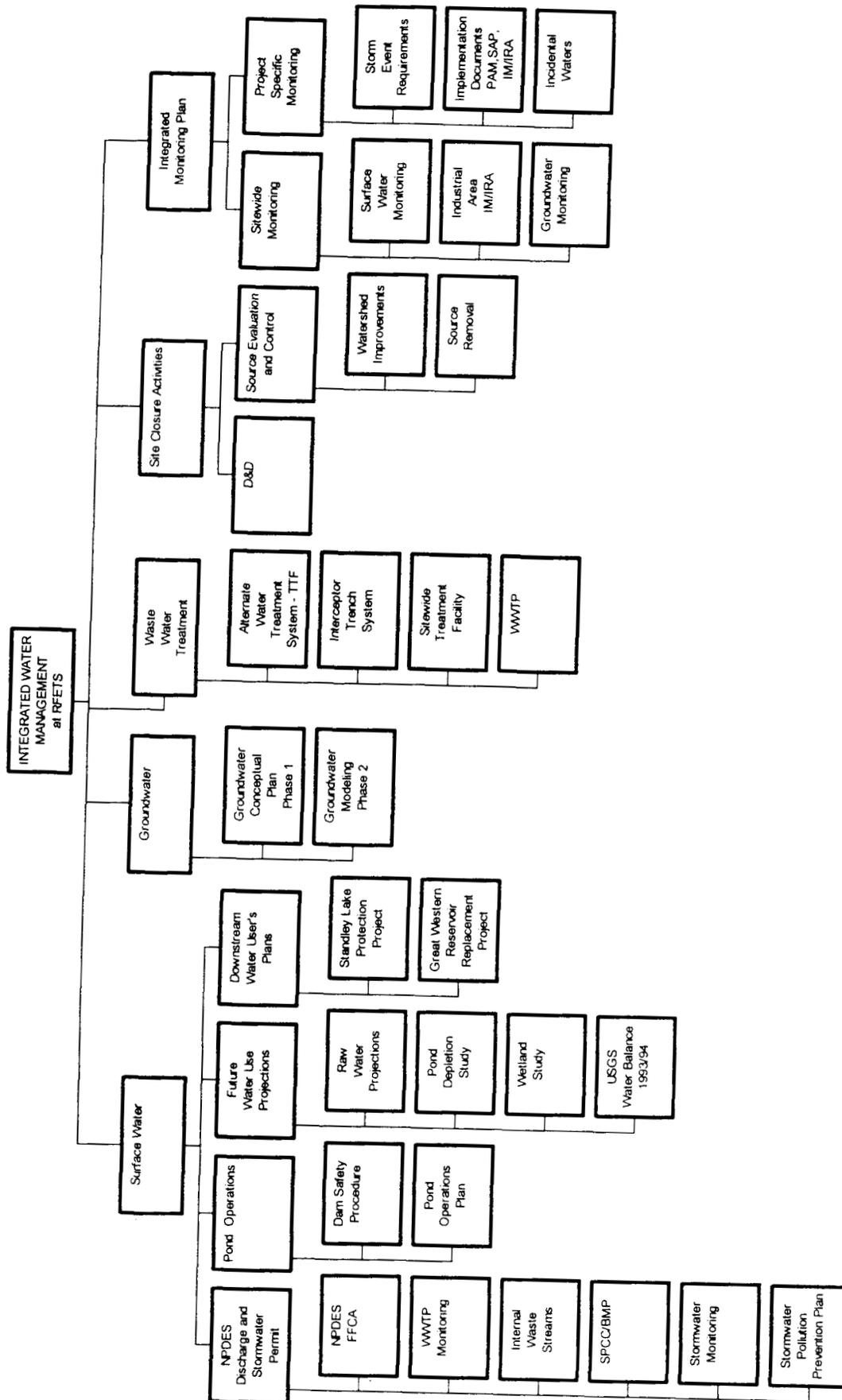


Figure 2 - RFETS Water Management by Programs

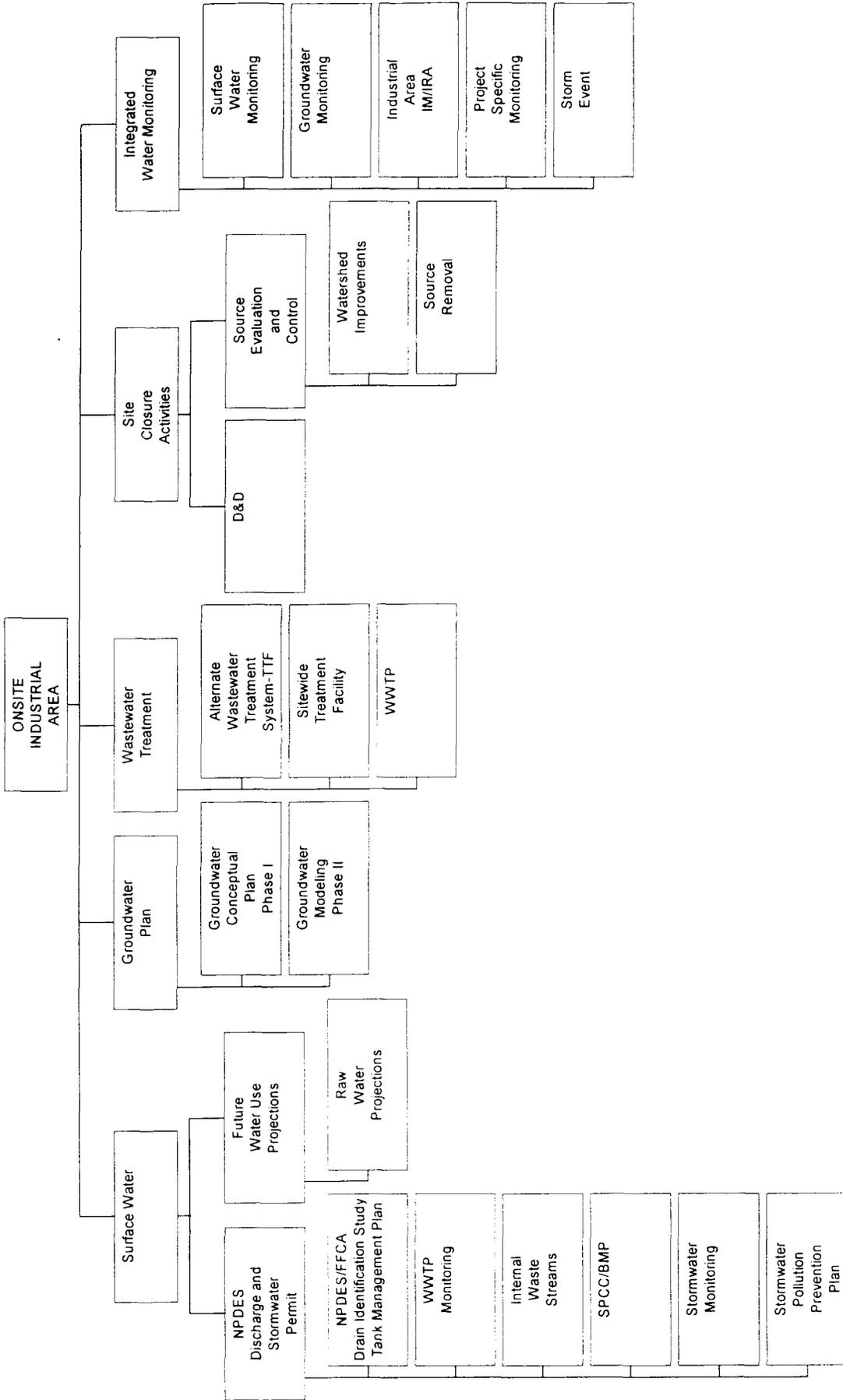


Figure 2A.1 - Water Management Programs by Location

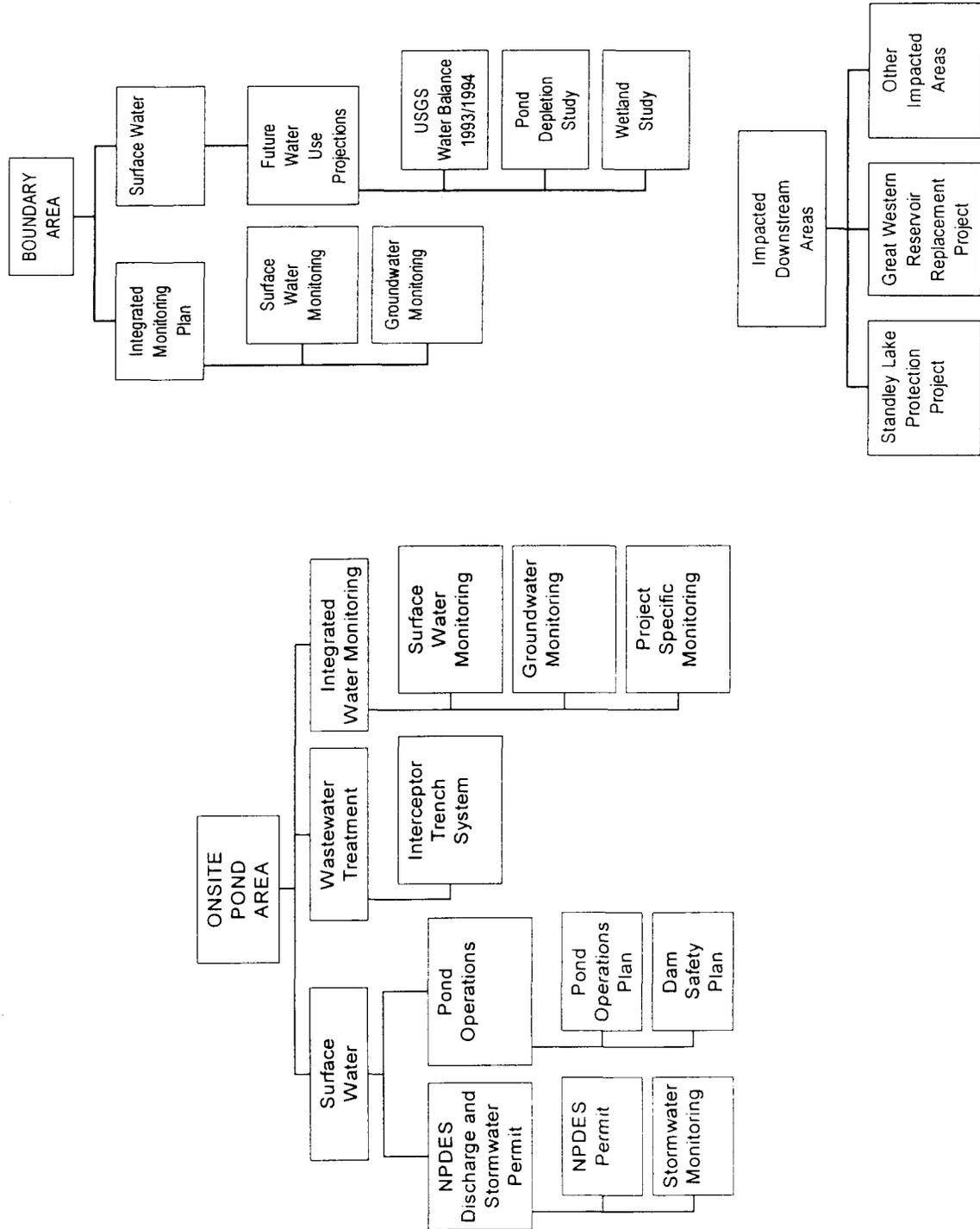


Figure 2A.2 - Water Management Programs by Location

Table 1 - IDENTIFICATION OF WATER MANAGEMENT ACTIVITIES BY SUBJECT AREA

Water Management	NPDES Permit	NPDES FFCA	DIS	TMP	Internal Waste Streams	SPCC / BMP	Storm Water Monitoring	SPPP	Dam Safety Proc.	POP	Raw Water Proj.	Wetlands Study	Groundwater Conceptual Plan and Modeling	AWTS Design / B374	STF	Source Removal PAMS	Integ. Water Monitoring
SURFACE WATER																	
Storm water runoff	X				X	X	X	X		X							X
Pond Operations																	
• Site Discharges	X						X		X	X							X
• Pond Management							X			X							X
• Dam Safety									X	X							X
Spills	X					X				X				X			
Underground Tanks				X													
Above Ground Tanks			X			X		X									
Building Operations	X	X	X		X	X		X									X
Footing Drains	X	X						X		X			X	X			
Future Water Use Projections											X		X				
GROUNDWATER																	
New Sanitary Landfill Leachate	Alternative Disposal ¹																

ACRONYMS:

AWTS Alternate Wastewater Treatment System
 BMP Best Management Practices
 DIS Drain Identification Study
 NPDES National Pollutant Discharge Elimination System
 POP Pond Operations Plan
 SPCC/BMP Spill Prevention Control & Countermeasure/Best Management Practices
 STF Site-wide Treatment Facility
 TMP Tank Management Plan
 WWTP Wastewater Treatment Plant

Table 1 - IDENTIFICATION OF WATER MANAGEMENT ACTIVITIES BY SUBJECT AREA

Water Management	NPDES Permit	NPDES FFCA	NPDES DIS	NPDES TMP	Internal Waste Streams	SPCC / BMP	Storm Water Monitoring	SPPP	Dam Safety Proc.	POP	Raw Water Proj.	Wetlands Study	Groundwater Conceptual Plan and Modeling	AWTS Design / B374	STF	Source Removal PAMS	Integ. Water Monitoring
WMF Leachate	X																
Interceptor Trench System										X				X			
Environmental Restoration Groundwater													X		X	X	X
WASTEWATER TREATMENT																	
Sanitary Sewer	X				X												
Laundry Water	X																
SITE CLOSURE ACTIVITIES																	
Building Deactivation																	
• Liquid Stabilization	X													X			
• Residue Elimination	X													X			
• Tank Mgt.	X																
• B374/774 Sludge Treatment	X																

ACRONYMS:
 AWTS Alternate Wastewater Treatment System
 BMP Best Management Practices
 DIS Drain Identification Study
 NPDES National Pollutant Discharge Elimination System
 POP Pond Operations Plan
 SPCC/BMP Spill Prevention Control & Countermeasure/Best Management Practices
 STF Site-wide Treatment Facility
 TMP Tank Management Plan
 WWTP Wastewater Treatment Plant

Table 1 - IDENTIFICATION OF WATER MANAGEMENT ACTIVITIES BY SUBJECT AREA

Water Management	NPDES Permit	NPDES FFCA	NPDES DIS	NPDES TMP	Internal Waste Streams	SPCC / BMP	Storm Water Monitoring	SPPP	Dam Safety Proc.	POP	Raw Water Proj.	Wetlands Study	Groundwater Conceptual Plan and Modelling	AWTS Design / B374	STF	Source Removal PAMS	Integ. Water Monitoring
D&D	X													X	X		
Source Removals	X				X	X	X	X		X			X	X	X	X	X
INTEGRATED MONITORING																	
Surface Water Monitoring																	X
Groundwater Monitoring																	X
IA IM/IRA																	X
Incidental Waters	X				X	X				X							

1. Normal operation is leachate to evaporation pond.

ACRONYMS:

- AWTS Alternate Wastewater Treatment System
- BMP Best Management Practices
- DIS Drain Identification Study
- NPDES National Pollutant Discharge Elimination System
- POP Pond Operations Plan
- SPCC/BMP Spill Prevention Control & Countermeasure/Best Management Practices
- STF Site-wide Treatment Facility
- TMP Tank Management Plan
- WWTP Wastewater Treatment Plant

Management Tool	Description	Status	Output/Information
SURFACE WATER			
NPDES Discharge and Stormwater Permit			
NPDES Permit/WWTP Monitoring	Governs discharges from the WWTP and surface water ponds A-3, A-4, B-5 and C-2.	Monthly reports submitted to Agencies	Water quality data from Discharge Monitoring Report which will identify treatment deficiencies
Drain Identification Study	Reviewed sanitary and process drains and possible sources of hazardous or otherwise inappropriate influent to the sanitary sewer system.	Study completed. 85% of risk areas completed in May 1996. Balance to be completed by 9/96.	Potential spill pathways to sanitary sewer system are identified and are being capped.
Tank Management Plan	Assessed the integrity of aboveground storage tanks and established Level 1 procedure for routine inspections for leakage.	Inventory completed and program now in transition to building management.	Complete inventory and condition of aboveground and RCRA tanks.
Phase III WWTP Improvements	Influent and effluent storage capacity will be added to the WWTP.	Improvements scheduled to be completed in FY98.	Provide storage that will allow time to store wastewater during upset conditions.
Internal Waste Streams Program	Uses pretreatment regulations (40 CFR 403) as guidelines in the control of internal waste streams.	All nonprocess, nondomestic discharges to the sanitary collection system are included in program.	Verifies that the WWTP can treat influent wastewater.
Spill Prevention Control and Countermeasures/Best Management Practices (SPCC/BMP)	Document existing plans and programs to prevent or minimize the potential for significant releases of toxic materials or hazardous substances from the Site.	Reviewed and revised as necessary every three years.	Identification of measures in place to prevent and contain spills from entering surface water.
Storm Water Monitoring	Measures streamflow during storm events.	Specific magnitude of storm events are targeted and funded for monitoring.	Water quality and quantity data from storm events that are monitored to identify for potential new sources of contamination.

Tab 2 Interaction Of Water Management Activities/Informa...n

Management Tool	Description	Status	Output/Information
Stormwater Pollution Prevention Plan	Establishes best management practices (BMPs) for stormwater quality improvement.	Revised July 21, 1995 and ready for finalization upon permit issuance.	Description of potential stormwater pollutant sources and outline of existing and proposed stormwater pollution prevention measures.
Pond Operations			
Dam Safety Procedure	Describes response actions required in the event of an emergency involving the site's terminal detention ponds.	Procedure is in place, being followed by Site personnel and updated as needed in cooperation with the State and Cities.	Identification of activities, action levels, and responses for emergencies involving the Site's terminal detention ponds.
Pond Operations Plan	Describes the transition plan for modifying pond operations, and change in management from the current batch mode to a future controlled detention mode.	DOE has received stakeholder comments and is preparing responses to comments.	Description of the transition plan for pond operations with a network logic and schedule for the steps in the transition process.
Future Water Use Projections			
Raw Water Projections	Uses sitewide water balances to estimate future volume of available water.	Estimates to be complete by 9/96 under 10-Year Plan.	Estimate of future volume of water discharges to drainages as site water use declines.
Wetland Study	Inventories wetlands and evaluates future potential wetlands based on raw water projections.	Estimates to be complete by 9/96 under 10-Year Plan.	Quantification of future sustainable wetlands based on water quantities in drainages.
Impacted Downstream Areas			
Standley Lake Protection Plan	Woman Creek Reservoir protects the Standley Lake drinking water supply from any future water quality impacts of the Site.	Woman Creek Reservoir construction has been completed; Operations Plan under development.	Woman Creek Reservoir Operations Plan; retained flows are discharged to Walnut Creek.

Management Tool	Description	Status	Output/Information
Great Western Reservoir Replacement Project and Proposed Reuse Plan	Broomfield drinking water supply will no longer be affected by future impacts of the Site to water quality in Walnut Creek.	Water supply from Great Western Reservoir replaced by new water source. Pipeline and new water treatment plant to be operational by 6/97. Reuse Plan is being developed by the City of Broomfield.	Great Western Reservoir Operations and Reuse Plans. City wastewater effluent stored in Great Western Reservoir for golf course landscape irrigation.
GROUNDWATER			
Groundwater Conceptual Plan	Identifies and ranks principal contaminant plumes	Completed in March, 1996	Identification of preliminary alternatives for managing contaminated groundwater.
Groundwater Modeling	One model assesses vertical migration. Another deals with sitewide flows and allows refinement of the analyses in the Groundwater Conceptual Plan for groundwater remediation alternatives.	To be completed in FY96 under 10-Year Plan.	Assessment of the potential for vertical migration of DNAPL. Provides preliminary design of plume containment/remediation.
WASTEWATER TREATMENT			
Alternative Wastewater Treatment System (AWTS)	Building 374 and its replacement facility (AWTS) designed to treat LL and LLMW liquids	The conceptual design report for AWTS has been completed.	Treatment facilities designed to meet or exceed Action Level Framework standards
Interceptor Trench System (ITS)	Alternative management for ITS to meet Action Levels and Standards Framework (ALF)	ITS water impact on the Walnut Creek watershed has been modelled and a draft management plan is in preparation.	ITS water would be removed from treatment in Building 374 and discharged to surface water under the management proposal.

Management Tool	Description	Status	Output/Information
Sitewide Treatment Facility (STF)	STF designed to treat water from environmental restoration activities	The STF was upgraded in FY95 when two existing treatment facilities were combined.	Treatment facilities designed to meet standards specified in OU1/OU2 IM/IRA documents.
SITE CLOSURE ACTIVITIES			
Source Evaluation and Control			
Watershed Improvements	Identifies improvements to reduce/eliminate runoff	Plan prepared and initial improvements budgeted for FY96	Used to guide the implementation of physical modifications to the watershed designed to improve the quality of surface water flowing from the site.
Source Removal	Identifies specific locations from which contaminants leach to groundwater	Source removals have been identified and prioritized. Ryan's pit was excavated in FY96 and two more trenches are scheduled for removal in FY96.	After sources of contamination are removed, contaminant loadings to surface water will be reduced.
Groundwater Plume Management	The results of the Groundwater Conceptual Plan and modeling will be used to design groundwater containment systems.	The Groundwater Conceptual Plan has been completed. Groundwater modeling will be completed in FY96.	The priority for design and installation of plume containment systems will be part of the Integrated Site Baseline.
Deactivation and D&D			

Tab. 2 Interaction Of Water Management Activities/Information

Management Tool	Description	Status	Output/Information
Building D&D	A detailed decommissioning plan is being developed for Building 779 which will serve as a model for decommissioning the majority of Site buildings. This plan will identify the requirements for water use by decommissioning operations.	Deactivation wastewater flows and characteristics have been estimated. The IA IM/IRA is in place to monitor D&D activities.	IA IM/IRA is used to monitor D&D activities.
INTEGRATED WATER MONITORING			
Integrated Monitoring Plan	Will provide information for operating and remediating the Site, ensuring public safety, and informing the public about discharges and emissions from the Site.	To be completed in FY96	Identification of sitewide monitoring requirements

Appendix A
Abbreviations and Acronyms

ABBREVIATIONS AND ACRONYMS

ALF	Action Levels and Standards Framework
AWTS	Alternate Wastewater Treatment System
BMP	Best Management Practices
CAIP	Chronic Acid Incident Plan
CDPHE	Colorado Department of Public Health and Environment
CDR	Conceptual Design Report
CFR	Code of Federal Regulations
CWQCC	Colorado Water Quality Control Commission
D&D	decontamination and decommissioning
DIS	Drain Identification Study
DNAPL	Dense Non-Aqueous Phase Liquid
DOE, RFFO	Department of Energy, Rocky Flats Field Office
DQO	data quality objectives
EPA	US Environmental Protection Agency
FFCA	Federal Facilities Compliance Agreement
GWRRP	Great Western Reservoir Replacement Project
IA	Industrial Area
IM/IRA	Interim Measure/Interim Remedial Action
ITS	Interceptor Trench System
IWMP	Integrated Water Management Plan
LL/LLM	low-level/low-level mixed
NPDES	National Pollutant Discharge Elimination System
PAM	Proposed Action Memorandum
POP	Pond Operations Plan
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
SID	South Interceptor Ditch
SLPP	Standley Lake Protection Plan
SOP	Standard Operating Procedure
SPCC/BMP	Spill Prevention Control & Countermeasure/Best Management Practices
STF	Sitewide Treatment Facility
SWPPP	Stormwater Pollution Prevention Plan
TA	Technical Appendix
TMP	Tank Management Plan
USGS	US Geological Survey
WWTP	Wastewater Treatment Plant

Appendix B

**Description of
Water Management Plans and Strategies**

DESCRIPTION OF WATER MANAGEMENT PLANS AND STRATEGIES

The content and purpose of each water management plan or program at RFETS are summarized below.

B.1 SURFACE WATER

B.1.1 NPDES DISCHARGE AND STORM WATER PERMIT

Activities conducted under the NPDES and storm water permit include implementation of the requirements of the *NPDES Federal Facilities Compliance Agreement (FFCA)* permit¹ (*NPDES Permit CO-0001333*), compliance and operational monitoring at the Site, wastewater treatment plant (WWTP), the Internal Waste Streams Program, *Spill Prevention Control and Spill Prevention Control & Countermeasure/Best Management Practices Plan (SPCC/BMP)*, the stormwater monitoring and the *Stormwater Pollution Prevention Plan (SWPPP)*. These activities are summarized below.

NPDES FFCA Program

On February 22, 1989 an unplanned chromic acid release occurred from a plating bath in Building 444. Although no chromium was detected beyond Site boundaries, the incident resulted in EPA's request for a *Chromic Acid Incident Plan (CAIP)* that was incorporated into the NPDES FFCA in March 1991. The NPDES FFCA required the implementation of two other plans: (1) the *FFCA Sewage Treatment Plant Compliance Plan* which included the WWTP upgrades and (2) the *Groundwater Protection and Monitoring Plan*.

Nine of the twelve activities required by these plans in the FFCA have been completed. The three remaining activities are in progress and nearing completion: (1) the aboveground storage tank integrity assessment plan, the *Scope of Work for Comprehensive Tank Management Plan (TMP)*, "designed to monitor the integrity of liquid containment structures plant-wide including those containing non-regulated materials"; (2) the *Surface Water Management Drain Identification Study Project Plan (DIS)*, designed to "review foundation footing drains. . . and possible sources of hazardous or otherwise inappropriate influent to the sanitary sewer system"; and (3) completion of the WWTP phase III upgrades (influent/effluent tanks).

The DIS has been rescoped for completion during FY96, the TMP is scheduled for completion in FY98, and the WWTP upgrades are on schedule for completion in 1998, as required in the IA IM/IRA.

Wastewater Treatment Plant Monitoring

Monitoring at the Site WWTP is divided into two major categories: compliance monitoring and operational monitoring. Compliance monitoring supports compliance with NPDES permit requirements, which apply to discharge from the facility. The results of compliance monitoring activities are reported monthly in the Discharge Monitoring Report, submitted to EPA and CDPHE. Operational monitoring

¹The current NPDES permit was issued in 1984 and has been administratively extended until it is renewed in approximately September, 1997.

supports optimal functioning of the facility. Operational monitoring also includes routine observations on the activated sludge and other unit processes as well as on-line monitoring for selected parameters as indicators of influent quality.

Following the chromic acid incident of 1989, continuous monitoring probes for pH, conductivity, and lower explosive limit were installed at the headworks of Building 995, as well as at the equalization basins upstream of the plant. Operators keep track of influent quality as part of normal shift operations, and are prepared to respond to changes in influent quality, should any occur. Monitoring for radionuclides is not part of the influent monitoring program. The plant is also equipped with a bench-top respirometer for the measurement of oxygen uptake rate in the aeration basins as a further indication of the health of the biological treatment process.

Internal Waste Streams Program

An Internal Waste Streams Program has been developed at the Site to manage the discharge of nonprocess, nondomestic wastewaters to the WWTP. These waste streams are a potential source of pollutants that may interfere with wastewater treatment operations, may pass-through the WWTP untreated and above NPDES effluent limitations, or threaten contamination of the WWTP sludge, impacting selected sludge uses or disposal practices. To prevent or reduce these potential problems, the general pretreatment regulations (40 CFR 403 et seq.) are used as guidelines in the control of internal waste streams. Some nonprocess, nondomestic wastewater is compatible with normal WWTP operations while others may have severe impacts, even in small quantities. Therefore, any nonprocess, nondomestic discharge is subject to control by the internal waste streams program. This type of discharge includes all chemicals, cleaners, foundation drain water, cooling tower blowdown, and others.

A request for authorization to discharge any such wastewaters to the WWTP must be filed and approved by Sitewide Surface Water and Liquid Waste Operations prior to commencing discharges. Sampling requirements and operational restrictions are identified on the discharge request form. Approval or denial is determined through investigation of waste stream treatability and chemical composition. The NPDES permit requires notification to the permit-issuing authority of any increased discharges to the WWTP that may impact effluent limitations specified in the permit.

Spill Prevention Control and Countermeasures/Best Management Practices Plan

The SPCC/BMP Plan was prepared in support of the NPDES permit for the Site. The purpose of the SPCC/BMP Plan is to document existing plans and programs which prevent or minimize the potential for significant releases of toxic materials or hazardous substances from the Site to waters of the United States. Requirements for the SPCC portion of the plan, which pertains to oil spills, are outlined in 40 CFR 112.7. Requirements for the BMP portion of the plan, which pertains to controlling spills of hazardous or toxic pollutants, are outlined in 40 CFR 125.100. Issues addressed include material inventory, material compatibility, employee training, notification procedures, inspections, maintenance, housekeeping, and security. The Site SPCC/BMP is reviewed every three years and revised as needed.

Stormwater Monitoring

Stormwater monitoring is accomplished through the IA IM/IRA which is implemented to monitor the environmental consequences of transition activities at the Site and to provide early warning of potentially harmful releases. Transition activities include, but are not limited to, the removal of building contents, waste storage areas, and in some cases, entire buildings or facilities from the Site. The Site's IA IM/IRA storm-water monitoring strategy uses a three-tiered approach; tiers of increasing monitoring resolution are defined by drainage basins of decreasing drainage area.

- Tier I, the first level of monitoring, consists of continuously recording, automated, stream-gaging stations that monitor all surface water leaving the perimeter of the IA. There are ten Tier I stations established for the IA IM/IRA.
- Tier II monitoring consists of sub-basin gaging stations in and around transition areas to provide a high resolution of monitoring for potential releases of materials from those areas. Two Tier II stations are currently located near Building 889, and two additional Tier II stations are located near the 200 Area Fuel Oil tanks.
- Tier III monitoring consists of monitoring stations with ill-defined sources of water without adequate water-quality characterization. One Tier III station is located at the Building 887 Lift Station overflow. Tier III stations may consist of various seeps or springs that have resulted from anthropogenic sources of water.

Stormwater Pollution Prevention Plan

The purpose of the SWPPP is to minimize pollution associated with storm-water runoff from the Site. A draft SWPPP was prepared to support the requirements of the draft NPDES permit issued on February 21, 1994 and revised July 21, 1995. A final SWPPP is due to EPA six months after the final NPDES permit is issued. The SWPPP may be broadly characterized by two components: identification and characterization of potential storm-water pollutant sources, and proposed storm-water pollution prevention measures. Extensive descriptions are provided for spill prevention and response measures, routine inspection programs, employee training programs, and recordkeeping procedures. The description of existing measures is followed by an outline of proposed BMPs and a summary table of all measures, both existing and proposed, for preventing storm water pollution.

B.1.2 POND OPERATIONS

Terminal pond operations are governed by two plans, the POP and the Dam Safety Procedure.

Pond Operations Plan

The POP describes the Department of Energy, Rocky Flats Field Office (DOE, RFFO) transition plan for modifying the operation and management of the onsite surface-water detention ponds from the current batch mode to a future controlled detention or flow-through mode for discharging water. The POP is supplemented by a Technical Appendix (TA) that provides additional detail and a technical basis for the transition. Topics of the TA include: Site hydrology; spill response programs; contaminated runoff

source areas and remediation options; an analysis of radionuclides contained in storm water runoff; an analysis of the capacity of the ponds to remove radionuclides through settling; operating guidelines for the controlled detention mode based on the analyses; and a description of pond monitoring necessary for controlled detention. Summary tables are provided in the POP that outline steps in the transition process.

Dam Safety Procedure

The dam safety procedure, officially titled *Emergency Response Plan for Failure of Dams A-4, B-5 or C-2*, describes response actions required in the event of an emergency involving the Site's terminal detention ponds. Situations addressed by the procedure include pond volumes that exceed established safety limits, piezometer readings that exceed established safety limits, abnormal seepage or abnormal piezometer readings, emergency discharges of water, partial dam failure, and catastrophic dam failure. The status of each terminal dam is described by one of seven different action levels, ranging from Action Level 0 to Action Level 6. Action Level 0 refers to a stable condition with routine monitoring activities at the dams, whereas Action Level 6 references require actions in response to a dam failure. The procedure identifies members of a Site Dam Response Team and specifies notification responsibilities with respect to varying dam action levels.

B.1.3 FUTURE WATER USE PROJECTIONS

Under planning activities being conducted for site closure, several water balance studies are being conducted to predict the effects of reduced water use onsite. These include an estimate of raw-water demand over time as the Site workforce decreases and buildings close. Also, groundwater modeling will be conducted to assess the effect on aquifer recharge and water table elevation as exfiltration from subsurface pipelines is reduced, and surface caps and revegetation programs are implemented. A study is also being conducted to determine the amount and type of wetlands that can be sustained with reduced flows to the watershed. A *Water Balances/Pond Depletion Study* prepared by the US Geological (USGS) for the Site for water years 1993/94 will be the baseline for these projections.

B.1.4 DOWNSTREAM WATER USERS PLANS

Standley Lake Protection Plan

Standley Lake is a storage reservoir which lies within the Woman Creek watershed in Jefferson County and serves as the drinking water supply for approximately 200,000 people. The Cities of Westminster, Thornton and Northglenn (the *Standley Lake Cities*) derive a major portion of their water supplies from Standley Lake. Woman Creek flows through the RFETS buffer zone prior to reaching Standley Lake.

The U. S. Congress authorized DOE to use environmental restoration funds to reimburse the Standley Lake Cities for the cost of implementing water management programs to protect Standley Lake from water released from RFETS. These funds were used to create the Standley Lake Protection Project (SLPP) which was completed in 1995. The SLPP is designed to physically prevent Woman Creek flows passing through RFETS from reaching Standley Lake. The SLPP consists of the Woman Creek Reservoir and pipeline, Kinnear Ditch Pipeline, and the Standley Lake Wetlands. The Kinnear Ditch Pipeline and Standley Lake Wetlands projects physically separate Coal Creek tributary flows from Woman Creek.

The Woman Creek Reservoir project consists of an off-channel reservoir on the south side of Woman Creek just east of Indiana Street. Woman Creek flows will be diverted into Woman Creek Reservoir through a diversion channel and associated drop structure. The 850 acre-feet capacity is designed to capture a 100-year 24-hour storm event. Natural flows from Woman Creek will be diverted and collected in one of three identical 100 acre-feet compartments. The multiple compartment system will allow containment and testing of flows in one compartment while having other compartments available for receiving additional flows.

Once a compartment is filled, the water is tested and when water quality standards are verified, pumped by pipeline to Walnut Creek downstream of Great Western Reservoir. Should testing reveal contamination, the water will be treated prior to release. An agreement between DOE and the Standley Lake Cities creating an Authority for operation of Woman Creek Reservoir is pending.

Great Western Reservoir Replacement Project

In 1990, an agreement was negotiated between the DOE and City of Broomfield, wherein DOE would provide funds to allow Broomfield to abandon Great Western Reservoir as a drinking water supply and develop an alternate water source. This project, known as the Great Western Reservoir Replacement Project (GWRRP), involves construction of a pipeline to deliver water from Carter Lake to a new water treatment plant, and permanently severs any physical connection between Rocky Flats and Broomfield's drinking water supply.

Broomfield's contribution to the project requires sale of the City's Church Ditch water rights to fund construction of the new potable water treatment plant. Upon completion of the GWRRP in 1997, the primary source of water historically used to fill the reservoir will no longer be available.

A condition of the DOE grant for the GWRRP requires that use of Great Western Reservoir as a drinking water supply be forever restricted. However, Broomfield will retain ownership of the reservoir, dam, treatment plant, and surrounding property.

B.2 GROUNDWATER

Planning for groundwater management at the Site is being done in two phases. Under Phase I a Groundwater Conceptual Plan was developed by the Groundwater Working Group, which includes EPA and CDPHE representatives. The *Groundwater Conceptual Plan for the Rocky Flats Environmental Technology Site* (RF/ER-95-0121.UN), March 1996, identifies and describes the principal organic contaminant plumes in groundwater at the Site, ranks the plumes for the purpose of establishing priorities for cleanup actions, and provides an initial planning basis for funding and implementation of groundwater cleanup.

Under Phase II, a groundwater panel composed of world recognized experts unaffiliated with RFETS or DOE was formed to review the Site's assumptions and approach regarding groundwater contaminant management. The panel has been involved in reviewing the scope of work and intermediate work products being developed under the Site's 10-Year Plan for specific groundwater management activities relating to site closure. Activities being reviewed include groundwater modeling being done to support capture or containment of groundwater plumes, site efforts to determine that dense non-aqueous phase liquids (DNAPLs) are not migrating vertically, and assessment of groundwater remediation methodologies. White papers will be developed on each of these issues in FY96 and will be reviewed by

the groundwater panel. The recommendations of the panel will be used to aid in the prioritization of funding for future groundwater remediation activities.

B.3 WASTEWATER TREATMENT

There are three functioning wastewater treatment facilities at RFETS: the WWTP (Building 995), Building 374, and the Sitewide Treatment Facility (STF). The WWTP treats sanitary wastes and nonprocess, nondomestic wastewater. Building 374 treats radiologically contaminated wastewater from building operations, deactivation and D&D activities and water from the Interceptor Trench System (ITS). Wastewater treated in Building 374 is evaporated, condensed, and reused within the Site. The sitewide treatment facility treats wastewater from environmental restoration activities.

A *Sitewide Wastewater Treatment Strategy* (September 1995) was developed with the objectives of lowering lifecycle costs, shutting down and replacing Building 374, and meeting the Site's closure goals. The strategy quantified the temporarily increased flows associated with specific remediation/cleanup activities, including D&D, so that these increased flows could be properly managed.

A *Conceptual Design Report (CDR)* for the new facilities to replace Building 374, designed specifically for site closure activities, has been completed. The CDR and the new facilities' design is based on draft RFCA requirements and updates the *Sitewide Wastewater Treatment Strategy* which was completed before RFCA negotiations. Wastewater in the new facility will be evaporated and discharged. Discharges from the new facilities will comply with RFCA and ALF and will not increase pollutant loading to surface water. DOE has approved the concepts in the CDR and design will be initiated later in FY96 pending receipt of funding.

Management of groundwater currently collected in the ITS and treated in Building 374 has been reviewed. Since removal of sludges from the solar ponds was completed, the main contaminant of concern in groundwater collected in the ITS is nitrate. Uranium and tritium are also present. An ITS management study report shows that direct release of ITS groundwater to the environment is compatible with RFCA and the ALF. The proposal for future management of ITS groundwater uses a staged approach. The first stage includes the cessation of treatment in Building 374 and the controlled mixing of ITS water with water in Pond A-4, the final point of discharge of surface water from the Site. The second stage would be the direct release of ITS water into the North Walnut Creek drainage. This stage is dependent on the approval by CWQCC of the changes in standards proposed in the draft RFCA.

The STF was designed to remove organics and radionuclides from groundwater and decontamination water generated from environmental restoration activities. Future requirements for treating water generated from environmental restoration activities are being developed under 10-Year Plan planning activities.

B.4 SITE CLOSURE ACTIVITIES

Site closure activities including both D&D and environmental restoration activities have the potential to affect the quality of water released from the Site. To protect water quality during D&D activities, the following measures are being proposed.

B.4.1 Source Evaluation, Control, and Remediation

Proposed cleanup actions to protect surface water include source removal to protect groundwater, watershed improvements to protect surface water, and management of contaminated groundwater plumes (Section B.2).

Source Removal

A number of sources of contaminated material which may contribute to groundwater contamination have been identified; specifically contaminated material in trenches. Source removal actions have been prioritized (RFCA, Attachment 4) and require individual Proposed Action Memorandum (PAMs), Standard Operating Procedures (SOPs), or IM/IRAs to implement. Each will require project-specific monitoring to protect surface water. Initial source removals include Ryan's Pit (*Final Proposed Action Memorandum for the Remediation of Individual Hazardous Substance Site 109, Ryan's Pit* [completed]) and Trenches T-3 and T-4 (*completed*).

Watershed Improvements

The Watershed Improvement Plan will guide the implementation of physical modifications to the watershed designed to improve the quality of surface water flowing off the Site. The primary objective of the improvements will be to stabilize and entrap sediments that could be mobilized by precipitation and flow into surface waters. In particular, drainage areas identified as most likely to contribute radionuclides to the Site runoff will be targeted for control measures. Emphasis will be placed on watershed improvements that can be implemented quickly and cost effectively (e.g., silt fences, sediment traps and soil stabilizers). After the control measures have been installed, the results of subsequent storm water monitoring will be reviewed to determine the effectiveness of the various watershed improvements. Initial watershed improvements are in the implementation phase and the remaining watershed improvements are being prioritized for future execution.

B.4.2 Building Deactivation, Decontamination and Decommissioning

During development of the Sitewide Wastewater Treatment Strategy, wastewater sources were identified for all building deactivation, and decontamination and decommissioning (D&D) activities related to site closure. Projected deactivation wastewater flows and characteristics were estimated by Safe Sites of Colorado personnel for liquid stabilization, residue elimination, tank management, and Building 374/774 sludge treatment. Waste acceptance criteria have been developed for the deactivation liquids to determine whether Buildings 374 and 774 and the AWTS can adequately treat these liquids. Standard operating procedures are in place to monitor influent and effluent tanks to meet that treatment criteria prior to discharge.

A preliminary Decommissioning Plan was prepared for the *Accelerated Site Action Project, Phase II - Choices for Rocky Flats* report which developed a sequence for decommissioning all onsite buildings. The Kaiser-Hill Team is currently developing a detailed Decommissioning Plan for Building 779 which will serve as a model for decommissioning the majority of the buildings onsite. The approach to D&D is to use dry methods for decommissioning. Plans are for water generation to be minimal or nonexistent. The only anticipated water generation would be from concrete cutting operations, flushing of tanks (if sludges are present), dust control during demolition, and chemical decontamination techniques, if

required.

Project-specific monitoring of surface and groundwater impacts of D&D activities is being instituted under the IA IM/IRA (see Section B.1, Stormwater Monitoring and Section B.5, IA IM/IR). Verification monitoring has been implemented to confirm the effectiveness of pathway protection during D&D activities. The verification monitoring includes monitoring surface water in the subbasin where the D&D activity is occurring, monitoring for analytes specific to the activity, building or area, and establishing baseline and statistically based response levels.

B.5 INTEGRATED MONITORING PLAN

All monitoring programs at RFETS, including surface water, groundwater, ecological and air monitoring, are being integrated into an Integrated Monitoring Plan. The Integrated Monitoring Plan, as specified in the draft RFCA, will provide information on the operation and remediation of the Site, public safety, and discharges and emissions from the Site.

The Integrated Monitoring Plan will be developed in consultation with EPA, CDPHE, and downstream water users and its adequacy will be evaluated annually based on previous monitoring results, changed conditions, planned activities and public input.

In addition to sitewide monitoring under the Integrated Monitoring Plan, each remediation project requires a specific implementation plan, including a monitoring plan to protect watersheds. The portions of the Integrated Monitoring Plan relating to surface water and groundwater monitoring are summarized below. The IA IM/IRA will be integrated into the Integrated Monitoring Plan.

Surface Water Monitoring

The site is working with EPA, CDPHE, Broomfield, and Westminster to develop an integrated surface-water monitoring program for Site discharges. Working together and separately, these entities monitor process discharges before they leave the onsite buildings, IA drainage ditches, onsite streams and ponds, the downstream reservoirs, and community drinking water. The level of health risk is maintained well below the one-in-one-million level, so that drinking water supplies downstream from the Site are maintained at a quality level that is well within EPA's national primary drinking water standards.

Groundwater Monitoring

In May, 1995 a groundwater monitoring working group, including EPA and CDPHE representatives, evaluated the current RFETS groundwater monitoring network and made recommendations for a technically defensible, cost-effective program that met compliance requirements while providing adequate groundwater surveillance for the Site. The working group met from May through September 1995 and identified wells to be in the monitoring program.

The groundwater monitoring program is in the process of being updated to incorporate draft RFCA requirements into the Integrated Monitoring Plan. At present, RFCA identifies the current monitoring program that was initiated in October 1995 as part of the agreement.

Industrial Area IM/IRA

The IA IM/IRA focuses monitoring on areas within the IA that have the potential to impact water quality. Monitoring is implemented to address specific activities, such as D&D or environmental remediation, and will focus on the constituents associated with the activity or the area. This monitoring will establish preexisting baseline levels before the activity commences determine if the activity would impact the overall contaminant load for the area. Response actions built into the IM/IRA will be initiated on the basis of exceedances in baseline rather than on the draft RFCA action levels. However, IM/IRA monitoring provides source-area identification and characterization that will support the efforts of the Watershed Improvement Plan, and identify potential areas for source removal.

IM/IRA monitoring is closely linked with D&D activities (see Section B.4.2). The project is reprogrammed on an annual basis to be responsive to the D&D activities that are planned for the upcoming fiscal year. Because the activities of the Site are so dynamic, the IM/IRA is designed to be flexible and responsive to changing Site conditions and priorities.

All monitoring provided through the IM/IRA has been incorporated into the Integrated Monitoring Plan, and in turn, into the overall monitoring network for each media.

Project Specific Monitoring

Incidental Water

Occasionally, water accumulates in utility pits, berms, footing drains, and sumps, or spills out onto the ground. These are referred to as incidental waters. For example, every precipitation event leaves rainwater in some utility pits and secondary containments. Disposition of such waters depends upon the contaminants present, if any.

The Incidental Waters Program requires only inspection and field measurements, unless there is reason to expect the presence of oil, hazardous, or radioactive substances. The field-screening initial assessment may be made on the basis of an estimate of volume, process knowledge of the immediate vicinity, field pH, appearance (e.g., visible sheen), and field conductivity. Additional testing is performed only if screening tests are positive or inconclusive. If screening tests are negative, then the waters may be discharged to the environment, or to the WWTP system.