United States Department of Energy

Savannah River Site

FEDERAL FACILITY AGREEMENT ANNUAL

PROGRESS REPORT FOR FISCAL YEAR 1998 (U)

WSRC-RP-98-4300

November 1998

Prepared by:
Westinghouse Savannah River Company
Savannah River Site
Aiken, SC 29808

Prepared for U.S. Department of Energy under Contract No. DE-AC09-96SR18500

SAFETY · RESPONSIBILITY · SECURITY
SRS
SAVANNAH RIVER SITE

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Prepared for
U.S. Department of Energy

Prepared by

Westinghouse Savannah River Company

Program Development Section
of the
Environmental Restoration Division

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Federal Facility Agreement Annual Progress Report for FY 1998

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INTRODUCTION

The Savannah River Site (SRS) Federal Facility Agreement (FFA) was negotiated between the U.S. Department of Energy (U.S. DOE), the U.S. Environmental Protection Agency-Region IV, (U.S. EPA) and the South Carolina Department of Health and Environmental Control (SCDHEC). The FFA was made effective by U.S. EPA on August 16, 1993. The preparation and submittal of this report have been undertaken to meet the terms of Section XXV, Reporting of the FFA.

This FFA Annual Progress Report has been developed to summarize the information for activities performed during the Fiscal Year 1998 (October 1, 1997, to September 30, 1998) and activities planned for Fiscal Year 1999 by U.S. EPA, SCDHEC, and SRS at those units and areas identified for remediation in the Agreement.

This report is presented in nine sections:

Executive Progress Summaries by Project Area - provides high level descriptions of remediation and characterization achievements organized by project team focus areas;

Overview of Fiscal Year 1998 - provides a brief overview of the actions taken by U.S. EPA, SCDHEC, and SRS during Fiscal Year 1998 to implement the terms of the FFA;

Status of the Operable Units - a listing of each Operable Unit, arranged by watershed, then Operable Unit groupings. A unit Description, the Activities Accomplished in Fiscal Year 1998, and Activities Planned for Fiscal Year 1999 are provided for each operable unit;

Status of the Site Evaluation Program - describes the program, Activities Accomplished in Fiscal Year 1998, and Activities Planned for Fiscal Year 1999;

Public Involvement - describes the program, Activities Accomplished in Fiscal Year 1998, and Activities Planned for Fiscal Year 1999;

High-Level Radioactive Waste Tank Systems - describes the program, Activities Accomplished in Fiscal Year 1998, and Activities Planned for Fiscal Year 1999;

Institutional Control Units - contains the certification that specific units are currently being restricted in accordance with institutional controls corrective actions. This section also contains the results of applicable field walkdowns and groundwater monitoring for those units;

Post-Record of Decision Groundwater Monitoring - contains the reports on applicable groundwater monitoring performed as required by the Records of Decision for those units;

Environmental Restoration Program Funding - contains funds vs. spend comparison information for the Environmental Restoration Program in Fiscal Year 1998;

Contractor Assignments - provides a list of contractors assisting SRS to meet its FFA requirements; and

List of Abbreviations and Acronyms.

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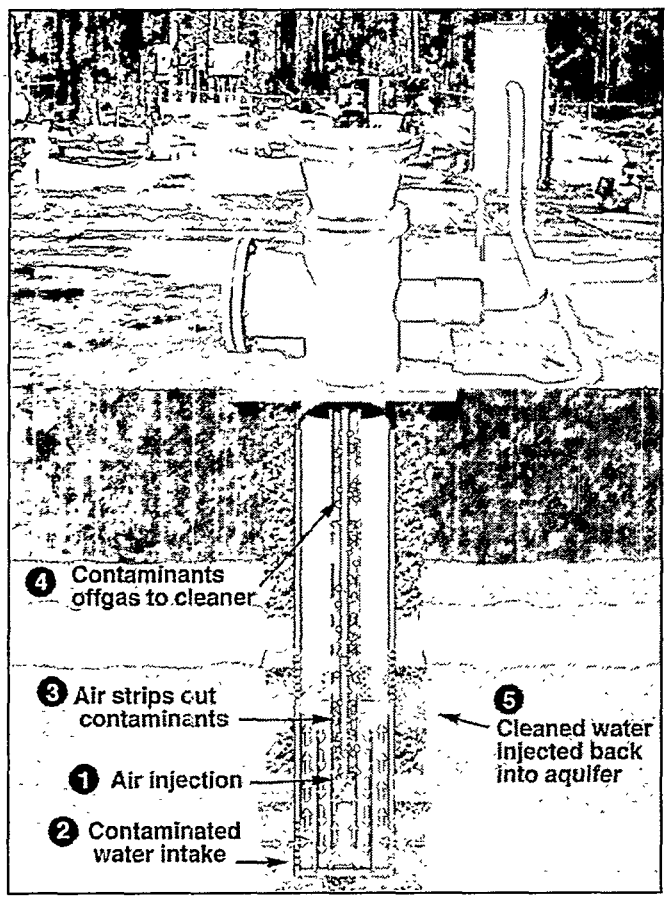
A/M and B Area Projects.....

Nine additional airlift recirculation wells were installed in Southern Sector this year, bringing the total to 12 wells.



This drawing shows multi-stage in-well aerator technology that will be tested at Southern Sector for future deployment at two other sites. Added baffling and sparging significantly increases stripping efficiency in the first pass through the groundwater treatment system.

The removal of chlorinated volatile organic compounds (CVOCs) from soil and groundwater continues as an important priority in A/M and B-Area. These CVOCs are the result of discontinued disposal practices used in the manufacture of components for defense nuclear reactors. Through 1998, over three billion gallons of groundwater have been treated and 700,000 plus pounds of CVOCS have been removed.

An important emphasis for the program in 1998 has been to increase efficiency of existing treatment systems and to deploy newer, more efficient cleanup technologies. Through hard work and innovation, the A/M Team has reduced hourly operating costs of existing treatment systems by 22 percent.

The best measure of successful cleanup, however, is that two of the six soil vapor extraction units (SVEUs) were shut down as removal rates fell below a preset threshold. The shut down of these SVEUs is the first step toward permanently closing down aggressive soil vapor extraction and switching the extraction wells to the passive BaroBall™ treatment method.

Also during 1998, the curtain of 12 recirculation wells for the Southern Sector of A/M-Area was completed with the installation of nine new wells. Attacking the 500 parts per billion concentration contour of the CVOC plume, recirculation well technology performs in situ stripping of the contaminant using air lift pumping in a concentric well configuration. Air pumped down the center well then travels upward in the outer well, lifting and stripping the contaminated groundwater. The stripped CVOC is exhausted to the atmosphere while the cleaned water is returned to the aquifer. The groundwater in the affected zone of the well is cycled through the system several times, adding to the efficiency of this cleanup. This remediation is done at about half the cost of conventional above ground air strippers.

This year, ER took airlift technology a step farther when it enhanced Recirculation Well #12 in the Southern Sector well using a multi-stage in-well aerator. Developed by Davis Environmental of California, the aerator adds sparging and extended pathways to the airlift design to increase removal efficiency. This new technology is expected to increase the single pass cleanup efficiency from 50% to over 90%.

Another accomplishment of note was the additional work at the Nonradioactive Waste Disposal Facility (NRWDF) in B-Area. A hazardous waste site under the Resource Conservation and Recovery Act, NRWDF is covered with the first geosynthetic closure cap system ever approved by the state of South Carolina for a hazardous waste site.

Continuing the frontrunner trend at NRWDF in technology deployments, this year ER finished installation of the two longest horizontal wells in the United States used for environmental purposes. After completion of associated infrastructure, the wells will be an important part of a new bioremediation system will begin delivery of methane and other microbe-stimulating nutrients. Once stimulated, the microbes will biodegrade respective trichloroethylene and vinyl chloride groundwater plumes.

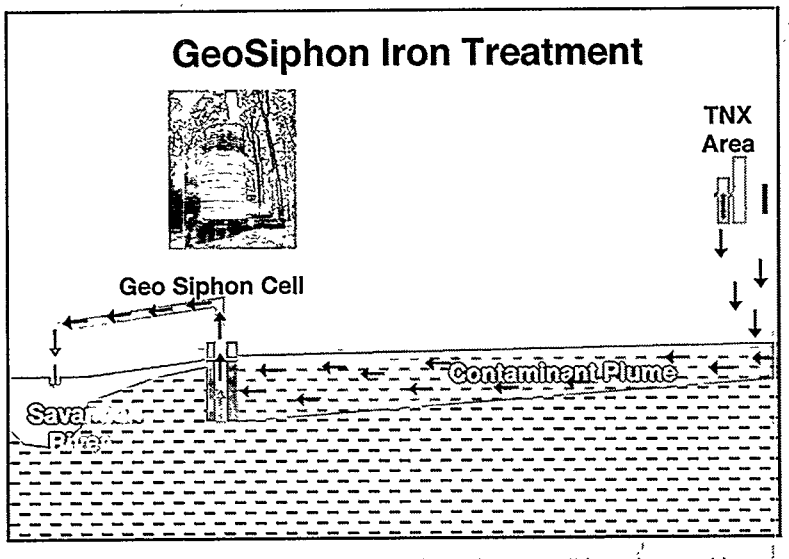
Not only has ER deployed effective, new technologies, the division is transferring these technologies to the private sector and to the Department of Defense. Both horizontal well and the BaroBall™ technology have moved into the private sector, and this year A/M-Area experts helped the Navy deploy in situ chemical oxidation at the Navy's King's Bay Facility in Georgia. Also known as Fenton's Chemistry, in situ chemical oxidation is a patented method for treating solvent-contaminated soils and groundwater by injecting strong oxidizers into the affected geologic formation. Through a chemical process, organic contamination is destroyed within the treatment region by conversion to carbon dioxide and water. This technology was successfully demonstrated in A/M-Area in 1997.

A/M-Area also sought increased success in faster, more accurate characterization during 1998. A forest-friendly piece of new equipment, a statistically significant characterization plan, and ER's new on site lab were all used at the A-Area Rubble Pile to perform characterization. Geotrack, a compact direct push track-rig, allowed technicians to get to sampling sites with minimal disturbance of foliage, yet maintain adequate control maneuvering through wooded terrain. The characterization plan, with preset criteria for step-out sampling locations, used the "real time" analytical laboratory results (24-hour turn-arounds) to accomplish a highly efficient determination of nature and extent of site contamination.

First and second photos: At NRWDF this year, horizontal wells and the above-ground infrastructure for the bioremediation system were both installed.

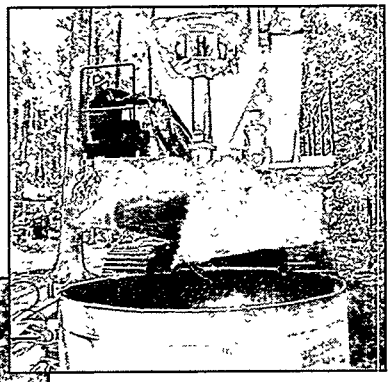
Third-Under the new EPA guidelines, volatile organic samples must be measured in the field. **Fourth**-The compact direct-push track-rig helps the project team take samples in small spaces.

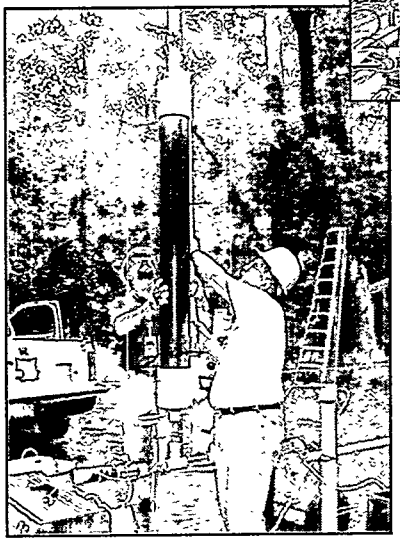
Central Savannah Watershed Projects.....



Natural groundwater flow through the GeoSiphon cell is enhanced by siphon action to the Savannah River.

Auger-caisson method used for efficient installation of 8-ft diameter by 2-ft tall cell.





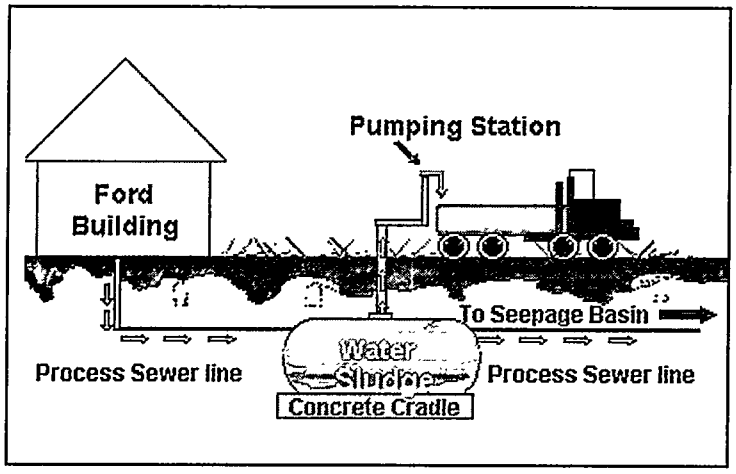
Offgas collection/ discharge chamber maintains siphon action through GeoSiphon cell.

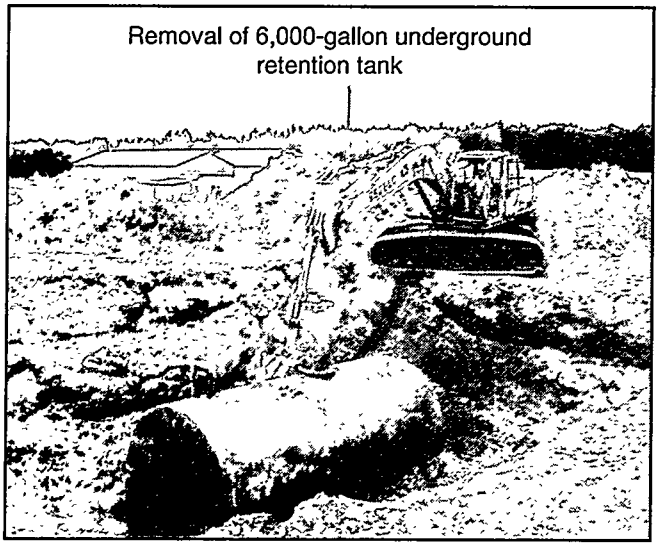
Three major achievements were realized in FY98 in the Central Savannah Watershed Projects Area. The GeoSiphon cell has been taken to new levels of remediation success. The team completed a critical removal action in the Central Shops Area, and D-Ash Basin had its field start.

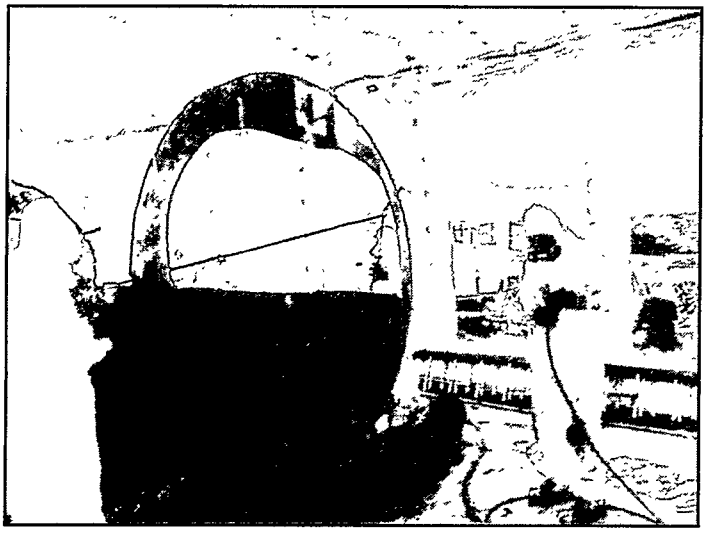
The GeoSiphon cell, a passive treatment system, continues to be an important emerging technology at the Savannah River Site. The cell, a large 8-foot diameter well, is installed by auger and caisson method. Packed with granular cast iron, it acts as the treatment media to remediate CVOC- contaminated groundwater. The first cell was installed in FY97.

During FY98, Phase II testing of the first cell began. The purpose of this testing is to determine acceptable siphon flow rates, the required cell spacing and demonstrate the overall concept and functionality of the technology. A second cell was installed September 14. This cell was placed approximately 50 feet south of the initial cell. Dual cell testing will begin next year and will evaluate the effectiveness of the two cells working in tandem.

An important FY98 remediation accomplishment for the Central Savannah Watershed team was the Ford Building Tank removal action. Located in the Central Shops Area, the Ford Building once refurbished previously decontaminated reactor heat exchanger units and other processing equipment. From 1964-1984, wastewater







Extensive radiation worker training and personal protective equipment prevent the spread of contamination during disassembly of the tank.

generated during these operations was piped to the 6,000-gallon retention tank and analyzed for radionuclides.

This wastewater was released from the Ford Building via an underground process sewer line to the underground retention tank. Materials in the tank were analyzed and either sent to the Ford Seepage Basin via an underground process line or were pumped into trucks for off-unit disposal.

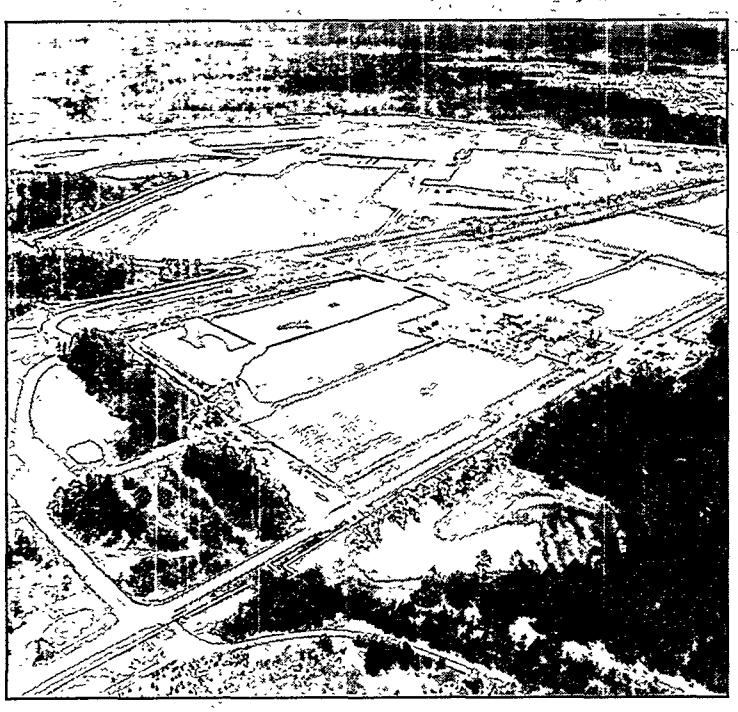
The basin received approximately 380,000 gallons of wastewater; primary radionuclides were tritium, cobalt-60, strontium-90, cesium-137, carbon-14, and various alpha-emitters. Other primary source materials included surfactants, cutting oils and solvents.

The time critical removal action was deemed necessary in 1997 when it was discovered that approximately 4,500 gallons of low-level radioactive water and nearly 150 gallons of low-level radioactive sludge remained in the tank. The project team completed removal of the tank in September FY98.

The Central Savannah Watershed Projects team also achieved a characterization field start at 488 D-Ash Basin (DAB) this year. The basin was put into operation in 1951 and received ash water from the D-Area powerhouse until 1952. However, after 1952, the basin received dry ash and coal reject material, while ash-sluice water went to other basins. The 488-DAB is inactive today and receives no additional waste materials. Of primary concern is an area of wetlands approximately 1250 ft. in length and 100 to 300 ft. in width located adjacent to the 488-DAB, which has been impacted by low pH runoff and leachate from the unit.

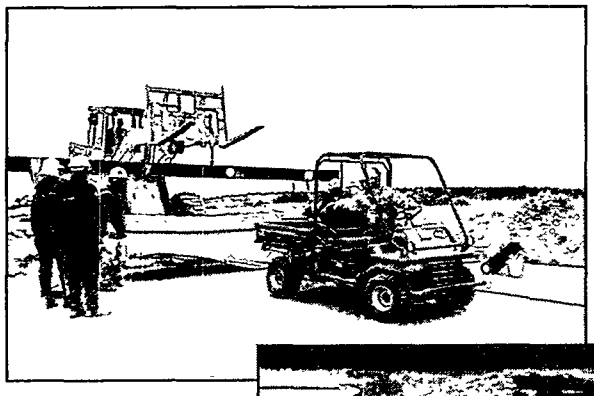
The field start for full characterization of D-Ash Basin started ahead of schedule on September 29. Characterization will focus on soil, surface water, groundwater and sediment sampling. Two plumes are under investigation. During the six-month characterization effort, 39 wells will be installed. These wells will help geologists define the boundaries of the two plumes as well as determine the extent of the contamination.

General Separations Projects.....



Within the General Separations Area are the Burial Ground Complex, the F and H Groundwater Treatment Facilities, and the Old F Seepage Basin. All three of the subareas have some relationship to the separations process that allowed the recovery of Plutonium-239 and Uranium-238 from targets and spent fuel rods. These separations processes are no longer performed at the site.

The Burial Ground Complex (BGC) occupies approximately 194 acres in the central section of the Savannah River Site (SRS) between F and H separation areas. The complex is divided into three former or present storage/disposal sites for hazardous and radioactive wastes from SRS activities. The three sites are called the Low-Level Radioactive Waste Disposal Facility (LLRWDF), the Old Radioactive Waste Burial Ground (ORWBG), and the Mixed Waste Management Facility (MWMF).



First photo: Aerial view of the Burial Ground Complex.
Middle photo: Capping at the Low-Level Radioactive Waste Disposal Facility.
Bottom photo: Technicians in protective clothing take samples from underground tanks.

Through FY98, approximately 95% of the inactive portions of the BGC have been capped. Geosynthetic capping over twenty five acres in the Low Level Radioactive Waste Disposal Facility will be completed by December 1998. Geosynthetic capping is faster, costs less, and still provides excellent protection from rainwater infiltration.

The ORWBG is the southern 76-acre portion of the complex that received wastes from 1952 through 1972. An Interim Action Native Soil Cover Cap was completed in October 1997 on the ORWBG to minimize infiltration of contaminants to the southwest groundwater plume. This year more attention has been focused on 22 underground storage tanks. The tanks once stored radioactive solvents.

SRS completed aqueous sampling and analysis activities of the solvent tanks and evaluated analytical data to determine the appropriate

alternative disposal methods for tank residuals. Analytical data on the solvent tank sludge will be provided prior to the evaluation of alternative disposal methods.

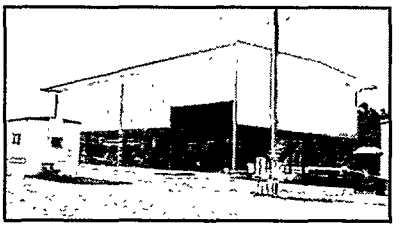
The 58-acre MWMF was closed in accordance with RCRA in 1991. At the Southwest Plume area of the MWMF, seep line sampling of surface water was conducted during the summer of 1998. This sampling was conducted to further evaluate groundwater movement and outcropping in this area. During 1998, the project team began evaluating the interim action that could be put in place in 1999 as the first step in managing the plume until a final comprehensive strategy can be put in place.

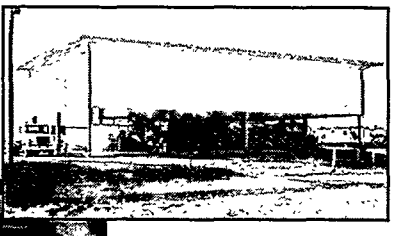
From 1958 until 1988, seven unlined basins covering 22 acres were used to dispose of radioactive wastewater from SRS separations facilities in F and H areas. All basins were closed and remediated with protective closure caps in 1991. However, contaminants have reached the groundwater in this area. Therefore, in FY97, ER installed two reverse osmosis water treatment facilities and thirty extraction wells. This remediation system reduces heavy metals, nitrates and radionuclides to groundwater protection standards and controls tritium migration.

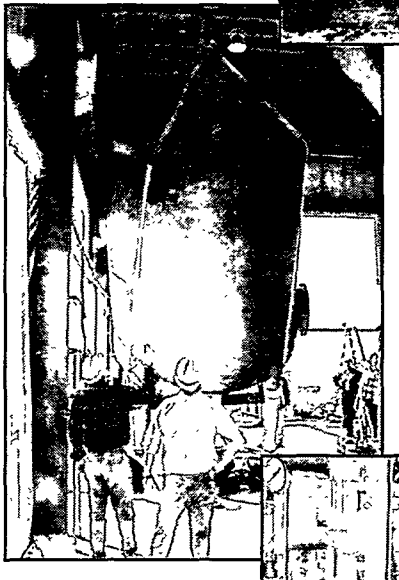
During FY98, the F and H Area Groundwater Treatment Units began full operation after receiving modifications to enhance system performance. Major components of the systems include reverse osmosis units, chemical flocculation tanks, ion exchange units, as well as collection and injection wells. Project engineers have replaced and/or modified many of these components to achieve capacity improvements in removing groundwater contaminants.

Finally, the Old F-Area Seepage Basin (OFASB) team completed a Federal Facility Agreement Milestone on September 10, 1998, nine days ahead of schedule. The milestone was for the remedial action start for the OFASB soil solidification project. The project scope includes in situ grouting of contaminated soils in the basin and installation of a low permeability engineered cap. The action began with the mobilization of subcontractor equipment, personnel, and trailers, and the use of ground-penetrating radar to prepare for the start of excavation activities.

The F-Area Water Treatment Facility (above) uses virtually the same design as the H-Area Facility (below). However, the processing capacity in F-Area is about twice that of the H-Area facility to satisfy requirements for hydraulic control of the tritium plume.



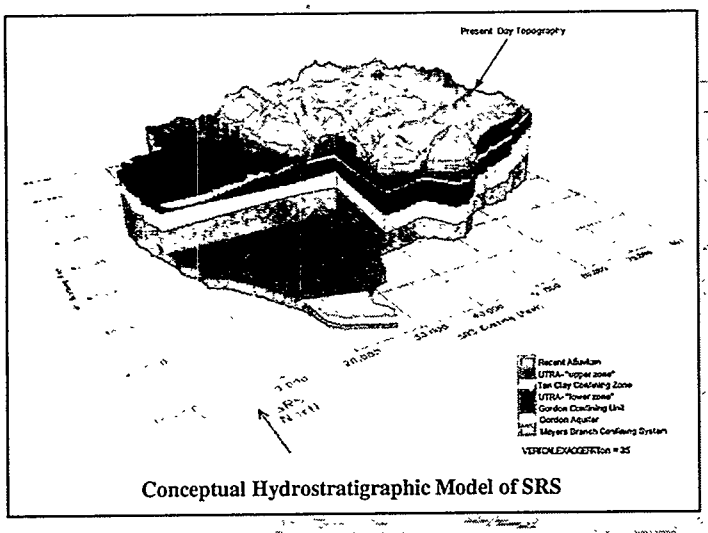




Modifications have been made to the F & H Groundwater Treatment units to improve efficiency.

The remedial action start for the Old F-Area Seepage Basin began nine days ahead of schedule.

Reactors Area Projects.....



Conceptual Hydrostratigraphic Model of SRS

The largest battery (above) uncovered at Pit 131-L weighed over 2,000 lbs.. Over 1300 batteries were excavated for recycling (right).

Removal action completed at Gas Cylinder Disposal Facility (bottom)

Several significant success stories came from the Reactors Area project team in FY98. The project team has delivered a regional groundwater model for all the reactor areas to focus characterization efforts, completed three removal actions, and accomplished more than 40 Federal Facility Agreement (FFA) milestones. Cleanup efforts in Reactor Areas have been accelerated in FY98 and will become an even higher priority in FY99.

For the first time at SRS, a regional groundwater flow model, which incorporates historical and recent field characterization data, was developed to encompass the five reactor areas. The model will be used to guide characterization activities, perform scoping analysis of contaminant transport, and serve as a common base for finer-scale transport and remedial/feasibility models within each reactor area.

During characterization activities at the L-Area Burning/Rubble Pit (131-L) in FY98, the project team discovered that a large number of zinc-mercury and lead-acid batteries had been disposed at the waste unit. A joint decision was made by the US Department of Energy (DOE), US Environmental Protection Agency, and South Carolina Department of Health and Environment Control to remove the batteries. Approximately 1300 batteries were excavated from the pit and will be shipped off site for metals recycling to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Off Site Rule approved facilities.

A Removal Action for the L-Area Rubble Pile (131-3L) and the L-Area Gas Cylinder Disposal Facility (131-2L) was completed in February 1998. Approximately 250 cubic yards of waste was removed from the Rubble Pile and 29 hazardous gas

cylinders were removed from the Gas Cylinder Disposal Facility. The majority of waste generated from the Rubble Pile removal was sanitary, however, polychlorinated biphenyls and Resource Conservation and Recover Act (RCRA) hazardous wastes were also removed. It was verified that the gas cylinders had been vented of hazardous gases during their disposal in the 1970s. All of the waste was shipped to CERCLA Off Site Rule approved facilities.

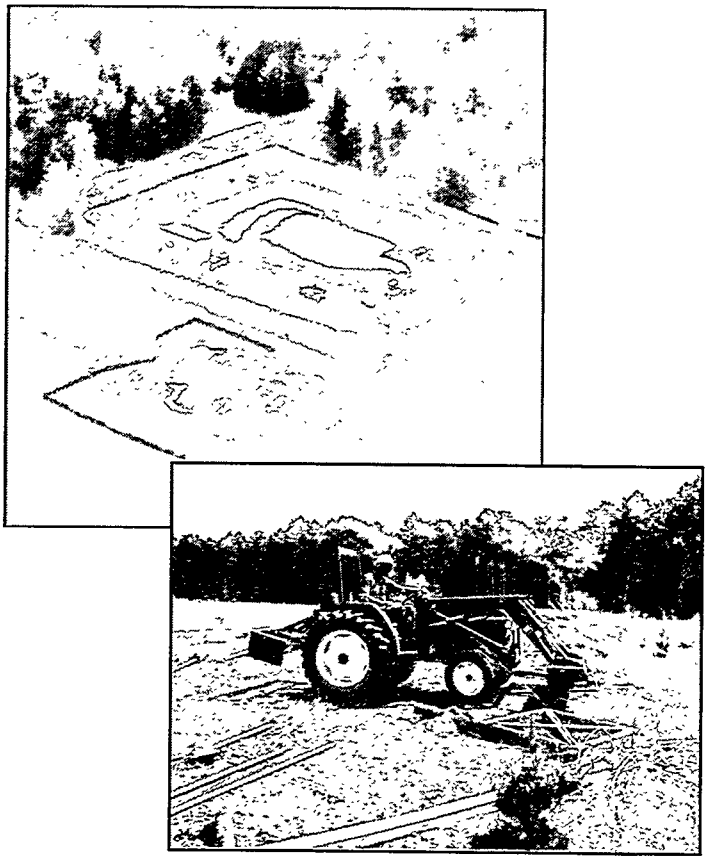
One of the major success stories of the year for the Environmental Restoration Division was the Remedial Action Start for the L-Area Oil and Chemical Basin (LAOCB) in late August 1998. The basin received radioactive and hazardous wastewater from the early 1960s through the 1970s that was not appropriate for discharge into local streams or other SRS treatment facilities. Grouting the entire basin will stabilize the contaminants remaining in the LAOCB. A low permeability soil cover will then be placed over the grouted basin.

The Reactors Area Project Team also removed and disposed of contaminated vegetation from within the K and C Reactor Seepage Basins. This removal was conducted in conjunction with the rollback of the Contamination Area to a Soil Contamination Area which enabled the realization of cost efficiencies.

Working closely with the US EPA and SCDHEC, the Reactors Area Project Team developed detailed implementation plans in support of the Plug-In approach to remediation for the C, K, L, and P Reactor Seepage Basins. The premise behind the strategy is that sites with similar characteristics will likely require a similar remedial action. Once initiated, this approach will expedite the remedial process.

Soil and groundwater samples were collected to complete the characterization of the L and P Reactor Seepage Basins. The data will be used to support the remediation method identified in the Plug-In-ROD.

Determination of the nature and extent of contamination at the R Reactor Seepage Basins was completed in 1998, after two years of field characterization. The Team used cone penetrometer technology equipment to determine the maximum extent of strontium-90 contamination in the groundwater. An experimental cone penetrometer technology Gamma Probe provided real-time data to expedite characterization of the radionuclides in the soils.



Top: aerial view of the L-Area Oil/Chemical Basin and the L-Area Acid Caustic Basin. **Middle:** Worker removing fence posts around the LAOCB.
Bottom: LAOCB with L Reactor in the background.

The Reactor Projects Team was successful in meeting 46 FFA milestones in FY98 for 33 waste units. This included the development, revision, and submittal of 41 documents and five Field Starts. The Team also performed three removal actions and pre-characterization field activities.

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OVERVIEW OF FISCAL YEAR 1998

The following is a brief synopsis of activities and accomplishments made by U.S. EPA, SCDHEC, and SRS throughout Fiscal Year 1998 for the following topics:

Annual Update of the FFA Appendices
Disputes
Extension Requests
FFA Implementation Plan
FFA Process Improvement Team
Field Activities
Land Use Restrictions
Records of Decision
Recovery Plan
Project Managers Meetings
Scoping and Comment Resolution Meetings
Status of Fiscal Year 1998 Milestones
Work Acceleration

A detailed explanation of the activities that occurred in each program is provided in the sections entitled, "Status of Operable Units," "Status of Site Evaluation Program," "Public Involvement," and "High-Level Radioactive Waste Tank Systems".

Annual Update of Appendices

SRS submits 4 appendices to the U.S. EPA and SCDHEC for their review/comment and approval each fiscal year:

- Appendix C - Due by October 30 of each year, this is the list of the RCRA/CERCLA Units;
- Appendix G - Due by October 30 of each year, this is the list of the Site Evaluation Areas;
- Appendix D - Due 15-business days after receipt of the annual budget allotment from DOE-Headquarters, this is the list of the current year milestones;
- Appendix E - Due by November 15 of each year, this is the list of the outyear milestones.

Appendices C and G

In accordance with the terms of the FFA, SRS submitted Revision.0 Appendices C, RCRA/CERCLA Units List and G, Site Evaluation Areas for Fiscal Year 1998 on September 30, 1997. The FFA provides a 120-day U.S. EPA and SCDHEC review/comment period and a 90-day SRS revision period. Although not specified in the FFA, the three Parties have agreed to a 30-day U.S. EPA- and SCDHEC-approval period. (The three dates for the review/comment, revision, and approval periods, based on a submittal date of September 30, 1997, were January 29, April 29, and May 29, 1998, respectively.)

U.S. EPA provided comments on July 2, 1998, and SCDHEC provided approval on April 14, 1998. Based upon the receipt of the U.S. EPA comments, SRS was required to address the comments and provide Revision.1 Appendices by September 30, 1998. SRS submitted Revision.1 Appendices on that date.

At the close of Fiscal Year 1998 on September 30, 1998, the three Parties had not finalized the Revision.1 Appendices C and G for Fiscal Year 1998. Although, the lack of approved Appendices C and G is technically interpreted as the Parties being in informal dispute, U.S. EPA, SCDHEC and SRS did not consider themselves in dispute over these Appendices. The lack of approved Appendices C and G does not affect the implementation of the FFA or the Environmental Restoration Program at the SRS.

Appendix D, Timetables and Deadlines

Appendix D is a list of the current fiscal year milestones. SRS, after receipt of their annual budget, develops the list of current year milestones based on the allocated funding.

In accordance with the terms of the FFA, Revision.0 Appendix D, Timetables and Deadlines for Fiscal Year 1998 was due to the U.S. EPA and SCDHEC by December 31, 1997. SRS submitted Revision.0 Appendix D on November 19, 1997. The FFA provides a 15-business day U.S. EPA and SCDHEC review/comment period and a 15-business day SRS revision period. Although not specified in the FFA, the three Parties have agreed to a 30-day U.S. EPA and SCDHEC approval period. The U.S. EPA and SCDHEC approved Revision.0 Appendix D on November 24 and December 30, 1997, respectively.

Appendix E, Long-Term Projections

Appendix E is a list of outyear milestones. The Parties use this appendix to develop an understanding of the resource needs that the implementation and oversight of the environmental restoration activities will require. In accordance with the terms of the FFA, SRS submitted Revision.0 Appendix E, Long-Term Projections for Fiscal Year 1998 on November 19, 1997. The FFA requires that U.S. EPA and SCDHEC provide comments by December 31, 1997, and that SRS respond to comments and provide a Revision.1 Appendix E by January 31, 1998. Although not specified in the FFA, the three Parties have agreed to a 30-day U.S. EPA- and SCDHEC-approval period.

U.S. EPA and SCDHEC provided comments on November 24 and December 30, 1997, respectively. SRS provided the Revision.1 and responses to comments on January 30, 1998. The U.S. EPA and SCDHEC approved the Revision.1 Appendix E on March 3 and March 20, 1998, respectively.

Disputes

Section XXVII, Resolution of Disputes of the FFA, provides procedures for the three Parties to follow in the event a dispute arises under the terms of the agreement. Section XXVII stipulates that the Parties are to make reasonable efforts to resolve disputes informally at the project manager or immediate supervisor level. If resolution cannot be achieved at that level, the formal procedures of Section XXVII are to be implemented to resolve the dispute.

The Parties entered Fiscal Year 1998 in informal dispute over Appendix E for Fiscal Year 1997. In accordance with the terms of the FFA, SRS submitted the Revision.0 Appendix E, Long-Term Projections for Fiscal Year 1997 on November 15, 1996. The FFA requires that U.S. EPA and SCDHEC provide comments by December 31, 1996, and that SRS respond to comments and provide a Revision.1 Appendix E by January 31, 1997. Although not specified in the FFA, the three Parties have agreed to a 30-day U.S. EPA- and SCDHEC- approval period.

U.S. EPA and SCDHEC provided comments on December 31, 1996. SRS provided Revision.1 and responses to comments on January 31, 1997. The U.S. EPA and SCDHEC provided additional comments on April 1, 1997. The SRS provided responses to comments and a Revised Revision.1 Appendix E on July 14, 1997. In a letter dated August 28, 1997, SCDHEC informed SRS that the Revision.1 Appendix E was in informal dispute.

Among the reasons the U.S. EPA and SCDHEC did not accept the July 14, 1997, Appendix E was a general feeling that the Appendix did not contain an adequate number of milestones for Fiscal Years 1998 and 1999. Specifically, they felt that the Appendix did not provide (1) replacement milestones for the three Remedial Action Starts that did not develop because they were No Further Action Records of Decision, (2) a replacement 1998 milestone for the Field Start moved from Fiscal Year 1998 into Fiscal Year 1997, (3) replacement milestones for those milestones deleted due to the Coal Pile Runoff Basins Removal Action, and (4) a replacement milestone for the Fire Department Hose Training Facility Remedial Action Start deleted due to a Removal Action.

The dispute was resolved with U.S. EPA and SCDHEC concurrence with the Appendix E for Fiscal Year 1997 documented in a letter dated October 6, 1997.

The Parties did not enter into a declared informal or formal dispute in Fiscal Year 1998.

Extension Requests

The FFA provides for two types of extensions: an Extension Notification and an Extension Request.

An Extension Notification is covered under the terms of Section XXII, Review/Comment on Documents, Subsection G Review and Comment on Documents. U.S. EPA or SCDHEC may extend their review/comment period up to 30-days, and SRS may extend its revision period up to 30-days. These extensions require the notifying party to provide written notification of the extension. These extensions do not require the other Parties approval. However, if an Extension Notification impacts a subsequent milestone, it may necessitate the submittal of an Extension Request. During Fiscal Year 1998, SRS submitted 3 Extension Notifications.

An Extension Request is covered under the terms of Section XXXI, Extensions. SRS is responsible for preparing all Extension Requests. Extension Requests require approval of U.S. EPA and SCDHEC. In the event that U.S. EPA or SCDHEC does not respond to an Extension Request within 14-business days of its receipt, the extension is granted.

During Fiscal Year 1998 the SRS submitted 15 Extension Requests. The U.S. EPA and SCDHEC granted 13 Extension Requests and rejected 2 Extension Requests. A summary of Extension Notifications and Extension Requests is provided in Table 1.

FFA Implementation Plan

The Parties finalized the FFA Implementation Plan (FImP) during the first quarter of Fiscal Year 1998. This document is a dynamic document and is revised and added to as the SRS Environmental Program evolves, as new U.S. EPA and SCDHEC guidance is developed, and as the Parties reach agreement on protocols.

U.S. EPA and SCDHEC approved the Revision.0 FImP in December 1996. The Parties continued to work on the FImP Bin List (Section 7.0 of the FImP). Agreed to topics from the Bin List resulted in the preparation of a Revision.1 FIP that SRS submitted for U.S. EPA and SCDHEC approval in February 1997.

During Fiscal Year 1998, progress continued on refinement of the FImP. Throughout the year the Parties finalized protocols for scoping and preparation of RFI/RI Work Plans, RFI/RI and Baseline Risk Assessment Reports, and Statement of Basis/Proposed Plans. The format of the FImP itself was revised during Fiscal Year 1998. This change was adopted to facilitate additions of new material to the FImP and to aid the Parties in using the document. The Parties intend to issue a Revision.2 FImP in Fiscal Year 1999.

Table 1. Summary of Extension Requests and Notifications in Fiscal Year 1998

Date	Extension Type: Unit Affected	Milestone Affected	Party Requesting or Notifying: Reason for Extension Request or Notification	Outcome
10/07/97	Request: Integrator Operable Units	Submittal of the Revision.0 Fourmile Branch IOU Work Plan	U.S. DOE: The scope of the IOU work plans was expanded and additional time necessary due to the additional work agreed to by U.S. EPA, SCDHEC, and SRS.	U.S. EPA and SCDHEC granted the extension request.
12/08/97	Request: H-area Tank Farm Groundwater Operable Unit	Submittal of the Revision.0 Record of Decision	U.S. DOE: An additional 15-days was added to the public comment period for the Statement of Basis/Proposed Plan and additional time was needed to resolve U.S. EPA and SCDHEC comments on the CMS/FS.	U.S. EPA and SCDHEC granted the extension request.
12/12/97	Request: A-Area Burning/Rubble Pits and Rubble Pit	Final Record of Decision	U.S. DOE: U.S. EPA and SCDHEC requested the resubmittal of the Revision.0 Record of Decision document and additional time to review the document.	U.S. EPA and SCDHEC granted the extension request.
01/23/98	Request: A-Area Burring/Rubble Pits and Rubble Pit	Submittal of the Revision.1 Record of Decision	U.S. DOE: SCDHEC questioned the selection of the preferred remedy and requested that U.S. DOE evaluate additional remedies. Additional time was necessary to perform these tasks.	U.S. EPA and SCDHEC granted the extension request.
02/03/98	Request: A-Area Burning/Rubble Pits and Rubble Pit	Final Record of Decision	U.S. DOE: SCDHEC questioned the selection of the preferred remedy and requested that U.S. DOE evaluate additional remedies. Additional time was necessary to perform these tasks.	U.S. EPA and SCDHEC granted the extension request.

Table 1. Summary of Extension Requests and Notifications in Fiscal Year 1998 (Continued)

Date	Extension Type: Unit Affected	Milestone Affected	Party Requesting or Notifying: Reason for Extension Request or Notification	Outcome
02/09/98	Request: C-Area Burning/Rubble Pit	Submittal of the Revision.0 CMS/FS	U.S. DOE: U.S. EPA and SCDHEC recommended that the schedule be extended to allow time to develop an operable unit strategy that included an interim action.	U.S. EPA and SCDHEC granted the extension request.
02/26/98	Request: A-Area Burning/Rubble Pits and Rubble Pit	Submittal of the Revision.1 Record of Decision	U.S. DOE: U.S. EPA, SCDHEC, and U.S. DOE were considering changing the selected soils remedy. Additional time was necessary to evaluate this decision.	U.S. EPA and SCDHEC granted the extension request.
03/05/98	Request: A-Area Burning/Rubble Pits and Rubble Pit	Submittal of the Revision.1 Record of Decision	U.S. DOE: U.S. EPA, SCDHEC, and U.S. DOE agreed that it was necessary to revise the preferred remedy as listed in the Statement of Basis/Proposed Plan that had been issued for public comment. As a result it was neccssary to revise the Statement of Basis/Proposed Plan, reissue it for public comment, and prepare a revised Record of Decision. Additional time was necessary to accommodate these tasks.	U.S. EPA and SCDHEC granted the extension request.
03/06/98	Request; H-Area Tank Farm Groundwater Operable Unit	Submittal of the Revision.0 Record of Decision	U.S. DOE: U.S. EPA, SCDHEC, and U.S. DOE agreed that additional groundwater characterization was necessary to support the Groundwater Mixing Zone and to finalize the CMS/FS.	SCDHEC rejected the extension request, requesting that additional details on the characterization plans be provided.

Table 1. Summary of Extension Requests and Notifications in Fiscal Year 1998 (Continued)

Date	Extension Type: Unit Affected	Milestone Affected	Party Requesting or Notifying: Reason for Extension Request or Notification	Outcome
03/11/98	Request: F-Area Retention Basin	Submittal of the Revision.0 Record of Decision	U.S. DOE: The 45-day public comment period for the Statement of Basis/Proposed Plan was extended at the request of a member of the public. The extended public comment period affected the submittal of the Revision.0 Record of Decision.	U.S. EPA and SCDHEC granted the extension
03/26/98	Request: H-Area Tank Farm Groundwater Operable Unit	Submittal of the Revision.0 Record of Decision	U.S. DOE: The extension request provided the additional detail as requested by SCDHEC in their rejection of the 03/06/98 extension request for this unit.	U.S. EPA and SCDHEC granted the extension request.
05/04/98	Notification: SRL Seepage Basins	Submittal of the Revision.1 RFI/RI & Baseline Risk Assessment, the CMS/FS, the Combined Document, and the Proposed Plan	U.S. DOE: An additional 30-days was needed for U.S. DOE to address extensive U.S. EPA and SCDHEC comments on the CMS/FS.	This extension notification did not affect any subsequent milestones.
05/22/98	Notification: L-Area Oil/Chemical and Acid/Caustic Basins	Submittal of the Revision.1 CM/RDR/RA Work Plan	U.S. DOE: An additional 30-days was needed for U.S. DOE to address SCDHEC comments on the Revision.0 document.	This extension notification did not affect any subsequent milestones.

Table 1. Summary of Extension Requests and Notifications in Fiscal Year 1998 (Continued)

Date	Extension Type: Unit Affected	Milestone Affected	Party Requesting or Notifying: Reason for Extension Request or Notification	Outcome
06/01/98	Request: SRL Seepage Basins	Submittal of the Revision.1 RFI/RI & Baseline Risk Assessment, the CMS/FS Combined Document, and the Proposed Plan	U.S. DOE: U.S. EPA, SCDHEC, and U.S. DOE agreed at a comment resolution meeting to increase the number of remedial alternatives listed in the CMS/FS from 5 to 11. Additional time was necessary for U.S. DOE to evaluate the additional alternatives and to prepare the document.	U.S. EPA and SCDHEC granted the extension request.
07/14/98	Request: R-Area Bingham Pump Outage Pits	Submittal of the Revision.1 RI & Baseline Risk Assessment	U.S. DOE: A contaminated plume was discovered at the unit. This plume required further characterization.	U.S. EPA and SCDHEC granted the extension request.
08/11/98	Notification: SRL Seepage Basins	Submittal of the Revision.1 Statement of Basis/Proposed Plan	U.S. DOE: U.S. EPA, SCDHEC, and U.S. DOE agreed that additional time was needed to resolve comments on the CMS/FS prior to the submittal of the Statement of Basis/Proposed Plan.	The Extension Notification did not affect any subsequent milestones.

FFA Process Improvement Team

In Fiscal Year 1997 the Parties recognized a need to develop a team of people with representatives from each Agency to identify, prioritize, and resolve programmatic and technical issues. These issues are listed in Section 7.0 of the Federal Facility Agreement Implementation Plan and are commonly referred to as the Bin List. This team is referred to as the FFA Process Improvement Team (FPIT).

The FPIT held 6 meetings approximately every other month from October 1997 through September 1998. FPIT accomplishments in Fiscal Year 1998 included the finalization of an Early Response Action Strategy, 14 RFI/RI and Baseline Risk Assessment document preparation protocols, 2 programmatic protocols, and 2 document outlines. The FPIT initiated development of a Groundwater Strategy and Post-Record of Decision document outlines and is in the process of finalizing a revision to the document scoping process flowchart. In addition, several design teams were established to focus on programmatic issues (ecological risk assessment, data management, and Post-Record of Decision document development).

Among the topics that FPIT will address in Fiscal Year 1999 are the finalization of the Groundwater Strategy, Statement of Basis/Proposed Plan and Record of Decision Checklists, and Post-Record of Decision document outlines and refinement of FFA Appendix F, Prioritization, and administrative protocols.

Field Activities

The Parties initiated RCRA Facility Investigation/Remedial Investigations on 8 units in Fiscal Year 1998: 3 R-Area Reactor Seepage Basins, P-Area Burning/Rubble Pit, A-Area Miscellaneous Rubble Pile, L-Area Burning/Rubble Pit and Rubble Pile, Ford Building Seepage Basins, and H-Area Retention Basin. The Parties intend to initiate RCRA Facility Investigation/Remedial Investigations at approximately 4 units in Fiscal Year 1999.

Remedial Actions were initiated and completed at 6 units in Fiscal Year 1998: 2 D-Area Burning/Rubble Pits, 3 F-Area Burning/Rubble Pits, and Silverton Road Waste Site.

Remedial Actions were initiated at 2 units in Fiscal Year 1998: L-Area Oil and Chemical Basin and Old F-Area Seepage Basin.

The following Remedial Actions, which were initiated prior to Fiscal Year 1998, were continued in Fiscal Year 1998: installation of the cover at the Old Radioactive Waste Burial Ground, the groundwater interim actions on the TNX Groundwater Operable Unit, the F- and H-Area Hazardous Waste Management Facilities, the M-Area Hazardous Waste Management Facility, the Mixed Waste Management Facility, and the A/M Area

Groundwater Operable Unit. Of these actions, the construction activities for the installation of the cover at the Old Radioactive Waste Burial Ground was completed on February 18, 1998, and the Post-Construction Report was submitted on July 10, 1998. Removal Actions were performed at 7 units in Fiscal Year 1998: vegetation removals were performed at the 4 SRL Seepage Basins and the 3 C-Area Reactor Seepage Basins.

Land Use Restrictions

On April 21, 1998, U.S. EPA-Region IV established their Federal Facilities Branch policy on measures to be taken to ensure the long-term effectiveness of land use restrictions being relied upon to protect human health and the environmental at federal facilities undergoing remediation pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA). The policy is entitled, "Assuring Land Use Controls at Federal Facilities". The purpose of this Region IV policy is to establish uniform requirements for efficient oversight of land use restriction remedy components at federal facilities within Region IV and to clarify the U.S. EPA-Region IV expectations and criteria for concurring on remedies including land use restrictions.

The policy required that SRS prepare a *Land Use Control Assurance Plan.* SRS provided a schedule for the finalization of the Plan to U.S. EPA and SCDHEC in July 1998. This schedule listed SRS submittal of the Plan by August 14, 1998, receipt of U.S. EPA and SCDHEC comments by October 15, 1998, with the SRS submittal of the revised Plan 30-days after receipt of comments, and the goal to finalize the Plan by December 16, 1998. SRS provided the Plan to the U.S. EPA and SCDHEC for review and comment on August 14, 1998. The Parties intend to finalize the Plan during Fiscal Year 1999.

Records of Decision

The Parties issued 4 Records of Decision for 5 units in Fiscal Year 1998: L-Area Oil/Chemical Basin, L-Area Acid/Caustic Basin, K-Area Bingham Pump Outage Pit, Fire Department Hose Training Facility, and 716-A Motor Shop Seepage Basin. The Parties intend to issue approximately 6 Records of Decision in Fiscal Year 1999.

Recovery Plan

In March 1997, U.S. EPA, SCDHEC, and SRS met to discuss their concerns over SRS's submittal of extension requests. SRS had been submitting extension requests for additional time needed to revise documents (specifically RFI/RI and Baseline Risk Assessment Reports and Corrective Measures Studies/Feasibility Studies) for various reasons, including protocol and operable unit strategy inconsistencies.

The Parties recognized that standardization of remedial assessment documents was needed to ensure consistency in the way operable units are evaluated, and held a working

meeting in April 1997 to identify the protocol changes that were necessary. As a result of this meeting, SRS developed a Document Protocol Matrix that identified the protocols for each type of document and the actual protocol utilized to create each unit-specific document.

The Parties determined that all documents that had not been prepared using previous protocols were to conform to the newly agreed to protocols to improve primary document quality and consistency. The Parties also recognized that time would be necessary to re-work some documents, which would impact the implementation schedules for affected units. The 8 units affected were C-Area Burning/Rubble Pit, CMP Pits, D-Area Oil Seepage Basin, F-Area Retention Basin, K-Area Burning/Rubble Pit and Rubble Pit, K-Area Reactor Seepage Basin, Miscellaneous Chemical Basin/Metals Burning Pit, and the TNX Operable Unit. SRS developed a plan entitled, "Recovery" that provided schedules to rework documents. Recovery was transmitted to U.S. EPA and SCDHEC on April 28, 1997. U.S. EPA and SCDHEC responded to the Recovery Plan on May 29, 1997, further defining their expectations.

The Recovery Plan was designed to allow the Parties sufficient time to rework the necessary documents while attempting to maintain the planned Remedial Action Start date for the affected units. SRS revised the Recovery Plan, including implementation schedules for the affected units, and resubmitted it on July 14, 1997. U.S. EPA and SCDHEC, in a letter dated September 5, 1997, approved the July 14, 1997, Recovery Plan, noting that their approval did not extend any milestone commitments.

During Fiscal Year 1998, the following units were removed from the Recovery for the reason indicated:

K-Area Burning/Rubble Pit and Rubble Pit – SRS provided U.S. EPA and SCDHEC with a revised strategy to address this unit in a letter dated January 16, 1998. U.S. EPA and SCDHEC approved the revised strategy in letters dated January 28 and February 24, 1998, respectively.

K-Area Reactor Seepage Basin – The three Parties agreed to address the unit under the Plug-In Approach.

C-Area Burning/Rubble Pit –SRS provided U.S. EPA and SCDHEC with a revised strategy to address this unit in a letter dated February 9, 1998. U.S. EPA and SCDHEC approved the revised strategy in letters dated February 20, 1998.

The following units remain in the Recovery. A synopsis of their status is provided (Refer to the unit-specific descriptions in the Status of Operable Units Section).

CMP Pits – The three Parties determined in September 1998 that an Interim

Action is appropriate for the unit. As such, SRS will provide a revised strategy and implementation schedule for U.S. EPA and SCDHEC approval in First Quarter Fiscal Year 1999. Upon U.S. EPA and SCDHEC approval of the revised strategy and implementation schedule, the unit will be removed from Recovery.

D-Area Oil Seepage Basin – All milestones have been met for this unit during Fiscal Year 1998. This unit will be removed from Recovery in Fiscal Year 1999 when SRS attains the Remedial Action Start date of September 3, 1999.

F-Area Retention Basin – All milestones have been met for this unit during Fiscal Year 1998. This unit will be removed from Recovery in Fiscal Year 1999 when SRS attains the Remedial Action Start date of April 4, 1999.

Miscellaneous Chemical Basin/Metals Burning Pit – The three Parties determined in September 1998 that an Interim Action is appropriate at the unit. As such, SRS will provide a revised strategy and implementation schedule for U.S. EPA and SCDHEC approval in First Quarter Fiscal Year 1999. Upon U.S. EPA and SCDHEC approval of the revised strategy and implementation schedule, the unit will be removed from Recovery.

TNX Operable Unit - All milestones have been met for this unit during Fiscal Year 1998. This unit will be removed from Recovery in Fiscal Year 2000 when SRS attains the Remedial Action Start date of July 18, 2000.

Project Managers Meetings

Section XXII of the FFA requires U.S. EPA, SCDHEC, and U.S. DOE to designate Project Managers. The Project Managers are to meet approximately every 45 days to review and discuss the progress of work being performed at SRS. U.S. EPA, SCDHEC, and U.S. DOE FFA Project Managers discussed the frequency of the meetings at the March 19, 1998, FFA Project Managers Meeting. At that meeting they agreed they were fulfilling the intent of FFA Section XXII through the many other phone calls and meetings held throughout any given month. They subsequently agreed that the FFA Project Managers Meetings will be held bi-monthly, on the odd-numbered months.

Scoping and Comment Resolution Meetings

The Parties hold document scoping meetings and comment resolution meetings on U.S. EPA and SCDHEC comments on primary documents. Approximately 80 of these meetings were held in Fiscal Year 1998. Details on these meetings are provided in the section of this report entitled, "Status of Operable Units."

Status of Fiscal Year 1998 Milestones

The Revision.0 Appendix D for Fiscal Year 1998 listed 80 milestones. These milestones were the submittal of primary documents, submittal of annual updates to the FFA Appendices, submittal of Site Evaluation Reports for 24 areas, submittal of supporting documents, the initiation of RFI/RI Field Starts and Remedial Action Starts, and the issuance of Records of Decision.

The 5 milestones associated with the Plug-In Revision.0 Record of Decision Submittal and the final Plug-In Record of Decision and the K-Area Reactor Seepage Basin were not accomplished in Fiscal Year 1998 although they were listed on the Appendix D. These milestones were footnoted to indicate that in the event the Plug-In Record of Decision was submitted to U.S. EPA for review by the Remedy Review Board, this review would impact the schedules for attaining these 5 milestones. The Plug-In Record of Decision was submitted by U.S. EPA to the Remedy Review Board and consequently these milestones could not be attained. These milestones were not considered "missed" by U.S. EPA and SCDHEC and no fines or penalties were assessed. All enforceable milestones were met on or before the due date listed in Appendix D.

Work Acceleration

The Parties are continually striving to streamline documentation and accelerate field activities (both characterization and remedial actions). The Parties continued the work they began in Fiscal Year 1997 to develop a Plug-In Record of Decision for the radioactive basins. The use of a Plug-In Record of Decision streamlines the RI/FS process in several ways, for example, through the elimination of redundant documents and through accelerating the time between characterization and initiation of the remedial action. The Parties had intended to issue the Plug-In Record of Decision in Fiscal Year 1998. However, the schedule was adversely impacted because the Record of Decision required a review by the U.S. EPA Remedy Review Board. The time required by the Board to review the Record of Decision and the significant comments provided by the Board resulted in the Parties being unable to issue the Record of Decision in Fiscal Year 1998. The Parties intend to issue the Plug-In Record of Decision during Fiscal Year 1999.

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STATUS OF FOURMILE BRANCH WATERSHED OPERABLE UNITS

FOURMILE BRANCH WATERSHED OPERABLE UNIT 1

Burial Ground Complex Groundwater (associated with Mixed Waste Management Facility)

Operable Unit 1 of the Fourmile Branch Watershed includes the groundwater beneath the Burial Ground Complex (BGC). The BGC Groundwater consists of three defined plumes: Southwest Plume, Northwest Plume, Northeast Plume, and one plume requiring further characterization, the Southeast Plume. This operable unit is associated with the Mixed Waste Management Facility listed on FFA Appendix H. Activities on this unit are SCDHEC-led RCRA actions.

Description

The BGC occupies approximately 194 acres in the central part of SRS between the F and H Separations Areas. The BGC consists of several adjacent facilities that were former disposal sites for hazardous and radioactive wastes and spent solvents generated from plant processes. It is divided into a northern area (118 acres) and a southern area (76 acres). The southern region, named the Old Radioactive Waste Burial Ground (ORWBG) (643-E), began receiving radioactive wastes in 1952 and was filled in 1972. The ORWBG also contains twenty-two underground tanks (650-01E - 22E), which were once used for the storage of spent radioactive solvents. By 1972, all radioactive waste disposal activities had moved to the northern area.

The northern area is called the Low-Level Radioactive Waste Disposal Facility (LLRWDF) (643-7E) and began initial waste receipt in 1970. A portion of the LLRWDF, the Mixed Waste Management Facility (MWMF), was closed in April 1991 utilizing a cap in accordance with an SCDHEC-approved RCRA Closure Plan. The RCRA status of the MWMF was necessitated by the inadvertent disposal of radioactively contaminated hazardous waste into the trenches. It was later determined that another portion of the LLRWDF had received radioactive contaminated hazardous wastes. This area is currently in the process of closure in accordance with a RCRA Closure Plan. Other portions of the LLRWDF that receive or have received low-level radioactive wastes include Transuranic Waste Storage Pads (TRU Pads), Greater Confinement Disposal Engineered Trench and Boreholes, engineered trenches, and slit-trenches (Non-RCRA portion of LLRWDF).

Activities Accomplished Prior to Fiscal Year 1998

An extensive system of groundwater monitoring wells around the BGC is monitored by SRS. Currently, 144 wells monitor groundwater quality in the uppermost aquifer beneath the BGC. Samples from the wells are analyzed for selected heavy metals, indicator parameters, radionuclides, VOCs, and other constituents. Current data indicate that

metals, radionuclides, tritium, and VOCs have been released to the groundwater.

Characterization efforts at the BGC to determine the vertical and horizontal extent of groundwater and vadose zone soil contamination are conducted in accordance with the SCDHEC-approved BGC Field Investigation Plan (FIP). The BGC FIP includes installation of monitoring wells to characterize groundwater, collection of soil and surface water samples, direct push technology for collection of groundwater samples, and aquifer testing. Phase I characterization of the BGC FIP was approved in March 1994 by SCDHEC.

Phase I ecological and hydrogeological activities for the BGC FIP included a collection of wetland soil and water samples and ambient air monitoring for tritium along the Old F-Area Effluent Stream seep line south of the BGC; installation of 12 groundwater monitoring wells to characterize the groundwater divide; collection of 78 deep soil-gas samples; and completion of initial hydrogeological characterization southwest of the BGC at 35 locations near the Old F-Area Effluent Stream Area (5 cores, geophysical logs, cone penetrometer data, water samples). Other field activities included abandonment of non-RCRA wells on the southern perimeter of the BGC. Preliminary Data Report #1 was submitted to SCDHEC and U.S. EPA on January 31, 1995.

In Fiscal Year 1995, phase II of the BGC FIP was implemented. Activities included cone penetrometer soil and water sampling; coring and geophysical logging; 11 groundwater monitoring well installations; and Hydropunch® water sampling at approved locations around the perimeter of the BGC. Ecological activities included soil and water sampling, soil and water toxicity testing, and biological tissue sampling in the F-Area Effluent Stream area. An ecological database was prepared for the Southwest Plume area (F-Area Effluent Stream). Preliminary Data Report #2 was submitted to SCDHEC in April 1996.

The MWMF (including the RCRA-regulated portions of LLRWDF) is listed as a RCRA unit in Appendix H of the FFA. The unit is considered an Interim Status Treatment/Storage/Disposal (TSD) facility. The MWMF RCRA Part B Post-Closure Care Permit Application, Revision 2, was submitted to SCDHEC for review in November 1993.

All groundwater associated with the burial ground complex is being addressed under the RCRA Permit for the MWMF in accordance with the Settlement Agreement 87-52-SW, second amendment, signed in September 1995. Revision 3, November 15, 1995, of the RCRA Part B Permit Application for the MWMF identifies three groundwater plume areas (Southwest Plume, Northwest Plume, and Northeast Plume) at the BGC and proposes a phased, plume-by-plume approach to assessment and remediation of each of the plumes.

Southwest Plume
The Southwest Plume is fully characterized. The nature and extent of the plume of contamination has been documented in the RCRA Part-B permit application (Revision 3, November 1995). The ACL/MZ proposes risk-based levels as Groundwater Protection Standards (GWPS) for constituents detected in the plume. Two contaminants, tritium and tetrachloroethylene, exceed the ACL/MZ proposed limits and will require remediation. Evaluation of corrective action alternatives continues while SCDHEC reviews the permit application.

Northwest and Northeast Plumes
The detection of these plumes has been identified in the RCRA permit application. Field investigation activities in the Northwest and Northeast Plumes are complete except for aquifer testing. Results of the characterization have been submitted to SCDHEC as part of Field Investigation Plan Report #2. The hydrogeologic characterization will also be submitted to SCDHEC as a revision to the permit application. Future work includes preparation of an ACL/MZ demonstration for each plume.

Southeast Plume
The Southeast Plume was not identified or discussed in the RCRA Part-B permit application. Detection of this plume has been identified in the FIP report #2. Characterization of the Southeast Plume is underway. This plume is in close proximity to the injection wells for the H-Area seepage basin groundwater remediation project. Further actions will depend on the results of the characterization activity. After characterization is complete, the delineation of the nature and extent of this plume will be submitted to SCDHEC as a revision to the permit application.

SRS submitted the Revision 3 MWMF RCRA Part-B Post-Closure Care Permit Application on November 15, 1995, in accordance with the settlement agreement. This revision represented a phased approach for the three groundwater plumes (Southwest Plume, Northwest Plume, and Northeast Plume) underneath the BGC.

Quarterly meetings to discuss issues pertinent to the MWMF RCRA Part-B Post-Closure Care Permit Application were held in November 1995, January 1996, June 1996, and September 1996.

On August 13, 1996, SRS submitted the Revision 4 MWMF RCRA Part-B Post-Closure Care Permit Application to SCDHEC. This revision included ACL/MZ risk-based cleanup levels for remediation of the Southwest Plume. The seven constituents of concern (COCs) were identified as 1,1-dichloroethylene, carbon tetrachloride, tetrachloroethylene, trichloroethylene, radium, tritium, and uranium-238. Two of the COCs, tetrachloroethylene and tritium, exceed the ACL/MZ risk-based cleanup limits and are proposed for remediation.

Groundwater characterization efforts, in accordance with the BGC FIP, continued during Fiscal Year 1996. Cone penetrometer and Hydropunch® pushes were made at 67 locations around the BGC to delineate the Southwest, Northwest, and Northeast Plumes. Shallow well, stream water, wetland water, and soil sediment samples were collected from the Old F-Area Effluent Stream to support ecological investigations for the Southwest Plume. Eleven monitoring wells were installed along the groundwater divide to better characterize the effect of the divide on contaminant transport. Data Report #2 for the BGC FIP was issued to SCDHEC on April 29, 1996. This data report summarized these activities in addition to the background soil sampling activities conducted around the BGC and the General Separations Area.

SRS continued work throughout Fiscal Year 1997 on technology selection for remediation of the Southwest Plume, on groundwater modeling to support the corrective action planning, and on characterization of the Southeast Plume.

Additional groundwater characterization was conducted at the Southeast Plume area during the summer of 1997. This groundwater characterization included installation of six multi-screened wells. These wells are different from traditional wells in that the samples will be collected from depth-discrete intervals instead of from a standard elevation. This provides for additional samples to be collected from the locations where higher levels of groundwater contamination resides. These are currently on the southwest monitoring program.

Activities Accomplished in Fiscal Year 1998

SCDHEC issued a Notice of Deficiency (NOD) on revisions 3 and 4 of the MWMF RCRA Part-B Permit Application in May 1998. A majority of the NODs were centered on the ACL demonstration and MZ request of the revision 4 Permit Application. SRS submitted responses to the NODs to SCDHEC with a revision 5 Part-B Permit Application in August 1998. The application proposes alternate groundwater protection standards versus an ACL/MZ and a corrective action schedule. The corrective action schedule depicts the approach to implementing future corrective actions at the MWMF.

Seep line sampling of surface water was conducted during the summer of 1998 at the Southwest Plume area of the MWMF. This sampling was conducted to further evaluate groundwater movement and outcropping in this area.

Comments on a Revision 0 Aquifer Test Plan were received from SCDHEC in May 1998. A Revision 1 Aquifer Test Plan was submitted to SCDHEC for approval in September 1998. The Aquifer Test Plan describes the approach for pump installation and 21 observation wells at 3 separate test pads around the MWMF. The aquifer tests will be conducted on the 3 aquifers beneath the MWMF to ascertain hydraulic values of the aquifers. These data will be used for future groundwater modeling to support future groundwater corrective actions at the MWMF.

Phase 1 of the evaluation of interim technologies was conducted to determine the appropriate technology(s) to be implemented at the Southwest Plume area of the MWMF. This evaluation determined that contaminated groundwater is outcropping to the surface.

Activities Planned for Fiscal Year 1999

In Fiscal Year 1999, the Pump Test Wells for Southwest, Northwest and Northeast Plumes will be installed and operational. The seep line sampling and analysis for the Southwest Plume will be completed. The monthly monitoring well sampling at the Southwest Plume area will be conducted. The transport model/source term will be developed. The groundwater modeling in support of the Southwest Interim Measures Plan/Corrective Measures Study will be developed. The groundwater flow modeling in support of the Southwest Corrective Action Plan will be developed.

In preparation of responses from SCDHEC on revision 5 of the MWMF RCRA Part-B Permit Application, SRS is performing groundwater modeling to support Corrective Action Plan development at the Southwest Plume area. Recent groundwater information will also be incorporated in the next revision of the Permit Application.

Installation of the pumping and observation wells as well as performance of the aquifer tests is being planned for the Southwest, Northwest, and Northeast Plume areas. Seep line sampling for the Southwest Plume area will be conducted during fourth and second quarters of Fiscal Year 1999.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 2

C-Area Coal Pile Runoff Basin, 189-C

Operable Unit 2 of the Fourmile Branch Watershed consists of one unit: the C-Area Coal Pile Runoff Basin (CPROB). This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description

The C-Area CPROB (189-C) is located approximately 600 feet southeast of the former C-Area coal storage site.

Steam and electricity for the SRS activities were produced by seven, coal-fired power plants located in A, C, D, F, H, K, and P Areas. Coal was stored at each of the seven power plant locations. Surface runoff from the coal storage piles was discharged to surface streams until the National Pollution Discharge Elimination System (NPDES) took effect in 1977. To meet NPDES discharge requirements and in response to SCDHEC requests, seven unlined earthen containment basins were constructed near each coal storage location to intercept, stabilize, and treat surface runoff from the coal piles. All

seven coal pile runoff basins were constructed between 1978 and 1981. The C- and F-Area basins have been inactive since late 1985 when the coal piles at these areas were removed.

Constituents of concern within the basins include low pH, sulfate, iron, antimony, aluminum, arsenic, and vanadium.

Activities Accomplished Prior to Fiscal Year 1998
Soil borings were drilled at each of the basins during June and July 1988. Groundwater monitoring data at this unit indicates there has been no impact to local groundwater as a result of basin operations.

The Revision.0 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on October 23, 1990. After receiving U.S. EPA's comments for the Revision.0 RFI/RI Work plan on October 30, 1991, SRS revised the work plan and submitted the Revision.1 RFI/RI Work Plan, which U.S. EPA and SCDHEC received January 29, 1992. Both Revision.0 and the Revision.1 RFI/RI Work Plans addressed all seven of the SRS Coal Pile Runoff Basins. Since that submittal, U.S. EPA, SCDHEC, and SRS have developed the operable units, and the seven Coal Pile Runoff Basins will be addressed either individually or with the other RCRA/CERCLA units in their operable unit.

The field start was initiated at the unit on June 29, 1995. SRS prepared and submitted the Revision.0 RFI/RI and Baseline Risk Assessment (BRA) report to U.S. EPA and SCDHEC, which they received on July 17, 1996.

U.S. EPA comments on the Revision.0 RFI/RI and BRA report were received on October 17, 1996, and SCDHEC comments were received on October 23, 1996. The Revision.1 RFI/RI and BRA was submitted to U.S. EPA and SCDHEC for approval on December 18, 1996. SCDHEC approved the Revision.1 RFI/RI and BRA report on January 3, 1997, and U.S. EPA deferred further review and approval until SRS submitted the Post-Removal RI Report for the early action at the C-, F-, K,-, and P- Area CPROBs (letter Feely to Hennessey, January 16, 1997).

Two white papers were submitted to U.S. EPA and SCDHEC for review on August 29, 1996, discussing potential early actions at the CPROBs and Burning Rubble Pits. Meetings were held on October 7 and November 20, 1996, with the U.S. EPA and SCDHEC to discuss the potential early action at this unit. SRS submitted a letter documenting the path forward for the proposed early remediation of the SRS CPROBs and requested U.S. EPA and SCDHEC concurrence. U.S. EPA concurred on February 3, 1997, and SCDHEC concurred on January 3, 1997.

On February 19, 1997, SRS submitted an extension request to adjust the FFA milestones in accordance with the approved path forward for C-, K-, F- and P-Area CPROBs.

A-, H-, and D-Area CPROBs were not included in this early action because they are still in operation. However, they may be addressed in a similar manner when they become inactive. The Removal Site Evaluation Report (RSER)/Wastewater Closure Plan for the C-, K-, F- and P-Area CPRBs was approved by U.S. EPA on March 13 and SCDHEC on April 25, 1997. The removal action was initiated on May 15 and completed on September 3, 1997. This removal action included removal of coal and coal-laden sediments from the basins and backfilling of the basins with clean soil. The coal and coal-laden sediments were removed and shipped offsite for beneficial reuse. This is the first time SRS has beneficially reused waste from a CERCLA action. This early site resulted in a schedule acceleration of 92 months and a significant cost savings. SRS expects this will be the final action for these basins.

Activities Accomplished in Fiscal Year 1998
SRS prepared and submitted the Revision.0 Post-Removal Action/Remedial Investigation Report, documenting the action taken at the four units, to U.S. EPA and SCDHEC on November 22, 1997. U.S. EPA and SCDHEC approved the document on January 21 and 26, respectively.

SRS prepared and submitted the Revision.0 Statement of Basis/Proposed Plan to U.S. EPA and SCDHEC on November 22, 1997. U.S. EPA and SCDHEC approved the document on January 21 and 26, respectively. A Revision.0 Record of Decision was submitted to U.S. EPA and SCDHEC on April 30, 1998. Both the U.S. EPA and SCDHEC provided comments to SRS on June 17, 1998. A Revision.1 Record of Decision was sent to the U.S. EPA and SCDHEC on July 17, 1998. The U.S. EPA gave notice of their approval on September 15, 1998, while SCDHEC approved it on August 11, 1998.

Activities Planned for Fiscal Year 1999
Sampling of groundwater at five wells will occur during the third quarter of Fiscal Year 1999.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 3

C-Area Burning/Rubble Pit, 131-C

Operable Unit 3 of the Fourmile Branch Watershed consists of one unit: the C-Area Burning/Rubble Pit (BRP). This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
The C-Area BRP (131-C) is located west of C-Area and north of Road A-7 on a ridge between two tributaries of Fourmile Creek.

Excavated in 1951, the C-Area BRP was a shallow, unlined pit 350-feet long by 25-feet

wide by 10-feet deep. Beginning in 1951, combustible wastes were accumulated in the unlined pit and periodically burned. During operation, the C-Area BRP received organic materials of unknown use and origin, paper, plastics, and rubber materials. Waste burning was halted in 1973. Afterwards, the pit typically received non-salvageable rubble materials such as concrete, brick, tile, asphalt, wallboard, lumber, rubber, and non-returnable empty drums. When the pit became full, it was backfilled with soil and sediments to grade level.

Although the C-Area BRP appears to have received hazardous waste, there is no record to indicate it received radioactive waste. The constituents of concern are chlorinated solvents and metals, including antimony, lead, arsenic, radium, chromium, cadmium, nickel, barium, copper, tin, and zinc. Cyanide, xylene, and phenolic constituents are also of concern. Further evaluation of the soil and groundwater contamination will be conducted for this unit.

Activities Accomplished Prior to Fiscal Year 1998

A soil-gas survey was conducted at the C-Area BRP in 1985 and 1986. The results indicated the presence of chlorinated solvents. In 1989, a unit-screening program was completed at the C-Area BRP. The results showed at least one sample had at least one of the substances listed above. During this unit screening, a ground penetrating radar survey was conducted to locate the boundaries of the pit and buried objects.

The SRS Groundwater Monitoring Program data from 1984 through 1990 indicated groundwater beneath the C-Area BRP exceeded U.S. EPA maximum contaminant levels (MCLs) at least one time for the substances listed above.

In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan (as part of the Eight BRP Work Plan) that was received by U.S. EPA and SCDHEC December 7, 1990. U.S. EPA and SCDHEC received the Revision.0 RFI/RI Work Plan on December 7, 1990. U.S. EPA comments on the C-Area BRP portion of the Work Plan were received by SRS on October 1, 1991. In response to U.S. EPA's comments, this unit was taken out of the Eight BRP Work Plan, and a separate work plan was developed for the unit. The Revision.1 RFI/RI Work Plan for the C-Area BRP was received by U.S. EPA and SCDHEC on December 31, 1991. C-Area BRP Work Plan and Implementation Plan were approved on June 1, 1995, by the U.S. EPA and SCDHEC. The RFI/RI field characterization of the C-Area BRP was initiated August 22, 1995

The field characterization activities were completed in Fiscal Year 1996. SRS prepared and submitted the Revision.0 RFI/RI and BRA Report to U.S. EPA and SCDHEC, which they received on September 12, 1996.

U.S. EPA and SCDHEC comments on the Revision.1 RFI/RI and BRA report were

received on December 12 and 19, 1996, respectively. SRS addressed the comments and submitted the Revision.1.1 document on March 27, 1997. U.S. EPA and SCDHEC provided comments on the document on May 28 and May 12, 1997, respectively. This unit was included in the Recovery Plan. (See the explanation of Recovery in the Overview of Fiscal Year 1997 Section.)

Activities Accomplished in Fiscal Year 1998

SRS submitted the Revision.1.1 RFI/RI/BRA to the U.S. EPA and SCDHEC on November 19, 1997. The U.S. EPA provided comments on January 15, 1998, and SCDHEC on January 30, 1998. The comments indicated the need for additional groundwater sample data to define and evaluate the groundwater plume.

In support of the comments received on the RFI/RI/BRA and the operable unit strategy, SRS submitted the RFI/RI work plan Appendix K. This plan describes the characterization activities (sampling plan) for the groundwater plume. Characterization of the plume was initiated in January 1998 and continued through the end of Fiscal Year 1998. The groundwater plume was found to be larger and more complex than originally anticipated. A minimum of 35 CPT locations were sampled, with between 3 and 10 samples per location.

After meeting with the U.S. EPA and SCDHEC, SRS submitted an operable unit strategy for the CBRP on November 5, 1997. This strategy outlined the path and scope that was needed to fully characterize the groundwater and to perform an interim action to remediate the source unit and initiate an interim groundwater remediation to prevent the plume from further migration. The U.S. EPA and SCDHEC approved the CBRP operable unit strategy in March 1998. This action removed the CBRP OU from the Recovery Plan.

In accordance with the OU strategy, SRS submitted an Interim Action Proposed Plan to the U.S. EPA and SCDHEC on November 13, 1997. The IAPP was reviewed and revised twice. The U.S. EPA approved the Revision.1.2 on April 15, 1998, and SCDHEC on April 16, 1998. The public comment period for the IAPP started on April 17, 1998 and ended on May 16, 1998. During the public comment period, the SRS provided a presentation of the proposed interim action to the CAB Environmental Restoration and Waste Management Subcommittee and to the public at their May 5, 1998, meeting.

After the close of the public comment period, SRS prepared and submitted the Revision.0 Interim Action Record of Decision (IROD) to the U.S. EPA and SCDHEC on June 8, 1998. Comments were received from the SCDHEC and U.S. EPA on July 28 and 29 respectively. SRS addressed the U.S. EPA and SCDHEC comments and prepared and submitted the Revision.1 IROD on August 28, 1998. The Revision.1 IROD was approved by the U.S. EPA and SCDHEC on September 30 and 28, 1998, respectively. The interim action consists of installing a low permeability soil cover over the pit and installing a soil vapor extraction and air sparging system.

SRS submitted the CMI/RD/RAWP for the interim action to the regulatory agencies on June 15, 1998. Comments were received from the U.S. EPA and SCDHEC on September 14 and 17, 1998, respectively.

SRS also prepared and submitted to the SCDHEC the Air Quality Control Permit Application and the Underground Injection Permit Application in support of the interim action.

Activities Planned for Fiscal Year 1999
SRS will prepare and submit the Revision.1.2 RFI/RI/BRA by November 16, 1998. Plans also call for incorporation of comments on the RD/RA Work Plan and submit Revision.1 by November 20, 1998. Construction is scheduled to start at the unit by January 22, 1999.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 4

C-Area Reactor Discharge Canal, 904-055G

Operable Unit 4 of the Fourmile Branch Watershed consists of one unit: the C-Area Reactor Discharge Canal. This unit is listed on FFA Appendix C, RCRA/CERCLA Units.

Description
The C-Area Reactor Discharge Canal is located near the southwest corner of C-Area, just outside the perimeter fence and south of the C-Area Reactor Seepage Basins. In the past, this canal served as a cooling water effluent and process sewer outfall that carried contaminated and potentially contaminated water, including reactor basin purge water pumped from reactor building sumps to process sewers

Activities Accomplished Prior to Fiscal Year 1998
None

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

FOURMILE BRANCH WATERSHED OPERABLE UNIT 5

C-Area Reactor Groundwater, NBN

Operable Unit 5 of the Fourmile Branch Watershed includes the groundwater beneath the C-Area Reactor. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
C-Reactor Area is located in the south-central portion of the Savannah River Site (SRS). Acceptable past disposal practices associated with historical reactor operations have produced waste units and potential waste units (spills, etc.) within the area. Some of these units may have contributed contamination to the area groundwater with operation waste materials. Groundwater characterization activities for the C-Area Reactor Groundwater will not duplicate waste unit characterization previously performed near the C-Reactor Area. The investigation of the C-Area Reactor Groundwater will utilize existing data. The scope of the C-Area Reactor Groundwater Operable Unit is currently being defined.

Available information suggests the groundwater may be contaminated with tritium, chlorinated volatile organic compounds, radionuclides, metals, and sulfate.

Activities Accomplished Prior to Fiscal Year 1998
None

Activities Accomplished in Fiscal Year 1998
This is a new unit. It was added to Appendix C in Fiscal Year 1998.

Activities Planned for Fiscal Year 1999
None.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 6

C-Area Reactor Seepage Basins, 904-066G, 067G, 068G

Operable Unit 6 of the Fourmile Branch Watershed consists of three units: the three C-Area Reactor Seepage Basins. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
The three C-Area Reactor Seepage Basins are located outside the C-Reactor perimeter fence. These basins received fission and activation products from C Reactor. The basins are unlined earthen excavations approximately 150 feet by 90 feet by 15 feet in dimension. The approximate capacity of each basin is 975,000 gallons. The basins were in use from 1957 to 1970. During that time, process purge water was released to the basins to allow a significant portion of the tritium to decay before the water outcropped to surface streams.

Activities Accomplished Prior to Fiscal Year 1998
This operable unit was listed on the FFA Appendix G, Site Evaluation List, as three separate areas. A Site Evaluation Report was written, which U.S. EPA and SCDHEC received on March 1, 1993. The Site Evaluation Report recommended that further investigation of these basins was needed and that they should be moved from FFA

Appendix G to FFA Appendix C, RCRA/CERCLA Units List. U.S. EPA and SCDHEC approvals were received on the report on June 4, 1993, and September 2, 1993, respectively.

SRS conducted a ground penetrating radar (GPR) survey, a radiological survey, and a civil engineering survey at the unit during 1996. The results of these surveys will be used in preparation of the Revision.0 RI Work Plan.

SRS completed the pre-work plan characterization within the fence and in the immediate vicinity of this operable unit. SRS also pursued technology development activities, including use of the sodium iodide detector to determine vegetation uptake and soil samples to evaluate the feasibility of phytoremediation within the unit. SRS performed a time critical removal action to cut radiologically contaminated vegetation growing in this operable unit.

Activities Accomplished in Fiscal Year 1998

The Revision.0 RI Work Plan Addendum was submitted by SRS to the regulators on October 8, 1997. The U.S. EPA and SCDHEC comments were received February 3, 1998, and February 6, 1998, respectively. The comments were resolved and incorporated in the Revision.1 document and submitted to the regulators on May 7, 1998. The U.S. EPA approved the document on June 8, 1998. SCDHEC sent additional comments June 10, 1998. SRS addressed the comments and submitted a Revision.1.1 on July 2, 1998. SCDHEC approved the document on July 8, 1998.

SRS initiated an extensive groundwater characterization RI field start on June 25, 1998, using CPT pushes for groundwater sampling and lithology. During Fiscal Year 1998, 52 locations were sampled and 330 samples obtained. Groundwater data indicates an extensive plume of chlorinated solvent and tritium. However, data indicates that there may be potential sources upgradient of the basin. Characterization will be completed in Fiscal Year 1999.

Removal of the radioactive vegetation cut down in Fiscal Year 1997 began in September 1998.

Drafting of the Plug-In Decision Document began in late Fiscal Year 1998.

Activities Planned for Fiscal Year 1999

This unit is included in the Plug-In Approach, along with the K-, L-, and P-Area Reactor Seepage Basins. The parties intend to finalize the Plug-In Record of Decision in Fiscal Year 1999. SRS will then submit a Revision.0 Plug-In Decision Document for the C-Area Reactor Seepage Basins to U.S. EPA and SCDHEC for review and comment.

Continue phase II characterization of groundwater and install monitoring wells.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 7

Central Shops Burning/Rubble Pit, 631-5G

Operable Unit 7 of the Fourmile Branch Watershed consists of two units: the Central Shops Burning/Rubble Pit (CSBRP) (631-5G) and the Heavy Equipment Wash Basin (NBN). This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description

The Central Shops-Area Burning/Rubble Pit is located approximately 1,000 feet north of the Central Shops Area in the central part of the SRS. It was constructed for the disposal of various waste materials.

The pit was originally reported to be a part of CSBRP, 631-1G and 631-3G. Recent land clearings indicate that the unit was a separate disposal facility, located west and southwest of the original designated location. Approximate dimensions of the pit are 385-feet long by 35-feet wide by 10-feet deep. This pit was used from 1951 until 1973 to burn wastes, including hazardous substances such as organic solvents. From 1973 to 1978 it was used to dispose inert solid wastes. In 1978 disposal activities ceased, at which time the pit was covered with soil. The constituents of concern (COCs) are organic chemical compounds and mercury.

The Heavy Equipment Wash Basin consists of the wash basin, discharge lines from the wash facility and washdown areas, the spray irrigation fields, National Pollution Discharge Elimination System (NPDES) Outfall CS002 and groundwater. The Heavy Equipment Wash Facility has been used to clean soil and grease from equipment. Wastewater from the operation was captured in a sump in the building, then discharged to the wash basin in the early years of operation or to the NPDES Outfall CS002 in more recent years. The discharge water would then flow to the unnamed tributary near the entrance to the CSBRP. Historic information suggests that the water in the wash basin was spray-irrigated to reduce the amount of water in the basin. Additional background information needs to be collected concerning the operational history of this facility.

Activities Accomplished Prior to Fiscal Year 1998

Accelerated site characterization was performed in June 1996 to determine unit-specific constituents that will be used to perform a more focused characterization in 1997. The U.S. EPA, SCDHEC, and the SRS agreed to combine this unit with the CSBRP (631-1G and 631-3G).

The SRS prepared and submitted the Revision.0 RFI/RI Work Plan to U.S. EPA and SCDHEC on February 25, 1997. The U.S. EPA and SCDHEC provided comments on the document on June 11 and June 26, 1997, respectively. The SRS addressed the comments

and submitted a Revision.1 Work Plan on August 4, 1997. The U.S. EPA and SCDHEC approved the work plan on September 30, 1997, and the SRS initiated the field start.

Activities Accomplished in Fiscal Year 1998
During characterization activities of pit 631-5G, a volatile organic compound (VOC) plume was found. The Heavy Equipment Wash Basin was contributing to the plume, which is located near pit 631-5G. The Parties determined that the pit would be removed from the CSBRP (631-1G and 3G) and that a new operable unit, the Central Shops Burning/Rubble Pit (631-5G) and the Heavy Equipment Wash Basin (NBN), would be created.

The SRS began pre-work plan characterization activities on the Heavy Equipment Wash Basin for preparation of an RFI/RI work plan to be submitted in Fiscal Year 1999.

The SRS submitted Revision.1.1 ASCAD™ RFI/RI Work Plan Addendum to U.S. EPA and SCDHEC on June 10, 1998, to request additional groundwater characterization. This was stopped due to the new OU strategy.

The SRS initiated pre-characterization according to the Sampling and Analysis Plan. The SRS began preparation for the RFI/RI work plan scope of work. The Heavy Equipment Wash Basin was added to the FFA with the Central Shops Burning Rubble Pit 631-5G. The source and groundwater for the new OU was evaluated separately from the Central Shops BRP 631-1G and -3G.

Activities Planned for Fiscal Year 1999
The SRS will submit the RFI/RI Work Plan Revision.0 by April 1, 1999. The SRS will review and partially incorporate comments of the RFI/RI work plan provided by the U.S. EPA and SCDHEC.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 7

Heavy Equipment Wash Basin, NBN

Operable Unit 7 of the Fourmile Branch Watershed consists of two units: The Heavy Equipment Wash Basin (NBN) and the Central Shops Burning/Rubble Pit (631-5G). This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The pre-work plan investigation for this site will characterize contaminated media associated with the Heavy Equipment Wash Basin (HEWB NBN) and the Burning/Rubble Pit (CSBRP 631-5G). The units are located approximately 0.7 miles south of the intersection of Road C and Road 5 on the Savannah River Site (SRS). The primary source characterization and nature and extent of contamination has been defined for CSBRP 631-

5G except for groundwater in the Lower Zone of the Upper Three Runs Aquifer. There is historic evidence that equipment and vehicle wash operations were conducted at several locations around the heavy equipment maintenance buildings. The sewers and outfalls discharging from the historic wash facilities are suspected to be contaminated with VOCs, since the process water contained degreasing chemicals that may have leached to the groundwater. Trichloroethene (TCE) was the major VOC identified in groundwater.

Historic evidence indicates that the earliest wash operations were performed at a pad that no longer exists. The pad was approximately 200 feet south of the southeast corner of Building 713-N. Wash water from that pad was drained to the sanitary sewer and discharged to what is presently identified as the HEWB. Another location that may have been a source of process wash water is a small bay on the western end of Building 716-N. There is a sump in the floor that has been grouted. The pipeline from the sump leads to the drainage ditch that drains to the NPDES SC-002 outfall. Soil sampling locations will be placed along each of the suspected pipelines, in the drainage ditch, at the NPDES outfall and in the unnamed tributary. A storm sewer leading from Building 716-N will be evaluated as a possible source area. It is suspected that leaks have occurred along the pipeline. The current wash facility in Building 716-4N has a wash-down pad and sump to catch all wash water. Prior to approximately 1985, the wash water from 716-4N was discharged to the surface and flowed into a drainage swale. After 1985, a PVC pipe was added to carry the wash water directly to the drainage ditch at NPDES outfall SC-002. In 1994, the PVC pipe was closed, and a closed recycling system was implemented at the wash facility.

The areas that are suspected to be most impacted from the wash operations are the outfalls and the wash basin. Residual levels of VOC contamination may be present around the wash facilities and pipelines.

Activities Accomplished Prior to Fiscal Year 1998

Prior to approximately 1985, the wash water from 716-4N was discharged to the surface and flowed into a drainage swale. After 1985, a PVC pipe was added to carry the wash water directly to the drainage ditch at NPDES outfall SC-002. In 1994, the PVC pipe was closed, and a closed recycling system was implemented at the wash facility.

The areas that are suspected to be most impacted from the wash operations are the outfalls and the wash basin. Residual levels of VOC contamination may be present around the wash facilities and pipelines.

Activities Accomplished in Fiscal Year 1998

During characterization activities at pit 631-5G, a VOC plume was discovered nearby. It was later determined that the HEWB was contributing to the plume that is located near pit 631-5G. The Parties determined that the pit would be removed from the CSBRP (631-1G and 3G) and that a new operable unit, the Central Shops Burning/Rubble Pit (631-5G) and

the HEWB, would be created.

The SRS began pre-work plan characterization activities of the HEWB in preparation of an RFI/RI Work Plan to be submitted in Fiscal Year 1999.

The SRS began preparation for the RFI/RI work plan scope of work. The HEWB was added to the FFA with the CSBRP 631-5G. The source and groundwater for the new operating unit was evaluated separately from the Central Shops BRP 631-1G and -3G

Activities Planned for Fiscal Year 1999
The SRS will submit the RFI/RI Work Plan Revision.0 by April 1999. The SRS will review and incorporate comments on the RFI/RI work plan provided by the U.S. EPA and SCDHEC.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 8

Central Shops Burning/Rubble Pits, 631-1G, -3G

Operable Unit 8 of the Fourmile Branch Watershed consists of two units: the two Central Shops Burning/Rubble Pits (CSBRP)(631-1G and 631-3G). This unit is listed in the FFA Appendix C, RCRA/CERCLA Units List.

Description
The Central Shops-Area Burning/Rubble Pits (631-1G and 631-3G) are located approximately 1,000 feet north of the Central Shops Area in the central part of the SRS. The units are two separate disposal areas that have been grouped together due to their close proximity and similarity of function. Between 1951 and 1973, both pits were used to dispose of various waste materials, including hazardous substances like organic solvents. The 631-1G and 631-3G pits are approximately 200-feet long by 30-feet wide by 10-feet deep and 400-feet long by 50-feet wide by 40-feet deep, respectively. From 1973 until 1978, Pit 631-1G was used solely for the disposal of inert solid wastes. Disposal activities ceased in 1978, and the area was covered with soil. From 1973 to 1983, Pit 631-3G was used for the disposal of dry inert rubble. In 1983, the disposal area was covered with soil to form a linear mound. The constituents of concern (COCs) identified by preliminary soil sampling in both pits are benzene and toluene, components of gasoline and paints, and chlorinated and organic solvents. The nature and extent of soil contamination within each of the listed limits will be determined during additional soil sampling and geophysical surveying.

Activities Accomplished Prior to Fiscal Year 1998
Accelerated site characterization was performed in June 1996 to determine unit-specific constituents.

SRS prepared and submitted the Revision.0 RFI/RI Work Plan to the U.S. EPA and SCDHEC on February 25, 1997. The U.S. EPA and SCDHEC provided comments on the document on June 11 and June 26, 1997, respectively. The SRS addressed the comments and submitted a Revision.1 Work Plan on August 4, 1997. The U.S. EPA and SCDHEC approved the Work Plan on September 30, 1997, and the SRS initiated the field start.

Activities Accomplished in Fiscal Year 1998

The SRS completed characterization activities including soil sampling and analysis, groundwater sampling and analysis, surface water/sediment sampling and analysis, and trenching and well installation per the RFI/RI work plan. SRS began preparation of the Revision .0 RFI/RI with the Baseline Risk Assessment Report, which is due to the U.S. EPA and SCDHEC in Fiscal Year 1999.

Activities Planned for Fiscal Year 1999

The SRS will prepare Revision .0 RFI/RI and Baseline Assessment Report submittal by October 10, 1998. The SRS will prepare a Revision.0 Combined document for submittal due May 1, 1999.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 9

Central Shops Sludge Lagoon, 080-24G

Operable Unit 9 of the Fourmile Branch Watershed consists of one unit: the Central Shops Sludge Lagoon. This unit is listed in the FFA Appendix C, RCRA/CERCLA Units List.

Description

The Central Shops Sludge Lagoon (080-24G) is located southwest of the Central Shops area. The lagoon is approximately 60-feet long by 40-feet wide by 5-feet deep and began operation in the early 1950s. Its purpose was to treat sanitary waste by oxidation and other degradation processes. During peak operation, the lagoon received about 100,000 gallons of sludge solution per year with a solids content of 2 to 5%. The lagoon ceased accepting sewage directly in the mid-1970s and was used as an evaporation pond for treated sewage sludge until 1986. No documentation exists to indicate that the unit received hazardous waste.

Activities Accomplished Prior to Fiscal Year 1998

The unit was closed under the auspices of an SCDHEC permit in 1988. The closure included removal of the sewage sludge (along with 2 feet of underlying soil) and its land application to borrow pits (one in K Area, one at Par Pond). Berms were pushed into the lagoon and used as backfill. The manhole and pipe were also filled. The Soil Conservation Service was required to characterize the sludge in the lagoon as part of

closure requirements. The sampled materials were removed, and land was applied to K-Area and Par Pond borrow pits prior to SRS receiving the sample analyses.

Samples were taken in August 1988 from three locations in the lagoon: at the surface and at 2- feet intervals to 8-feet in depth. Samples revealed elevated concentrations of heavy metals (silver, arsenic, lead, barium, nickel, chromium, selenium, mercury, and cadmium), the presence of volatile organics (chlorobenzene, 1,2-dichlorobenzene), and the pesticide Chlordane (a class B carcinogen). Additional sampling to confirm contamination was conducted in February 1989.

Chlordane was found to exist 14- to 19-feet below the surface in the parts per billion (ppb) range (maximum concentration found was 13.1 ppb). These samples were not analyzed for any other constituents. A soil-gas survey was conducted in August 1992. No C5-C10, benzene, toluene, ethylene, xylene (BTEX), or chlorinated solvents were found. No groundwater monitoring wells exist at the unit, and no groundwater analysis has been done. No sampling and analysis of surface water or sediment has been conducted.

Activities Accomplished in Fiscal Year 1998
The scoping package was sent to the regulators on December 3, 1997. A scoping meeting conference call was held on December 17, 1997

The Revision.0 RFI/RI Work Plan was submitted to the regulators on March 30. Comments were received from U.S. EPA on July 31,1998, and from SCDHEC on July 28, 1998. SCDHEC and U.S. EPA comments will be incorporated for submittal of the Revision.1 RFI/RI Work Plan on October 29, 1998. This project will be completed according to standard RI/FS schedule.

Activities Planned for Fiscal Year 1999
Plans are to complete RFI/RI Work plan Revision.1. The following activities are required to achieve a field start date of December 31:

- SRS will procure subcontractors for all required documents
- SRS will develop a program plan for new wells, land survey, waste management plan, quality assurance plan, HASP, sediment and soil erosion plan
- SRS will proceed with well installation-mobilization
- SRS will conduct sampling and analysis- soils, sediment, groundwater
- SRS will begin to develop RFI/RI/BRA Revision.0 on August 31, 1999.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 10

Ditch to Outfall H-12 (Tributary to Fourmile Creek), NBN

Operable Unit 10 of the Fourmile Branch Watershed consists of one unit: the Ditch to

Outfall H-12 (Tributary to Fourmile Creek). This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The ditch to Outfall H-12 is located east of H-Area, north of SRS Road E, approximately five hundred feet from the intersection of SRS Roads 4 and E. This active outfall receives a variety of sources, including nonprocess cooling water, cooling tower and air compressor blowdown, stormwater, neutralized flush water from the In-tank Precipitation facility, and cooling water from two radiological retention basins. The potential exists for these sources to be transported to an unnamed tributary of Fourmile Creek, which discharges into the Savannah River.

Activities Accomplished Prior to Fiscal Year 1998
None

Activities Accomplished in Fiscal Year 1998
Soil samples were collected along a section of the process sewer line from a diversion box at Warner's Pond Southwest under SRS Road E to support the closure of the RCRA unit, Inactive Process Sewer Line.

Activities Planned for Fiscal Year 1999
None

FOURMILE BRANCH WATERSHED OPERABLE UNIT 11

F-Area Coal Pile Runoff Basin, 289-F

Operable Unit 11 of the Fourmile Branch Watershed consists of one unit: the F-Area Coal Pile Runoff Basin. This operable unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The F-Area Coal Pile Runoff Basin (289-F) is located approximately 550 feet southeast of the former F-Area coal storage site.

Steam and electricity for SRS activities were produced by seven coal-fired power plants located in A, C, D, F, H, K, and P Areas. Coal was stored at each of the seven power plant locations. Surface runoff from the coal storage piles was discharged to surface streams until the NPDES took effect in 1977. To meet NPDES discharge requirements and in response to SCDHEC requests, seven unlined earthen containment basins were constructed near each coal storage location to intercept, stabilize, and treat surface runoff from the coal piles. All seven coal pile runoff basins were constructed between 1978 and 1981. The C- and F-Area basins have been inactive since late 1985 when the coal piles at

these areas were removed.

Constituents of concern within the basins include low pH, sulfate, iron, antimony, aluminum, arsenic, and vanadium.

Activities Accomplished Prior to Fiscal Year 1998

Soil borings were drilled at each of the basins during June and July 1988. Groundwater monitoring data at this unit indicates there has been no impact to local groundwater as a result of basin operations.

The Revision.0 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on October 23, 1990. After receiving U.S. EPA's comments on Revision.0 RFI/RI Work Plan on October 30, 1991, SRS revised the work plan and submitted the Revision.1 RFI/RI Work Plan, which U.S. EPA and SCDHEC received January 29, 1992. Both the Revision.0 and the Revision.1 RFI/RI Work Plans addressed all seven of the SRS Coal Pile Runoff Basins. Since that submittal, U.S. EPA, SCDHEC, and SRS have characterized the operable units, and the seven Coal Pile Runoff Basins will be addressed either individually or with the other RCRA/CERCLA units in their operable unit.

Two white papers were submitted to U.S. EPA and SCDHEC for review on August 29, 1996, discussing potential early actions at the Coal Pile Runoff Basins and Burning Rubble Pits. On October 7 and November 20, 1996, SRS met with U.S. EPA and SCDHEC to discuss the potential early actions issue. On December 23, 1996, SRS submitted a letter documenting the path forward for the proposed early remediation of the SRS Coal Pile Runoff Basins and requested U.S. EPA and SCDHEC concurrence. U.S. EPA concurred on February 3, 1997, and SCDHEC concurred on January 3, 1997.

On February 19, 1997, SRS submitted an extension request to adjust the FFA milestones in accordance with the approved path forward for C-, K-, F- and P-Area Coal Pile Runoff Basins. A-, H-, and D-Area Coal Pile Runoff Basins were not included in this early action because they were still in operation. However, they will be addressed in a similar manner when they become inactive. The Removal Site Evaluation Report (RSER)/Wastewater Closure Plan for the early action at C-, K-, F- and P-Area CPROB was approved by U.S. EPA on March 13 and SCDHEC on April 25, 1997. The removal action was initiated on May 15 and completed on September 3, 1997. This removal action included removal of coal and coal-laden sediments from the basins and the backfilling of the basins with clean soil. The coal and coal-laden sediments were removed and shipped off-site for beneficial reuse. This is the first time SRS has beneficially reused waste from a CERCLA action. This early action resulted in a schedule acceleration of 92 months and a significant cost savings.

Activities Accomplished in Fiscal Year 1998

SRS prepared and submitted the Revision.0 Post-Removal Action/Remedial Investigation

Report, which documented the action taken at these four units, to U.S. EPA and SCDHEC on November 22, 1997. U.S. EPA and SCDHEC approval was received on January 21, and 26, respectively.

SRS prepared and submitted the Revision.0 Statement of Basis/Proposed Plan to U.S. EPA and SCDHEC on November 22, 1997. U.S. EPA and SCDHEC approval was received on January 21, and 26, respectively. A Revision.0 Record of Decision was submitted to the U.S. EPA and SCDHEC on April 30, 1998. Both U.S. EPA and SCDHEC provided comments to SRS on June 17, 1998. A Revision.1 Record of Decision was sent to the U.S. EPA and SCDHEC on July 17, 1998. U.S. EPA and SCDHEC approved the Revision.1 Record of Decision for signature on September 15, and August 13, 1998, respectively.

Activities Planned for Fiscal Year 1999

The Groundwater Data Report was submitted to the U.S. EPA and SCDHEC during the second quarter of Fiscal Year 1999. Sampling of groundwater at five wells will occur during the third quarter of Fiscal Year 1999.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 12

F-Area Hazardous Waste Management Facility, 904-41G, -42G, & -43G (081-1F)

Operable Unit 12 of the Fourmile Branch Watershed consists of three units: the three closed basins of the F-Area Hazardous Waste Management Facility (HWMF). This operable unit is listed on FFA Appendix H, RCRA-Regulated Units. Activities on this unit are SCDHEC-led RCRA actions. The unit was certified closed under RCRA and a CERCLA No Action Record of Decision on the basin closure has been issued for this operable unit.

Description

The F-Area HWMF (904-41G, -42G, and -43G) is a source-specific operable unit within the Fourmile Branch Watershed. The F-Area HWMF is located in the center of SRS, east of Road C and north of Road E, approximately 5 miles from the nearest plant boundary.

The F-Area HWMF consists of three unlined, earthen surface impoundments, referred to as Seepage Basins F-1, F-2, and F-3. The three basins had a combined maximum operating capacity of 20.5 million gallons of wastewater. Dimensions of the basins were F-1: 98 feet by 288 feet by 12.7 feet; F-2: 98 feet by 538 feet by 12.7 feet; and F-3: 320 feet by 730 feet by 13.2 feet. The resulting volume capacity for each basin was F-1: 1.6 million gallons; F-2: 3.1 million gallons; and F-3: 15.8 million gallons. These basins were in service continuously from 1955 until November 7, 1988.

The F-Area HWMF began receiving waste effluents from F-Area chemical separation

facilities processes such as the nitric acid recovery unit, waste storage system evaporator overheads, and general purpose evaporator overheads. Significant amounts of nitrate and caustic were received. More than 99% of the radioactive releases to these basins were attributable to tritium.

Activities Accomplished Prior to Fiscal Year 1998

Several studies were conducted to characterize the subsoils. A 1984 soil coring study showed that approximately 90% of the radionuclides, cations, and anions were concentrated within the top 1 foot of basin soil. These constituents consisted of tritium, cobalt, strontium, zirconium, cesium, cerium, thorium, uranium, plutonium, iron, ammonia, fluoride, sodium, nitrate, carbonate, silicon, iodide, niobium, promethium, ruthenium, and mercury, among others. The primary constituents were tritium and nitrate.

The remedial alternatives evaluated under RCRA guidelines included No Action, No Waste Removal with Basin Closure, and Waste Removal with Basin Closure. No Waste Removal with Basin Closure was the selected remediation alternative

This alternative involved (1) elimination of free liquids by removing liquid waste or solidifying the remaining waste and residues; (2) stabilization of the remaining wastes to a bearing capacity sufficient to support the cover system; (3) placement of a final cover over the surface impoundment, which consisted of a layer of backfill, a two-foot layer of compacted kaolin clay, and a geotextile fabric topped with two feet of topsoil to support a vegetative cover; (4) a routine inspection of the HWMF for a minimum of 30 years to verify the integrity of the cover system, fences, signs, etc., with any necessary repairs to the cap being made as part of the program; (5) restricting access to the HWMF to authorized personnel with appropriate training of applicable requirements. The survey plat and records associated with use of the HWMF have been filed with Aiken County, South Carolina.

Groundwater monitoring activities around the F-Area HWMF indicate that contaminants have migrated from the seepage basins to the uppermost aquifer. Sampling and analysis activities have shown that some constituents are present in the uppermost aquifer in concentrations greater than those currently delineated in the Groundwater Protection Standards (GWPSs) in the RCRA Part B Post-Closure Permit. Constituents of concern (COCs) proposed for corrective action include tritium, barium, cadmium, chromium, lead, mercury, cobalt. copper, cyanide, nickel, tetrachloroethylene (PCE), trichlorofluoromethane, zinc, gross alpha, gross beta, total radium, and nitrates. The proposed corrective action includes an extraction/injection system, a skid-mounted treatment system, and a secondary waste treatment/handling system.

The RCRA Part A application was submitted to SCDHEC in September 1980. In February 1985, the original RCRA Part B Permit Application was submitted to SCDHEC for the F-Area HWMF. Between December 1985 and April 1987, SRS responded to two

Notice of Deficiency (NOD) letters from SCDHEC. In August 1988, the RCRA Part B Permit Application for the F-Area HWMF was denied.

In December 1988, SRS submitted an interim status closure plan for the F-Area HWMF. Upon approval of the closure plan in June 1989, SRS prepared and submitted a RCRA Part B Post-Closure Permit Application in December 1990. After three revisions during 1991 and 1992, SCDHEC indicated the Permit Application was complete in June 1992. SCDHEC issued a Draft Part B Permit for public comment in July 1992. On September 30, 1992, the Part B Permit was issued by SCDHEC and the Part B Permit for F-Area HWMF became effective on November 2, 1992. The basins were closed by dewatering, physically and chemically stabilizing the remaining sludge, and placing a protective multi-layer cover system over them to reduce rainwater contact with basin bottoms. The closure was completed in February 1991.

A CERCLA Proposed Plan for the F-Area HWMF source control operable unit was prepared and submitted to U.S. EPA and SCDHEC on June 10, 1993. The plan included information to support a CERCLA No Further Action Necessary Decision for source control at the F-Area HWMF and the integration of CERCLA actions with the previously approved State of South Carolina RCRA actions. The RCRA corrective action provides the necessary protectiveness to human health and the environment to satisfy all CERCLA requirements.

The Proposed Plan was issued for public comment from June 18, 1992, until August 2, 1992. No comments were received. The Record of Decision document was issued for the unit on September 10, 1993.

A Revision.3 RCRA Part B Permit Application Modification for the Drainage Enhancement to improve the drainage system at the unit was submitted to SCDHEC on November 15, 1995. SCDHEC approved the permit application on April 19, 1996. The drainage enhancement activities were initiated in September 1996.

The drainage enhancement activities at the HWMF were completed in August 1997.

Activities Accomplished in Fiscal Year 1998

Routine maintenance and monitoring activities were conducted, including subsidence surveying, repair of fences, repair of signs, mowing of the vegetative cover, and general repair to the drainage ditches. Replacement of portions of the existing bahia cover with a lower maintenance vegetative cover began.

Activities Planned for Fiscal Year 1999

Routine maintenance and monitoring activities will occur. The existing grass cover will be changed to a low maintenance grass cover.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 13

F-Area Inactive Hazardous Waste Transfer Lines from Building to the Security Fence, 081-1F

Operable Unit 13 of the Fourmile Branch Watershed consists of a single unit: the F-Area Inactive Process Sewer Lines from Building to the Security Fence (081-1F). However, this unit and Operable Unit 15 of the Fourmile Branch Watershed [the H-Area Inactive Process Sewer Lines from Building to the Security Fence (081-H)] are addressed in one work plan. Both of these units are listed in FFA Appendix C, RCRA/CERCLA Units List.

To prevent any possible confusion, it should be noted that the F-Area Inactive Process Sewer Lines from the Security Fence to the F-Area HWMF (904-41G, -42F, and -43G) are RCRA-Regulated Units under the terms of the FFA.

Description
The F-Area Inactive Process Sewer Lines run throughout F-Area. The primary sewer lines were utilized from 1955 to 1982. The gravity fed process sewers, 4.6 miles in total length, were used to transport liquid wastes from Separations, Tritium, and Waste Management Facilities to their respective seepage basins. There are roughly 2,000 feet of various types and sizes of lines from Building FB-221 to the Security Fence. The majority of the lines are made of vitrified clay. Portions of lines are slip-lined with active lines and some with inactive lines. The constituents of concern (COCs) based on soil sampling include low-levels of radionuclides, metals, nitrates, and low-pH liquids. Sample results for metals are less than the Toxicity Characteristic Leaching Procedure (TCLP) regulatory limits.

Construction of a security system for Separations facilities has allowed SRS to conduct soil sampling in the area. Sample results indicate no significant soil contamination problems from the sewer lines.

Activities Accomplished Prior to Fiscal Year 1998
In 1988, SRS took preliminary soil samples near the process sewer lines outside the security fence. The samples had low levels of radioactive materials and traces of metals, nitrates, and low-pH liquids, indicating leaks in the sewer lines.

SRS prepared and submitted the Revision.0 RFI/RI Work Plan on March 31, 1992. SCDHEC comments were received on December 22, 1993.

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

FOURMILE BRANCH WATERSHED OPERABLE UNIT 14

F-Area Retention Basin, 281-3F

Operable Unit 14 of the Fourmile Branch Watershed consists of one unit: the F-Area Retention Basin (281-3F). This operable unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The F-Area Retention Basin (381-3F) is located just outside the southern fence in F-Area Separations.

This basin is approximately 150-feet long by 100-feet wide by 10-feet deep. The retention basin was used from 1955 to 1973. The open, unlined basin provided temporary emergency storage for potentially contaminated cooling water from the chemical separation process. When radioactivity was encountered in the cooling water, immediate action was taken to divert the water from surface drainage streams to the retention basin. If the radioactivity was above stream release limits, the wastewater was processed by deionization to reduce contamination and permit release. The F-Area basin has been excavated, backfilled with clean soil, and is now covered with vegetation.

The SRS records do not show the exact quantities of radioactive water discharged to the basin. Preliminary environmental investigations have detected radioactive substances in and around the basin. SRS believes only trace quantities of hazardous substances were discharged to the basin.

Activities Accomplished Prior to Fiscal Year 1998
SRS submitted the Revision.1 RI Work Plan in October 1995 to U.S. EPA/SCDHEC. The Revision.1 RI Work Plan was approved by U.S. EPA on November 8, 1995, and by the SCDHEC on June 2, 1995. Characterization at the F-Area Retention Basin was initiated on March 31, 1995, and progressed to completion of basin sampling.

The phase II RI characterization was completed in November 1995 with the completion of the sampling of the pipeline sediment and the surrounding soils.

SRS prepared and submitted a Revision.0 RI and Baseline Risk Assessment to U.S. EPA and SCDHEC on August 1, 1996.

U.S. EPA and SCDHEC provided comments on the Revision.0 RI and Baseline Risk

Assessment Report (submitted in Fiscal Year 1996) on October 25 and November 1, 1996, respectively. SRS addressed the comments and, in accordance with an SCDHEC request, SRS conducted additional well sampling. SRS submitted a Revision.1 document to U.S. EPA and SCDHEC on January 28, 1997, after notification of a thirty-day extension. Both U.S. EPA and SCDHEC notified SRS that they would defer review of the Revision.1 document until the new groundwater information was provided. SRS submitted the page changes to the Revision.1 document and the groundwater sampling on March 27, 1997.

On March 10, 1997, SRS requested an extension of the Revision.0 Record of Decision submittal date of March 31, 1997, to August 27, 1997, and an extension to all subsequent milestones. The U.S. EPA and SCDHEC granted the request for the submittal of the Revision.0 Record of Decision but did not grant an extension to the subsequent milestones.

SRS prepared and submitted the Revision.0 ASCAD™ Combined Document to U.S. EPA and SCDHEC on March 28, 1997. U.S. EPA and SCDHEC provided comments on the document on June 27 and 30, 1997, respectively. SRS addressed the comments and submitted a Revision.1 FS/PP to the U.S. EPA and SCDHEC on July 29, 1997, in accordance with the proposed recovery schedule.

SCDHEC provided comments on the Groundwater Sampling Report on May 6, 1997. As a result of ongoing RI protocol concerns, the SRS submitted a recovery schedule for the FRB and other units on July 14, 1997 (see explanation of Recovery in the Overview of Fiscal Year 1997 Section). In accordance with the proposed recovery schedule, SRS submitted the Revision 1.2 RI/BRA with the Groundwater Sampling Plan on July 28, 1997. Approval of this document was received from SCDHEC on September 19, 1997.

Activities Accomplished in Fiscal Year 1998

The Revision.1.2 RI and Baseline Risk Assessment Report was approved by U.S. EPA on October 1, 1997.

The Revision.1 ASCAD™ Combined Document comments were received from U.S. EPA and SCDHEC on October 28 and 21, 1998, respectively. The Revision.1.1 CMS/FS and SB/PP was submitted to U.S. EPA and SCDHEC on November 27, 1997. SCDHEC provided comments on the Revision.1.1 CSM/FS and SB/PP on December 5, 1997 and U.S. EPA approved the Revision.1.1 CMS/FS and SB/PP on January 5, 1998. Comments were incorporated and the Revision.1.2 CMS/FS and SB/PP was submitted to U.S. EPA and SCDHEC on January 14, 1998. SCDHEC approved the document on January 16, 1998. The Public Comment Period for the SB/PP began on January 20, 1998. On March 5, 1998, SRS received a request from a member of the public to extend the public comment period. The Parties agreed to extend the public comment period until April 4, 1998.

The Revision.0 Record of Decision with Responsiveness Summary was submitted to U.S. EPA and SCDHEC on April 20, 1998. Comments were received from U.S. EPA and SCDHEC on June 10, 1998, and June 2, 1998, respectively. The Revision.1 ROD was submitted on July 9, 1998, and comments on this document were received from U.S. EPA and SCDHEC on July 23, 1998, and August 10, 1998, respectively. The Revision.1.1 ROD was submitted to U.S. EPA and SCDHEC on August 26, 1998. U.S. EPA and SCDHEC approved the Revision.1.1 ROD on September 9, 1998, and September 28, 1998, respectively.

The Revision.0 CM/RD Work Plan was submitted to U.S. EPA and SCDHEC on September 29, 1998.

Activities Planned for Fiscal Year 1999
The Revision.0 CMI/RDR/RA Work Plan will be submitted on October 20,1998.

The remedial action start is scheduled to begin on April 4, 1999.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 15

F-Area Retention Basin, 281-08F

Operable Unit 15 of the Fourmile Branch Watershed consists of one unit: the F-Area Retention Basin (281-08F). This operable unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
Building 281-8H is an active, lined, diversion basin used to store stormwater runoff from the tank farm and contaminated cooling water from the chemical separation processes.

The FFA Appendix E.3 lists the field start of characterization in the first quarter of Fiscal Year 2002.

Activities Accomplished Prior to Fiscal Year 1998
None

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

FOURMILE BRANCH WATERSHED OPERABLE UNIT 16

F-Area Seepage Basin Groundwater Operable Unit

Operable Unit 16 of the Fourmile Branch Watershed consists of one unit: the F-Area Groundwater. This operable unit is listed in FFA Appendix H, RCRA-Regulated Units. Activities on this unit are SCDHEC-led RCRA actions.

Description
The F-Area Groundwater Operable Unit consists of the groundwater underlying the F-Area Hazardous Waste Management Facility (HWMF) (Operable Unit 9 of Fourmile Branch Watershed). This groundwater was impacted by the operation of the F-Area HWMF. The section for that operable unit provides a description of the operations that resulted in the impact to the F-Area Groundwater.

Activities Accomplished Prior to Fiscal Year 1998
In Fiscal Year 1996, SCDHEC approved the Underground Injection Control (UIC) Permit to install the injection and extraction wells at the unit. SRS submitted the Industrial Wastewater Treatment (IWT) Permit Applications for the construction required to install the complete waste treatment system in F Area, which SCDHEC approved. SRS completed the detailed design of the treatment facility and completed fabrication and factory testing of the waste treatment unit in an offsite facility. SRS completed installation of the proposed injection and extraction wells, including installation of the electrical and mechanical systems. SRS maintains ecological monitoring, updates the groundwater modeling, and continues permit-required well sampling and analysis. SRS performed a waste minimization demonstration, utilizing phase I pilot scale equipment, to evaluate potential technical system improvements that may reduce the projected phase I secondary waste volumes.

The F- and H-Area Inactive Process Sewer Line Phase II Groundwater Assessment Plan was submitted to SCDHEC on December 1, 1995. Comments on the plan were received from SCDHEC on July 16, 1996.

SRS received the construction permit for the F-Area Phase I Groundwater Treatment Unit in September and commenced with installation of the unit onsite. Installation of all associated electrical and mechanical systems was completed in May. Testing of the systems continues. The system continued to operate in a shakedown mode through the end of September 1998, resulting in the treatment of approximately 750,000 gallons of contaminated groundwater. Well sampling and analysis as well as corrective action assessment continue as required by the permit.

SRS revised and submitted the F- and H-Area Inactive Process Sewer Line Phase III Groundwater Assessment Plan on May 1, 1997. Approval for the sampling effort was

received from SCDHEC on July 11, 1997. Groundwater sampling activities commenced in August 1997.

Activities Accomplished in Fiscal Year 1998

SRS continued testing and improving the F-Area groundwater remediation system. On February 23, 1998, SRS received a warning letter from SCDHEC-RCRA and entered into consent order negotiations. On March 6 and 13, 1998, SRS submitted IWT permit application modifications to install pre-filters in the zeolite ion exchange column, a charcoal column, a filtrate return tank, a sludge hold tank, and a sludge filter press.

UIC and RCRA permit application modifications were also submitted to SCDHEC for the clarification of the flow rates required to maintain hydraulic control. The RCRA permit application modifications also proposed changing the disposal options for the secondary waste generated from the treatment system and included examples of treatment system downtime.

The IWT permit to operate the modified system was received on June 24, 1998. The system has continued to operate in the shakedown mode following receipt of this permit. An IWT permit application modification for the final system configuration was submitted to SCDHEC on September 30, 1998.

SRS initiated planning the Corrective Action Phase II Remediation Activities and continued groundwater sampling, ecological sampling, and corrective action reporting as required by the permits. The RCRA Part-B Permit Application Review Volume Reduction was completed.

Phase III groundwater sampling, which began in August 1997, to assess the groundwater contamination downgradient of the inactive process sewer line concluded on February 26, 1998.

Activities Planned for Fiscal Year 1999

In Fiscal Year 1999, operation and maintenance of the F- Area Groundwater Remediation Systems will continue. Operational testing and analysis to ensure system compliance and efficiency will be performed. Preventative and corrective maintenance of the treatment systems will be continued. Title III services, such as as-builts, engineering walkdowns, review of vendor shop drawings, review of deviation requests, and operational engineering support will be conducted. RCRA, UIC and IWT permit application modifications will be submitted, as necessary.

Collection of field data necessary to support the groundwater monitoring reports and corrective action reports will be conducted. The well maintenance will be conducted as determined by well and system performance. Groundwater modeling will be performed to evaluate system efficiencies for the F&H remediation project. Updates to observed field

conditions will be made as input to this model. The operations model will be revised to identify appropriate model inputs to the General Separations Area model. Technical meetings on the F&H remediation system will be held with SCDHEC personnel regarding progress of the phase II efforts. This is to open discussions on the performance of remediation goals for the F&H remediation system, including alternate concentration limit/mixing zone (ACL/MZ) strategies. Ecological studies will continue and remain consistent with past data collected. Support activities for renewal of the RCRA permits due in Fiscal Year 2000 will be initiated. The hydrogeologic monitoring network will be reviewed and evaluated with respect to hydraulic and geochemical data needs for system operating performance.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 17

F-Area Tank Farm Groundwater, NBN

Operable Unit 17 of the Fourmile Branch Watershed consists of the F-Area Tank Farm Groundwater Operable Unit, which includes the groundwater underlying the F-Area Tank Farm Facility. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List. This groundwater may have been impacted by operation of the F-Area Tank Farm Facility.

Description
The F-Area Tank Farm Groundwater consists of the groundwater underlying the F -Area Tank Farm Facility. This groundwater may have been impacted by operation of the F-Area Tank Farm Facility. FFA Appendix E.3 lists the field start of characterization for the fourth quarter of Fiscal Year 2007.

Activities Accomplished Prior to Fiscal Year 1998
None

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

FOURMILE BRANCH WATERSHED OPERABLE UNIT 18

Ford Building Seepage Basin, 904-91G

Operable Unit 18 of the Fourmile Branch Watershed consists of one unit: the Ford Building Seepage Basin (904-91G). This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description

The Ford Building Seepage Basin (904-91G) is located at the extreme southeastern tip of the Central Shops area, approximately 250 feet north of the railroad track. When the Ford Building Seepage Basin was originally constructed, the bottom of the basin had dimensions of 60 feet by 20 feet, while the dimensions at ground level were 80-feet long by 40-feet wide by 10-feet deep. It was constructed in 1964 to receive wastewater resulting from process equipment repair work in the Ford Building.

A 6,000-gallon underground retention tank is located adjacent to the Ford Building and is connected to the seepage basin by an underground sewer line pipe. Much of the repair work conducted in the Ford Building was on heat exchangers from the reactor areas, which generated wastewater contaminated with low levels of radioactivity and trace amounts of non-radioactive organic and inorganic compounds. The wastewater was sent to the retention tank, analyzed for radionuclides, and either released to the seepage basin, or transferred to Waste Management Operations (WMO) for proper disposal. The Ford Building Seepage Basin was retired in 1984 because of the purchase of new heat exchanger heads, which reduced the need for repairs. Since then, wastewater from Ford Building operations have been transported to WMO for disposal.

The constituents of concern (COCs) in the soil include cobalt-60, strontium-90, cesium-137, europium-155, cadmium, mercury, and zinc. Radionuclides are the potential COCs in the groundwater; however no radionuclides have been detected in area wells, indicating that the FBSB has not impacted the groundwater.

Activities Accomplished Prior to Fiscal Year 1998

In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan that was received by the U.S. EPA and SCDHEC in the early 1990's. No comments were received on the Revision.0 Work Plan. The work plan was rescheduled for submittal in March 1997.

In September 1996, accelerated characterization was performed at the Ford Building Seepage Basin to determine unit-specific contaminants. Information derived from this characterization was used to perform a more focused characterization in 1997.

The SRS submitted the RFI/RI Work Plan Revision.0 on March 17, 1997. The SRS incorporated SCDHEC and U.S. EPA comments and submitted the Revision. 1 RFI/RI Work Plan in September 1997.

Activities Accomplished in Fiscal Year 1998

Throughout October, November, and December 1997, the Parties prepared and reviewed a Revision 1.1 and Revision 1.2 as well as a Revision 1.3 RFI/RI/BRA Work Plan. The U.S. EPA and SCDHEC approved the Revision 1.3 RFI/RI Work Plan on March 12, 1998, and January 15, 1998, respectively.

Characterization activities were completed in August 1998 with sampling in the backfill after the tank removal.

A time-critical removal action was initiated in November 1997 with the removal of the effluent and influent process pipe. The tank removal activities began in June 1998 and continued through September 1998 with transfer of the Toxic Substances Control Act (TSCA) waste to the mixed waste storage facility. Additional Low-Level Radioactive Waste (LLRW) will be disposed at the Low-Level Radioactive Waste Disposal Facility (LLRWDF) located at SRS.

Development of the RFI/RI/BRA began in September 1998.

Activities Planned for Fiscal Year 1999
SRS will submit Revision.0 of the RFI/RI/BRA by February 5, 1999. The SRS will complete and obtain approval of the RFI/RI/BRA by August 5, 1999, and incorporate a post-removal document within the RFI/RI/BRA and prepare the Revision.0 CMS/FS by September 23, 1999.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 19

Ford Building Waste Site, 643-11G

Operable Unit 19 of the Fourmile Branch Watershed consists of one unit: the Ford Building Waste Site (643-11G). This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
The Ford Building Waste Site is located in the southeast portion of the Central Shops area, north of the Ford Building, south of Road 3.

The origin and history of waste disposal at the Ford Building Waste Site is unknown although it is suspected that work on radioactive regulated equipment may have occurred there. The unit, rectangular in shape with dimensions of 22 feet by 169 feet, was originally listed as the Central Services Works Engineering (CSWE) miscellaneous rubble pile. Original waste materials included lumber, weathered shoe covers, step-off pads, coveralls, and a load lugger pan containing soiled rubber gloves, which indicated that regulated work may have been performed at the unit and the protective clothing worn by the personnel disposed at the unit. The lugger pan, lumber, and protective equipment were removed in 1990. The method of disposal and current location of the items is unknown. Between 1980 and 1997, approximately half of the unit was a radiologically controlled area with restricted access, and the remaining portion was open to unrestricted access.

The primary constituent of concern (COC) at the Ford Building Waste Site is cesium-137.

In 1986, a soil-gas investigation indicated the presence of trans-1, 2-dichloroethylene and tetrachloroethylene (PCE). In 1988, elevated radioactivity was detected by Health Protection during groundskeeping work. A subsequent radiation survey conducted in January 1990 indicated slightly elevated radiation levels.

In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan to the U.S. EPA and SCDHEC in the early 1990's. No comments were received on the Revision.0 Work Plan. The RFI/RI Work Plan was rescheduled for submittal in September 1996.

Accelerated characterization was performed at the Ford Building Waste Site and the Fire Department Hose Training Facility in June 1996 to determine unit-specific constituents. The accelerated characterization was used to perform a more focused characterization in 1997. The U.S. EPA, SCDHEC, and SRS held an RFI/RI Work Plan Scoping Meeting on July 24, 1996. SRS presented the data from the accelerated characterization, indicating that no further characterization was required at the Fire Department Hose Training Facility. This action was recommended in a letter (the DOE, to the U.S. EPA, and SCDHEC, August 15, 1996) along with the recommendation that contamination found at the Ford Building Waste Unit be removed with a time-critical removal action. In addition, the Ford Building Waste Unit and the Fire Department Hose Training Facility would be separated into two separate units. The SRS recommended that a Removal Site Evaluation Report for the Ford Building Waste Unit be submitted in lieu of the Revision.0 RFI/RI Work Plan for the Ford Building Waste Unit on September 30, 1996. The U.S. EPA and SCDHEC concurred with these recommendations.

Activities Accomplished Prior to Fiscal Year 1998

The SRS submitted the Removal Site Evaluation Report for the Ford Building Waste Unit to U.S. EPA and SCDHEC on September 29, 1996.

The removal action for contaminated soils at the Ford Building Waste Site was performed from January 8 through June 2, 1997. The SRS began preparation of the Revision.0 RFI/RI and Baseline Risk Assessment Report for the Ford Building Waste Site.

Activities Accomplished in Fiscal Year 1998

SRS submitted the Revision.0 RFI/RI and Baseline Risk Assessment Report to the U.S. EPA and SCDHEC on November 26, 1997. SCDHEC and U.S. EPA indicated in the scoping meeting of the RFI/RI/BRA that location-specific samples should be collected for use in the evaluation of the RFI/RI/BRA instead of composite samples used in the removal action. A new Revision 0.1 of the RFI/RI/BRA was submitted to U.S. EPA and SCDHEC on January 22, 1998, for review with the Revision 0 RFI/RI/BRA submitted in

November 1997. The Revision.0 SB/PP and draft ROD for the Ford Building Waste Unit was submitted to the U.S. EPA and SCDHEC on June 9, 1998. The SRS received comments from the U.S. EPA on March 20, 1998, and from SCDHEC on March 3, 1998. Revision.1 of the same document was submitted to the U.S. EPA/SCDHEC on May 5, 1998. It was approved by the U.S. EPA on June 16, 1998, and approved by SCDHEC on June 3, 1998.

Revision.0 Statement of Basis/Proposed Plan was submitted to the U.S. EPA/SCDHEC on June 6, 1998. Comments were received from the U.S. EPA on September 3, 1998, and from the SCDHEC on July 22, 1998.

Activities Planned for Fiscal Year 1999
A Public Comment Period will occur in November and December 1998. The SRS will prepare the Revision.0 ROD and obtain approval of a final ROD by May 17, 1998.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 20

G-Area Oil Seepage Basin, 761-13G

Operable Unit 20 of the Fourmile Branch Watershed consists of one unit: the G-Area Oil Seepage Basin. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
The G-Area Oil Seepage Basin (761-13G) is located southeast of Central Shops Area.

The basin was used for liquid waste disposal during the SRS plant construction. The basin is 150-feet long by 100-feet wide by 4-feet deep. Environmental investigations suggest that "oil" seepage basin is a misnomer. While the dark color of the basin once suggested that it contained oil, an investigation of the unit's disposal history shows no receipt of hydrocarbons. The basin may have received waste from the time of plant construction until the early 1960s. The exact nature of the liquids disposed in the basin is unknown. There is no record of any disposal of radioactive or hazardous substances at the unit.

In February 1989, two surface water samples and one basin sediment sample were collected from the basin. In addition, soil-gas samples were analyzed from around the basin in 1991, and the area was probed with ground penetrating radar (GPR) in 1992. The GPR was performed in an attempt to locate an underground pipe that is carrying the effluent water from the Central Shops Wastewater Treatment Facility to the basin. Basin sediment metals of concern include barium, chromium, lead, and silver. Trace amounts of chlordane are also of concern. Surface water constituents of concern (COCs) include volatile organics.

The basin no longer receives clean water (National Pollution Discharge Elimination

System (NPDES)-permitted outfall) from the Central Shops Wastewater Treatment Plant through an underground pipe. In July 1993, an effort to redirect the flow away from the basin began with the installation of a new underground pipe. The construction was completed on September 24, 1993.

Activities Accomplished Prior to Fiscal Year 1998
In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan that was received by U.S. EPA and SCDHEC on May 7, 1991.

Rerouting effluent from the Central Shops Wastewater Treatment Plant away from the basin began in July 1993. Soil samples were taken near the new pipe's tie-in location to the existing pipe. U.S. EPA and SCDHEC approval was secured for the construction activities. All analytical results were below the detection limit of laboratory equipment or below SCDHEC levels for soil contamination.

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

FOURMILE BRANCH WATERSHED OPERABLE UNIT 21

H-Area Acid Caustic Basin, 904-75G

Operable Unit 21 of the Fourmile Branch Watershed consists of one unit: the H-Area Acid/Caustic Basin. This operable unit is listed on FFA Appendix H, RCRA-Regulated Units. Activities on this unit are SCDHEC-led RCRA actions.

Description
The H-Area Acid/Caustic Basin (904-75G) is located within H-Area on SRS. The basin was used until 1982 to support processes needed for power generation activities at each area. The basin is associated with boiler feed water conditioning for the removal of inorganic salts from raw water before its use in the boiler.

Boiler feed water at SRS contains natural salts that affect boiler operation, and thus must undergo a demineralization process. This demineralization process uses cation and anion resins to remove the salts. The cation resin exchanges hydrogen for cations, and the anion resin exchanges hydroxyl ions for the anions. When these resins become saturated with cations or anions, they must be regenerated. This is accomplished by passing a dilute solution of sulfuric acid over the cation resin and a dilute solution of sodium hydroxide over the anion resin. The partially spent regenerant solutions and associated rinse water comprised the influent of the acid/caustic basin.

The basin provided mixing and neutralization of the regenerants before discharging them to local surface streams. The H-Area Acid/Caustic Basin has been inactive since 1982 when SRS neutralization facilities went on line.

The basin is approximately 50-feet long by 50-feet wide by 7-feet deep and has a capacity of approximately 75,000 gallons. When in operation, the basin received 2.4 million gallons/year.

The regenerant solutions consisted of calcium and magnesium cations, sulfates, chlorides, carbonic acid, silicic acid, and any acid or base in the original solution that was unused. No known hazardous waste constituents were discharged to the basin. Analyses of sediment samples from the basin using the Toxicity Characteristic Leaching Procedure (TCLP) indicate that concentrations of analyzed metals were well below U.S. EPA guideline concentrations. The main environmental concern with the acid/caustic basin is the pH of the solutions in the basin. It cannot be proved that the pH did not go below 2 or above 12.5.

Activities Accomplished Prior to Fiscal Year 1998
The initial issue of the Interim Status Closure Plan for the F-, H-, K-, and P-Area Acid/Caustic Basins was submitted to SCDHEC on January 25, 1989. The closure plan was submitted for public comment in August 1990, and the only changes to the Closure Plan since that time were the addition of data and a health-based risk assessment supporting the initial closure proposal. The final closure plan (Revision 3) was submitted on July 13, 1991, and updated on February 5, 1992, to include a dewatering plan and groundwater data through the third quarter of 1991.

U.S. EPA Region IV has determined that the interim status closure plan specifically for the H- and P-Area Acid Caustic Basins is protective of human health and the environment. SRS has completed the closure of the H-Area Acid Caustic Basin with the understanding that the closure plan may change in its requirements during the SCDHEC approval process.

An F-, H-, K-, P-Area Acid/Caustic Basin Interim Status Closure Plan (WSRC-RP-94-1259, Revision 6, dated June 19, 1995) was approved by SCDHEC on November 8, 1995. The plan approved the clean closure of the basins to the extent that filling of the basins was warranted for safety and housekeeping purposes. The filling of the basins was previously completed, and in Fiscal Year 1996, groundwater monitoring wells associated with the basin characterization were abandoned. All activities associated with the unit have been completed.

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

FOURMILE BRANCH WATERSHED OPERABLE UNIT 22

H-Area Hazardous Waste Management Facility, 904-44G, -45G, -46G & -56G

Operable Unit 22 of the Fourmile Branch Watershed consists of four units: the four closed basins of the H-Area Hazardous Waste Management Facility (HWMF). This operable unit is listed on FFA Appendix H, RCRA-Regulated Units. Activities on this unit are SCDHEC-led RCRA actions. The unit was certified closed under RCRA and a CERCLA No Action Record of Decision (ROD) on the basin closure has been issued for this operable unit.

Description
The H-Area HWMF (904-44G, -45G, -46G, and -56G) is a source-specific operable unit within the H-Area operable unit. The H-Area HWMF is located in the center of SRS, south of Road E and east of Road 4, approximately 6 miles from the nearest plant boundary.

The H-Area HWMF consists of three unlined, earthen surface impoundments referred to as seepage basins H-1, H-2, and H-4. The three basins had a combined maximum operating capacity of 26.5 million gallons of wastewater. Dimensions of the basins were H-1: 93 feet by 243 feet by 11 feet; H-2: 113 feet by 463 feet by 11 feet; and H-4: 130-430 feet by 2,400 feet by 10.7 feet. The resulting volume capacity for each basin is H-1: 1.1 million gallons; H-2: 2.8 million gallons; and H-4: 22.6 million gallons. These basins were in service continuously from 1955 until November 7, 1988, and are considered RCRA-regulated units. The H-3 basin was not a RCRA-regulated unit but was identified as a RCRA 3004 unit (u) requiring investigation and remediation. It was decided to incorporate basin H-3 into the RCRA closure. Basin H-3 had dimensions of 315 feet by 430 feet by 9.5 feet and an operating capacity of 9.4 million gallons. The basin was in use from 1955 to 1962, at which time it was replaced by unit H-4.

The H-Area HWMF began receiving waste effluents from H-Area chemical separation facilities processes such as the nitric acid recovery unit, waste storage system evaporator overheads, and general purpose evaporator overheads, and the overheads from two waste tank farm evaporators. Additional sources of effluent were cooling water from tritium facilities retention basin transfers and liquid from receiving basins for offsite fuel. Significant amounts of nitrate and caustic were received. More than 99% of the radioactive releases to these basins were attributable to tritium.

Several studies were conducted to characterize the subsoils. A 1984 soil coring study

showed that approximately 90% of the radionuclides, cations, and anions were concentrated within the top foot of basin soil. These constituents consisted of tritium, cobalt, strontium, zirconium, cesium, cerium, thorium, uranium, plutonium, iron, ammonia, fluoride, sodium, nitrate, carbonate, silicon, promethium, ruthenium, chromium, manganese, calcium, titanium and zinc, among others. The primary constituents were tritium and nitrate.

The remedial alternatives evaluated under RCRA guidelines included No Action, No Waste Removal with Basin Closure, and Waste Removal with Basin Closure. No Waste Removal with Basin Closure was the selected remediation alternative. This alternative involved (1) the elimination of free liquids by removing liquid waste or solidifying the remaining waste and residues; (2) stabilization of the remaining wastes to a bearing capacity sufficient to support the cover system; (3) placement of a final cover over the surface impoundment. The cover consisted of a layer of backfill, a two-foot layer of compacted kaolin clay, and a geotextile fabric topped with two feet of topsoil to support a vegetative cover; (4) routine inspection of the HWMF for a minimum of 30 years to verify the integrity of the cover system, fences, signs, etc., with any necessary repairs to the cap being made as part of the program; (5) restricting access to the HWMF to authorized personnel with appropriate training of applicable requirements. The survey plat and records have been filed with Aiken County, South Carolina.

Groundwater monitoring activities around the H-Area HWMF indicate that contaminants have migrated from the seepage basins to the uppermost aquifer. Sampling and analysis activities have shown that some constituents are present in the uppermost aquifer in concentrations greater than those currently delineated in the Groundwater Protection Standards (GWPS) in the RCRA Part B Post-Closure Permit. Constituents of concern (COCs) proposed for corrective action include tritium, arsenic, barium, cadmium, lead, mercury, cobalt, copper, nickel, vanadium, tetrachloroethylene, zinc, gross alpha, gross beta, total radium, and nitrates. The proposed corrective action includes an extraction/injection system, a skid-mounted treatment system, and a secondary waste treatment/handling system. The RCRA Part A Permit Application was submitted to SCDHEC in September 1980. In February 1985, the original RCRA Part B Permit Application was submitted to SCDHEC for the H-Area HWMF. Between December 1985 and April 1987, SRS responded to two Notice of Deficiency (Nod) letters from SCDHEC. In August 1988, the RCRA Part B Post-Closure Permit Application for the H-Area HWMF was denied.

In December 1988, SRS submitted an interim status closure plan for the H-Area HWMF. Upon approval of the closure plan in June 1989, SRS prepared and submitted a RCRA Part-B Post- Closure Permit Application, submitted in December 1990.

After three revisions during 1991 and 1992, SCDHEC indicated the RCRA Part-B Permit Application was complete in June 1992. SCDHEC issued a Draft Part B Permit for public

comment in July 1992. On September 30, 1992, the Part B Permit was issued by SCDHEC, and the Part B Permit for H-Area HWMF became effective on November 2, 1992.

The four basins were closed by dewatering, physically and chemically stabilizing the remaining sludge, and placing a protective multi-layer cover system over them to reduce rainwater contact with basin bottoms. The closure was completed in August 1991.

A CERCLA Proposed Plan for the H-Area HWMF source control operable unit was prepared and submitted to U.S. EPA and SCDHEC on June 10, 1993. The plan included information to support a CERCLA No Further Action Necessary decision for source control at the H-Area HWMF and the integration of CERCLA actions with previously approved State of South Carolina RCRA actions.

The Proposed Plan was issued for public comment from June 18, 1992, until August 2, 1992. No comments were received. The ROD document was issued for the unit on September 10, 1993.

A Revision. 3 RCRA Part B Permit Application Modification for the drainage enhancement to improve the drainage system at the unit was submitted to SCDHEC on November 15, 1996. SCDHEC approved the permit application on April 19, 1996. The drainage enhancement activities were initiated in September 1996.

The drainage enhancement activities at the HWMF were completed in August 1997.

Activities Accomplished in Fiscal Year 1998
Routine maintenance and monitoring activities were conducted, including subsidence surveying, repair of fences, repair of signs, mowing of the vegetative cover, and general repair to the drainage ditches. Replacement of portions of the existing bahia cover with a lower maintenance vegetative cover began.

A RCRA Part B Permit Application Modification was submitted to SCDHEC on January 16, 1998, for minor modifications to the drainage system. Drainage enhancements were completed along approximately 550 linear feet of drainage channel to effectively convey stormwater and drainage away from the basin cap/covers.

Activities Planned for Fiscal Year 1999
Routine maintenance and monitoring activities will occur. The existing grass cover will be changed to a low maintenance grass cover.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 23

H-Area Inactive Hazardous Waste Transfer Lines from Building to the Security

Fence, 081-H

Operable Unit 23 of the Fourmile Branch Watershed consists of a single unit: the H-Area Inactive Process Sewer Lines from Building to the Security Fence (081-H).

To prevent any possible confusion, it should be noted that the H-Area Inactive Process Sewer Lines from the security fence to the H-Area Hazardous Waste Management Facility (HWMF) (904-44G, -45G, -46G, and -56G) are RCRA-regulated units under the terms of the FFA.

Description
The H-Area Inactive Process Sewer Lines run throughout H Area. The primary sewer lines were utilized from 1955 to 1982. The process sewers, 4.6 miles in total length, were used to transport liquid wastes from Separations, Tritium, and Waste Management Facilities to their respective seepage basins (gravity fed). There are more than 8,000 feet of various types and sizes of lines from Buildings FB-221 and HB-221 to the security fence, with roughly 6,000 feet in H Area. The majority of the lines are made of vitrified clay. Portions of lines are slip-lined with active lines and some with inactive lines. The constituents of concern (COCs), based on soil sampling, include low-levels of radionuclides, metals, nitrates, and low-pH liquids. Sample results for metals are less than Toxicity Characteristic Leaching Procedure (TCLP) regulatory limits.

Construction of a security system for Separations facilities has allowed SRS to conduct soil sampling at the unit. Sample results indicate no significant soil contamination problems at the unit.

Activities Accomplished Prior to Fiscal Year 1998
In 1988, SRS environmental engineers took preliminary soil samples near the process sewer lines outside the security fence. The samples indicated low-levels of radioactive materials and traces of metals, nitrates, and low-pH liquids, indicating leaks in the sewer lines.

The Revision.0 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on March 31, 1992. SCDHEC comments were received on December 22, 1993. Field start of characterization is listed in the FFA Appendix E.3 for the first quarter of Fiscal Year 2002.

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

FOURMILE BRANCH WATERSHED OPERABLE UNIT 24

H-Area Retention Basin, 281-3H

Operable Unit 24 of the Fourmile Branch Watershed consists of one unit: the H-Area Retention Basin. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description

The H-Area Retention Basin(HRB) (381-3H) operable unit (OU) is located just south of Road E near the intersection of E Road and Road 4. The basin is approximately 150-feet long by 100-feet wide by 10-feet deep. It was used from 1955 to 1973. The open, unlined basin provided temporary emergency storage for potentially contaminated cooling water from the chemical separation process. When radioactivity was encountered in the cooling water, immediate action was taken to divert the water from surface drainage streams to the retention basin. If the radioactivity was above stream release limits, the wastewater was processed by deionization to reduce contamination and permit release. The H-Area basin is fenced in, open to atmospheric conditions, and presently contains water.

Activities Accomplished Prior to Fiscal Year 1998

The H-Area Retention Basin, in combination with the F-Area Retention Basin, was chosen as a Streamlined Approach for Environmental Restoration (SAFER) pilot project by DOE-Headquarters. The goal of the SAFER process is to streamline the preparation of work plans actively involving all parties prior to writing the work plan, thereby shortening the period of time between work plan submittal to U.S. EPA and SCDHEC and the initiation of field activities. Meetings were held with U.S. EPA, SCDHEC, and SRS on January 11, 1994, and March 30, 1994. The field start was initiated on June 30, 1994.

SRS records do not show the exact quantities of radioactive water discharged to the basin. Preliminary environmental investigations have detected radioactive substances in and around the basin. SRS believes only trace quantities of hazardous substances were discharged to the basin.

In 1996, SRS undertook a technology demonstration, liquid viscous barrier, at the unit to attempt to reduce possible groundwater infiltration into the contaminated basin sediments. To this end, SRS submitted, and U.S. EPA and SCDHEC approved, a time-critical removal action to consolidate the contaminated soils onto the basin and to conduct a treatability study to implement the technology demonstration. However, further tests of the technology at the basin revealed that its application at the unit was not technically feasible due to the high clay content of the unit soils. As a result, SRS, with U.S. EPA and SCDHEC concurrence, terminated the time-critical removal action and treatability study and the Parties reevaluated remedial action options.

A critical removal action was performed at this unit to remove and treat contaminated vegetation. By the end of September 1996, all vegetation had been cut, sectioned, removed and incinerated. Approximately, 126,480 pounds of vegetation were removed from the unit between April 4, 1996 and September 30, 1996.

The non-hazardous radioactive ash, which was generated from the incineration of the contaminated vegetation, was disposed at the SRS Low-Level Disposal Facility on April 13, 1997.

The Revision.0 RI Groundwater (GW) Work Plan was submitted to SCDHEC and U.S. EPA on April 3, 1997. A Revision.0 FS/PP and Revision.0 Phase I RD Work Plan, supporting a bias for action at the source unit, were also submitted to SCDHEC and U.S. EPA on April 3.

On August 6, a comment resolution meeting was conducted for the Revision.0 RI Groundwater Work Plan. At this meeting, SCDHEC indicated they were not comfortable with the level of uncertainty in the feasibility study and recommended revisiting the HRB OU strategy.

An HRB strategy scoping meeting was conducted on September 3. At this meeting, SCDHEC requested that a scope of the RI GW Work Plan be expanded to include the soils and surface soils. SRS submitted the Revision.1 RFI/RI Work Plan for groundwater assessment to SCDHEC and U.S. EPA on September 9, committing to a revision to incorporate the soils and subsurface soil by October 31, 1997. Conditional approval to proceed with the groundwater characterization was provided by SCDHEC (September 29) and U.S. EPA (September 30).

Activities Accomplished in Fiscal Year 1998

The groundwater characterization commenced on October 1, 1997. A Revision.1.2 RFI/RI Work Plan, which incorporated the characterization of the basin soils and subsurface soils, was submitted to U.S. EPA and SCDHEC on October 30, 1997. Comments on the Revision.1.2 RFI/RI Work Plan were received from U.S. EPA and SCDHEC on February 25, 1998, and February 27, 1998, respectively.

SRS submitted the Revision.1.3 RFI/RI Work Plan on April 14, 1998. Comments were received from U.S. EPA on the Revision.1.3 RFI/RI Work Plan on May 7 and May 28, 1998, and SCDHEC comments were received on June 15, 1998.

To support the RFI/RI with Baseline Risk Assessment Plan submittal date, the soil sampling field activities commenced at risk on May 29, 1998. Both groundwater and soil characterizations were completed during Fiscal Year 1998.

The Revision.1.4 RFI/RI Work Plan was submitted to U.S. EPA and SCDHEC on July 9,

1998. Comments were received from SCDHEC on the Revision.1.4 RFI/RI Work Plan on August 13, 1998 while U.S. EPA approval was received on August 6, 1998.

SRS submitted the Revision.1.5 RFI/RI Work Plan to U.S. EPA and SCDHEC on September 14, 1998.

The Revision.0 Treatability Study Work Plan was submitted to U.S. EPA and SCDHEC on April 30, 1998. Comments were received from SCDHEC on May 26, 1998, and U.S. EPA approval was received on August 14, 1998. The comments were incorporated into the Revision.1 Treatability Study, which was submitted to U.S. EPA and SCDHEC on September 28, 1998.

Activities Planned for Fiscal Year 1999
SRS will prepare and submit Revision.0 RFI/RI and the Baseline Risk Assessment will be submitted on June 18,1999.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 25

H-Area Retention Basin, 281-1H, -2H, and -8H

Operable Unit 25 of the Fourmile Branch Watershed consists of three units: the three H-Area Retention Basins (281-1H, -2H, and -8H). This unit is listed on FFA Appendix C, RCRA/CERCLA Units.

Description
Building 281-1H is a concrete, return-water, delaying basin located near the H-Area Canyon facility. Building 281-2H is a concrete, return-water, pumping basin located near the H-Area Canyon building. These structures are an active part of the cooling water system for the canyon facility.

Building 281-8H is a lined diversion basin used for the storage of stormwater runoff from the tank farm and contaminated cooling water from the chemical separation processes.

Activities Accomplished Prior to Fiscal Year 1998
None

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

FOURMILE BRANCH WATERSHED OPERABLE UNIT 26

H-Area Seepage Basin Groundwater Operable Unit

Operable Unit 26 of the Fourmile Branch Watershed consists of one unit: the H-Area Groundwater. This operable unit is listed on FFA Appendix H, RCRA-Regulated Units. Activities on this unit are SCDHEC-led RCRA actions.

Description
The H-Area Groundwater Operable Unit consists of the groundwater underlying the H-Area Hazardous Waste Management Facility (HWMF) (Operable Unit 14 of Fourmile Branch Watershed). This groundwater was impacted by operation of the H-Area HWMF. The section for that operable unit provides a description of the operations that resulted in the impact to the H-Area Groundwater.

Activities Accomplished Prior to Fiscal Year 1998
In 1996, SCDHEC approved the Underground Injection Control Permit to install the injection and extraction wells at the unit. SRS submitted the Industrial Wastewater Treatment (IWT) Permit Applications for the construction required to install the complete waste treatment system in H Area, which SCDHEC approved. SRS completed the detailed design of the treatment facility and completed fabrication and factory testing of the waste treatment unit in an offsite facility. SRS completed installation of all the proposed injection and extraction wells and is processing the installation of the electrical and mechanical systems. SRS initiated permit changes and received approval to install hot spot wells in H-Area to allow groundwater remediation in areas of high contamination to enhance the overall phase I remediation duration. All the hot spot wells have been installed. SRS maintains ecological monitoring, updated the groundwater modeling, and continued permit-required well sampling and analysis. SRS performed a waste minimization demonstration utilizing phase I pilot-scale equipment to evaluate potential technical system improvements that may reduce the projected phase I secondary waste volumes.

The F- and H-Area Inactive Process Sewer Line Phase II Groundwater Assessment Plan was submitted to SCDHEC on December 1, 1995. Comments on the plan were received from SCDHEC on July 16, 1996.

SRS received the construction permit for the F-Area Phase I groundwater treatment unit in September and commenced with installation of the unit on site. Installation of all associated electrical and mechanical systems was completed in May. Shakedown testing of the systems continues. The system continued to operate in a shakedown mode through the end of September 1998, resulting in the treatment of approximately 800,000 gallons of contaminated groundwater.

The colloid transport tests were completed and results of analysis have been documented. Update of the regional groundwater model to incorporate information on the latest field conditions was conducted and submitted to the regulators as a permit modification. Well sampling and analysis, and corrective action assessment continue as required by the permit.

SRS revised and submitted the F- and H-Area Inactive Process Sewer Line Phase III Groundwater Assessment Plan on May 1, 1997. Approval for the sampling effort was received from SCDHEC on July 11, 1997. Groundwater sampling commenced in August 1997.

Activities Accomplished in Fiscal Year 1998

SRS continued testing and improving the H-Area groundwater remediation system. On February 23, 1998, SRS received a warning letter from SCDHEC-RCRA and entered into consent order negotiations. On March 6, 13 and April 13, 1998, SRS submitted IWT permit application modifications to install an alum/polymer addition systems, pre-filters to the zeolite ion exchange column, a dowex ion exchange column, a charcoal column, a filtrate return tank and distribution piping for the newly proposed injection wells.

UIC and RCRA permit application modifications were also submitted to SCDHEC for the construction/operation of eight new injection wells and clarification of the flow rates required to maintain hydraulic control. The RCRA permit application modifications also proposed changing the disposal options for the secondary waste generated from the treatment system and included examples of treatment system downtime.

The IWT permit to operate the modified system was received on April 30, 1998. The system has continued to operate in the shakedown mode following receipt of this permit. An IWT permit application modification for the final system configuration was submitted to SCDHEC on September 30, 1998.

SRS initiated planning the corrective action phase II remediation activities and continued groundwater sampling, ecological sampling, and corrective action reporting as required by the permits. The RCRA Part-B Permit Application Review Volume Reduction was completed.

Phase III groundwater sampling to assess the groundwater contamination downgradient of the Inactive Process Sewer line, which began in August 1997, concluded on February 26, 1998. Shallow soil samples were also taken along sections of the Inactive Process Sewer Line to support future closure alternatives.

Activities Planned for Fiscal Year 1999

In Fiscal Year 1999, operation and maintenance of the F-Area Groundwater Remediation Systems will continue. Operational testing and analysis to ensure system compliance and

efficiency will be performed. Preventative and corrective maintenance of the treatment systems will be continued. Title III services, such as as-builts, engineering walkdowns, review of vendor shop drawings, review of deviation requests, and operational engineering support will be conducted. RCRA, UIC and IWT permit application modifications will be submitted, as necessary.

Collection of field data necessary to support the groundwater monitoring reports and corrective action reports will be conducted. The well maintenance will be conducted as determined by well and system performance. Groundwater modeling will be performed to evaluate system efficiencies for the F&H remediation project. Updates to observed field conditions will be made as input to this model. The operations model will be revised to identify appropriate model inputs to the General Separations Area model. Technical meetings on the F&H remediation system will be held with SCDHEC personnel regarding progress of the phase II efforts. This is to open discussions on the performance remediation goals for the F&H remediation system, including alternate concentration limit mixing zone strategies. Ecological studies will continue and remain consistent with past data collected. Support activities for renewal of the RCRA permits due in Fiscal Year 2000 will be initiated. The hydrogeologic monitoring network will be reviewed and evaluated with respect to hydraulic and geochemical data needs for system operating performance.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 27

H-Area Tank Farm Groundwater

Operable Unit 27 of Fourmile consists of the H-Area Groundwater Operable Unit, which consists of the groundwater underlying the H-Area Tank Farm Facility. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List. This groundwater was impacted by the operation of the H-Area Tank Farm Facility.

Description

SRS originally submitted and obtained approval of an RFI/RI Work Plan for Tank 16 of the H-Area Tank Farm. Upon completion of the groundwater investigation as detailed in the work plan, SRS requested an extension for the submittal of the RFI/RI Report for Tank 16 that was due on December 1, 1994. Also included in the request was a proposal to modify Appendix E, Long-term Projections, of the FFA to eliminate the IAPP for Tank 16 that was due on December 28, 1995. In addition, SCDHEC requested the RFI/RI Report be titled H-Area Groundwater Operable Unit and that Appendix C, RCRA/CERCLA Units List, be revised to include H-Area Groundwater Tank Farm Groundwater Operable Unit. U.S. EPA provided SRS with similar direction with correspondence dated December 19, 1995. During Fiscal Year 1995, the SRS completed characterization activities and developed and submitted the Revision.0 RFI/RI Report for the H-Area Tank Farm Groundwater Operable Unit on April 26, 1995. SRS received

U.S. EPA and SCDHEC comments within the scheduled 90-day review schedule.

Activities Accomplished Prior to Fiscal Year 1998

SRS, U.S. EPA, and SCDHEC, based on a meeting held September 20, 1995, agreed to changes that were incorporated in the Revision.1 RFI/RI Report. SRS submitted a technical memorandum justifying additional sampling to U.S. EPA and SCDHEC on October 17, 1995. The additional sampling agreed upon resulted in SRS submitting the Revision.1 RFI/RI Report to U.S. EPA and SCDHEC on August 15, 1996.

SRS received a comment from SCDHEC on the Revision.1 RFI/RI Report during October 1996, requesting that a groundwater mixing zone demonstration be considered as part of the final decision. Revision.1.1 RFI/RI Report page changes incorporating this comment were submitted to SCDHEC and U.S. EPA on November 13.

SRS prepared and submitted a Revision.0 Focused CMS/FS Report with a groundwater mixing zone demonstration on May 9, 1997. Comments were received from SCDHEC (July 31) and U.S. EPA (August 4). A Revision.1 CMS/FS with a Groundwater Mixing Zone Application were submitted on September 18. A Revision.0 Statement of Basis/Proposed Plan (SB/PP) was submitted on July 28, 1997. Regulatory review of the SB/PP was put on a hold pending resolution of issues in the Revision.0 CMS/FS. Following resolution of the CMS/FS comments, clarification page changes to the Revision.0 SB/PP were submitted to the regulators with the Revision.1 CMS/FS on September 18.

Activities Accomplished in Fiscal Year 1998

SCDHEC provided comments on the Revision.1 CMS/FS on October 21, 1997, while U.S. EPA approved the Revision.1 CMS/FS on October 22, 1997. The Revision.1.1 CMS/FS was submitted to U.S. EPA and SCDHEC on December 10, 1997.

Comments on the Revision.0 SB/PP were provided by U.S. EPA and SCDHEC on November 7, 1997, and November 19, 1997, respectively. SRS incorporated the comments and submitted the Revision.1. SB/PP on December 18, 1997.

Comments were received from SCDHEC on the Revision.1.1 CMS/FS on January 15, 1998. At the comment resolution meeting for the Revision.1.1 CMS/FS, SCDHEC indicated they could not approve the groundwater mixing zone application until the extent of the groundwater plume was fully characterized. It was agreed by the Parties that additional groundwater characterization would be conducted to support the groundwater mixing zone assumptions and finalization of the CMS/FS and SB/PP.

SRS submitted a phase II characterization plan to assess the extent of the groundwater plume on April 14, 1998. Comments were received from both U.S. EPA and SCDHEC on the plan on May 15, 1998. The Revision.1 Phase II Characterization Plan was

submitted to U.S. EPA and SCDHEC on May 29, 1998. U.S. EPA approval of the Revision.1 Phase II Characterization Plan was received on July 1, 1998. Following SCDHEC approval of the well approval request and the Revision.1 Phase II Characterization Plan on June 25, 1998, well installation began and continued throughout the fiscal year.

Activities Planned for Fiscal Year 1999
Well installation activities will be completed, followed by the sampling of the new wells. Results from the characterization phase will be incorporated into the Revision.1.2 CMS/FS and the groundwater mixing zone application and submitted to U.S. EPA and SCDHEC.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 28

HP- 52 Ponds, NBN

Operable Unit 28 of the Fourmile Branch Watershed consists of one unit: the HP-52 Ponds. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
HP-52 Ponds are located adjacent to the H-Separations Area, immediately south of the HP-52 Outfall. The ponds were formed as an action to clean up a spill in the stream from the HP-52 Outfall. This storm sewer outfall became contaminated in May 1967 when an overflow of high level waste to the ground and nearby storm sewer occurred during a transfer of waste in the H-Area Tank Farm. In February 1969, waste reached the storm sewer following a rupture in a waste transfer line. Most of the high level waste (primarily cesium-137) from the 1967 incident seeped into the soil. Contaminated soil containing 1200 curies was removed and placed in the burial ground. A much smaller amount of high level waste (primarily cesium-137) leaked to the storm sewer in 1969, after which soil containing approximately 0.5 curies was disposed at the burial ground. As a result of the 1967 incident, two small holding ponds were constructed to contain contaminated water. After the 1969 release, the ponds were filled with contaminated soil from the stream channel and covered with clean backfill. Concrete markers were erected to identify the location of these ponds.

Radiological surveys of animals and vegetation conducted at HP-52 Ponds operable unit showed elevated levels of curium-137 in grasses and vines. An expedited vegetation removal action was performed in 1996 to clear the thick vegetation, including trees, from the area.

Activities Accomplished Prior to Fiscal Year 1998
Pre-work plan characterization was conducted at the HP- 52 ponds and Warner's Pond from June to August 1997. The scope of the sampling effort included soil boring inside

the contaminant zone, background soil boring, collecting surface water/sediment samples, and installing and sampling new groundwater monitoring wells. A notification was provided to SCDHEC and U.S. EPA on June 23, 1997, of the intent to perform pre-work plan characterization.

Activities Accomplished in Fiscal Year 1998
Results of the sampling and analysis conducted as part of the pre-work plan characterization were compiled for future use in the RFI/RI work plan preparation. Results of the pre-work plan groundwater characterization were provided to SCDHEC on February 9, 1998, as required by a condition in the monitoring well approval.

Routine maintenance activities, such as mowing the vegetative cover, were conducted.

Activities Planned for Fiscal Year 1999
Routine maintenance activities will be conducted.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 29

Old Radioactive Waste Burial Ground Including Solvent Tanks 650-01E - 22E), 643-E

Operable Unit 29 of the Fourmile Branch Watershed consists of the Old Radioactive Waste Burial Ground and the Solvent Tanks 650-01E - 22E. These facilities collectively are a single unit listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The Burial Ground Complex (BGC) occupies approximately 194 acres in the central part of SRS between the F- and H-Separations Areas. The BGC consists of several adjacent facilities that were former or are current disposal sites for hazardous and radioactive wastes and spent solvents generated from plant processes. The BGC is divided into a northern area (size 118 acres) and a southern area (size 76 acres). The southern region is named the Old Radioactive Waste Burial Ground (ORWBG) (643-E), which began receiving radioactive wastes in 1952 and was filled in 1972. The ORWBG also contains twenty-two underground tanks (650-01E - 22E), once used for the storage of spent radioactive solvents. By 1972, all radioactive waste disposal activities had moved to the northern area.

Activities Accomplished Prior to Fiscal Year 1998
In accordance with the SRS RCRA Permit, a Revision.0 RFI/RI Work Plan for the ORWBG was submitted to U.S. EPA and SCDHEC on December 7, 1990. The BGC Revision.2 RFI/RI Work Plan that incorporated the BGC Field Investigation Plan work was submitted to U.S. EPA and SCDHEC on December 16, 1994.

Assessment activities at the ORWBG included ground-penetrating radar (GPR) and soil-

gas surveys. The GPR survey was conducted to identify the locations and dimensions of buried trenches and to determine the locations of metallic objects and metals contamination sources in the trenches. SRS performed a geophysical technology demonstration for portions of the ORWBG to evaluate non-intrusive subsurface investigatory procedures. The soil-gas survey was performed to identify trenches and soils in the BGC that have been affected by releases of volatile organic compounds (VOCs).

Assessment activities for the Solvent Tanks S01-S22 included vapor sampling, content inventory (rodding), and collection of historical solvent/sludge characterization data. In preparation for sampling the tank vapors, the tank gin poles and braces were removed, and the tank riser pipes were weatherproofed. The vapor sampling for volatiles, semi-volatiles, and radiological screening, was performed in the first quarter of Fiscal Year 1995.

SRS submitted a Revision.0 Interim Action Proposed Plan to construct a low-permeability soil cover to U.S. EPA and SCDHEC on October 5, 1995. SRS addressed the comments and submitted a Revision.1 Interim Action Proposed Plan to U.S. EPA and SCDHEC on December 17, 1995. U.S. EPA and SCDHEC approved the Interim Action Proposed Plan on January 15, and January 22, 1996, respectively. The Interim Action Proposed Plan was issued for a 30-day public comment period February 2 through March 2, 1996. A public meeting was held on the Interim Action Proposed Plan on February 27, 1996. SRS submitted the responses to comments and the Revision.0 Record of Decision to U.S. EPA and SCDHEC on March 18, 1996. U.S. EPA and SCDHEC approved the Record of Decision for signature on April 1 and March 2, 1996, respectively. The Old Radioactive Waste Burial Ground Interim Action Record of Decision was signed by DOE, U.S. EPA, and SCDHEC on March 18, June 18, and May 30, 1996, respectively. The Interim Remedial Action start was initiated on July 31, 1996

On April 14, 1996 and April 30, 1996, SRS received comments from the U.S. EPA and SCDHEC, respectively, on the Revision.2 RFI/RI Work Plan for the BGC. U.S. EPA and SCDHEC requested that the unit, BGC, be split up into multiple units. On July 29, 1996, SRS submitted comment responses and agreed with U.S. EPA and SCDHEC request. SRS agreed to manage the Mixed Waste Management Facility (MWMF), Low-Level Radioactive Waste Disposal Facility (LLRWDF), and the entire BGC groundwater under the RCRA program. SRS further committed to create one new RCRA/CERCLA unit, the ORWBG (which included the twenty-two Solvent Tanks) and other RCRA/CERCLA units, as needed, from within the non-RCRA portions of LLRWDF. The strategy was approved by U.S. EPA and SCDHEC on August 13, 1996, and August 14, 1996, respectively.

In November 1995, an inventory (via rodding) was performed on all of the solvent tanks to determine tank residual contents.

On June 24, 1996, SRS issued an internal information document on the solvent tanks. The Information document collected all of the pertinent historical operating data, tank physical dimensions, and content sample analysis history.

Installation of the interim soil cover continued through the end of Fiscal Year 1997. Activities include completion of a new sedimentation basin, three new drainage systems, and the placement of common fill base and low permeability soil.

On May 29, 1997, a scoping meeting was conducted with U.S. EPA and SCDHEC to discuss the RI/RFI Work Plan to be submitted on August 29, 1997. Prior to this meeting SRS began an extensive effort to collect historical data on the ORWBG from various sources, including aerial photographs, construction drawings, health physics burial maps, the computerized burial record analysis (COBRA) database and SRS staff. SRS presented to U.S. EPA and SCDHEC the preliminary results of this data collection effort. Based on the extensive amount of historical information available, it was determined by DOE, U.S. EPA, and SCDHEC that further intrusive characterization of this unit would not be required. It was also agreed upon by the Parties that SRS would submit a combined document (Work Plan/RFI/RI Report) that would streamline the RI/FS process. Because the scope of this document was significantly expanded as compared to a standard RI/RFI work plan, SRS requested an extension to the submittal date for the combined document. The extension for this submittal was granted by U.S. EPA on July 7, 1997, and SCDHEC on July 9, 1997. The submittal date for the combined document was revised to November 19, 1997.

Radiological and camera surveys were conducted on the solvent tanks beginning in February 1997. As of September 30, 1997, surveys of eleven tanks have been completed and standpipes have been removed from the remaining eleven tanks to allow completion of the camera surveys. A sample and analysis plan for solvent tank residuals is in the process of approval and will be submitted to U.S. EPA and SCDHEC as part of the combined document on November 19, 1998.

Activities Accomplished in Fiscal Year 1998

SRS completed the placement of the interim soil cover on the ORWBG in the first quarter of Fiscal Year 1998.

The ORWBG Revision.0 Work Plan RFI/RI Report was submitted to U.S. EPA and SCDHEC on November 19, 1997. Comments were received from U.S. EPA and SCDHEC on March 19 and April 14, 1998, respectively. The Revision.1 document was submitted on July 13, 1998. Comments were received from U.S. EPA and SCDHEC on August 14 and 31, 1998, respectively.

SRS completed aqueous sampling and analysis activities of the solvent tanks and evaluated analytical data to determine the appropriate alternative disposal methods for tank

residuals. SRS conducted a scope meeting on the solvent tanks with U.S. EPA and SCDHEC on August 12, 1998. At the meeting, U.S. EPA and SCDHEC requested that analytical data on the solvent tank sludge be provided before alternative disposal methods could be evaluated.

SRS initiated the development, review, and approval of the feasibility study for the ORWBG. This process included conducting scoping meetings and public workshops.

Activities Planned for Fiscal Year 1999
The ORWBG Feasibility Study Revision. 0 will be submitted by March 1, 1999, and appropriate alternative disposal methods will be evaluated and incorporated in the CMS/FS. SRS will receive approval for the Feasibility Study by May 30, 1999. The Proposed Plan Rev. 0 will be submitted by July 2, 1999.

The solvent tanks sludge sampling and analysis will be completed in Fiscal Year 1999.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 30

SRL Oil Test Site, 080-16G

Operable Unit 30 of the Fourmile Branch Watershed consists of one unit: the SRL Oil Test Site. This unit is listed on the FFA Appendix C, RCRA/CERCLA Units List.

Description
The SRL Oil Test Site (080-16G) is located approximately 2,000 feet east of the intersection of Roads 3 and 5. Separated from the Central Shops complex by C-railroad spur line, the unit is subdivided into three distinct areas of concern: the SRL Oil Test Site, the Rubble Disposal Site, and Petroleum-contaminated Soil Temporary Storage Area.

The SRL Oil Test Site was developed in 1975 as a location from which to evaluate the ability of native microorganisms to biodegrade petroleum hydrocarbons. No initial characterization was conducted on waste oils applied to the soil. In 1975, 220 gallons of used machine cutting oil was applied to 12 test plots, each measuring 12-feet wide by 35-feet long, so that the oil concentration was 400 gallons per square foot. In 1976, varying amounts of fertilizer were applied to each of the plots, and 824 gallons of used hydraulic fluid and 1,100 gallons of used paint thinner were randomly applied to two additional plots (10-feet wide by 230-feet long). There are no existing records of origin, history, or sampling analysis of the unknown material strip. Oil test plots were sampled immediately after application, 1 month after application, then every 3 months for two years, and again for 5 years. Results indicated that after 2 years, approximately 50% of applied oil was lost from the soil profile through biodegradation and volatilization. The SRL Oil Test Site has been inactive since 1977.

Rubble Disposal Site

This area is on the Site Evaluation List and will be evaluated under that program. The site was used to dispose waste oils, rubble, and construction materials, with other spill materials, including oil-contaminated soil. Most of these materials were excavated and moved to the SRS Sanitary Landfill in 1982. No existing records of the origin, history, or sampling and analysis for hazardous substances were believed to have been conducted on the material prior to disposal in the landfill. The Rubble Disposal Site has been inactive since November 1982.

Petroleum-Contaminated Soil Temporary Storage Area

The Petroleum-Contaminated Soil Temporary Storage Area received approximately ten truckloads of petroleum-contaminated soil that was stored on plastic sheeting during 1990, at which time the soil was removed from this unit. There is no record of origin or disposal of this soil. The area been inactive since soil removal in June 1990.

Soil and soil-gas surveys were conducted from 1975 to 1986. Data indicate hydrocarbons have not migrated more than 30 centimeters below the soil surface. Data indicates approximately 50% of the petroleum hydrocarbons have been biodegraded and/or volatilized. Methane, ethylene, and propylene were found at higher levels in the oil test plots than in the control plots. Phosphorus levels were above pre-application levels 1 year after oil application. All other parameters tested (pH, potassium, calcium, magnesium) had returned to pre-application levels after 1 year or were not affected by the oil application. Examination of the soil profile found a dark discoloration of the top 6 to 9 inches of soil. No groundwater monitoring wells exist at this unit. An analysis for metals and radionuclides has not been conducted at this unit.

Activities Accomplished Prior to Fiscal Year 1998

In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan that was received by the U.S. EPA and SCDHEC on October 23, 1990. The U.S. EPA comments were received on January 30, 1992. The Revision.1 RFI/RI Work Plan was received by the U.S. EPA and SCDHEC on April 30, 1992.

Activities Accomplished in Fiscal Year 1998

This operable unit was characterized using the site evaluation protocols. A Revision.0 streamlined No Action Statement of Basis/Proposed Plan and draft ROD were submitted to the U.S. EPA and SCDHEC on June 2, 1998. Comments were received from the SCDHEC on June 29, 1998, indicating that the SB/PP was inadequate. Further work on this operating unit was stopped.

Activities Planned for Fiscal Year 1999

None. This project is scheduled to begin in Fiscal Year 2004. Plans are to accelerate this project in order to gain a No Action remedial decision.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 31

Stormwater Outfall H-013, NBN

Operable Unit 31 of the Fourmile Branch Watershed consists of one unit: the Stormwater Outfall H-013. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
Stormwater Outfall H-013 is located approximately 500 feet west of the intersection of SRS Roads 4 and E. This is a process sewer discharge to the H-Area Hazardous Waste Management Facility (Fourmile Branch Operable Unit 22) for which RCRA closure was completed in August 1997.

Activities Accomplished Prior to Fiscal Year 1998
None

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

FOURMILE BRANCH WATERSHED OPERABLE UNIT 32

Tank 105-C Hazardous Waste Management Facility

Operable Unit 32 of the Fourmile Branch Watershed consists of one unit: Tank 105-C. This unit is a RCRA-regulated unit. This unit was certified closed under RCRA in November 1991. A final Record of Decision (ROD) was issued for the unit on November 9, 1994.

Description
The Tank 105-C Hazardous Waste Management Facility (HWMF) consists of one 8,400-gallon capacity underground storage tank (UST) and ancillary piping. This unit is a source-specific operable unit within the Fourmile Branch Watershed. The Tank 105-C HWMF was installed in 1961 as part of an off-line heat exchanger repair program and was used as a temporary holding tank for liquid waste generated by rinsing the heat exchangers with a weak oxalic acid solution. Sumps from the heat exchanger cleaning area drained into Tank 105-C. Oil in the tank was probably attributable to oil leaks into these sumps.

The reacted or spent oxalic acid solution that resulted from the rinsing process was pumped into an aboveground neutralization tank in the stack area of the reactor building. Potassium hydroxide (KOH) was then added to neutralize the solution to a pH of 8.0 or above. After neutralization, the waste was transferred to the UST 105-C HWMF for

temporary storage. It was common for the neutralization process to require additional pH adjustment inside UST 105-C, accomplished by circulating the waste in the tank with a pump and adding more KOH to adjust the pH. A permanent pump was installed to pump the waste into a waste trailer for transportation to a storage/disposal facility. The pump and circulation lines were disassembled in 1983.

The primary constituents of concern included tritium and other radionuclides with a pH of 13.2. Closure activities specifically included the neutralization of waste to a pH of less than 12.5, removal of as much waste as reasonably possible, and shipment of the removed waste to an onsite storage/disposal facility. Any remaining waste and the tank void were stabilized with concrete.

Activities Accomplished Prior to Fiscal Year 1998
RCRA actions at the Tank 105-C HWMF were conducted pursuant to the requirements of Settlement Agreement 90-64-SW. In October 1990, a RCRA Closure Plan was submitted to SCDHEC. SRS received approval of the closure plan on January 16, 1991, with no revision required. Revisions and subsequent approvals were made to the closure plan during closure activities. Closure of the Tank 105-C HWMF began in May 1991 and was completed in September 1991. The Tank 105-C HWMF was certified closed in November 1991. In December 1991, closure certification was accepted by SCDHEC as being in compliance with RCRA requirements.

Activities Accomplished in Fiscal Year 1998
None. All activities associated with the unit have been completed.

Activities Planned for Fiscal Year 1999
None. All activities associated with the unit have been completed.

FOURMILE BRANCH WATERSHED OPERABLE UNIT 33

Warner's Pond, 685-23G

Operable Unit 33 of the Fourmile Branch Watershed consists of one unit: Warner's Pond. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
Warner's Pond was constructed as a holding pond to receive segregated cooling water when such water became contaminated. Contamination of the cooling water system in H Area occurred in September 1956, May 1960, and November 1965. On all three occasions, contaminated cooling water entered the pond and was diverted or pumped to the 281-3H retention basin. Radionuclides associated with the releases were neither identified nor counted in the 1956 or 1960 releases. In 1965, approximately 300 acres of fission product activity was released. Radioactivity was reduced by pumping water to a

diversion box that discharged to the H-Area Seepage Basins. After the 1965 incident, the dam was breached, the pond drained and backfilled with two feet of soil, and the low level contamination remaining was coated with asphalt. After the backfilling was completed, the maximum radiation through clean soil was 500 counts/minute beta-gamma.

This unit was originally listed in FFA Appendix G, Site Evaluation List. The Site Evaluation Report prepared for the unit recommended that the area needed further investigation and should be deleted from FFA Appendix G and moved to FFA Appendix C, RCRA/CERCLA Units List, which it was in January 1993.

Radiological surveys of Warner's Pond were conducted January 6 and January 9, 1995, which indicated migrating contamination was caused by biological movement (e.g., vegetation, animals). As a result, a fence was constructed around Warner's Pond in April 1995 to restrict access to site workers and local wildlife. In addition, herbicide was applied to the vegetation at Warner's Pond in April and to the unit in August 1995 to identify areas and levels of contaminated vegetation.

Activities Accomplished Prior to Fiscal Year 1998

On August 31, 1995, SRS, in a Removal Site Evaluation Report, submitted to the U.S. EPA and SCDHEC expressed intent to perform a time-critical removal action to remove all vegetation from the unit.

A time-critical removal action was performed at this unit to remove and treat contaminated vegetation. By the end of September 1996, all vegetation had been cut, sectioned, removed and incinerated. Approximately 137,000 pounds of vegetation were removed from the unit between April 4, 1996, and September 30, 1996. The non-hazardous radioactive ash generated from the incineration of the contaminated vegetation was disposed at the SRS Low-Level Waste Disposal Facility on April 13, 1997.

Pre-work plan characterization was conducted at the HP- 52 ponds and Warner's Pond from June to August 1997. The scope of the sampling effort included soil boring inside the contaminant zone, background soil boring, collecting surface water/sediment samples, and installing and sampling new groundwater monitoring wells. On June 23, 1997, a notification of the intent to perform pre-work plan characterization was provided to SCDHEC and U.S. EPA.

Activities Accomplished in Fiscal Year 1998

Results of the sampling and analysis conducted as part of the pre-work plan characterization were compiled for future use in the RFI/RI work plan preparation. Results of the pre-work plan groundwater characterization were provided to SCDHEC on February 9, 1998, as required by a condition in the monitoring well approval.

Routine maintenance activities, such as mowing the vegetative cover, were conducted.

Activities Planned for Fiscal Year 1999
Routine maintenance activities will be conducted.

STATUS OF LOWER THREE RUNS WATERSHED OPERABLE UNITS

LOWER THREE RUNS WATERSHED OPERABLE UNIT 1

108-4R Overflow Basin

Operable Unit 1 of the Lower Three Runs Watershed consists of seven units: the 108-R Overflow Basin and the six R-Area Reactor Seepage Basins. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The Overflow Basin (108-4R) is located approximately 250 feet southwest of R-Area 105 R-Reactor Building inside R Area.

The basin dimensions are approximately 60-feet long by 60-feet wide by 13-feet deep. The basin was used between 1953 and 1964 for collecting diesel fuel from the incidental overflow of adjacent storage tanks. Based on its previous use, the basin was identified for unit screening to determine if constituents were present in the basin and if further investigations were warranted. Organic constituents of concern found during the unit-screening program included typical components of gasoline such as benzene, toluene, ethyl benzene, and xylene.

Activities Accomplished Prior to Fiscal Year 1998
A unit-screening program was completed at the overflow basin in 1990. Screening data indicated that soil concentrations exceeded analytical method detection limits in at least one sample for the above-mentioned substances. In addition, total petroleum hydrocarbons (TPH), an indicator parameter used to detect the presence of petroleum hydrocarbons, was detected in several samples. A soil-gas study was also conducted in July 1991.

Activities Accomplished in Fiscal Year 1998
SRS submitted the Revision.0 RFI/RI/BRA document to the U.S. EPA and SCDHEC on August 11, 1998. Groundwater modeling in support of the General Groundwater Strategy was also completed.

Activities Planned for Fiscal Year 1999
Initiate the filling of the overflow basin in accordance with underground storage tank (UST) requirements.

LOWER THREE RUNS WATERSHED OPERABLE UNIT 1

R-Area Reactor Seepage Basins, 904-57G, -58G, -59G, -60G, -103G, -104G)

Operable Unit 1 of the Lower Three Runs Watershed consists of seven units: the 108-R Overflow Basin and the six R-Area Reactor Seepage Basins. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The R-Area Reactor Seepage Basins (904-57G, -58G, -59G, -60G, -103G, and -104G) are located next to the inactive R Reactor in the central part of the SRS.

Comprised of 6 unlined earthen basins, the unit received radioactively contaminated purge water from the R-Reactor Disassembly Basin. In 1957, an experimental fuel element failed, resulting in the release of 200 curies of strontium and 1,000 curies of cesium to basin 1. Basin 1 was deactivated and backfilled, and basins 2 through 5 were placed in operation. In 1960, basins 2 through 5 were deactivated, backfilled, treated with herbicide, and covered with asphalt. In addition, a clay cap and dike were placed over basin 1 and the north section of basin 3. In 1964, basin 6 was deactivated; in 1977, it was backfilled and covered with asphalt. Preliminary investigations indicate radiological contamination along with minor cadmium and lead concentrations in and around basins and along an abandoned construction sewer line that was breached during the installation of basins.

Activities Accomplished Prior to Fiscal Year 1998
Groundwater monitoring wells are sampled periodically. The Revision.0 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on February 3, 1992. The Revision.1 RFI/RI Work Plan was submitted to U.S. EPA and SCDHEC for review and comment. The U.S. EPA and SCDHEC provided conditional approval for field start, which was initiated on September 28, 1995.

Ground penetrating radar has been conducted to verify underground features and basin boundaries. Photogrammetry is being used to develop a topographic map. Scheduled herbicide and pesticide treatments are conducted each quarter to control vegetation and fire ant populations in the immediate vicinity of the basins to prevent uptake of radiation.

In 1996, SRS continued the RFI/RI characterization activities as outlined in the approved RFI/RI work plan during 1996. During the phase I characterization, 3 soil borings, 3 background soils borings, approximately 21 surface soil samples, 6 background wells, and 12 monitoring wells were completed. The results will be used to develop and streamline the list of constituents of potential concern (COPCs). SRS submitted a removal site evaluation report to U.S. EPA and SCDHEC for the refurbishment of the asphalt cover on the unit. Field activities were initiated at the unit on August 5, 1996, as a time-critical

removal action.

SRS completed the time-critical removal action and pursued technology development activities, including the Office of Technology Development (OTD) Gamma Probe Testing. The phase II characterization was initiated, which included using a gamma probe in the basins and adjacent to the pipelines as well as conducting thorough surface radiological surveys. Phase II characterization will also include additional groundwater characterization. A limited list of COPCs was negotiated with U.S. EPA and SCDHEC to be analyzed in the phase II characterization. SRS submitted the RFI/RI Work Plan Addendum for the phase II characterization on June 26, 1997, for U.S. EPA and SCDHEC approval and review. SCDHEC comments on the RFI/RI Work Plan Addendum were received on August 26, 1997, and U.S. EPA approval was received on September 2, 1997. SRS submitted the revised RFI/RI Work Plan Addendum to U.S. EPA and SCDHEC on September 24, 1997, for review and approval. SCDHEC approved the revised RFI/RI Work Plan Addendum on October 13, 1997.

Activities Accomplished in Fiscal Year 1998
SRS submitted the Revision.0 RFI/RI/BRA to U.S. EPA and SCDHEC on August 11, 1998. Groundwater modeling in support of the general groundwater strategy was completed. Development of the CMS/FS/PP draft ROD was begun. The phase II work plan field characterization was completed in Fiscal Year 1998.

Activities Planned for Fiscal Year 1999
Respond to U.S. EPA and SCDHEC comments on the Revision.0 RFI/RI/BRA and incorporate them in the Revision.1 document. Submit Revision.1 RFI/RI/BRA to U.S. EPA and SCDHEC for their final review and approval.

Complete the Revision.0 CMS/FS/PP draft Record of Decision (ROD) and submit to the U.S. EPA and SCDHEC for review and comments. Respond to any comments from the U.S. EPA and SCDHEC and incorporate them in Revision.1. Submit Revision. 1 CMS/FS/PP to U.S. EPA and SCDHEC for their final review and approval.

LOWER THREE RUNS WATERSHED OPERABLE UNIT 2

Combined Spills North of Building 105-R, NBN

Operable Unit 2 of the Lower Three Runs Watershed consists of four units: Combined Spills from 105-R, 106-R, 109-R and the 109-R Purge Water Storage Basin. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
Combined spills from 105-R, 106-R and 109-R are located to the north and east of the Reactor building (105-R). The southern boundary of the area includes the soil around the

105-R Building, up to the northeast corner of the building, then extends 60 feet south to include the soils surrounding the 106-R Building. To the east, the area is bounded by a fence approximately 270 feet from the building. The area to the north is bounded by a fence 150 feet from the building. The area extends west approximately 430 feet from the northeast corner of the 105-R Building and encompasses the soils around Building 109-R. The operable unit consists of those soils surrounding Building 106-R, Building 105-R and the area bounded by the northeast corner of Building 105-R as well as the process line connecting these facilities. Based on limited data and information, the only currently identified contaminants are radionuclides. A complete investigation is planned. The groundwater is covered under the R-Area Groundwater Operable Unit.

Activities Accomplished Prior to Fiscal Year 1998
None.

Activities Accomplished in Fiscal Year 1998
SRS submitted the Remedial Site Evaluation Report for the Combined Spills from Buildings 105-R, 106-R, 109-R (NBN) and the Purge Water Storage Basin (109-R) to U.S. EPA and SCDHEC on December 31, 1997. The report recommended that the unit be added to the FFA Appendix C, RCRA/CERCLA Units List. The unit was added to Appendix C in 1998. U.S. EPA notified SRS that they concurred with the report's recommendation on May 6, 1998. SCDHEC concurred on May 27, 1998.

Activities Planned for Fiscal Year 1999
None.

LOWER THREE RUNS WATERSHED OPERABLE UNIT 3

Gunsite 218 Rubble Pile, 631-23G

Operable Unit 3 of the Lower Three Runs Watershed consists of one unit: the Gunsite 218 Rubble Pile. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The Gunsite 218 Rubble Pile (631-23G) is located on a peninsula, known as Monkey Island, extending into the west side of Par Pond.

Gunsite 218 is a former anti-aircraft gun emplacement that was used to protect the SRS facility from the mid-1950s to early 1960s. The gunsite rubble pile is located within a planted pine forest. Areas of interest at the gunsite include four bunkers constructed of sandbags and/or mounded earth, two concrete slab foundations, the former location of two aboveground fuel oil tanks (removed), one underground diesel tank (removed in February 1992), an abandoned septic tank and tile field system, an old water well, an area of stressed vegetation, and an area of oil-stained soils.

Activities Accomplished Prior to Fiscal Year 1998
The underground storage tank (UST) was removed along with the contaminated soil (UST removed in February 1992, soil in November 1992). The constituents detected during sampling activities included arsenic, barium, mercury, tin, zinc, chromium, and vanadium. In addition, low levels of volatile organic compounds (VOCs) and total petroleum hydrocarbons (TPH) were present in excess of analytical detection limits. Gross alpha and beta radionuclides were also detected but were within background levels.

A soil plug and soil-gas survey were performed at Gunsite 218 in 1988. Soil-gas samples were collected from 11 locations in the vicinity of bunkers where old paint and paint thinner cans were observed. Five soil samples exhibited low levels of trans 1,2-dichloroethylene [< 11 nanograms per gram (ng/g)]. The soil-gas samples contained low levels of light hydrocarbons (< 2,500 parts per billion methane) that are within levels that could be expected to occur naturally. In 1990, 4 soil borings and 9 hand-auger borings were performed to obtain soil samples.

In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan that was received by U.S. EPA and SCDHEC on October 23, 1990.

Additional soil was removed in early 1993. Subsequently all petroleum-contaminated soil resulting from the UST has been removed from the unit, and the excavation backfilled with clean soil.

Activities Accomplished in Fiscal Year 1998
None.

Activities Planned for Fiscal Year 1999
None.

LOWER THREE RUNS WATERSHED OPERABLE UNIT 4

Old R-Area Discharge Canal, NBN

Operable Unit 4 of the Lower Three Runs Watershed consists of one unit: the Old R-Area Discharge Canal. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
The Old R-Area Discharge Canal, also know as Joyce Branch, is located within 5 miles of the SRS boundary. This canal received radionuclide-contaminated water from the Disassembly Basin between 1953 and 1958. The discharge was directed along the Old R-Area Discharge Canal to Lower Three Runs. This resulted in soil and sediment

contamination along the length of both streams. The radioactive constituents of concern are cesium-137, strontium-89/90, cobalt-60, and hydrogen-3 (tritium).

Activities Accomplished Prior to Fiscal Year 1998
SRS moved this unit from the FFA Appendix G, Site Evaluation List, to FFA Appendix C, RCRA/CERCLA Units List, in Fiscal Year 1997.

Activities Accomplished in Fiscal Year 1998
None.

Activities Planned for Fiscal Year 1999
None.

LOWER THREE RUNS WATERSHED OPERABLE UNIT 5

P-Area Acid Caustic Basin, 904-78G

Operable Unit 5 of the Lower Three Runs Watershed consists of one unit: the P-Area Acid/Caustic Basin. This operable unit is listed on FFA Appendix H, . Activities on this unit are SCDHEC-led RCRA actions.

Description
The P-Area Acid/Caustic Basins (904-78G) are located within P Area. The basin was used until 1982 to support processes needed for power generation activities at each area. The basin is associated with boiler feed water conditioning for the removal of inorganic salts from raw water before its use in the boiler.

Boiler feed water at SRS contains natural salts that affect boiler operation and so must undergo a demineralization process. This demineralization process uses cation and anion resins to remove the salts. The cation resin exchanges hydrogen for cations, and the anion resin exchanges hydroxyl ions for the anions. When these resins become saturated with cations or anions, they must be regenerated. This is accomplished by passing a dilute solution of sulfuric acid over the cation resin and a dilute solution of sodium hydroxide over the anion resin. The partially spent regenerant solutions and associated rinse water make up the influent of the acid/caustic basin.

The basin provided mixing and neutralization of the regenerants before discharging to local surface streams. The P-Area Acid/Caustic Basin has been inactive since 1982, when SRS neutralization facilities went on line.

The acid/caustic basin is approximately 50-feet long by 50-feet wide by 7-feet deep and has a capacity of approximately 75,000 gallons. When in operation, the basin received 2.4 million gallons/year of spent regenerants and rinse water.

The regenerant solutions consisted of calcium and magnesium cations, sulfates, chlorides, carbonic acid, silicic acid, and any acid or base in the original solution that was unused. No known hazardous waste constituents were discharged to the basin. Analyses of sediment samples from the basin, performed using the toxicity characteristic leaching procedure (TCLP), indicate that concentrations of analyzed metals were well below U.S. EPA guideline concentrations. The main environmental concern with the acid/caustic basin is the pH of the solutions in the basin. It cannot be proved that the pH did not go below 2 or above 12.5.

Activities Accomplished Prior to Fiscal Year 1998

The initial issue of an Interim Status Closure Plan for the F-, H-, K-, and P-Area Acid/Caustic Basins was submitted to SCDHEC on January 25, 1989. The closure plan was submitted for public comment in August 1990, and the only changes to the plan since that time has been the addition of data and a health-based risk assessment supporting the initial closure proposal. The final closure plan (Rev. 3) was submitted on July 13, 1991, and updated on February 5, 1992, to include a dewatering plan and groundwater data through the third quarter of 1991.

U.S. EPA Region IV has determined that the interim status closure plan specifically for the H- and P-Area Acid Caustic Basins is protective to human health and the environment. SRS has completed the closure of H- and P-Area Acid Caustic Basin with the understanding that the closure plan may change in its requirements during SCDHEC approval process.

An F-, H-, K-, P-Area Acid/Caustic Basin Interim Status Closure Plan (WSRC-RP-94-1259, Revision 6, dated June 19, 1995) was approved by SCDHEC on November 8, 1995. The plan approved the clean closure of the basins so that filling the basins was warranted for safety and housekeeping purposes. The filling of the basins was previously completed, and in Fiscal Year 1996, groundwater monitoring wells associated with the basin characterization were abandoned. All activities associated with the unit have been completed.

Activities Accomplished in Fiscal Year 1998

None.

Activities Planned for Fiscal Year 1999

None.

LOWER THREE RUNS WATERSHED OPERABLE UNIT 6

P-Area Bingham Pump Outage Pit, 643-4G

Operable Unit 6 of the Lower Three Runs Watershed consists of one unit: the P-Area Bingham Pump Outage Pit. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description

The Bingham Pump Outage Pits are unlined earthen pits located outside the fences of the reactor areas: K (1 pit), L (2 pits), P (1 pit), and R (3 pits).

Repairs to primary and secondary reactor cooling systems were performed between 1957 and 1958. The outages of the cooling water systems that occurred as a result of the modifications became known as the Bingham Pump Outages. The pits received low-level [less than 25 mR/hr] construction debris such as pipes, cables, ladders, drums, and boxes of miscellaneous hardware generated by the repairs. No pumps or liquids are buried at the pits. The pits were excavated to a depth of 13 feet, filled with approximately 9 feet of debris, and backfilled with approximately 4 feet of cover soil. It is conservatively estimated that, at the time of burial, the total amount of radioactivity buried in each reactor area was 1 curie. Approximately 70% of this activity is estimated to have been eliminated through radioactive decay since 1958.

A ground penetrating radar survey was performed to delineate pit boundaries. Surface radiation levels recently measured by Health Protection revealed no detectable surface radiation. A soil- gas survey also indicated very low levels of volatile organic compounds.

Activities Accomplished Prior to Fiscal Year 1998

SRS conducted pre-work plan characterization of the unit in conjunction with the L-Area and R-Area Bingham Pump Outage Pits, which included 27 soil borings that were analyzed and radiologically screened for the full suite of contaminants. Thirteen cone penetrometer technology (CPT) pushes were also performed to gather lithologic information about the unit. SRS submitted the Revision.0 RI Work Plan Addendum to U.S. EPA and SCDHEC on July 25, 1996.

U.S. EPA and SCDHEC provided comments on the Revision.0 RI Work Plan on December 2, and October 28, 1996, respectively. SRS addressed the U.S. EPA and SCDHEC comments and provided a Revision.1 Work Plan on January 30, 1997. SCDHEC provided comments on the Revision.1 Work Plan on February 28, 1997. U.S. EPA conditionally approved the Revision.1 Work Plan on March 3, 1997. SRS addressed the comments and SCDHEC approved the work plan on March 3, 1997. SRS initiated the field start for this unit on March 3, 1997.

This unit is a secondary ASCAD™ unit to the K-Area Bingham Pump Outage Pit.

Activities Accomplished in Fiscal Year 1998
SRS forwarded an ASCAD™ scoping package to the U.S. EPA and SCDHEC on March 4, 1998. A scoping meeting for the ASCAD™ Combined Document was held with the U.S. EPA and SCDHEC on March 18, 1998. The Revision.0 ASCAD™ combined document (RI/BRA/FS), Proposed Plan, and draft Revision.0 Record of Decision for the L-Area BPOP were forwarded to U.S. EPA and SCDHEC on September 17, 1998.

Activities Planned for Fiscal Year 1999
SRS plans to obtain approval of the ASCAD™ Combined Document and the Proposed Plan. Plans also call for submittal of a Revision.0 and Revision.1 ROD.

LOWER THREE RUNS WATERSHED OPERABLE UNIT 7

P-Area Coal Pile Runoff Basin, 189-P

Operable Unit 7 of the Lower Three Runs Watershed consists of one unit: the P-Area Coal Pile Runoff Basin. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The P-Area Coal Pile Runoff Basin (189-P) is located approximately 350 feet south of the P-Area coal storage site.

Steam and electricity for the SRS activities were produced by seven coal-fired power plants located in A, C, D, F, H, K, and P Areas. Coal was stored at each of the seven power plant locations. Surface runoff from the coal storage piles was discharged to surface streams until the National Pollution Discharge Elimination System (NPDES) took effect in 1977. To meet NPDES discharge requirements and in response to SCDHEC requests, seven unlined, earthen containment basins were constructed near each coal storage location to intercept, stabilize, and treat surface runoff from the coal piles. All seven basins were constructed between 1978 and 1981. The C- and F-Area coal pile runoff basins have been inactive since late 1985 when the coal piles at these areas were removed.

Constituents of concern within the basins include low pH, sulfate, iron, antimony, aluminum, arsenic, and vanadium.

Activities Accomplished Prior to Fiscal Year 1998
Soil borings were drilled at each of the basins during June and July 1988. Groundwater monitoring data at this unit indicates there has been no impact to local groundwater as a result of basin operations.

The Revision.0 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on October 23, 1990. After receiving U.S. EPA's comments for the Revision.0 RFI/RI Work Plan on October 30, 1991, SRS revised the work plan and submitted the Revision.1 RFI/RI Work Plan, which U.S. EPA and SCDHEC received January 29, 1992. Both the Revision.0 and the Revision.1 RFI/RI Work Plans addressed all seven of the SRS Coal Pile Runoff Basins. Since that submittal, U.S. EPA, SCDHEC, and SRS have developed the operable units, and the seven Coal Pile Runoff Basins will be addressed either individually or with the other RCRA/CERCLA Units in their operable unit.

Two white papers were submitted to U.S. EPA and SCDHEC for review on August 29, 1996, discussing potential early actions at the Coal Pile Runoff Basins and Burning Rubble Pits. On October 7, and November 20, 1996, SRS met with U.S. EPA and SCDHEC to discuss the potential early actions issue. On December 23, 1996, SRS submitted a letter documenting the path forward for the proposed early remediation of the SRS Coal Pile Runoff Basins and requested U.S. EPA and SCDHEC concurrence. U.S. EPA concurred on February 3, 1997, and SCDHEC concurred on January 3, 1997.

On February 19, 1997, SRS submitted an extension request to adjust the FFA milestones in accordance with the approved path forward for C-, K-, F- and P-Area Coal Pile Runoff Basins. A-, H-, and D-Area Coal Pile Runoff Basins were not included in this early action because they were still in operation. However, they will be addressed in a similar manner when they become inactive. The Removal Site Evaluation Report (RSER)/Wastewater Closure Plan for the early action at C-, K-, F- and P-Area Coal Pile Runoff Basins was approved by U.S. EPA on March 13 and SCDHEC on April 25, 1997. The removal action was initiated on May 15 and completed on September 3, 1997. This removal action included removal of coal and coal-laden sediments from the basins and the backfilling of the basins with clean soil. The coal and coal-laden sediments were removed and shipped offsite for beneficial reuse. This is the first time SRS has beneficially reused waste from a CERCLA action. This early action resulted in a schedule acceleration of 92 months and a significant cost savings. SRS expects this to be the final action for these basins.

Activities Accomplished in Fiscal Year 1998

SRS prepared and submitted the Revision.0 Post-Removal Action Remedial Investigation Report, documenting the action taken at these four units, to U.S. EPA and SCDHEC on November 22, 1997. U.S. EPA approval was received on January 21, 1998, while SCDHEC gave notice of their approval on January 26, 1998.

SRS prepared and submitted the Revision.0 Statement of Basis/Proposed Plan to U.S. EPA and SCDHEC on November 22, 1997. U.S. EPA approval was received on January 21, 1998, while SCDHEC approved of the document on January 26, 1998. A Revision.0 Record of Decision (ROD) was submitted to U.S. EPA and SCDHEC on April 30, 1998. Both the U.S. EPA and SCDHEC provided comments to SRS on June 17, 1998. A

Revision.1 ROD was sent to U.S. EPA and SCDHEC on July 17, 1998. The U.S. EPA gave notice of their approval on September 15, 1998, while SCDHEC approved it on August 13, 1998.

Activities Planned for Fiscal Year 1999
The groundwater data report will be submitted to the U.S. EPA and SCDHEC during the first calendar quarter of 1999. Groundwater at five wells will be sampled during the second calendar quarter of 1999.

LOWER THREE RUNS WATERSHED OPERABLE UNIT 8

P-Area Reactor Groundwater, NBN

Operable Unit 8 of the Lower Three Runs Watershed includes the groundwater beneath the P-Area Reactor. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
P-Reactor Area is located in the south-central portion of SRS. Acceptable past disposal practices associated with historical reactor operations have produced waste units within the area. These waste units have contaminated the area groundwater with operational wastes. Groundwater characterization activities scheduled for the P-Area Reactor Groundwater unit will not duplicate individual waste unit characterization activities. The combined data will be used to develop an acceptable regulatory path forward for groundwater remediation, if warranted. In P- Reactor Area, the waste unit where the groundwater is being decoupled from the surface unit is the Reactor Seepage Basin. The groundwater remains coupled to the units for the Burning Rubble Pits, the Coal Pile Runoff Basin, and the Bingham Pump Outage Pit.

Monitoring well data collected from the reactor area indicate the groundwater is contaminated with tritium, chlorinated volatile organics, other radionuclides, heavy metals, and sulfate.

Activities Accomplished Prior to Fiscal Year 1998
SRS added this unit to the FFA Appendix C, RCRA/CERCLA Units List in 1998.

Activities Accomplished in Fiscal Year 1998
None.

Activities Planned for Fiscal Year 1999
None.

LOWER THREE RUNS WATERSHED OPERABLE UNIT 9

P-Area Reactor Seepage Basins, 904-61G, -62G, -63G

Operable Unit 9 of the Lower Three Runs Watershed consists of three units: the three P-Area Reactor Seepage Basins. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The three unlined P-Area Reactor Seepage Basins (904-61G, 904-62G, 904-63G) were placed in service in 1957. They received purge water from the P-Area Reactor Disassembly Basin. From 1970 to 1978, the basins were bypassed. In 1978 discharge of process purge water to the basins was resumed until 1991 when the reactor was placed in shutdown. There are seven water table monitoring wells surrounding the P-Area Reactor Seepage Basin. Sample results from these wells indicate levels of copper, lead, nitrate, strontium, and tritium in the groundwater. Soil-core analysis indicates the presence of cesium, cobalt and strontium radionuclides.

Activities Accomplished Prior to Fiscal Year 1998
None.

Activities Accomplished in Fiscal Year 1998
SRS completed the scheduled pre-work plan characterization for the decision document. These activities included gathering of soil samples inside and outside the basins; lab analysis of the soil samples; CPT pushes for lithology; and testing of wells.

Activities Planned for Fiscal Year 1999
This unit is included in the Plug-In Approach, along with the K-, L-, and P-Area Reactor Seepage Basins. The Parties intend to finalize the Plug-In Record of Decision in Fiscal Year 1999. SRS will then submit a Revision.0 Plug-In Decision document for C-Area Reactor Seepage Basins for U.S. EPA and SCDHEC review and comment.

Verify and validate completion of the Fiscal Year pre-work plan characterization work.

LOWER THREE RUNS WATERSHED OPERABLE UNIT 10

Par Pond Sludge Land Application Site, 761-5G

Operable Unit 10 of the Lower Three Runs Watershed consists of one unit: the Par Pond Sludge Land Application Site. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The Par Pond Sludge Land Application Site is located north of Road B and southeast of

the Par Pond. The Par Pond Sludge Land Application Site was originally a 31-acre borrow pit that was reclaimed for land applications of sewage sludge. In 1980, after surficial soil preparation, about 300,000 gallons of liquid sludge from non-SRS sewage treatment plants were injected 13 to 20 inches beneath the soil to fertilize and condition it. In 1981, ten species of hardwood and loblolly pines were planted on the site. In 1988, about 340 tons of sewage sludge from the Central Shops (CS) Sewage Sludge Lagoon was spread over the soil of approximately 22 of the 31 acres of the site.

Sludge and underlying soil samples were taken at the CS Sewage Sludge Lagoon, but sample results were not reported until after the sludge had been applied to the Par Pond Sludge Land Application Site. Analytical results of the sludge from CS Sludge lagoon indicated the presence of chlordane, a hazardous (class B carcinogen) pesticide used in termite control. The source of the chlordane has not been determined. Results also showed the presence of heavy metals in the sludge.

Activities Accomplished Prior to Fiscal Year 1998
In accordance with the SRS RCRA Permit SRS prepared and submitted the Revision.0 RFI/RI Work Plan that was received by U.S. EPA and SCDHEC on July 8, 1991.

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

LOWER THREE RUNS WATERSHED OPERABLE UNIT 11

Par Pond (including the pre-cooler Ponds and canals), 685-G

Operable Unit 11 of the Lower Three Runs Watershed consists of one unit: the Par Pond. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
Par Pond currently receives discharges from all storm sewer outfalls from the deactivated R Area, a few storm sewers in P Area, and probably discharges from the water table aquifer. Most of the radionuclide inventory comes from the 1950-1960 era releases. In the 30 years since these releases, approximately half of the strontium-90 and cesium-137 (the main isotopes in the release) has decayed. The current estimated inventory in Par Pond is approximately 43 curies of cesium-137. The constituents of concern identified thus far for the Par Pond sediments and water include cesium-137, tritium, and mercury.

The Par Pond is a 2,640-acre reservoir near the eastern edge of SRS and is located adjacent to P and R Areas. It was created as a cooling pond to augment the cooling

requirements of both P and R Reactors. Par Pond dam is an earthen embankment 65-feet high and 4,500-feet long. The water level at 200 feet above mean sea level has been maintained in the reservoir since its construction. From August 1958 to October 1961, Par Pond received thermal effluent from R Reactor only. During this time, R Reactor discharged thermal effluent to the Middle or Hot Arm of Par Pond via the precooler Pond C. Both reactors utilized Par Pond from November 1961 to June 1964. During this period, R Reactor discharged effluent to the north arm via Pond B. The P Reactor discharged effluent into the Hot Arm of the pond via a series of canals and precooler ponds, including Pond C. In July 1964, R-Reactor operations were suspended, and the reactor was placed on standby. Thereafter, Par Pond has received thermal effluent from P Reactor only, and Pond B has not received any effluent cooling water. Currently, these reactors are not operating, and their discharge to the reservoir has ceased. During a routine structural inspection of the dam in March 1991, a small surface depression was noted on the downstream face of the dam. Based on the inspection report, DOE ordered a detailed structural investigation into the cause of the depression and initiated a simultaneous precautionary drawdown of the reservoir to the 181-foot mean sea level elevation in June 1991. This level was chosen to reduce the risk and consequences of flooding in the event of a dam failure downstream of the reservoir.

As the drawdown and structural investigation proceeded, regulatory agencies and the public were notified and apprised of the drawdown. Due to radionuclide contamination of the sediment below the 200-foot mean sea level elevation, DOE and U.S. EPA viewed the drawdown and the exposed sediments of the Par Pond as a removal action under CERCLA. As a result, SRS was directed to perform a CERCLA Risk Assessment (based on existing information) associated with the exposed sediments. To monitor activity levels and cesium-137 content during drawdown of the reservoir, water and sediment samples were tested weekly at monitoring points in Lower Three Runs Creek by SRS.

The lowering of Par Pond posed a potential for environmental impact because the reservoir and antecedent streams had received releases of radionuclides. The main source of radionuclides were accidental releases resulting from fuel element failures and leaks during the 1950s and 1960s. The largest release was from a fuel element that failed in 1957.

The Par Pond Removal Action underwent a 45-day public comment period from June 8 through July 23, 1992. In October 1992, the Baseline Risk Assessment, which used existing data for Par Pond, was prepared to meet U.S. EPA request for a risk assessment based on the drawdown of the Par Pond reservoir.

Following the drawdown, SRS was directed to develop an Interim Action Proposed Plan to review the remedial alternatives and select a preferred alternative to eliminate or contain the potential risks for the exposed sediment. Emphasis was placed on restoring the Par Pond to its pre-drawdown conditions to allow ecological recovery of the pond. A 30-day

public comment period was completed in January 1995. The public comment period included a public meeting on December 14, 1994. Many comments were submitted and addressed. The Interim Action Record of Decision was drafted in January 1995 and was approved by U.S. EPA and SCDHEC in February 1995. The pond was refilled to full pool by March 15, 1995.

Based on some public comments, the preferred alternative was modified to allow the pond to fluctuate naturally while pumping water from the river was minimized. An environmental assessment (EA) was performed to evaluate this option. The EA allowed the pond to fluctuate but placed a minimum flow rate to Lower Three Runs.

The refill was carried out by a combination of natural refill and pumping from the river. In July 1995, SRS received approval from SCDHEC and U.S. EPA to remove the siphons from the pond and not maintain it at the reduced level (181 feet mean sea level). SRS would not remove any natural influx to the pond (i.e., rainwater). The pond had refilled itself halfway by the time the Interim Action Record of Decision was signed. To minimize the impact to the ecosystem, the pond was filled to full pool by pumping water from the river before spring. The pond and outfalls were monitored during refill for releases from the pond. No releases occurred.

Activities Accomplished Prior to Fiscal Year 1998
The Remedial Design/Remedial Action Work Plan was submitted to U.S. EPA and SCDHEC in May 1995 and approved in August 1996.

Sampling of PAR Pond and L Lake was completed. Twenty-five cores were taken from the PAR Pond, the canals, and L Lake to support a NEPA environmental assessment. The data will also be used for any CERCLA activities.

The Remedial Design/Remedial Action Work Plan was finalized in August 1996.

Activities Accomplished in Fiscal Year 1998
None.

Activities Planned for Fiscal Year 1999
No activities planned.

LOWER THREE RUNS WATERSHED OPERABLE UNIT 12

R-Area Acid/Caustic Basin, 904-79G

Operable Unit 12 of the Lower Three Runs Watershed consists of one unit: the R-Area Acid/Caustic Basin. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The R-Area Acid/Caustic Basin (904-77G) is located in an area forested with second growth pine, which is about 600 feet south of the R-Area facility.

The R-Area Acid/Caustic Basin, which operated between 1955 and 1964, is an unlined earthen basin 50-feet long by 50-feet wide by 7-feet deep. It received wastes from R-Area Water Treatment Plant. The wastes consisted of dilute acid and caustic solutions, rinse water from ion exchange, steam condensate, overflow from sodium hydroxide storage tanks, and rain water.

There are no historical records on the quantities or characteristics of water purification wastewater discharged to the basin. SRS performed preliminary environmental studies of the basins in 1985. Data associated with the 1985 investigations is not consistent with present sampling protocols and data quality requirements. However, these studies do suggest that the sediments in the basins may contain metals in concentrations slightly above typical SRS soils. In addition, these preliminary data indicate that metal concentrations in the sediments are not likely to be a threat to human health or the environment. The groundwater near the basin in R Area contains radium that is slightly higher than typical SRS background concentrations. Monitoring of four groundwater wells continues annually.

Activities Accomplished Prior to Fiscal Year 1998
In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan received by U.S. EPA and SCDHEC on September 21, 1990. U.S. EPA comments on the Revision.0 RFI/RI Work Plan were received by SRS on August 12, 1991. The Revision.1 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on November 6, 1991. SCDHEC comments on the Revision.1 RFI/RI Work Plan were received by SRS on May 28, 1993.

Activities Accomplished in Fiscal Year 1998
SRS completed the site survey at the waste site during Fiscal Year 1998. Sampling and analysis of the groundwater was also completed during the year.

Activities Planned for Fiscal Year 1999
SRS is submitting a new Revision.0 RI Work Plan on December 21, 1998.

SRS expects to prepare, submit, and receive regulator approval of the Revision.0 or Revision.1 Work Plan and achieve a field start by September 30, 1999.

LOWER THREE RUNS WATERSHED OPERABLE UNIT 13

R-Area Bingham Pump Outage Pits, 643-8G, -9G, -10G

Operable Unit 13 of the Lower Three Runs Watershed consists of three units: the three R-Area Bingham Pump Outage Pits. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description

The Bingham Pump Outage Pits are unlined earthen pits located outside the fences of the reactor areas: K (1 pit), L (2 pits), P (1 pit), and R (3 pits).

Repairs to primary and secondary reactor cooling systems were performed between 1957 and 1958. The outages of the cooling water systems that occurred as a result of the modifications became known as the Bingham Pump Outages. The pits received low-level (less than 25 millirem/hour) construction debris such as pipes, cables, ladders, drums, and boxes of miscellaneous hardware that were generated by the repairs. No pumps or liquids are buried at the pits. The pits were excavated to a depth of 13 feet, filled with approximately 9 feet of debris, and backfilled with approximately 4 feet of cover soil. It is conservatively estimated that at the time of burial, the total amount of radioactivity buried in each reactor area was 1 curie. Approximately 70% of this activity is estimated to have been eliminated through radioactive decay since 1958.

A ground penetrating radar survey was performed to delineate pit boundaries. Surface radiation levels recently measured by Health Protection revealed no detectable surface radiation. A soil-gas survey also indicated very low levels of volatile organic compounds.

Activities Accomplished Prior to Fiscal Year 1998

SRS conducted a pre-work plan characterization of the unit in conjunction with the L-Area and P-Area Bingham Pump Outage Pits, which included 27 soil borings that were analyzed for the full suite of contaminants and radiologically screened. Thirteen CPTs were also performed to gather lithologic information about the unit. SRS submitted the Revision.0 RI Work Plan Addendum to the U.S. EPA and SCDHEC on July 25, 1996.

The U.S. EPA and SCDHEC provided comments on the Revision.0 RI Work Plan on December 2, and October 28, 1996, respectively. SRS addressed the U.S. EPA and SCDHEC comments and provided a Revision.1 Work Plan on January 30, 1997. SCDHEC provided comments on the Revision.1 Work Plan on February 28, 1997. The U.S. EPA conditionally approved the Revision.1 Work Plan on March 3, 1997. SRS addressed the comments and SCDHEC approved the work plan on March 3, 1997. SRS initiated the field start for this unit on March 2, 1997. The characterization activities were conducted in accordance with the approved RI work plan addendum.

Activities Accomplished in Fiscal Year 1998
SRS held a meeting with the U.S. EPA and SCDHEC on June 15, 1998, to discuss the groundwater contamination at this unit. At this meeting, agreement was reached with the U.S. EPA and SCDHEC to break out the R-Area Bingham Pump Outage Pits from the Bingham Pump Outage Pits ASCAD™ grouping because of the groundwater contamination at this unit. An extension request was submitted to U.S. EPA and SCDHEC on July 14, 1998, and was approved on August 3, 1998. A work plan addendum revision was submitted to the U.S. EPA and SCDHEC on June 29, 1998, for additional characterization of the R-Area Bingham Pump Outage Pits and was approved on August 19, 1998.

Activities Planned for Fiscal Year 1999
SRS plans to submit the R-Area Bingham Pump Outage Pits Revision.0 Feasibility Study and Proposed Plan on October 19, 1999.

LOWER THREE RUNS WATERSHED OPERABLE UNIT 14

R-Area Groundwater, NBN

Operable Unit 14 of the Lower Three Runs Watershed includes the groundwater beneath R Reactor Area. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
R Reactor Area is located in the south-central portion of the Savannah River Site (SRS). Acceptable past disposal practices associated with historical reactor operations have produced waste units and potential waste units (spills, etc.) within the area. Some of these areas may have contributed contamination to the area groundwater with operational waste materials. The combined data will be used to develop an acceptable regulatory path forward for groundwater remediation, if warranted. The scope of the R-Area Groundwater Operable Unit is currently being defined.

Monitoring well data collected in the vicinity of the reactor area indicates the groundwater may be contaminated with tritium, chlorinated volatile organics, other radionuclides, heavy metals, and sulfate.

Activities Accomplished Prior to Fiscal Year 1998
None.

Activities Accomplished in Fiscal Year 1998
SRS added this unit to the FFA Appendix C, RCRA/CERCLA Units list, in Fiscal Year 1998.

Activities Planned for Fiscal Year 1999
SRS expects to define the scope and area of the R Reactor Groundwater Operable Unit.

LOWER THREE RUNS WATERSHED OPERABLE UNIT 15

R-Area Rubble Pile, 631-25G

Operable Unit 15 of the Lower Three Runs Watershed consists of one unit: the R-Area Rubble Pile (631-25G). This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The unit was supposed to contain railroad ties, empty drums, cans, buckets, and inert materials. A search of the records did not reveal any history of disposal of hazardous constituents. However, confirmatory sampling indicated chlorinated solvents and mercury. In addition, the groundwater is shallow underneath this unit.

Activities Accomplished Prior to Fiscal Year 1998
This unit was originally listed in FFA Appendix G, Site Evaluation List. The Site Evaluation Report Revision.1, submitted to the regulators on September 30, 1994, recommended the unit be added to the FFA Appendix C, RCRA/CERCLA Units List, for remediation.

The U.S. EPA Region IV and the SCDHEC concurred with this recommendation on June 19, 1995, and December 14, 1994, respectively.

Activities Accomplished in Fiscal Year 1998
None.

Activities Planned for Fiscal Year 1999
SRS plans to perform extensive pre-work plan characterization, sampling, and analysis to support a September 2000 Revision.0 Work Plan submittal date.

LOWER THREE RUNS WATERSHED OPERABLE UNIT 16

R-Area Burning/Rubble Pits, 131-R, -1R

Operable Unit 16 of the Lower Three Runs Watershed consists of two units: the two R-Area Burning/Rubble Pits (131-R and 131-1R). This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The R-Area Burning/Rubble Pits (131-R and 131-1R) are located southeast of R Area, south of the junction of Roads G and G-1 in a small ridge above Pond 4.

The 131-R pit is roughly 238-feet long by 21-feet wide by 10-feet deep, and the 131-1R pit is 236-feet long by 33-feet wide by 10-feet deep. The burning/rubble pits operated from 1951 to 1973. During operation of the pits, organic materials of unknown use and origin, rags, paper, plastics, wood, telephone poles, cardboard, oil, and rubber were disposed and periodically (monthly) burned. In 1973, the burning of wastes ceased at SRS. A layer of soil was placed over the pit debris, and the unit then was filled to capacity with rubble such as concrete, paper, tile, asphalt, wood, wallboard, rubber, and non-returnable empty drums. The 131-R pit reached capacity in 1978, its use was terminated, and the pit was covered with soil to grade level. The other, 131-1R, remains unlined and uncovered.

The constituents of concern in the soil are laboratory chemicals, trace amounts of chlorinated solvents such as trichloroethylene (TCE), tetrachloroethylene (PCE), and metals including barium, chromium, copper, lead, vanadium, and zinc. Groundwater constituents in nearby wells included iron and manganese.

Four monitoring wells surrounding the R-Area Burning/Rubble Pits have been sampled to obtain groundwater data since the wells were installed. Results show that the above-mentioned substances have exceeded U.S. EPA maximum contaminant levels at least once.

A unit-screening program, completed in 1989, indicated that trace levels of the above-mentioned substances were present in soil samples obtained within the burning/rubble pit confines. A soil- gas survey was conducted in 1991. The results of the survey indicated the presence of several organics. Ground penetrating radar was used to delineate the pit boundaries.

Activities Accomplished Prior to Fiscal Year 1998
In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan (as part of the Eight Burning/Rubble Pits Work Plan) that was received by U.S. EPA and SCDHEC December 7, 1990. U.S. EPA comments on the R-Area Burning/Rubble pits were received on October 1, 1991. This unit was taken out of the Eight Burning/Rubble Pits Work Plan in accordance with U.S. EPA direction.

Activities Accomplished in Fiscal Year 1998
None.

Activities Planned for Fiscal Year 1999
SRS plans to perform extensive Pre-Work plan characterization, sampling, and analysis to support a September 2000 Rev. 0 Work Plan submittal date.

STATUS OF PEN BRANCH WATERSHED OPERABLE UNITS

PEN BRANCH WATERSHED OPERABLE UNIT 1

Central Shops Burning/Rubble Pit, 631-6G

Operable Unit 1 of the Pen Branch Watershed consists of one unit: the Central Shops Burning/Rubble Pit (631-6G). A final Record of Decision (ROD) was issued for the unit on June 19, 1997, with a "No Action" remedial decision.

Description

The Central Shops Area Burning/Rubble Pit unit (631-6G) is located at the extreme southeastern tip of the Central Shops Area, adjacent to the northern side of the railroad track in the central part of the Savannah River Site. It was constructed for the disposal of various waste materials.

Waste disposal activities at the unit were initiated in 1951 and consisted of the deposition and periodic burning of waste oils, rags, paper, cardboard, plastics, degreasers, wood, rubber, and drummed organic solvents. Waste volumes were not reported.

Based on historical accounts, the disposal area of the pit was thought to be a rectangular area approximately 275-feet long by 30- to 45-feet wide by 10-feet deep. The pit is currently delineated by orange ball markers. Aerial photos obtained in August 1994 indicate that the pit is twice the size of the current waste unit boundaries. A photographic review of the area indicated that the waste unit is not accurately marked in the field, and the location is more likely to extend an additional 100- to 125-feet further east of the waste unit markers. Thus, the area is now believed to be approximately 480-feet long by 70-feet wide by 10-feet deep. In addition, the ditch immediately adjacent to the easternmost edge of the marked unit runs through what may have been the original waste unit. Currently, a construction laydown yard is located on a portion of the extended unit boundaries.

The hazardous substances identified by groundwater analysis, soil-gas survey, and soil sampling include low concentrations of polyaromatic hydrocarbon compounds and RCRA metals.

Activities Accomplished Prior to Fiscal Year 1998

The U.S. EPA and SCDHEC received the Revision.0 RFI/RI Work Plan on October 23, 1990. The U.S. EPA comments were received by SRS on June 5, 1991. U.S. EPA and SCDHEC received the Revision.1 RFI/RI Work Plan on September 10, 1991. The SCDHEC comments were received by SRS on February 25, 1993. U.S. EPA and SCDHEC received the Revision.2 RFI/RI Work Plan on May 27, 1993. The U.S. EPA and SCDHEC approved the Revision.2 RCRA Facility Investigation/Remedial

Investigation (RFI/RI) Work Plan on August 12, 1993. The field start was initiated on March 25, 1994.

The SRS submitted the Revision.0 RFI/RI and Baseline Risk Assessment report to U.S. EPA and SCDHEC on April 3, 1996. The U.S. EPA conditionally approved the document on May 8, 1996. SCDHEC provided comments on the document on May 3, 1996. The SRS addressed the comments and submitted the Revision.1.1 document to the U.S. EPA and SCDHEC on May 30, 1996. SCDHEC approved the Revision.1.1 document on June 28, 1996. The results of the RFI/RI and Baseline Risk Assessment indicated that submittal of the Revision.0 CMS/FS was not warranted. U.S. EPA and SCDHEC concurred with this action in May and June 1996, respectively. The SRS submitted the Revision.0 Statement of Basis/Proposed Plan to U.S. EPA and SCDHEC August 11, 1996. U.S. EPA and SCDHEC comments were received on September 24 and 23, 1996, respectively.

SRS addressed U.S. EPA and SCDHEC comments on the Revision.0 Statement of Basis/Proposed Plan and submitted the Revision.1 document to U.S. EPA and SCDHEC by October 24, 1996. The public comment period on the Statement of Basis/Proposed Plan was held from December 10, 1996, through January 23, 1997. The SRS prepared a responsiveness summary and submitted the Revision.0 ROD by February 5, 1997. The Revision.1 ROD was approved by U.S. EPA and SCDHEC on May 14, 1997, with a "No Action" remedial decision.

Activities Accomplished in Fiscal Year 1998
No activity since U.S. EPA and SCDHEC approval of the "No Action" Revision.1 ROD* on June 19, 1997.

Activities Planned for Fiscal Year 1999
None. All activities associated with this unit have been completed.

PEN BRANCH WATERSHED OPERABLE UNIT 2

CMP Pits, 080-170G, -171G, -180G, -181G, -182G, -183G, -190G

Operable Unit 2 of the Pen Branch Watershed consists of seven units: the seven Chemical, Metal, and Pesticides (CMP) Pits. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
The CMP Pits are located approximately 1 mile north of L Area and 1 mile northeast of the 131-3L Rubble Pit.

This unit originally consisted of seven unlined pits that were designed to receive

nonradioactive wastes such as spent solvents, pesticides, and toxic metals. Each pit was roughly 45- to 70-feet long, 10- to 15-feet wide, and 10- to 15-feet deep. The pits were in use from August 1971 until February 1979. In December 1979, the pits were taken out of operation permanently. In 1984, the pits were excavated, and the waste materials were removed. Then the area was backfilled and capped with a geosynthetic material.

During 1984, a series of well clusters were installed to monitor groundwater. Groundwater monitoring data at the unit indicated the presence of volatile organic compounds and metals in the groundwater in various wells. A soil-gas survey was performed in the vicinity of the CMP Pits in 1991. Preliminary results of this survey indicated the soils near or beneath the CMP Pits contained volatile organic compounds (VOCs). The soil-gas survey also suggested that additional monitoring wells were required to characterize groundwater contamination.

Activities Accomplished Prior to Fiscal Year 1998

The RCRA Facility Investigation/Remedial Investigation (RFI/RI) field start was initiated on this unit on September 29, 1994, in accordance with the U.S. EPA and SCDHEC-approved RFI/RI Work Plan.

SRS completed the RFI/RI soil characterization of the unit initiated in Fiscal Year 1994. This included installing three groundwater well clusters and completing two sampling events. SRS repaired the geosynthetic cap liner where seven holes were placed to perform characterization sampling beneath the pits.

SRS prepared and submitted the Revision.0 RFI/RI and Baseline Risk Assessment Report to U.S. EPA and SCDHEC on April 3, 1996. The SCDHEC and U.S. EPA transmitted comments on the report on July 1, 1996, and September 4, 1996, respectively.

SRS submitted the Revision.1 RFI/RI and Baseline Risk Assessment Report to U.S. EPA and SCDHEC on October 31, 1996. U.S. EPA and SCDHEC provided comments on the document on January 24 and February 28, 1997, respectively. SRS addressed the comments and submitted a Revision.1.1 document on June 9, 1997. U.S. EPA approved the document July 15, 1997. SCDHEC provided comments on July 7, 1997. SRS addressed the comments and submitted a Revision.1.2 document on September 3, 1997.

The CMP Pits were identified in July 1997 as one of the units under Recovery (see explanation of Recovery in the Overview of Fiscal Year 1997 Section).

SRS prepared and submitted the Revision.0 Corrective Measures Study/Feasibility Study (CMS/FS) to U.S. EPA and SCDHEC on December 3, 1996. U.S. EPA and SCDHEC provided comments on the document on March 13 and 4, 1997, respectively. SRS addressed the comments and submitted a Revision.1 document on June 9, 1997. U.S. EPA approved the document July 15, 1997. SCDHEC provided comments on the

document on July 7, 1997. SRS addressed the comments and submitted a Revision.1.1 document on September 3, 1997.

SRS prepared and submitted the Revision.0 Statement of Basis/Proposed Plan to U.S. EPA and SCDHEC on August 7, 1997. U.S. EPA and SCDHEC provided comments on the document on September 25 and 24, 1997, respectively.

Activities Accomplished in Fiscal Year 1998
SCDHEC gave approval to the Rev. 1.2 RFI/RI/BRA on October 1, 1997. The same day they also provided comments on the Revision.1.1 CMS/FS. SRS submitted Revision.1.2 of the CMS/FS on January 16, 1998, to the U.S. EPA and SCDHEC. Comments were received from the U.S. EPA and SCDHEC on March 20, 1998. Revision.1 of the Statement of Basis/Proposed Plan was submitted to the regulatory agencies on January 16, 1998. SCDHEC provided comments on the document on March 2, 1998.

Additional characterization of the unit groundwater was commenced on March 7, 1998. Comment resolution and operable unit strategy meetings were held on April 15, 1998. Characterization results, remedial action objectives, and operable unit strategy were discussed with the U.S. EPA and SCDHEC on July 29, August 13, September 2 and 23 of 1998. These meetings resulted in the decision to further characterize the distal portion of the groundwater plume at the unit and to proceed with an interim action for the unit surface soils, vadose zone, and groundwater hot spots.

Activities Planned for Fiscal Year 1999
SRS plans to complete characterization of the distal portion of the groundwater plume, submit and obtain approval of an IAPP and IROD, and submit a combined post-ROD Remedial Action document.

PEN BRANCH WATERSHED OPERABLE UNIT 3

Fire Department Hose Training Facility, 904-113G

Operable Unit 4 of the Pen Branch Watershed consists of one unit: the Fire Department Hose Training Facility (904-113G). This unit is listed in the FFA Appendix C, RCRA/CERCLA Units List. These units are listed separately on Appendices D and E. The units are being evaluated separately with independent documentation for each unit.

Description
The Fire Department Hose Training Facility is located adjacent to the Ford Building Seepage Basin in the Central Shops Area. The facility was in use from 1975 to February 1983. It consisted of a shallow pit (approximately 20- by 40-feet with a 1-foot dike on all sides). Virgin oil was poured into the basin, ignited, and the resultant fire extinguished by fire department personnel during training exercises. In 1983, the pit dikes, 1 foot of the

soil on the pit floor, and all oil-contaminated soil were removed and sent to the Burial Ground (643-28E). The remaining excavation was backfilled with clean soil to grade.

Activities Accomplished Prior to Fiscal Year 1998

The Fire Department Hose Training Facility was originally listed in FFA Appendix G, Site Evaluation List. A Site Evaluation Report was prepared that recommended that the area needed further investigation and should be deleted from FFA Appendix G and moved to the FFA Appendix C, RCRA/CERCLA Units List. U.S. EPA and SCDHEC received the report on February 1, 1993. U.S. EPA and SCDHEC concurred with the report's recommendation. The U.S. EPA and SCDHEC letters of concurrence were received May 14, 1993, and August 20, 1993, respectively. It was determined by the U.S. EPA, SCDHEC, and the SRS in September 1996 that sufficient data existed to bypass the RCRA Facility Investigation/Remedial Investigation and Baseline Risk Assessment Report (RFI/RI/BRA) Work Plan for the Fire Department Hose Training Facility and go directly to the submittal of the RFI/RI/BRA. SRS submitted the Revision.0 RFI/RI and Baseline Risk Assessment Report for the Fire Department Hose Training Facility to the U.S. EPA and SCDHEC on December 9, 1996. The RFI/RI and Baseline Risk Assessment Report Rev 1. was approved on May 27, 1997. SRS prepared and submitted the Revision.0 Statement of Basis/Proposed Plan to U.S. EPA and SCDHEC on August 12, 1997.

Activities Accomplished in Fiscal Year 1998

Revision.1 of the Statement of Basis/Proposed Plan was submitted to U.S. EPA/SCDHEC on October 20, 1997 and was approved by the U.S. EPA on December 1, 1997, and by the SCDHEC on November 1.

Revision.0 Record of Decision was submitted to the U.S. EPA/SCDHEC on February 6, 1998. The U.S. EPA and SCDHEC provided comments on March 27 and March 20, 1998, respectively. SRS submitted the Revision.1 document to the U.S. EPA and SCDHEC on April 28, 1998. The document was approved for signature by U.S. EPA and SCDHEC May 19 and April 18, 1998, respectively. The ROD was issued on September 17, 1998.

Activities Planned for Fiscal Year 1999

No activities are planned since the no action ROD was approved in 1998.

PEN BRANCH WATERSHED OPERABLE UNIT 4

Gas Cylinder Disposal Facility, 131-2L

Operable Unit 4 of the Pen Branch Watershed consists of three units: the Gas Cylinder Disposal Facility, the L-Area Rubble Pit (131-3L) and the L-Area Burning/Rubble Pit,

(131-L). This operable unit is listed as three separate entries on FFA Appendix C, RCRA/CERCLA Units List.

Description

This unit is beside the L-Area Burning/Rubble Pit (131-L), a RCRA/CERCLA unit. The first date of receipt is unknown; the last date of waste receipt was 1977. Partially full cylinders were placed in the ground, buried in concrete, the tops removed, and the gas vented to the atmosphere. The cylinders were covered with concrete and backfilled with dirt, and a cap of asphalt was placed over the mound. The depth of the pit is unknown. The unit consists of 28 empty cylinders that contained the following gases

Gas Type	# of Cylinders
HF	2
F	2
HBr	2
BrF_5	1
ClF_3	1
NH_4	1
HCl	4
Br_3	1
Cl_3	5
$N0_3$	2
H_3S	1
$S0_3$	2
Acetylene, O_2, H_2O, Argon	1
Unknown	3

A soil-gas survey conducted in February 1992 showed two samples with elevated carbon tetrachloride (0.015 ppm and 0.017 ppm, respectively) and one sample at maximum contaminant levels (MCLs) (0.005 ppm). The soil investigations from the L-Area Burning/Rubble Pit also revealed contaminants similar to those found in the Gas Cylinder Disposal Facility. It was believed that the gases found at this unit were from the adjacent L-Area Burning/Rubble Pit.

Activities Accomplished Prior to Fiscal Year 1998

This unit was originally listed on the FFA Appendix G, Site Evaluation List. A Site Evaluation Report was prepared, which recommended that no further action was necessary. U.S. EPA and SCDHEC received the report on January 29, 1993. SCDHEC concurred with the report's recommendation. U.S. EPA concurred; however, U.S. EPA stated that further evaluation of this unit, in conjunction with the L-Area Burning/Rubble Pit, should focus on whether the Gas Cylinder Disposal Facility could impact remediation activities at the pit. Their letters were received on August 10, 1993, and April 26, 1993, respectively.

It was determined that a removal action to remove the gas cylinders at the Gas Cylinder Disposal Facility was necessary. In the event that the gas cylinders have not been properly vented, they pose a potential risk to the workers who will be performing characterization at the nearby L-Area Burning/Rubble Pit. Consequently, SRS submitted a Removal Site Evaluation Report documenting the need for a time-critical removal action at the L-Area Rubble Pile (131-3L) and the Gas Cylinder Disposal Facility (131-2L) on July 6, 1997. The U.S. EPA and SCDHEC provided comments on the report on July 14 and September 19, 1997, respectively. SRS addressed the comments and provided a revised report to U.S. EPA and SCDHEC on September 4, 1997. U.S. EPA and SCDHEC provided comments on the revised report on September 15 and 22, 1997, respectively.

The Revision.0 ASCAD™ RFI/RI Work Plan was submitted to the regulators on March 20, 1997. U.S. EPA and SCDHEC comments were received on September 9 and July 22, 1997. The Revision.1 document was received by U.S. EPA and SCDHEC on September 22, 1997.

Activities Accomplished in Fiscal Year 1998

SRS received comments on the Revision.1 ASCAD™ RFI/RI Work Plan Addendum from SCDHEC on October 28, 1997. U.S. EPA approved the document on October 31, 1997. SCDHEC subsequently approved the document on October 31, 1997. A Revision 1.1 was submitted to the U.S. EPA and SCDHEC on November 20, 1997. The prior approval dates from the regulators applied to this revision; therefore, no further approvals were necessary.

The RFI/RI Field Start Milestone was achieved on October 31, 1997.

FFA Milestone Early Action Start was achieved October 2, 1997.

Activities Planned for Fiscal Year 1999

SRS expects that the regulators will approve the Revision.1 RFI/RI/BRA.

A Mixing Zone Model Application is scheduled for Fiscal Year 1999.

PEN BRANCH WATERSHED OPERABLE UNIT 4

L-Area Burning/Rubble Pit, 131- L

Operable Unit 4 of the Pen Branch Watershed consists of three units: the Gas Cylinder Disposal Facility, the L-Area Rubble Pit (131-3L) and the L-Area Burning/Rubble Pit, (131-L). This operable unit is listed as three separate entries in FFA Appendix C, RCRA/CERCLA Units List.

Description
The L-Area Burning/Rubble Pit (131-L) is located in a grassy, fenced-in, level area approximately 1/4 mile northwest of L-Area, off Road 7.

The L-Area Burning/Rubble Pit was constructed in 1951. Dimensions of the pit were approximately 230-feet long by 29-feet wide by and 10-feet deep. Actual contents of the L-Area Burning Rubble Pit are not fully known, but it is assumed from information from other Burning/Rubble Pits at SRS that wastes such as paper, plastics, rubber materials, rags, wood, cardboard, organic materials of unknown use and origin were disposed (burned) on a monthly basis. The disposal records, including the composition origin, and use of materials disposed, were not kept for this unit during its period of operation. The burning of waste at SRS was discontinued in October 1973. A layer of soil was placed over the burned remains, and the pit was filled with non-salvageable rubble materials such as concrete, brick, tile, asphalt, wood, wallboard, lumber, rubber, and non-returnable empty drums and cans. In 1978, the pit became full and was backfilled with soil and sediments to grade level.

Activities Accomplished Prior to Fiscal Year 1998
In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan (as part of the Eight Burning/Rubble Pits Work Plan) that was received by U.S. EPA and SCDHEC on December 7, 1990. U.S. EPA comments on the L-Area Burning/Rubble Pit were received on October 1, 1991. This unit was taken out of the Eight Burning/Rubble Pits Work Plan in accordance with U.S. EPA direction. The Revision.1 RFI/RI Work Plan for the L-Area Burning/Rubble Pit was received by U.S. EPA and SCDHEC on February 1, 1992.

SRS performed pre-work plan characterization at the unit to delineate the list of Contaminants of Potential Concern and to gather information that was used in the preparation of the Revision.0 ASCAD™ RFI/RI Work Plan.

SRS submitted a Removal Site Evaluation Report documenting the need for a time-critical removal action at the L-Area Rubble Pile (131-3L) and the Gas Cylinder Disposal Facility (131-2L).

SRS prepared and submitted the Revision.0 ASCAD™ RFI/RI Work Plan to U.S. EPA and SCDHEC on March 20, 1997. U.S. EPA and SCDHEC provided comments on the document on September 9 and July 22, 1997, respectively. SRS addressed the comments and submitted a Revision.1 document on September 22, 1997.

Activities Accomplished in Fiscal Year 1998
SRS received comments on the Revision.1 ASCAD™ RFI/RI Work Plan Addendum from SCDHEC on October 28, 1997. U.S. EPA approved the document on October 31, 1997. SCDHEC subsequently approved the document on October 31, 1997. A Revision.1.1 was

submitted to U.S. EPA and SCDHEC on November 20, 1997. The prior approval dates from the regulators applied to this revision; therefore, no further approvals were necessary.

The RFI/RI Field Start Milestone was achieved on October 31, 1997.

Trenching activities took place in April 1998 as part of the unit characterization and buried batteries were uncovered, necessitating a removal action. The Revision.0 document was submitted to U.S. EPA and SCDHEC on May 21, 1998. The U.S. EPA returned comments on July 2, 1998. SCDHEC had comments that were received on June 25, 1998. SRS revised the document and submitted Revision.1 to the regulators on July 17, 1998. The U.S. EPA notified SRS of their approval on July 28, 1998.

Activities Planned for Fiscal Year 1999
SRS expects that the regulators will approve the Revision.1 RFI/RI/BRA.

SRS expects to complete the removal action on the batteries during the first quarter of Fiscal Year 1999.

PEN BRANCH WATERSHED OPERABLE UNIT 4

L-Area Rubble Pit, 131- 3L

Operable Unit 4 of the Pen Branch Watershed consists of three units: the Gas Cylinder Disposal Facility, the L-Area Rubble Pit (131-3L), and the L-Area Burning/Rubble Pit, (131-L). This operable unit is listed as three separate entries in FFA Appendix C, RCRA/CERCLA Units List.

Description
The L-Area Rubble Pit (131-3L) is located on the north side of a dirt road, northwest of L-Area.

Dimensions of the unit are 500-feet long by 120-feet wide. It is unknown when disposal activities at the unit occurred or the types and volumes of wastes that were disposed there because waste disposal activities at the unit were not recorded. The unit consists of several rubble pits, randomly scattered throughout the area. Based on the sizes and shapes of the rubble pits, disposal at 131-3L apparently consisted of dumping truckloads of waste on the land surface. Wastes are not believed to be buried at the unit because there is no visible evidence of excavation. However, rubble pits may have been leveled or reworked with heavy machinery. Assorted cans, bottles, construction timbers, and scrap metal are visible on the surface of the rubble pits. The unit is overgrown with brush and trees, suggesting that it has been inactive for many years. Based on soil-gas surveys, the constituents of concern (COCs) are chloroform, trichloroethylene (TCE),

tetrachloroethylene (PCE), carbon tetrachloride, and o-xylene.

Activities Accomplished Prior to Fiscal Year 1998
In accordance with SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan that was received by U.S. EPA and SCDHEC on June 7, 1991. SRS received U.S. EPA comments on the Revision.0 RFI/RI Work Plan on December 9, 1991, and the Revision.1 RFI/RI Phase I Work Plan was received by U.S. EPA and SCDHEC on March 7, 1992.

Activities Accomplished in Fiscal Year 1998
SRS received comments on the Revision.1 ASCAD™ RFI/RI Work Plan Addendum from SCDHEC on October 29, 1997. U.S. EPA approved the document on October 31, 1997. SRS incorporated SCDHEC's comments and resubmitted the Revision.1.1 to the regulators on November 20, 1997. Both agencies had already approved the document on October 31, 1997.

SRS took credit for a field start on October 31, 1997.

FFA Milestone early action start was achieved October 2, 1997.

Activities Planned for Fiscal Year 1999
SRS expects that the regulators will approve the Revision.1 RFI/RI/BRA.

A Mixing Zone Model Application is scheduled for Fiscal Year 1999.

PEN BRANCH WATERSHED OPERABLE UNIT 5

Hydrofluoric Acid Spill, 631-4G

Operable Unit 5 of the Pen Branch Watershed consists of one unit: the Hydrofluoric Acid Spill. This unit is listed in the FFA Appendix C, RCRA/CERCLA Units List.

Description
The Hydrofluoric Acid Spill Area (631-4G) is located in the southwest portion of the Central Shops area, south of Road 3. The unit measures approximately 30-feet by 30-feet. The area surrounding the unit is mostly bare or covered with gravel and is affected by human activities. Railroad tracks are located 100-feet south of the unit, a concrete slab/laydown is located adjacent and east of the unit, and an asphalt laydown yard and storage area is located adjacent to and northwest of the unit.

The history of waste disposal at the Hydrofluoric Acid Spill Area is unknown. It is uncertain whether hydrofluoric acid was spilled or if acid-contaminated soil or acid-filled containers were buried at the unit. The spill or disposal most probably occurred prior to

1970 and was documented only by a site identification sign that reads, CONTAMINATED AREA - HYDROFLUORIC ACID BURIED 6 FEET - DO NOT DIG 15 FEET EACH SIDE OF POST. Interviews with former and current SRS employees regarding the unit's history were inconclusive. Preliminary groundwater sampling identified constituents of concern (COCs) to be cadmium, iron, manganese, and the insecticide lindane.

Activities Accomplished Prior to Fiscal Year 1998
In accordance with the SRS RCRA Permit, the SRS prepared and submitted the Revision.0 RFI/RI Work Plan to the U.S. EPA and SCDHEC in the early 1990's.

Activities Accomplished in Fiscal Year 1998
A magnetrometer survey was performed on April 25, 1998. The survey indicated a strong magnetic anomaly at the same location identified with the electromagnetic survey (which was performed earlier in April of 1998) and a slight indication of disturbed soil from ground penetrating radar (GPR). SRS performed a more detailed GPR in May in suspect areas .

SRS prepared a safety analysis plan, a site-specific health and safety plan, a readiness review, and an Environmental Monitoring Service mobilization for pre-work plan characterization.

Due to a new operable unit (Heavy Equipment Wash Basin and Central Shops Burning Rubble Pit 631-5G) being added to Fiscal Year 1999, this project has been stopped for Fiscal Year 1998 scope and will be rescheduled at a later date.

Activities Planned for Fiscal Year 1999
None. Due to a new Operable Unit (Heavy Equipment Wash Basin and Central Shops Burning Rubble Pit 631-5G) being added to Fiscal Year 1999, this project has been deleted from the Fiscal Year 1999 scope.

PEN BRANCH WATERSHED OPERABLE UNIT 6

K-Area Acid Caustic Basin, 904-80G

Operable Unit 6 of the Pen Branch Watershed consists of one unit: the K-Area Acid/Caustic Basin (904-080G). This operable unit is listed on FFA Appendix H, RCRA-Regulated Units as well as Appendix C, RCRA/CERCLA Units List. Activities on this unit are SCDHEC-led RCRA actions.

Description
The K-Area Acid/Caustic Basin (904-80G) is located within the K Area on SRS. The basin was used until 1982 to support processes needed for power generation activities at

each area. The basin was associated with boiler-feed water conditioning for the removal of inorganic salts from raw water before its use in the boiler.

Boiler-feed water at SRS contains natural salts that affect boiler operation and thus must undergo a demineralization process. This demineralization process uses cation and anion resins to remove the salts. The cation resin exchanges hydrogen for cations, and the anion resin exchanges hydroxyl ions for the anions. When these resins become saturated with cations or anions, they must be regenerated. This is accomplished by passing a diluted solution of sulfuric acid over the cation resin and a dilute solution of sodium hydroxide over the anion resin. The partially spent regenerant solutions and associated rinse water comprise the influent of the acid/caustic basin.

The basin provided mixing and neutralization of the regenerants before discharging to local surface streams. The K-Area Acid/Caustic Basin has been inactive since 1982, when SRS neutralization facilities went on line.

The basin has approximate dimensions of 50-feet long by 50-feet wide by 7-feet deep. It has a capacity of approximately 75,000 gallons. During operation, the basin received 1.5 million gallons/year.

The regenerant solutions consisted of calcium and magnesium cations, sulfates, chlorides, carbonic acid, silicic acid, and any acid or base in the original solution that was unused. No known hazardous waste constituents were discharged to the basin. Analyses of sediment samples from the basin using Toxicity Characteristic Leaching Procedure (TCLP) indicate that concentrations of analyzed metals were well below U.S. EPA guideline concentration. The main environmental concern with the acid/caustic basin is the pH of the solutions in the basin. It cannot be proven that the pH did not go below 2 or above 12.5.

Activities Accomplished Prior to Fiscal Year 1998

The initial issue of Interim Status Closure Plan for the F-, H-, K-, and P-Area Acid/Caustic Basins was submitted to SCDHEC on January 25, 1989. The Closure Plan was submitted for public comment in August 1990, and the only changes to the closure plan since that time were the addition of data and a health-based risk assessment supporting the initial closure proposal. The final closure plan (Rev. 3) was submitted on July 13, 1991, and updated on February 5, 1992, to include a dewatering plan and groundwater data through the third quarter of 1991.

An F-, H-, K-, P-Area Acid/Caustic Basin Interim Status Closure Plan (WSRC-RP-94-1259, Revision 6, dated June 19, 1995) was approved by SCDHEC on November 8, 1995. The plan approved the clean closure of the basins so that the filling of the basins was warranted for safety and housekeeping purposes. The filling of the basins was previously completed, and in Fiscal Year 1996 groundwater monitoring wells associated with the

basin characterization were abandoned. All activities associated with the unit have been completed.

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

PEN BRANCH WATERSHED OPERABLE UNIT 7

K-Area Bingham Pump Outage Pit, 643-1G

Operable Unit 7 of the Pen Branch Watershed consists of one unit: the K-Area Bingham Pump Outage Pit (643-1G). This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The K-Area Bingham Pump Outage Pit unit is one of seven unlined earthen pits located outside the fences of the reactor areas: K (1 pit), L (2 pits), P (1 pit), and R (3 pits). Repairs to primary and secondary reactor cooling systems were performed between 1957 and 1958. The outages of the cooling water systems that occurred as a result of the modification became known as the Bingham Pump Outages. The pits received low-level (less than 25 mR/hr) construction debris generated by the repairs such as pipes, cables, ladders, drums, and boxes of miscellaneous hardware. No pumps or liquids are buried at the pits. The pits were excavated to a depth of 13 feet, filled with approximately 9 feet of debris, and backfilled with approximately 4 feet cover soil. It is conservatively estimated that at the time of burial, the total amount of radioactivity buried in each reactor area was 1 Ci. Approximately 70% of this activity is estimated to have been eliminated through radioactive decay since 1958.

A ground penetrating radar (GPR) survey was performed to delineate pit boundaries. Surface radiation levels measured by Health Prevention revealed no detectable surface radiation. A soil-gas survey also indicated very low levels of volatile organic constituents (VOCs)

The Revision.1 Phase I Work Plan was submitted to SCDHEC and U.S. EPA on October 28, 1994. Field characterization work was initiated on December 13, 1994, and analytical soil sampling was completed February 27, 1995. In June 1995 a request was made to SCDHEC and U.S. EPA to implement ASCAD™ (Approved Standardized Corrective Action Design) at the K-, L-, P-, and R-Area Bingham Pump Pits. ASCAD™ identified the K-Area Bingham Pump Outage Pit as the lead ASCAD™ unit with RI/FS development of the R-, P-, and L-Area Bingham Pump Outage Pits as secondary units

based upon data and evaluations from the lead unit, the K-Area Bingham Pump Outage Pit. This request was accepted, and work on a combined RFI/RI and Baseline Risk Assessment Report for the K-Area Bingham Pump Outage Pit commenced in August 1995 on an accelerated basis.

Activities Accomplished Prior to Fiscal Year 1998

SRS prepared and submitted the Revision.0 RI and Baseline Risk Assessment Report to U.S. EPA and SCDHEC on January 14, 1996. U.S. EPA and SCDHEC provided comments on the report on April 15, and May 3, 1996, respectively. SRS addressed the U.S. EPA and SCDHEC comments and submitted the Revision.1 RI and Baseline Risk Assessment Report to U.S. EPA and SCDHEC September 10, 1996. SRS submitted a Revision.1.1 to the U.S. EPA and SCDHEC on January 20, 1997, based on the comments from the U.S. EPA and SCDHEC. SRS submitted a Revision.1.2 RI/BRA to the U.S. EPA and SCDHEC on March 10, 1997, based on their comments received in February 1997. This document was approved by SCDHEC and the U.S. EPA as of March 14, 1997.

SRS prepared and submitted the Revision.0 FS to U.S. EPA and SCDHEC on September 12, 1996. SRS addressed the U.S. EPA and SCDHEC comments on the Revision.0 FS and submitted a Revision.1 document on March 10, 1997. SRS submitted a Revision.1.1 FS to the U.S. EPA and SCDHEC on May 22, 1997, based on their comments. This document was approved on June 19, 1997. SRS prepared and submitted a Revision.0 Proposed Plan to the U.S. EPA and SCDHEC on March 10, 1997. SCDHEC comments on the Revision.0 Proposed Plan were received on April 21, 1997. SRS submitted a Revision.1 Proposed Plan on May 22, 1997 and U.S. EPA conditionally approved the Proposed Plan on June 2, 1997. The Revision.1 Proposed Plan was approved by U.S. EPA on July 10, 1997 and by SCDHEC on June 19, 1997.

The Revision.0 Record of Decision (ROD) was submitted to U.S. EPA and SCDHEC on July 25, 1997. U.S. EPA comments on the ROD were received on September 23, 1997, and SCDHEC comments were received on September 12, 1997.

Activities Accomplished in Fiscal Year 1998

SRS submitted the Revision.1 Record of Decision (ROD) to the U.S. EPA and SCDHEC on October 14, 1997, and it was approved November 13, 1997, when a signed ROD was submitted to U.S. EPA and SCDHEC. The Revision.1 Record of Decision was signed by U.S. EPA and SCDHEC on March 23 and April 14, 1998, respectively. U.S. EPA provided contingent approval of the Revision.1 Final Remediation Report on October 5, 1998. SCDHEC had provided approval of the Revision.0 Final Remediation Report on July 1, 1998.

SRS submitted a Revision.0 Final Remediation Report to U.S. EPA and SCDHEC on March 5, 1998. SRS submitted the Revision.1 Final Remediation Report redlined version to U.S. EPA and SCDHEC on August 27, 1998.

Activities Planned for Fiscal Year 1999
Obtain approval of the Final Remediation Report and meet requirements of the Final Remediation Report by February 13, 1999, the remedial action start date.

SRS expects to submit the clean copy of the Revision.1 Final Remediation Report by November 2, 1998.

PEN BRANCH WATERSHED OPERABLE UNIT 8

K-Area Coal Pile Runoff Basin, 189-K

Operable Unit 8 of the Pen Branch Watershed consists of one unit: the K-Area Coal Pile Runoff Basin (189-K). This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
The K-Area Coal Pile Runoff Basin (189-K) is located approximately 230-feet west of the K-Area coal storage site.

Steam and electricity for the SRS activities were produced by seven coal-fired power plants located in the A, C, D, F, H, K, and P Areas. Coal was stored at each of the seven power plant locations. Surface runoff from the coal storage piles was discharged to surface streams until the National Pollution Discharge Elimination System (NPDES) took effect in 1977. To meet NPDES discharge requirements and in response to SCDHEC requests, seven unlined earthen containment basins were constructed near each coal storage location to intercept, stabilize, and treat surface runoff from the coal piles. All seven coal pile runoff basins were constructed between 1978 and 1981. The C- and F-Area basins have been inactive since late 1985 when the coal piles at these areas were removed.

Constituents of concern (COCs) within the basins include low pH, sulfate, iron, antimony, aluminum, arsenic, and vanadium.

Activities Accomplished Prior to Fiscal Year 1998
Soil borings were drilled at each of the basins during June and July 1988. Monitoring data at this unit indicate the presence of elevated metals and gross alpha in the groundwater resulting from K-CPRB operations.

In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan that was received by U.S. EPA and SCDHEC on October 23, 1990. After receiving U.S. EPA comments for Revision.0 RFI/RI Work Plan on October 30, 1991, SRS revised the work plan and submitted the Revision.1 RFI/RI Work Plan, which

U.S. EPA and SCDHEC received January 29, 1992. Both the Revision.0 and the Revision.1 RFI/RI Work Plans addressed all seven of the SRS Coal Pile Runoff Basins. Since that submittal, U.S. EPA, SCDHEC, and SRS have developed the Operable Units, and the seven Coal Pile Runoff Basins will be addressed either individually or with the other RCRA/CERCLA units in their operable unit.

Field characterization for the K-Area Coal Pile Runoff Basin was initiated on December 12, 1994; and the data validation was completed in May 1995.

SRS prepared and submitted the Revision.0 RFI/RI and Baseline Risk Assessment Report to U.S. EPA and SCDHEC, which they received on April 3, 1996. The SCDHEC and U.S. EPA transmitted comments on the document on July 1, 1996. SRS revised the document to address comments and submitted the Revision.1 RFI/RI and Baseline Risk Assessment Report to U.S. EPA and SCDHEC, which they received on August 28, 1996. SCDHEC provided comments on the Revision.1 document on September 27, 1996.

SRS addressed the SCDHEC comments on the Revision.1 RFI/RI and Baseline Risk Assessment Report and submitted the Revision.1.1 Report to U.S. EPA and SCDHEC on November 1, 1996. U.S. EPA Approved the Revision.1.1 Report on December 13, 1996. SCDHEC provided comments on the Revision.1.1 Report on December 6, 1996. SRS addressed the comments and submitted the Revision.1.2 Report on January 13, 1997. SCDHEC provided comments on the Revision.1.2 Report on March 10, 1997. SRS addressed the comments and submitted a Revision.1.3 Report on March 10, 1997. SCDHEC approved the Revision.1.3 Report on March 14, 1997

SRS prepared and submitted a Revision.0 CMS/FS on November 27, 1996. U.S. EPA and SCDHEC comments were received on March 8 and March 5, 1997, respectively. SRS addressed the comments and prepared a Revision.1 CMS/FS that was submitted to U.S. EPA and SCDHEC on May 12, 1997. U.S. EPA and SCDHEC provided comments on the Revision.1 document on June 13 and June 6, 1997, respectively. SRS addressed the comments and submitted the Revision1.1 document on July 7, 1997. SCDHEC approved the document on August 7, 1997.

Two white papers were submitted to U.S. EPA and SCDHEC for review on August 29, 1996, discussing potential early actions at the Coal Pile Runoff Basins and Burning Rubble Pits. On October 7 and November 20, 1996, SRS met with U.S. EPA and SCDHEC to discuss the potential early actions issue. On December 23, 1996, SRS submitted a letter documenting the path forward for the proposed early remediation of the SRS Coal Pile Runoff Basins and requested U.S. EPA and SCDHEC concurrence. U.S. EPA concurred on February 3, 1997, and SCDHEC concurred on January 3, 1997.

On February 19, 1997, SRS submitted an extension request to adjust the FFA milestones in accordance with the approved path forward for C-, K-, F- and P-Area Coal Pile Runoff

Basins. A-, H-, and D-Area Coal Pile Runoff Basins were not included in this early action because they were still in operation. However, they will be addressed in a similar manner when they become inactive. The Removal Site Evaluation Report (RSER)/Wastewater Closure Plan for the early action at C-, K-, F- and P-Area CPROB was approved by U.S. EPA on March 13 and SCDHEC on April 25, 1997. The removal action was initiated on May 15 and completed on September 3, 1997. This removal action included removal of coal and coal-laden sediments from the basins and the backfilling of the basins with clean soil. The coal and coal-laden sediments were removed and shipped offsite for beneficial reuse. This is the first time SRS has beneficially reused waste from a CERCLA action. This early action resulted in a schedule acceleration of 92 months and a significant cost savings. SRS expects this to be the final action for these basins.

Activities Accomplished in Fiscal Year 1998

SRS prepared and submitted the Revision.0 Post-Removal Action Remedial Investigation Report, documenting the action taken at these four units to U.S. EPA and SCDHEC on November 22, 1997. U.S. EPA approval was received on January 21, 1998, while SCDHEC gave notice of their approval on January 26, 1998.

SRS prepared and submitted the Revision.0 Statement of Basis/Proposed Plan to U.S. EPA and SCDHEC on November 22, 1997. U.S. EPA approval was received on January 21, 1998, while SCDHEC approved of the document on January 26, 1998. A Revision.0 Record of Decision (ROD) was submitted to the U.S. EPA and SCDHEC on April 30, 1998. Both the U.S. EPA and SCDHEC provided comments to SRS on June 17, 1998. A Revision 1 ROD was sent to the U.S. EPA and SCDHEC on July 17, 1998. The U.S. EPA gave notice of their approval on September 15, 1998, while SCDHEC approved it on August 13, 1998.

Activities Planned for Fiscal Year 1999

Submittal of the Groundwater Data Report to U.S. EPA and SCDHEC during the first calendar quarter of 1999. Sampling of groundwater at five wells will occur during the second calendar quarter of 1999.

PEN BRANCH WATERSHED OPERABLE UNIT 9

K - Area Burning/Rubble Pit, 131- K

Operable Unit 9 of the Pen Branch Watershed consists of two units: K-Area Rubble Pile (631-20G) and K-Area Burning/Rubble Pit (131-K). These units are listed on FFA Appendix C, RCRA/CERCLA Units List.

Description

The K-Area Burning/Rubble Pit (131-K) is located east of the K-Reactor.

The 131-K Pit is approximately 240-feet long by 30-feet wide by 10-feet deep. The burning/rubble pits operated from 1951 to 1973. During the operation of the pits, organic materials of unknown use and origin, rags, paper, plastics, wood, telephone poles, and rubber were disposed and periodically (monthly) burned. In 1973, the burning of wastes ceased at SRS. A layer of soil was placed over the pit debris, and the unit then was filled to capacity with rubble such as concrete, brick, tile, asphalt, plastics, wallboard, rubber, and non-returnable empty drums. When the pits were filled to capacity, a layer of soil was placed over the pit. All burning/rubble pits were closed by 1981.

Preliminary soil, soil-gas, and groundwater screening of the area showed solvents in groundwater and low concentrations of arsenic, chromium, lead, and components of waste oils or insecticides in area soil.

Four monitoring wells surrounding the K-Area Burning/Rubble Pit were installed in October 1983 and August 1984. Quarterly groundwater data have been collected since the wells were installed. Results show that the above-mentioned substances have exceeded U.S. EPA maximum contaminant levels (MCLs) at least once. Ground penetrating radar (GPR) was run in 1988; soil-gas sampling was performed in 1988 and 1991; and unit screening was conducted in October 1988. Samples were collected from four soil borings, three inside the pit and one outside, to various depths.

Activities Accomplished Prior to Fiscal Year 1998

In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan (as part of the Eight Burning/Rubble Pits Work Plan) that was received by U.S. EPA and SCDHEC on December 7, 1990. U.S. EPA comments on the K-Area Burning/Rubble Pit were received on October 1, 1991. In response to U.S. EPA comments, this unit was taken out of the Eight Burning/Rubble Pits Work Plan. SRS prepared a Revision.1 Work Plan addressing only the K-Area Burning/Rubble Pit which U.S. EPA and SCDHEC received on December 31, 1991. No comments were received on the Revision.1 Work Plan. Because U.S. EPA, SCDHEC, and SRS have grouped this unit with the K-Area Rubble Pile, U.S. EPA and SCDHEC will not submit comments on the Revision.1 Work Plan. Upon receipt of the Revision.0 Work Plan that addresses both units, U.S. EPA and SCDHEC will perform their review and comment. The Revision.0 RFI/RI Work Plan (WSRC-RP-91-1117) was submitted to U.S. EPA and SCDHEC, which they received on April 28, 1995. U.S. EPA and SCDHEC transmitted comments, which were received on August 10, and August 14, 1995, respectively.

SRS addressed U.S. EPA and SCDHEC comments and submitted the Revision.1 RFI/RI Work Plan on November 12, 1995. The U.S. EPA and SCDHEC approved the work plan and the field start was initiated on March 18, 1996. The field characterization activities, as outlined in the approved work plan, were completed. These activities included obtaining approximately 34 soil borings, sampling two trenches dug within the pit boundaries and obtaining groundwater samples. SRS submitted, and U.S. EPA and SCDHEC approved,

two work plan addenda to further delineate groundwater contamination.

This unit was affected by Recovery (see explanation of Recovery in Overview of Fiscal Year 1997 Section). In accordance with the Recovery Schedule for this unit, SRS initiated preparation of the Revision.0 RFI/RI and Baseline Risk Assessment Report incorporating the protocols agreed upon by SRS, U.S. EPA, and SCDHEC.

Activities Accomplished in Fiscal Year 1998
SRS submitted the Revision.0 RFI/RI/BRA to the U.S. EPA and SCDHEC in December 1997. The U.S. EPA comments were received on March 25, 1998, with additional late comments received on April 23, 1998. SCDHEC comments were received on March 16, 1998. Following an April 22, 1998, comment resolution meeting, the U.S. EPA forwarded additional comments on the Revision.0 RFI/RI/BRA on May 5, 1998. SRS submitted the Revision.1 RFI/RI/BRA on May 22, 1998. SCDHEC commented on the Revision.1 RFI/RI/BRA while the U.S. EPA conditionally approved the document on July 14, 1998. The Revision.1 RFI/RI/BRA was submitted to the U.S. EPA and SCDHEC on August 14, 1998. The Revision.0 CMS/FS/SB/PP/Draft Record of Decision was submitted to the U.S. EPA and SCDHEC on August 21, 1998. The mixing zone model and application were included.

Activities Planned for Fiscal Year 1999
Activities planned for 1999 include resolving and incorporating the U.S. EPA and SCDHEC comments to the FS/PP. Plans also include the resolution and incorporation of public comments to the Proposed Plan. Completing and issuing the ROD should also take place in Fiscal Year 1999.

PEN BRANCH WATERSHED OPERABLE UNIT 9

K-Area Rubble Pile, 631-20G

Operable Unit 09 of the Pen Branch Watershed consists of two units: K-Area Rubble Pile (631-20G) and K-Area Burning/Rubble Pit (131-K). These units are listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The K-Area Rubble Pile (631-20G) is located east of the K-Reactor.

The 631-20G Pile is approximately 300-feet long, 50- to 125-feet wide, and 4- to 6-feet high. The K-Area Rubble Pile was used for bulk solid waste disposal during the SRS plant construction and may have received waste from the time of plant construction to the early 1970s. The waste in the area is suspected to consist of construction rubble that was not disposed in the adjacent K-Area Burning/Rubble Pit. Visual surveys have noted the presence of concrete, wood, asphalt, vegetation and tree stumps, scrap metal, and old

metal containers.

Activities Accomplished Prior to Fiscal Year 1998
The Revision.0 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on November 6, 1991. No comments were received on the Revision.0 RFI/RI Work Plan. Because U.S. EPA, SCDHEC, and SRS have grouped this unit with the K-Area Burning/Rubble Pit, U.S. EPA and SCDHEC will not submit comments on the Revision.0 RFI/RI Work Plan.

This unit was affected by Recovery (see explanation of Recovery in Overview of Fiscal Year 1997 Section). In accordance with the Recovery Schedule for this unit SRS initiated preparation of the Revision.0 RFI/RI and Baseline Risk Assessment Report incorporating the protocols agreed upon by SRS, U.S. EPA, and SCDHEC.

Activities Accomplished in Fiscal Year 1998
SRS submitted the Revision.0 RFI/RI/BRA to the U.S. EPA and SCDHEC in December 1997. The U.S. EPA comments were received on March 25, 1998, with additional late comments received on April 23, 1998. SCDHEC comments were received on March 16, 1998. Following an April 22, 1998, comment resolution meeting, the U.S. EPA forwarded additional comments on the Revision.0 RFI/RI/BRA on May 5, 1998. SRS submitted the Revision.1 RFI/RI/BRA on May 22, 1998. SCDHEC commented on the Revision.1 RFI/RI/BRA while the U.S. EPA conditionally approved the document on July 14, 1998. The Revision.1 RFI/RI/BRA was submitted to the U.S. EPA and SCDHEC on August 14, 1998. The Revision.0 CMS/FS/SB/PP/Draft Record of Decision was submitted to the U.S. EPA and SCDHEC on August 21, 1998. The mixing zone model and application were included.

Activities Planned for Fiscal Year 1999
Activities planned for 1999 include resolving and incorporating U.S. EPA and SCDHEC comments to the Feasibility Study/Proposed Plan (FS/PP). Plans also include resolution and incorporation of public comments to the Proposed Plan. The completion and issuing of the ROD should also take place in Fiscal Year 1999.

PEN BRANCH WATERSHED OPERABLE UNIT 10

K-Area Reactor Discharge Canal, NBN

Operable Unit 10 of the Pen Branch Watershed consists of one unit: the K-Area Reactor Discharge Canal. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
The K-Area Reactor Discharge Canal is located outside the K-Area perimeter fence, west of the 105-K Reactor Building. In the past, this canal served as a reactor cooling

wastewater/process sewer outfall to Indian Grave Branch, which reaches the Savannah River via Pen Branch.

Activities Accomplished Prior to Fiscal Year 1998
None

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

PEN BRANCH WATERSHED OPERABLE UNIT 11

K-Area Reactor Groundwater (Excluding the K-Area Tritium Anomaly), NBN

Operable Unit 11 of the Pen Branch Watershed consists of one unit: the K-Area Reactor Groundwater, excluding the K-Area Tritium Anomaly. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
K-Reactor Area is located in the south-central portion of the SRS. Acceptable past disposal practices associated with historical reactor operations have produced waste units within the area. These waste units may have contributed to contaminating the area groundwater with operational wastes. Groundwater characterization activities scheduled for the K-Reactor Groundwater unit will not duplicate individual waste unit characterization activities. The combined data will be used to develop an acceptable regulatory path forward for groundwater remediation, if warranted. The K-Area Reactor Groundwater (KRGW) operable unit (OU) does not include the K-Area Tritium Anomaly OU. The scope area of the KRGW OU is currently being defined.

Monitoring well data collected from the reactor area indicates the groundwater is contaminated with tritium, chlorinated volatile organics, other radionuclides, heavy metals, and sulfate.

Activities Accomplished Prior to Fiscal Year 1998
None

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

PEN BRANCH WATERSHED OPERABLE UNIT 12

K-Area Reactor Seepage Basin, 904-65G

Operable Unit 12 of the Pen Branch Watershed consists of one unit: the K-Area Reactor Seepage Basin (904-65G). This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
The K-Area Reactor Seepage Basin (904-65G) is located west of the K-Area Reactor.

The basin was constructed in 1957 to receive low-level radioactive wastewater from disassembly basin purges at the K-Area Reactor. The original dimensions of the basin were 135-feet long by 70-feet wide by 7-feet deep. Radionuclides entered the disassembly basin water from irradiated components during transfer from reactor tank to disassembly basin. Although many different radionuclides have been discharged into the basin, almost all of the radioactivity is due to tritium, strontium-90, cesium-137, and cobalt-60. The purge water may also contain amounts of non-radioactive detergents and organic and inorganic substances. Disposal ceased at the basin in 1960. The basin remains open and is currently designated a Radiologically Controlled Area (RCA).

Sediment and soil samples were collected from a test boring in the basin in 1978. The test boring was 20-feet deep, and three samples were collected: one sample from 0 to 2 feet, another from 8.5 to 10 feet, and a third from 18.5 to 20 feet. Cobalt-60, strontium-90, and cesium-137 were detected at activity levels above basin background in sediment samples collected from the upper 2 feet of the basin floor. Below the 2-foot depth, radioactivity levels are reported at 2.0 pCi/g or less for all tested radionuclides.

Four groundwater monitoring wells were installed surrounding the basin in 1984. Since 1985, tritium has consistently been reported above the Drinking Water Standards (DWS) (20 pCi/ml) in all four wells. Data from the third quarter of 1990 showed trichloroethylene (TCE) exceeding (DWS) in wells 1, 3, and 4, while tetrachloroethylene (PCE) exceeded DWS in wells 1 and 4. All other organic halogens remained below DWSs. PCE and TCE concentrations diminished to below DWS by the second quarter of 1991. Available evidence indicates that the organics detected are attributable to sources upgradient of the basin and are part of the K-Area Tritium Anomaly, another operable unit listed on the FFA Appendix C. This groundwater source is not used for the site drinking water supplies.

Activities Accomplished Prior to Fiscal Year 1998

In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan that was received by U.S. EPA and SCDHEC on March 31, 1992. SCDHEC comments on the Revision.0 RFI/RI Work Plan were received on October 5, 1993. An addendum to the Revision.1 RI Work Plan was submitted to U.S. EPA and SCDHEC in April 1995, and U.S. EPA and SCDHEC approved the RI Work Plan in June 1995. The field start was initiated on February 3, 1995.

The field characterization activities outlined in the approved RI Work Plan were performed by SRS. These activities included the sampling and analysis of approximately 32 soil samples for Target Analyte List/Target Compound List (TAL/TCL) and radiological indicators. Approximately 5 samples were obtained in the basin and analyzed for full radiological speciation. The results of the field characterization activities were used by SRS in the preparation of the Revision.0 RI and Baseline Risk Assessment Report.

SRS prepared and submitted the Revision.0 RI and Baseline Risk Assessment Report to the U.S. EPA and SCDHEC on December 18, 1996. U.S. EPA and SCDHEC comments were June 4, and March 17, 1997, respectively.

Activities Accomplished in Fiscal Year 1998

Revision.1 of the RFI/RI/BRA was submitted to U.S. EPA and SCDHEC on November 26, 1997. U.S. EPA provided comments on January 29, 1998, while SCDHEC sent their comments on the first revision on February 25, 1998. SRS submitted Revision.1.1 of the RFI/RI/BRA to the regulatory agencies on April 28, 1998. U.S. EPA and SCDHEC approved the document on May 28 and May 26, 1998, respectively.

SRS also began drafting the Plug-In Decision Document for the KRSB.

Activities Planned for Fiscal Year 1999

This unit is included in the Plug-In Approach, along with the K-, L-, and P-Area Reactor Seepage Basins. The Parties intend to finalize the Plug-In Record of Decision in Fiscal Year 1999. SRS will then submit a Revision.0 Plug-In Decision Document for the C-Area Reactor Seepage Basins for U.S. EPA and SCDHEC review and comment.

PEN BRANCH WATERSHED OPERABLE UNIT 13

K-Area Sludge Land Application Site, 761-4G

Operable Unit 13 of the Pen Branch Watershed consists of one unit: the K-Area Sludge Land Application Site. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The K-Area Sludge Land Application Unit is located west of K Area, south of Road B. The unit is surrounded by Pen Branch and Indian Grave Creeks. The K-Area Sludge Land Application Unit was originally a borrow pit that was used in an experimental reclamation project. The former borrow pit covers about 17 acres. In 1980, about 300,000 gallons of liquid sludge from non-SRS sewage treatment plants was injected 5 to 8 inches beneath the soil surface. Afterwards, ten species of hardwood and loblolly pines were planted on the unit. In 1988, about 210 tons of sewage sludge from the Central Shops (CS) Sewage Sludge Lagoon was spread over the soil on approximately 14 of the 17 acres of the former borrow pit. Analytical results of the sludge from CS Sludge Lagoon indicated the presence of chlordane, a hazardous (class B carcinogen) pesticide used in termite control. The source of the chlordane has not been determined. Results also showed higher concentrations of certain metals in the sludge than in the underlying soil.

The K-Area Sludge Land Application Unit soils were sampled in February 1989 to confirm the presence of chlordane. Three samples of soil containing residual sludge and three samples of underlying soils were collected to determine the extent of the chlordane concentrations. The highest and lowest concentrations of chlordane detected in the sludge was 32,300 parts per billion and 3,820 parts per billion, respectively. The underlying soil at the same location as the sludge had concentrations of 90.2 parts per billion and 8 parts per billion, respectively. Three groundwater monitoring wells were installed in 1988. Evaluation of groundwater data showed that the Sludge Land Application Unit has not impacted the quality of shallow groundwater.

Activities Accomplished Prior to Fiscal Year 1998
In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan that was received by U.S. EPA and SCDHEC on July 8, 1991.

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

PEN BRANCH WATERSHED OPERABLE UNIT 14

K-Area Tritium Anomaly, NBN

Operable Unit 14 of the Pen Branch Watershed consists of one unit: the K-Area Tritium Anomaly. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
The source of the K-Area Tritium Anomaly may have been the result of the two separate

incidents occurring in 1991 involving leaks from the distillation columns, the heat exchanger laydown area, or a leaking sump in the K-Area Canyon. Based on calculations derived from the amount of tritium in the monitoring wells, it is estimated that 82 Ci of tritium have been released to the ground.

Activities Accomplished Prior to Fiscal Year 1998
This unit did not appear on an FFA Appendix. Both U.S. EPA Region IV and SCDHEC requested that this anomaly be investigated under the Site Evaluation Program. A Site Evaluation Report was submitted March 31, 1995. It recommended a "No Further Action" required based on calculations of a tritium activity level of 43 Ci outcropping at Indian Grave Branch in 2003. U.S. EPA Region IV and SCDHEC did not concur with that recommendation and requested that the unit be moved to Appendix C, RCRA/CERCLA Units List (June 30, 1995, and May 25, 1995, respectively). The SRS concurred with this request on August 17, 1995.

Activities Accomplished in Fiscal Year 1998
SRS completed of the regional flow model and K-Tritium Plume transport model. SRS obtained lithology data at 26 K-Reactor Area locations. The data were incorporated in the flow models. SRS installed 34 piezometers and obtained hydraulic head data.

Activities Planned for Fiscal Year 1999
SRS plans to incorporate additional field data into the regional flow model and K-Tritium Plume transport model. A mixing zone evaluation for the K-Tritium Plume will also be performed. Plans also call for additional field characterization of the K-Area consisting of installing 12 wells, performing 4 cone penetrometer testing (CPT) pushes for lithology and 16 CPT pushes for plume delineation, conducting flow measurements, and conducting seepage line sampling.

PEN BRANCH WATERSHED OPERABLE UNIT 15

L-Area Bingham Pump Outage Pits, 643-2G, -3G

Operable Unit 15 of the Pen Branch Watershed consists of two units: the two L-Area Bingham Pump Outage Pits. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
The Bingham Pump Outage Pits are unlined earthen pits located outside the fences of the reactor areas: K (1 pit), L (2 pits), P (1 pit), and R (3 pits).

Repairs to primary and secondary reactor cooling systems were performed between 1957 and 1958. The outages of the cooling water systems that occurred as a result of the modifications became known as the Bingham Pump Outages. The pits received low-level

(less than 25 mR/hr) construction debris generated by the repairs such as pipes, cables, ladders, drums, and boxes of miscellaneous hardware. No pumps or liquids are buried at the pits. The pits were excavated to a depth of 13 feet, filled with approximately 9 feet of debris, and backfilled with approximately 4 feet of cover soil. It is conservatively estimated that at the time of burial, the total amount of radioactivity buried in each reactor area was 1 Ci. Approximately 70% of this activity is estimated to have been eliminated through radioactive decay since 1958.

A ground penetrating radar (GPR) survey was performed to delineate pit boundaries. Surface radiation levels recently measured by Health Protection revealed no detectable surface radiation. A soil-gas survey also indicated very low levels of volatile organic compounds (VOCs).

Activities Accomplished Prior to Fiscal Year 1998

SRS conducted pre-work plan characterization of the unit in conjunction with the P-Area and R-Area Bingham Pump Outage Pits, which included 27 soil borings that were analyzed for the full suite of contaminants as well as radiologically screened. Thirteen (13) Cone Penetrometer Testing (CPTs) were also performed to gather lithologic information about the unit. SRS submitted the Revision.0 RI Work Plan Addendum to U.S. EPA and SCDHEC on July 25, 1996.

U.S. EPA and SCDHEC provided comments on the Revision.0 RI Work Plan on December 2, and October 28, 1996, respectively. SRS addressed U.S. EPA and SCDHEC comments and provided a Revision.1 Work Plan on January 30, 1997. SCDHEC provided comments on the Revision.1 Work Plan on February 28, 1997. U.S. EPA conditionally approved the Revision.1 Work Plan on March 3, 1997. SRS addressed the comments and SCDHEC approved the work plan on March 3, 1997. SRS initiated the field start for this unit on March 3, 1997.

This unit is a secondary ASCAD™ unit to the K-Area Bingham Pump Outage Pit.

Activities Accomplished in Fiscal Year 1998

SRS forwarded an Approved Standardized Corrective Action Design (ASCAD™) scoping package to U.S. EPA and SCDHEC on March 4, 1998. A scoping meeting for the ASCAD™ Combined Document was held with U.S. EPA and SCDHEC on March 18, 1998. The Revision.0 ASCAD™ Combined Document (RI/BRA/FS) Proposed Plan and draft Revision.0 Record of Decision (ROD) for the L-Area Bingham Pump Outage Pits was forwarded to the U.S. EPA and SCDHEC on September 17, 1998.

Activities Planned for Fiscal Year 1999

SRS plans to obtain approval of the ASCAD™ Combined Document and the Proposed Plan.

The Parties expect to hold a public comment period on the Proposed Plan during Fiscal Year 1999. After the public comment period SRS will prepare and submit a Revision.0 Record of Decision to the U.S. EPA and SCDHEC for review and comment.

PEN BRANCH WATERSHED OPERABLE UNIT 16

L-Area Rubble Pit, 131-4L

Operable Unit 16 of the Pen Branch Watershed consists of one unit: the L-Area Rubble Pit. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
A search of the records revealed that this unit should contain inert rubble from the demolition of a powerhouse stack and silo. The rubble should have consisted of primarily of metal and concrete. The records did not reveal any history of disposal of hazardous constituents. However, confirmatory sampling indicated elevated levels of semi-volatile compounds.

Activities Accomplished Prior to Fiscal Year 1998
This unit was originally listed on FFA Appendix G, Site Evaluation List. The Revision.1 Site Evaluation Report, submitted to the regulators on September 30, 1994, recommended that the unit be transferred from FFA Appendix G to FFA Appendix C, RCRA/CERCLA Units List, for remediation. U.S. EPA Region IV and SCDHEC concurred with this recommendation on June 19, 1995, and December 12, 1994, respectively.

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

PEN BRANCH WATERSHED OPERABLE UNIT 17

L-Area Reactor Retention Basin, 904-87G

Operable Unit 17 of the Pen Branch Watershed consists of one unit: the L-Area Reactor Retention Basin. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The L-Area Reactor Retention Basin is located in the western portion of L-Area, approximately 700 feet west of SRS Road 7. This 50-million-gallon earthen basin served as the end containment point for the L-Reactor emergency cooling system.

Activities Accomplished Prior to Fiscal Year 1998

None

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

STATUS OF SAVANNAH RIVER SWAMP WATERSHED OPERABLE UNITS

SAVANNAH RIVER FLOODPLAIN SWAMP WATERSHED OPERABLE UNIT 1

D-Area Ash Basin, 488-D

Operable Unit 1 of the Savannah River Floodplain Swamp Watershed consists of two units: the D-Area Ash Basin and the D-Area Coal Pile Runoff Basin. These units are listed as separate entries on FFA Appendix C, RCRA/CERCLA Units List.

Description
The Ash Basin (488-D) is located in the southwestern part of D-Area. D-Area itself is situated in the west-southwest portion of the Savannah River Site.

The basin, which began operation in 1951, is approximately 23 acres in size and 13-feet deep. The purpose of this unit was to intercept, stabilize, and provide passive treatment of ash sluice water prior to discharge to local surface streams. The basin ceased receiving sluice water when the construction of the 488-1D and 488-2D Ash Basins were completed. The 488-D Ash Basin was subsequently used for the placement of dry ash and coal-crusher reject material. There is no record of hazardous waste or hazardous constituents being disposed in the basin. Analysis of basin soils indicates the constituents of concern (COCs) are elevated levels of several heavy metals typically found in coal ash including iron, manganese, barium, and sodium. Baseline groundwater sampling near the basin shows high total dissolved solids, high sulfate, and silica. Metals found in the groundwater include calcium, chromium, iron, potassium, magnesium, manganese, and sodium. Some monitoring wells contain low pH water and levels of trichloroethylene (TCE) detected above the primary drinking water standards.

Activities Accomplished Prior to Fiscal Year 1998
In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan to U.S. EPA and SCDHEC on May 7, 1991.

Activities Accomplished in Fiscal Year 1998
The Parties agreed that SRS should prepare a new Revision.0 RFI/RI Work Plan written to current protocols. The Revision.0 RFI/RI Work Plan was completed and submitted to

the regulators on December 22, 1997. U.S. EPA and SCDHEC comments on the Revision.0 RFI/RI Work Plan were received on April 24 and May 1, 1998, respectively. Requirements for the Revision.1 Work Plan were agreed upon in a comment resolution call with the regulators on June 17. The Revision.1 RFI/ RI Work Plan was submitted to the regulators on July 29. Approval of the Revision.1 Work Plan was obtained from the U.S. EPA on August 24 and from SCDHEC on August 28. The characterization field start, an FFA milestone for August 30, was achieved on August 29 with the commencement of soil sampling at the 488-D Ash Basin. The Parties agreed to include the source characterization of the soil at the D-Area Waste Oil Facility 484-D (DWOF) in the D-Ash Basin Operable Unit (DABOU). This will be accomplished through the issue of a work plan addendum to the Revision.1 Work Plan for this operable unit. Characterization of the DWOF will be conducted to determine if the source of a trichloroethylene (TCE) plume under the DABOU is within the operable unit.

SRS will assess the strategy to add the D-Area Waste Oil Facility 484-D to the work plan.

Activities Planned for Fiscal Year 1999

SRS will continue with plans for sampling, analysis, and validation. Soils, sediments and groundwater samples are to be collected and analyzed according to the requirements of the Revision.1 Work Plan and the upcoming work plan addendum. This is expected to include characterization of the source units, the wetlands, complete characterization of the groundwater plume and location and identification of upgradient-off unit contaminant sources.

SRS will install approximately 39 new monitoring wells. SRS will begin development of RFI/RI/BRA Revision 0. SRS will clear and grub access road for installation of new wells, site survey.

SAVANNAH RIVER FLOODPLAIN SWAMP WATERSHED OPERABLE UNIT 1

D-Area Coal Pile Runoff Basin, 489-D

Operable Unit 1 of the Savannah River Floodplain Swamp Watershed consists of two units: the D-Area Ash Basin and the D-Area Coal Pile Runoff Basin. These units are listed as separate entries on FFA Appendix C, RCRA/CERCLA Units List.

Description

The D-Area Coal Pile Runoff Basin (489-D) is located approximately 100 feet south of the D-Area coal storage site.

Steam and electricity for the SRS activities were produced by seven coal-fired power plants located in A, C, D, F, H, K, and P Areas. Coal was stored at each of the seven power plant locations. Surface runoff from the coal storage piles was discharged to

surface streams until National Pollution Discharge Elimination System (NPDES) took effect in 1977. To meet NPDES discharge requirements and in response to SCDHEC requests, seven, unlined, earthen containment basins were constructed near each coal storage location to intercept, stabilize, and treat surface runoff from the coal piles. All seven coal pile runoff basins were constructed between 1978 and 1981. The C- and F-Area basins have been inactive since late 1985 when the coal piles at these areas were removed.

Constituents of concern within the basins include low pH, sulfate, iron, manganese, magnesium, aluminum, cadmium, chromium, and arsenic.

Soil borings were drilled at each of the basins during June and July 1988. Monitoring data at each unit indicate the presence of the above-mentioned compounds and metals in the groundwater and soils.

Activities Accomplished Prior to Fiscal Year 1998

In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan that was received by U.S. EPA and SCDHEC on October 23, 1990. After receiving U.S. EPA's comments on the Revision.0 RFI/RI Work Plan on October 30, 1991, SRS revised the work plan and submitted the Revision.1 RFI/RI Work Plan, which U.S. EPA and SCDHEC received January 29, 1992. Both the Revision.0 and the Revision.1 RFI/RI Work Plans addressed all seven of the SRS Coal Pile Runoff Basins. Since that submittal, U.S. EPA, SCDHEC, and SRS have developed operable units, and the seven Coal Pile Runoff Basins will be addressed either separately or with the other RCRA/CERCLA units in their operable unit.

Pre-characterization sampling of the groundwater at existing wells was completed in February 1997.

SRS prepared an information package containing an uncertainty discussion and a proposed path forward. It was presented to U.S. EPA/SCDHEC in March 1997. After review of the uncertainty analysis and the proposed path forward, SCDHEC directed SRS to proceed with development of work plan for submittal in the first quarter of Fiscal Year 1998.

Field Surveying of cone penetrometer technology (CPT) locations has been completed.

Surveys of stressed vegetation area and the wetland area have been initiated.

Activities Accomplished in Fiscal Year 1998

SRS submitted the Revision.0 RFI/RI Work Plan to the U.S. EPA and SCDHEC on December 23, 1997. The U.S. EPA and SCDHEC provided comments on April 24 and May 1, 1998, respectively. The Revision.1 document was submitted to the regulators on

July 31, 1998. SRS initiated the RFI/RI Field Start on September 30, 1998.

Activities Planned for Fiscal Year 1999

SRS will continue with plans for sampling, analysis, and validation. Soils, sediments and groundwater samples are to be collected and analyzed according to the requirements of the Revision.1 Work Plan and the upcoming work plan addendum. This is expected to include characterization of the source units, the wetlands, complete characterization of the groundwater plume and location and identification of upgradient off-unit contaminant sources.

SRS will install approximately 39 new monitoring wells. SRS will begin development of RFI/RI/BRA Revision 0. SRS will clear and grub access road for installation of new wells, site survey.

SAVANNAH RIVER FLOODPLAIN SWAMP WATERSHED OPERABLE UNIT 2

D-Area Burning/Rubble Pits, 431-D, -1D

Operable Unit 2 of the Savannah River Floodplain Swamp Watershed consists of two units: the two D-Area Burning/Rubble Pits (D BRP) (431-D and 431-1D). A final Record of Decision (ROD) was issued for these units on April 22, 1997.

Description

The D-Area BRPs are located on the western portion of D-Area. The 431-D pit is approximately 258-feet long by 46-feet wide by 10-feet deep, and 431-1D pit is approximately 229-feet long by 37-feet wide by 10-feet deep.

The D-Area BRPs operated from 1951 to 1973. During the operation of the pits, spent organic solvents, waste oils, rags, paper, plastics, wood, telephone poles, and rubber were disposed and periodically (monthly) burned. In 1973, the burning of wastes ceased at SRS. A layer of soil was placed over the pit debris, and the site was then filled to capacity with rubble such as concrete, brick, tile, asphalt, plastics, wallboard, rubber, and non-returnable empty drums. When the pits were filled to capacity, a layer of soil was placed over the pit. All burning/rubble pits were closed by 1981.

The four monitoring wells surrounding the D-Area BRPs were installed in September 1983 and June 1984. Quarterly groundwater data have been collected since the wells were installed. Ground penetrating radar (GPR) was run in 1988, site screening was conducted in November 1989, and soil-gas sampling was performed in 1991. A backhoe was used to trench across the pits for sampling and to identify the pit boundaries. Samples were collected from four soil borings to various depths (two inside and two outside the pits).

The constituents of concern are low concentrations of metals (arsenic, barium, chromium, copper, lead, mercury, nickel, selenium), semi-volatile organics in soil, and metals (iron, lead, manganese) in groundwater.

Activities Accomplished Prior to Fiscal Year 1998

In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan that was received by U.S. EPA and SCDHEC on August 6, 1990. The Revision.1 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on May 9, 1991.

The Revision.2 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on November 18, 1992. The Revision.2 RFI/RI Work Plan was approved by U.S. EPA and SCDHEC in May 1993. The RFI/RI phase II field characterization began on June 8, 1993. Sampling involved the following: 8 soil borings within the pits, 4 soil borings outside the pits, 3 Hydropunch™ groundwater samples outside the pits, 1 permanent monitoring well installed outside the pits, and 9 surface waste/sediment samples collected from a nearby creek and wetland.

The D-Area BRP RFI/RI and Baseline Risk Assessment reports were completed and submitted to the regulators ahead of schedule on October 21, 1994. The Revision.1 RFI/RI and Baseline Risk Assessment report for the D-Area BRPs were submitted to the regulators on May 24, 1995, for final review and approval. SRS submitted the Revision.0 CMS/FFS and the Proposed Plan for the D- Area BRPs to U.S. EPA and SCDHEC on September 28, 1995.

Based on the groundwater monitoring history, the probable condition is that no significant groundwater contamination has originated from the D- Area BRPs. The RFI/RI and Baseline Risk Assessment report conclude that the D-Area BRP source operable unit poses no significant risk to the environment and minimal risk to human health. Thus no remedial action and a period of continued monitoring for confirmation was selected as the appropriate action for the groundwater at D- Area BRP.

SRS submitted the Revision.0 Record of Decision (ROD) containing the responsiveness summary to U.S. EPA and SCDHEC on November 14, 1997. U.S. EPA and SCDHEC provided comments on January 2, 1997. SRS addressed the comments and submitted a Revision.1 ROD, signed by the Department of Energy, to U.S. EPA and SCDHEC on February 10, 1997. U.S. EPA and SCDHEC notified SRS that they approved the ROD for signing by their agencies on February 25 and February 21, 1997, respectively. U.S. EPA signed the ROD on March 27, 1997. SCDHEC, after issuing the final RCRA Permit Modification for a 15-day appeal, signed the ROD on April 22, 1997. Consequently, the ROD was issued on April 22, 1997.

SRS prepared the post-ROD document, Corrective Measures Implementation/Remedial Action Plan, which was submitted to U.S. EPA and SCDHEC on August 8, 1997.

Activities Accomplished in Fiscal Year 1998

The Revision.1 Final Remediation Report was submitted to the regulators on January 20, 1998. Approval of the Revision.1 Final Remediation Report was received from U.S. EPA on February 19, 1998. A Revision 1.1 of the Final Remediation Report was submitted to the regulators on March 23. SCDHEC approved the Revision 1.1 Final Remediation Report on April 16, 1998. U.S. EPA stated in an April 20, 1998, letter that they had previously approved the Revision .1 and did not intend to approve the Revision1.1.

The remedial action for the D-Area BRP, which was approved in the signed ROD, is "Institutional Controls for the D-Area BRP Source Unit and no remedial action for the groundwater with a period of confirmatory groundwater monitoring." The specifics of the Institutional Controls, as delineated in the approved Final Remediation Report, include as near- term actions the posting of signs indicating that the site has been used to manage hazardous waste, the application of existing SRS access controls to prohibit residential use, and the initiation of a groundwater monitoring program. The appropriate signage was installed at the site on May 12, 1998. SRS access controls to limit site use to approved activities are in place and are part of an existing sitewide program.

Groundwater samples were obtained during April 1997 and again in April 1998. Based on the field activities outlined above, the remedial action field start for this unit was achieved May 12, 1998. The FFA milestone date for the field start for this unit is July 22, 1998.

Activities Planned for Fiscal Year 1999

SRS will complete groundwater sampling during Third Quarter Fiscal Year 1999 as required in the Final Remediation Report and a groundwater report will be developed on this sampling event.

SAVANNAH RIVER FLOODPLAIN SWAMP WATERSHED OPERABLE UNIT 3

D-Area Oil Seepage Basin, 631-G

Operable Unit 3 of the Savannah River Floodplain Swamp Watershed consists of one unit: the D-Area Oil Seepage Basin. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description

The D-Area Oil Seepage Basin (631-G) is located approximately 0.6 miles north of D-Area between unpaved roads A-4.4 and A-4.5.

D-Area Oil Seepage Basin was originally designed and constructed as a series of unlined seepage trenches to dispose waste oils and other fluids unsuitable for burning in 400-D Powerhouse boilers. The trenches began receiving waste oils and fluids in 1952 and were

periodically burned along with general office and cafeteria waste. This practice continued until 1973 when open burning ceased at SRS. However, the basin continued to receive waste oils until it was backfilled and closed in 1975. Approximately one foot of standing liquid plus an unspecified number of 55-gallon drums remained in the basin when it was backfilled.

There is no historical evidence that the basin received radionuclides.

Activities Accomplished Prior to Fiscal Year 1998

SRS prepared and submitted the Revision.0 RFI/RI Work Plan for the D-Area Oil Seepage Basin in September 1990. The field start was initiated in August 1995 in accordance with the U.S. EPA and SCDHEC approved RFI/RI Work Plan. A characterization using the expedited site characterization (ESC) method in the examination of the D-Area Oil Seepage Basin was conducted during 1995 and 1996. This characterization supported a Remedial Investigation and Baseline Risk Assessment. The regulators approved the RI/BRA Report in August 1997.

SRS submitted the Revision.0 Interim Action Proposed Plan for the D-Area Oil Seepage Basin, which U.S. EPA and SCDHEC received November 1993. This IAPP detailed the proposed interim remedial action of drum and debris removal at the D-Area Oil Seepage Basin. The three Parties issued the Interim Action Record of Decision in March 1995.

An interim remedial action was conducted. The action consisted of the removal of the buried drums, debris, and principal-threat source material from the seepage basin. The excavation was then backfilled with clean fill dirt and a mixture of rapidly germinating grass seeds was applied to the surface.

Prior to backfilling the basin, a bioremediation system was installed in the basin. SRS initiated operation of the bioremediation system on September 17, 1996. The introduction of air and gaseous nutrients through this system enhanced the biodegradation rates of petroleum components and stimulated microbial degradation of chlorinated solvents. When operation of the bioremediation system ceased in July 1997, methylene chloride, the only constituent of concern (COC) in the basin soil, had been reduced to concentrations below the RGO.

The RD/RA work plan directs a semi-annual sampling and analysis of groundwater. This sampling will occur each December and June for a three-year period beginning December 1996. A brief written report of the results of each sampling event will be submitted to the regulators six months after the sampling event has taken place.

SRS submitted the D-Area Oil Seepage Basin Interim Action Post-Construction Report to U.S. EPA and SCDHEC in November 1996. Final regulator approval of this report was obtained in February 1997.

SRS prepared and submitted a Revision.0 CMS/FS and Statement of Basis/Proposed Plan to U.S. EPA and SCDHEC on August 28, 1997. This submittal included a Revision.0 Groundwater Mixing Zone application. This application was proposed as part of the preferred remedy for this operating unit.

Activities Accomplished in Fiscal Year 1998

SRS prepared and submitted a Revision.0 CMS/FS and Statement of Basis/Proposed Plan to U.S. EPA and SCDHEC on August 28, 1997. This submittal included a Revision.0 Groundwater Mixing Zone application. This application was proposed as part of the preferred remedy for this operating unit.

The U.S. EPA and SCDHEC approved the CMS/FS, Statement of Basis /Proposed Plan (SB/PP) and the Groundwater Mixing Zone Application on April 13, 1998, and April 14, 1998, respectively.

The public comment period began May 1. The Environmental Restoration and Waste Management (ER&WM) Program Subcommittee of the Citizens Advisory Board (CAB) made a motion to the CAB to accept the D-Area Oil Seepage Basin Proposed Plan without changes. The Public Comment period for the Proposed Plan closed on June 1, 1998. No comments were received during this time. The Revision.0 Record of Decision (ROD) was submitted to the U.S. EPA and SCDHEC on June 16, 1998.

Comments on the Revision.0 ROD were received from the U.S. EPA on July 22, 1998, and from SCDHEC on July 17, 1998. A Revision.1.1 ROD was submitted to U.S. EPA and SCDHEC on August 10, 1998, and SCDHEC approval was received on August 11, 1998. The signed ROD was submitted to the U.S. EPA and SCDHEC on August 28, 1998.

Work was initiated on the post-ROD documents in August 1998.

Activities Planned for Fiscal Year 1999

A program plan includes nine new wells, a land survey Waste Management Plan, a Quality Assurance Plan, a Health and Safety Plan, a Hazard Assessment Document Determination, and a Sediment and Soil Erosion Plan.

SRS will develop a CM/RD Work Plan, a CM/RD Report, and a CM/RA work plan. SRS will clear and grub an access road for installation of new wells. SRS will mobilize for well installation.

SAVANNAH RIVER FLOODPLAIN SWAMP WATERSHED OPERABLE UNIT 4

D-Area Waste Oil Facility, 484-D

Operable Unit 4 of the Savannah River Floodplain Swamp Watershed consists of one unit: the D-Area Waste Oil Facility (DWOF). This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description

The D-Area Waste Oil Facility (484-10D) consists of a 2,000 gallon, 1/4-inch-thick steel-plate storage tank and a steel 500-gallon skid-tank located in a concrete diked area covered by a corrugated roof. This area is 40-feet by 60-feet. The tank stores waste oil that is used as fuel for the D-Area Powerhouse (484-D) boilers as part of an energy recovery program. A sump in the diked area collects and transfers spills to the waste oil tank. A pipe approximately 10-feet long, runs from the storage tank to the powerhouse.

The Waste Oil Facility has been in operation since 1953; it is currently active and receives approximately 92,000 gallons per year of waste oil, engine lubricant, pump oil, kerosene, fuel oil, diesel oil, non-PCB (polychlorinated biphenyl) transformer oil, and gear box oil.

Based on soil-gas analyses, there have been releases to the soil of 1,1,1-trichloroethane, trichloroethylene, and tetrachloroethylene. These releases exceed U.S. EPA maximum contaminant levels (MCLs) under RCRA. Proposed RCRA Subpart S. chloroform, benzene, and toluene were also found at lower levels. Pentane, hexane, and heptane were above expected background levels.

Activities Accomplished Prior to Fiscal Year 1998

This unit was originally included on FFA Appendix G, Site Evaluation List. A Site Evaluation Report was prepared recommending that the area needed further investigation and should be deleted from FFA Appendix G and moved to FFA Appendix C, RCRA/CERCLA Units List. U.S. EPA and SCDHEC received the report on March 1, 1993. U.S. EPA and SCDHEC concurred with the report's recommendation. Their letters of concurrence were received April 13, 1993, and July 19, 1993, respectively.

Activities Accomplished in Fiscal Year 1998

Project activities at the D-Area Waste Oil Facility had been scheduled to start during First Quarter Fiscal Year 2002; therefore, no work was done on this unit during Fiscal Year 1998.

Activities Planned for Fiscal Year 1999

Groundwater sampling of the D-Area Ash Basin Operable Unit (DABOU) during Fiscal Year 1998 revealed the existence of a tricholoroethylene (TCE) plume under the DABOU,

the source of which appears to be in the vicinity of the DWOF. Therefore, it will be necessary to perform characterization of soil and groundwater in the D-Area Waste Oil Facility and the surrounding area during Fiscal Year 1999. Soil samples will be taken and groundwater monitoring wells will be installed and sampled.

A work plan addendum to the Revision.1 work plan will be submitted to address the characterization of the DWOF.

SAVANNAH RIVER FLOODPLAIN SWAMP WATERSHED OPERABLE UNIT 5

M-Area West, 631-21G

Operable Unit 5 of the Savannah River Floodplain Swamp Watershed consists of one unit: the M-Area West Unit. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List. A "No Action" Record of Decision was issued for this unit on September 29, 1995.

Description

The M-Area West unit is located west of the M-Area production facility, near a dirt access road approximately 1.1 miles north of Silverton Road. The unit consists of two small areas where drums were found. Visible materials at the unit included six empty 55-gallon drums, four 1-gallon cans, a 1-gallon glass jar, and miscellaneous debris. Most of the debris was removed in July 1992. Some miscellaneous items remain. Markings on the drums indicate they once contained chlorinated solvents and oil and are about 30- years old. The constituents detected at the unit included metals, volatile and semi-volatile organics, and phenolic compounds in soil. Because of the expected depth to the water table [approximately 128-feet below land surface (bls)] and the lack of data regarding the extent of the contamination at this unit, unit assessment activities focused on soil contamination only.

A preliminary investigation conducted during March/April 1988 revealed low measurable concentrations of chlorinated solvents at the unit. A unit-screening program completed in November 1989 indicated the possible presence of hazardous substances, including metals, volatile organics, semi-volatile organics, and phenolic compounds in the soil. No monitoring wells were associated with this unit; however, to the north and east (closest cluster is 1 mile away) are monitoring wells associated with the M-Area groundwater study.

Activities Accomplished Prior to Fiscal Year 1998

In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan that was received by U.S. EPA and SCDHEC on September 21, 1990. U.S. EPA comments on the Revision.0 RFI/RI Work Plan were received by SRS on June 18, 1991. The Revision.1 RFI/RI Work Plan was received by U.S. EPA and SCDHEC September 10, 1991. SCDHEC comments on the Revision.1 RFI/RI Work Plan were

received by SRS on May 19, 1993.

Geophysical surveys (magnetometer and ground penetrating radar (GPR)) and soil-gas surveys (including geoprobe sampling) were conducted during June and July 1993. The geophysical surveys revealed no trenches, buried objects, or new debris. Soil-gas analysis detected the presence of low levels of light hydrocarbons, but no chlorinated organics.

The Revision.2 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on October 4, 1993. U.S. EPA and SCDHEC approved the Revision.2 RFI/RI Work Plan on April 19, 1994, and October 27, 1993, respectively. SRS submitted an implementation schedule for the Revision.2 RFI/RI Work Plan, which U.S. EPA and SCDHEC received on March 26, 1994. The implementation schedule was approved by U.S. EPA and SCDHEC on April 19 and June 10, 1994, respectively.

The field start commitment was met on December 10, 1993, earlier than the FFA Appendix D, Timetables and Deadlines, for the Fiscal Year 1994 commitment to initiate the field start on December 31, 1993. Following the field work, SRS developed an abbreviated RFI/RI and Baseline Risk Assessment to evaluate the impact from the unit. It was determined that the unit posed no risk to human health or the environment. A "No Action" alternative was recommended in the Proposed Plan for the unit. The Proposed Plan also recommended removing the remainder of the inert debris from the unit as a maintenance action. The Record of Decision confirming the "No Action" alternative was issued on September 29, 1995. This is the Final Action for the unit.

Activities Accomplished in Fiscal Year 1998
None. All activities associated with the unit have been completed.

Activities Planned for Fiscal Year 1999
None. All activities associated with the unit have been completed.

SAVANNAH RIVER FLOODPLAIN SWAMP WATERSHED OPERABLE UNIT 6

Road A Chemical Basin, 904-111G

Operable Unit 6 of the Savannah River Floodplain Swamp Watershed consists of one unit: the Road A Chemical Basin. This unit is in FFA Appendix C, RCRA/CERCLA Units List.

Description
The Road A Chemical Basin (904-111G) is approximately one-half mile southwest of the intersection of Road A (SC Highway 125) and SRS 6, four miles east of the SRS boundary.

The original basin dimensions were 100-feet long by 175-feet wide by 10-feet deep. The

history of waste disposal in the basin, the dates of operation, and the nature and quantities of materials disposed were not recorded. The basin was backfilled in 1973, and an area of 400-feet by 400- feet was regraded. The Environmental Information Document, written in 1987, indicates the contents of the basin consisted of miscellaneous radioactive and chemical aqueous wastes.

Activities Accomplished Prior to Fiscal Year 1998
The Revision.0 Preliminary Characterization Summary/Preliminary Risk Assessment Report was received by U.S. EPA and SCDHEC on August 20, 1990. The Revision.0 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on July 1, 1992.

The unit was surveyed and fenced to prevent access to this remotely located unit.

Activities Accomplished in Fiscal Year 1998
SRS submitted the Revision.0 RFI/RI Work Plan to the U.S. EPA and SCDHEC on September 30, 1998.

Activities Planned for Fiscal Year 1999
SRS expects to prepare and submit the Revision.1 Work Plan when the regulators provide comments. The Parties intend to initiate a field start at the unit by June 30, 1999.

SAVANNAH RIVER FLOODPLAIN SWAMP WATERSHED OPERABLE UNIT 7

Silverton Road Waste Site, 731-3A

Operable Unit 7 of the Savannah River Floodplain Swamp Watershed consists of one unit: the Silverton Road Waste Site. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List. A final Record of Decision (ROD) was issued for this unit on April 22, 1997.

Description
The Silverton Road Waste Site is 1.5 miles west-southwest of A/M Area. The unit is approximately 700-feet long by 300-feet wide by 7-feet deep. The unit was an open pit prior to construction of Savannah River Site. The pit is assumed to have been a disposal site for domestic and community waste. During and after the construction of Savannah River Site, the pit and surrounding area were used for the disposal of construction debris such as metal shavings, drums, and storage tanks until its closing in 1974.

Approximately 30 monitoring wells have been installed at the unit.

Activities Accomplished Prior to Fiscal Year 1998
In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan that U.S. EPA and SCDHEC received on November 7, 1990. U.S. EPA comments were received by SRS on June 3, 1991. The Revision.1 RFI/RI Work

Plan was submitted to U.S. EPA and SCDHEC on September 10, 1991. SCDHEC comments on the Revision.1 RFI/RI Work Plan were received by SRS on December 1, 1992. The Revision.2 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on March 31, 1993. Regulatory approval of the Revision.2 RFI/RI Work Plan was received from U.S. EPA on June 28, 1993, and from SCDHEC on May 17, 1993.

The field start was initiated July 6, 1993, and was completed October 26, 1993. A total of 15 borings were drilled in July and August 1993. Nine additional wells were installed on September 30, 1993, to more precisely monitor the groundwater in the vicinity.

SRS submitted the Revision.0 RFI/RI and Baseline Risk Assessment Reports on February 27, 1995. U.S. EPA and SCDHEC comments on the Revision.0 RFI/RI Report were received on June 29, 1995, and June 7, 1995, respectively. U.S. EPA and SCDHEC comments on the Revision.0 Baseline Risk Assessment Report were received on June 29, 1995, and September 11, 1995, respectively. SRS submitted the Revision. 1 documents on September 26, 1995. U.S. EPA and SCDHEC comments on the Revision.1 documents were received on November 21, 1995, and October 30, 1995, respectively. SRS submitted the Revision.1.1 RFI/RI and Baseline Risk Assessment Reports on January 31, 1996. The U.S. EPA and SCDHEC approved the Revision.1.1 Baseline Risk Assessment Report on March 4, and March 7, 1996, respectively. U.S. EPA approved the Revision.1.1 RFI/RI Report on March 4, 1996; however, SCDHEC provided comments on the Revision.1.1 document on March 7, 1996. SRS submitted the Revision.1.2 RFI/RI Report on May 7, 1996. U.S. EPA and SCDHEC approved the Revision.1.2 document on June 17 and May 30, 1996, respectively.

SRS submitted the Revision.0 CMS/FS to U.S. EPA and SCDHEC on February 23, 1996. U.S. EPA and SCDHEC provided comments on the document on May 7, and April 26, 1996, respectively. SRS addressed the comments and submitted the Revision.1 CMS/FS to U.S. EPA and SCDHEC on June 21, 1996. U.S. EPA approved the document on July 12, 1996. SCDHEC provided comments on the document on July 23, 1996. SRS addressed the comments and submitted a Revision.1.1 document on August 21, 1996, which SCDHEC approved on August 30, 1996.

SRS submitted the Revision.0 Proposed Plan to U.S. EPA and SCDHEC on March 15, 1996. U.S. EPA and SCDHEC provided comments on the Revision.0 Proposed Plan on May 13 and May 3, 1996, respectively. SRS addressed the comments and submitted the Revision.1 Proposed Plan on June 21, 1996. U.S. EPA approved the document on July 12, 1996. SCDHEC provided comments on the document on July 23, 1996. The subsequent document, the Statement of Basis/Proposed Plan, was approved by U.S. EPA and SCDHEC on September 3, 1996, and August 29, 1996, respectively.

The Statement of Basis/Proposed Plan was issued for a 45-day public comment period that initiated on September 17, 1996, and ended on October 31, 1996. A public meeting

was held on October 15, 1996, during which a presentation of the recommended option for the Silverton Road Waste Site was given.

SRS prepared the Revision.0 Record of Decision (ROD), containing the responsiveness summary, and submitted it to U.S. EPA and SCDHEC on November 13, 1996. U.S. EPA and SCDHEC provided comments on January 14 and January 7, 1997, respectively. SRS addressed the comments and submitted a Revision.1 ROD to U.S. EPA and SCDHEC on February 6, 1997. U.S. EPA and SCDHEC notified SRS that they approved the ROD for signing by their agencies on February 25 and 21, 1997, respectively. The DOE-signed Record of Decision was submitted to U.S. EPA and SCDHEC on February 26, 1997. U.S. EPA signed the ROD on March 27, 1997. SCDHEC, after issuing the Final RCRA Permit Modification for a 15-day appeal, signed the ROD on April 22, 1997, which was issued on April 22, 1997.

SRS prepared the Post-ROD document, Corrective Measures Implementation/Remedial Action Report, which identified the proposed locations for new background wells and monitoring requirements. The Revision.0 Report was submitted to U.S. EPA and SCDHEC on August 15, 1997. Comments were received from U.S. EPA on October 6, 1997, and from SCDHEC on November 20, 1997.

Activities Accomplished in Fiscal Year 1998

U.S. EPA and SCDHEC comments on the Revision.0 Corrective Measures Implementation/Remedial Action Report were received on October 13 and November 21, 1997, respectively. The subsequent document, Revision.1 Final Remediation Report, was submitted on January 19, 1998. U.S. EPA approval of the Revision.1 document was received on February 19, 1998. SCDHEC comments on the Revision.1 document were received on February 18, 1998. The Revision.1.1 Final Remediation Report was submitted on March 23, 1998. U.S. EPA and SCDHEC approved the Revision.1.1 document on April 20 and April 16, 1998, respectively.

As required in the approved Final Remediation Report, SRS installed signs and three new background wells.

SRS notified U.S. EPA and SCDHEC of the Remedial Action Start on July 7, 1998.

Activities Planned for Fiscal Year 1999

Sampling of the three newly installed background wells, in addition to continued sampling of the seven existing wells, will begin in First Quarter Fiscal Year 1999. The wells will be monitored on a semi-annual basis.

SAVANNAH RIVER FLOODPLAIN SWAMP WATERSHED OPERABLE UNIT 8

New TNX Seepage Basin, 904-102G

The TNX Area Operable Unit of the Savannah River Floodplain Swamp Watershed consists of four waste units. These are the New TNX Seepage Basin (904-102G); TNX Burying Ground (643-5G); Old TNX Seepage Basin (904-076G), and TNX Groundwater (082-G), which is the groundwater beneath the units. The TNX Area Operable Unit is listed as one entry in the FFA Appendix C, RCRA/CERCLA Units List.

Description

The New TNX Seepage Basin (904-102G),part of the TNX-Area Operable Unit is located across River Road from the TNX process area, about 2,000-feet east of the Savannah River.

The basin consists of two sections: seepage (roughly 60-feet by 250-feet) and inlet (about 50- feet by 75-feet), with a total volume of approximately 1-million gallons. Basin overflow is discharged to a low-lying area adjacent to the basin. The basin was placed in service in 1980 and received process waste flows from pilot-scale simulations conducted at TNX in support of the Defense Waste Processing Facility and Separations Areas. Batch discharges of process water were neutralized for pH prior to release to the basin. There are no records of hazardous wastes or hazardous constituents disposed at the basin. Service was terminated in 1988, at which time influent to the basin was rerouted to the TNX Effluent Treatment Facility.

In 1985, basin sediments were sampled and analyzed. Barium and lead, identified as constituents, were detected below background levels. In 1986, the process waste flow was analyzed and no hazardous constituents were detected. In 1990, the basin surface water was analyzed; the primary constituents detected were inorganics and metals. Results from basin soil samples indicate that, by Toxicity Characteristic Leaching Procedure (TCLP) protocols, none of the constituents present in the basin are hazardous. In response to regulator comments on the Revision.0 RFI/RI/BRA Report, expanded characterization was performed at this waste site during February and March 1998.

The Redline Revision 1.1 RFI/RI/BRA Report, which was submitted to the regulators in August 1998, identified 5 human health constituents of concern (COCs) (barium, manganese, nickel, radium-226 and uranium 238) for soils; one human health COC (radium-226) for sediments; eight ecological COCs (arsenic, chromium, copper, lead, mercury, nickel, silver and zinc) for sediments, and 11 ecological COCs (aluminum, barium, boron, copper, lead, manganese, mercury, nickel, silver, vanadium and zinc) for surface water at this unit.

Groundwater monitoring of the new TNX Seepage Basin is performed by the YSB series of wells as part of the TNX Area Groundwater monitoring effort.

Activities Accomplished Prior to Fiscal Year 1998

SRS performed the RFI/RI characterization. The data from this characterization was used

to prepare the Revision.0 RFI/RI and Baseline Risk Assessment Report that was submitted to the U.S. EPA and SCDHEC on June 11, 1997.

The SRS initiated preparation of the Revision.0 CMS/FS/SB/PP and Draft ROD.

Activities Accomplished in Fiscal Year 1998
The SRS addressed regulator comments on the RFI/RI/BRA Report and submitted the Redline Revision 1.0 and Redline Revision 1.1 in November 1997 and August 1998, respectively.

The SRS performed an expanded characterization at the New TNX Seepage Basin in response to a regulatory comment on the Revision.0 RFI/RI/BRA Report. Field sampling was performed at this waste site during February and March 1998.

The SRS prepared and submitted the Combined Revision.0 CMS/FS/Statement of Basis/Proposed Plan and Draft Record of Decision, which was due to the U.S. EPA and SCDHEC July 7, 1998.

The SRS Submitted the Redline Revision.1 RFI/RI/BRA Report to U.S. EPA/SCDHEC on May 6, 1998. Comments on the document were received from the SCDHEC on July 8, 1998 and U.S. EPA on July 20, 1998, respectively. The Redline Revision 1.1 RFI/RI/BRA Report was submitted to the U.S. EPA/SCDHEC on August 20, 1998.

Activities Planned for Fiscal Year 1999
SRS will prepare and submit the Redline Revision 1.2 RFI/RI/BRA Report. SRS will prepare and submit the Combined Revision.1 CMS/FS/SB/PP. There will be a Public notification and comment period on the SB/PP (January 7, 1999, through March 6, 1999). SRS will prepare and submit the Revision.0 ROD (due to the U.S. EPA/SCDHEC March 20, 1999). SRS will prepare and submit (June 3, 1999) the Revision.1 Record of Decision (ROD). SRS will develop and submit the combined Revision.0 CMR/RDR/RA Work Plan (due to U.S. EPA/SCDHEC August 27, 1999).

SAVANNAH RIVER FLOODPLAIN SWAMP WATERSHED OPERABLE UNIT 8

Old TNX Seepage Basin, 904-076G (Part of T N X Operable Unit)

Operable Unit 8 of the Savannah River Floodplain Swamp Watershed consists of four units: TNX Burying Ground (643-5G), Old TNX Seepage Basin (904-076G); TNX Groundwater (082-G); and New TNX Seepage Basin (904-102G). These units are listed as one entry in FFA Appendix C, RCRA/CERCLA Units List.

Description
The Old TNX Seepage Basin (904-076G) was a liquid waste disposal basin associated

with the TNX pilot-scale test facility situated in the southwestern portion of the SRS.

The basin was constructed in two parts: a settling section and a larger main section. The two collective sections are approximately one-fourth acre in size. The sections are rectangular in shape and have surface areas of 880 and 9,375 square feet. Each section is approximately 10-feet deep. The walls slope outward at a 56-degree angle. The basin was operated from 1958 to 1980. During the 22-year operating period, overflow from the basin resulted in the creation of an outfall delta approximately 100-feet wide inside the eastern side of the Savannah River Swamp. The Old TNX Seepage Basin received a number of chemicals including inorganic salts, low-level radionuclides, and organic solvents. Except for mercury, the exact quantities of waste involved is unknown.

In 1981, the west wall of the basin was breached to drain the impounded liquids to the nearby swamplands, and the basin was backfilled with sand and clay and then capped with clay. A portion of the cap was revegetated, and the remainder was covered with asphalt.

In 1982, seven monitoring wells were installed at the basin. Analytical results on groundwater, soil, and soil-gas samples collected from the basin indicate evidence of organic, inorganic, and low-level radioactive contamination. The RFI/RI and Baseline Risk Assessment Report performed in 1997 indicates no human health or ecological constituents of concern (COCs) were found at the Old TNX Seepage Basin. However, at the outfall delta, nine human health COCs were identified. Only mercury, a COC for the earthworm receptor, is retained as a final ecological COC in surface soils in the outfall delta.

Activities Accomplished Prior to Fiscal Year 1998

SRS completed the RFI/RI characterization. The data from this characterization was used to prepare the Revision.0 RFI/RI and Baseline Risk Assessment Report that was submitted to U.S. EPA and SCDHEC on June 11, 1997.

SRS initiated preparation of the Revision.0 CMS/FS/Statement of Basis/Proposed Plan and Draft Record of Decision (SB/PP/DR/ROD) that is due to U.S. EPA and SCDHEC in Fiscal Year 1998.

Activities Accomplished in Fiscal Year 1998

The SRS addressed regulator comments on the RFI/RI/BRA Report, and submitted the Redline Revision.1.0 and Redline Revision.1.1 in November 1997, and August 1998, respectively.

SRS prepared and submitted the Combined Revision.0 CMS/FS/Statement of Basis/Proposed Plan and Draft Record of Decision, which was due to the U.S. EPA and SCDHEC July 7, 1998.

SRS submitted the Redline Revision.1 RFI/RI/BRA Report to the U.S. EPA and SCDHEC on May 6, 1998. Comments on the document were received from the SCDHEC on July 8, 1998 and the U.S. EPA on July 20, 1998, respectively. The Redline Revision.1.1 RFI/RI/BRA Report was submitted to the U.S. EPA and SCDHEC on August 20, 1998.

Activities Planned for Fiscal Year 1999

SRS will prepare and submit the Redline Revision.1.2 RFI/RI/BRA Report. SRS will prepare and submit the Combined Revision.1 CMS/FS/SB/PP. There will be a public notification and comment period on the SB/PP (January 7, 1999, through March 6, 1999). SRS will prepare and submit the Revision.0 ROD (due to the U.S. EPA/SCDHEC on March 20, 1999). SRS will prepare and submit the Revision.1 ROD. SRS will develop and submit the combined Revision.0 CMR/RDR/RA Work Plan (due to the U.S. EPA/SCDHEC on September 27, 1999).

SAVANNAH RIVER FLOODPLAIN SWAMP WATERSHED OPERABLE UNIT 8

TNX Burying Ground, 643-5G

Operable Unit 8 of the Savannah River Floodplain Swamp Watershed consists of four units: the TNX Burying Ground (643-5G), Old TNX Seepage Basin (904-076G); TNX Groundwater (082-G); and New TNX Seepage Basin (904-102G). These units are listed as one entry in FFA Appendix C, RCRA/CERCLA Units List.

Description

The TNX Burying Ground (643-5G) is located in the TNX Area within the TNX facility fence. In 1953, an experimental evaporator containing approximately 1300 pounds of uranyl nitrate exploded. The material contaminated as a result of the explosion was buried in four trenches at 6- to 8-feet below land surface. The contaminated material included structural steel, tin, timber, drums, and rags. The waste trenches were rediscovered in 1980 during construction of buildings. Most of the contaminated material was removed in 1982 and 1983. Five areas of known contamination and one suspect area remain. These areas are under buildings or in locations where use of excavation equipment is restricted. An estimated 60 pounds of uranyl nitrate remains in these un-excavated areas.

In August 1996, three metal drums were discovered in an area adjacent to the TNX Burying Ground. This was referred to as the New Suspect Area. One drum contained job control wastes such as incandescent light bulbs, lead strips, adsorbent material, sample vials, and rubber gloves. The other drums contained soil-like materials. Radionuclides and metals were detected in each drum. The drums and adjacent soils were removed and transferred to the Waste Management Operations Department of Westinghouse Savannah River Company. Consequently, they no longer represent primary sources at this exposure unit. Eight monitoring wells (TBG Series) were installed at the TNX Burying Ground

from 1988 to 1989. The results of the analyses are reported in the SRS Annual Environmental Report.

Activities Accomplished Prior to Fiscal Year 1998
The SRS completed the RFI/RI characterization. The data from this characterization was used to prepare the Revision.0 RFI/RI /RI/BRA Report that was submitted to U.S. EPA and SCDHEC on June 11, 1997.

Activities Accomplished in Fiscal Year 1998
SRS addressed regulator comments on the RFI/RI/BRA Report and submitted the Redline Revision.1.0 and Redline Revision.1.1 in November 1997 and August 1998, respectively.

SRS prepared and submitted the Combined Revision.0 CMS/FS/Statement of Basis/Proposed Plan and Draft Record of Decision, which was due to the U.S. EPA and SCDHEC on July 7, 1998.

SRS submitted the Redline Revision.1 RFI/RI/BRA Report to the U.S. EPA/SCDHEC on May 6, 1998. Comments on the document were received from the SCDHEC on July 8, 1998, and U.S. EPA on July 20, 1998, respectively. The Redline Revision .1.1 RFI/RI/BRA Report was submitted to U.S. EPA/SCDHEC on August 20, 1998.

Activities Planned for Fiscal Year 1999
SRS will prepare and submit the Redline Revision 1.2 RFI/RI/BRA Report. SRS will prepare and submit the Combined Revision.1 CMS/FS/SB/PP. There will be a Public notification and comment period on the SB/PP (January 1 to March 6, 1999). SRS will prepare and submit the Revision.0 ROD (due to the U.S. EPA/SCDHEC March 20, 1999). SRS will prepare and submit (June 6, 1999) the Revision.1 ROD. SRS will develop and submit the combined Revision.0 CMR/RDR/RA Work Plan, which is due to the U.S. EPA/SCDHEC in September 1999.

SAVANNAH RIVER FLOODPLAIN SWAMP WATERSHED OPERABLE UNIT 8

TNX Groundwater, 082-G

Operable Unit 8 of the Savannah River Floodplain Swamp Watershed consists of four units: the TNX Burying Ground (643-5G); Old TNX Seepage Basin (904-076G); TNX Groundwater (082-G); and New TNX Seepage Basin (904-102G). These units are listed as one entry on FFA Appendix C, RCRA/CERCLA Units List.

Description
Groundwater contamination in the TNX Area includes chlorinated volatile organic compounds (VOCs), nitrate, mercury, and gross alpha. These constituents exceed the Primary Drinking Water Standards (DWS). In September 1990, trichloroethylene (TCE)

was detected in the groundwater at 4,800 parts per billion (or approximately 1000 times the maximum contaminant level (MCL)). VOCs are the most widespread and fastest migrating groundwater constituents in the TNX Area. Mercury and gross alpha are elevated in one well out of 50 located in the TNX Area and do not appear to be migrating at this time. TCE has been detected at the seep line in the Savannah River Swamp where the groundwater plume outcrops. However, no constituents from the plume have been detected in the Savannah River or any offsite groundwater. Currently no offsite risk is present from the groundwater contamination; however, an unacceptable risk to a theoretical onsite groundwater user has been documented in an interim risk evaluation.

A public meeting was held October 13, 1994, in Aiken, South Carolina, to address comments or concerns on the TNX Area Groundwater Interim Action Proposed Plan that had been issued for public comment. There were no comments or concerns from this meeting on the TNX project. The TNX Interim Action Record of Decision was signed by DOE October 31, 1994, by U.S. EPA on November 10, 1994, and by SCDHEC on November 16, 1994. The TNX Interim Action Record of Decision stipulated that a Hybrid Groundwater Corrective Action (HGCA) system be installed as the preferred interim remedial alternative. This alternative provided for an interim groundwater remedial action consistent with any potential future clean-up actions in the TNX Area and the goals of the National Contingency Plan for releases of hazardous substances into the environment. The HGCA system is comprised of two components: 1) traditional pump and treat technology to treat and inhibit further migration of the 500 parts per billion dissolved VOC plume and 2) an innovative in situ technology, airlift recirculation well, located at the heart of the plume to expedite remediation.

Based on testing performed in late Fiscal Year 1996, it was determined that the recirculation well was not effective in removing contaminants at this location due to unit specific conditions. Consequently, it was decided to discontinue further operation of the recirculation well at TNX. Furthermore, it was determined that the pump and treat system would adequately meet the remedial objectives of the Interim Record of Decision. Currently the pump and treat is operating at a rate of 70 gallons per minute.

Other technological approaches are being considered or evaluated in the event that the interim remedial action does not suffice for a final remedy. These approaches include the GeoSiphon cell pilot study and the soil-vapor extraction investigation.

Pursuant to a successful laboratory study that investigated the applicability of zero valent iron degradation of chlorinated volatile organic compounds (CVOCs) in the TNX Area groundwater, a field trial of a GeoSiphon Cell is being pursued in the TNX Area flood plain. GeoSiphon Cell is essentially a large diameter well containing granular cast iron, which reduce the CVOCs in the groundwater to ethane, methane, and chloride ions. The flow of groundwater through the treatment cell will be passively induced by the natural hydraulic head difference between the cell and the Savannah River, where the treated

groundwater will ultimately be discharged.

Soil-vapor extraction (SVE) has been recognized by the U.S. EPA in its Superfund Accelerated Cleanup Model as a presumptive remedy for remediation of sediments contaminated with CVOCs. Soil-vapor analysis at TNX showed that CVOCs are present in the soil at concentrations up to 55 parts per million. The residual CVOCs will continue to be a source of groundwater contamination as long as they are present in the subsurface. A pilot-study has been proposed to evaluate the applicability of soil-vapor extraction at TNX utilizing the existing infrastructure. Removal of residual contaminants from the unsaturated zone would significantly reduce the operating time frame of the air stripping system.

Activities Accomplished Prior to Fiscal Year 1998
An Interim Action Record of Decision was approved in November 1994.

Interim action operation began on September 16, 1996.

An Explanation of Significant Differences was issued on September 22, 1997, to remove the recirculation well component of the Interim Remedial Action.

The Assessment of Intrinsic Remediation, performed in partnership with the USGS, in the floodplain area of TNX was initiated in Fiscal Year 1996.

The Permeable Wall Passive Groundwater Remediation Study led to installation of the first GeoSiphon Cell in July 1997.

SRS performed a test to verify the viability of Soil Vapor Extraction (SVE) at the TNX Operable Unit in June 1997.

SRS completed the RFI/RI characterization. The data from this characterization was used to prepare the Revision.0 RFI/RI /BRA Report, which was submitted to the U.S. EPA and SCDHEC on June 11, 1997.

SRS initiated preparation of the Revision.0 CMS/FS/SB/PP and Draft ROD.

Activities Accomplished in Fiscal Year 1998
SRS addressed regulator comments on the RFI/RI/BRA Report and submitted the Redline Revision. 1.0 and Redline Revision.1.1 in November 1997 and August 1998, respectively.

SRS prepared and submitted the Combined Revision.0 CMS/FS/Statement of Basis/Proposed Plan and Draft Record of Decision, which was due to U.S. EPA and SCDHEC on July 7, 1998.

Submitted the Redline Revision.1 RFI/RI/BRA Report to U.S. EPA and SCDHEC on May 6, 1998. Comments on the document were received from SCDHEC on July 8, 1998, and U.S. EPA on July 20, 1998, respectively. The Redline Revision.1.1 RFI/RI/BRA Report was submitted to U.S. EPA and SCDHEC on August 20, 1998.

Completed phase I testing of the GeoSiphon Cell on December 16, 1997. Test results indicated that the cell is capable of treating TNX flood plain groundwater with TCE concentrations greater than 200 parts per billion at a rate of 8 gallons per minute.

Phase II testing of the GeoSiphon Cell began June 18, 1998. Based on encouraging results of the initial cell, installation of a second GeoSiphon Cell (TGSC-2) was completed September 24, 1998.

Continued operation of the T-1 Air Stripper System (interim remedial action). Through the end of September, a total of 53-million gallons of groundwater had been treated and 48 pounds of solvent removed.

Continued groundwater monitoring in accordance with the effectiveness monitoring strategy for the interim remedial action. The 1997 Comprehensive and Effectiveness Monitoring Strategy Report was submitted May 15, 1998, and the Data Only Report was submitted on September 30.

Activities Planned for Fiscal Year 1999

SRS will prepare and submit the Redline Revision 1.2 RFI/RI/BRA Report. SRS will prepare and submit the Combined Revision.1 CMS/FS/SB/PP. There will be a Public notification and comment period on the SB/PP (January 7, 1999, to March 6, 1999). SRS will prepare and submit the Revision.0 ROD (due to U.S. EPA/SCDHEC March 20, 1999). SRS will prepare and submit (June 3, 1999) the Revision.1 ROD. SRS will develop, prepare, and submit the combined Revision.0 CMR/RDR/RA Work Plan (due to U.S. EPA/SCDHEC on September 27, 1999).

Groundwater monitoring will continue in accordance with the effectiveness monitoring strategy for the interim remedial action. The 1998 Comprehensive Groundwater and Effectiveness Monitoring Report is due May 15, 1999. The Data Only report is due September 30, 1999.

Phase II testing of the first GeoSiphon Cell (TGSC-1) will be completed December 21, 1998. Dual cell testing involving TGSC-1 and the newly installed TGSC will occur between January and June of 1999.

A multi-well soil vapor extraction (SVE) test is planned from December 18, 1998, to March 29, 1999.

SAVANNAH RIVER FLOODPLAIN SWAMP WATERSHED OPERABLE UNIT 9

TNX Outfall Delta, Lower Discharge Gully and Swamp, NBN

Operable Unit 9 of the Savannah River Floodplain Swamp Watershed consists of one unit: the TNX Outfall Delta, Lower Discharge Gully and Swamp. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
The TNX Area Operable Unit consists of three surface waste units and the underlying groundwater. The surface waste units are the Old TNX Seepage Basin, the New TNX Seepage Basin, and the TNX Burying Ground.

The Old TNX Seepage Basin was a liquid-waste disposal area associated with the TNX pilot-scale test facility located on the west side of the Savannah River Site. The basin would overflow periodically, and the liquids would flow down the hill to the west and discharge into the Savannah River swamp. The swamp is a heavily wooded lowland located between the TNX facility and the Savannah River. The basin was operational from 1958 until 1980 and was closed in 1981. During the closure, the west wall of the basin was breached and the remaining liquids were discharged into the swamp, forming an outfall delta. The list of process chemicals disposed in the basin includes various inorganic salts, low-level radionuclides, and organic solvents. The exact quantities of disposed waste are not documented. Characterization data for the basin, including soil borings and monitoring wells, is considered adequate. The results of the outfall delta investigations indicate the presence of inorganic and low-level radioactive contamination; however, the extent of contamination has not been determined at this time.

The New TNX Seepage Basin is an unlined earthen basin that received wastewater generated by the TNX Facility. The basin consists of two sections: the inlet which is approximately 50- feet by 75-feet, and the seepage basin, which is approximately 60 feet by 250 feet. The total volume of these two sections is approximately one-million gallons. Beginning in 1980, the basin went into operation and received process waste flows from pilot scale simulations conducted at the TNX Facility in support of the Defense Waste Processing Facility and the Separations Area. The non-hazardous wastewater consisted primarily of simulated, nonradioactive material along with other wastes such as laboratory sink discharges. Prior to 1983, the basin also received simulated, nonradioactive salt supernatant. In August 1988, the basin was removed from operation, at which time the process flows from the TNX Facility were routed to the TNX Effluent Treatment Facility. Constituents detected in the basin soils include barium (133 mg/kg), sodium (18,300 mg/kg), and nitrate (2.9 mg/kg).

The TNX Burying Ground (643-5T) received contaminated material (conduit, structural

steel, tin, timber, drums, rags, etc.) from a 1953 explosion of an experimental evaporator containing uranyl nitrate. Most of the waste was excavated from 1982 to 1983. Five known areas and one suspect area of contamination remain. These areas contain an estimated 29-kilograms of uranyl nitrate.

A proposal has been made to separate the TNX Lower Discharge Gully, Outfall Delta and Swamp into a new operable unit with an implementation schedule decoupled from the original TNX Area Operable Unit. This action is necessary because collection of data from the expanded sampling grid at the Outfall Delta and Inner Swamp cannot occur in time for these data to be incorporated into the RFI/RI/BRA under the original TNX Area Operable Unit implementation schedule.

Activities Accomplished Prior to Fiscal Year 1998
The regulators approved the RFI/RI Work Plan (Revision 1.2) on January 26, 1996, and field characterization activities began in January 1996. As a result of the discovery of three buried drums in the vicinity of the TNX Burying Ground on July 11, 1996, during foundation excavation activities for a construction project, a decision was made to characterize this new suspect area as well. Consequently, the RFI/RI Work Plan was revised, and approval was received from the regulators (Rev. 1.3) on September 12, 1996. Field characterization sampling activities, including the characterization of the expanded footprint of the TNX Burying Ground, were completed on September 26, 1996. Results of the phase II characterization indicated that the extension of contamination at the Old TNX Seepage Basin Outfall Delta was not established. Consequently, the work plan was revised once again to address the expanded characterization at the Outfall Delta and at the New TNX Seepage Basin (in response to a regulator comment on the Rev. 0 RFI/RI/BRA report).

Activities Accomplished in Fiscal Year 1998
The RFI/RI work plan addendum for expanded characterization of the outfall delta was approved.

Due to delays caused by persistently wet conditions, expanded characterization sampling activities at the outfall delta were initiated July 15, 1998. Based on radiological screening results, it became apparent that the initial expanded sampling grid failed to delineate the extent of contamination.

Activities Planned for Fiscal Year 1999
Complete field sampling, data analysis and validation.

Prepare the Combined Revision.0 RFI/RI/BRA/CMS/FS/SB/PP and Draft Record of Decision, which is due to the regulators on October 18, 1999.

SAVANNAH RIVER FLOODPLAIN SWAMP WATERSHED OPERABLE UNIT 10

X-001 Outfall Drainage Ditch, NBN

Operable Unit 10 of the Savannah River Floodplain Swamp Watershed consists of one unit: the X-001 Outfall Drainage Ditch. This unit is listed on the FFA Appendix C, RCRA/CERCLA Units List.

Description
The X-001 Outfall Drainage Ditch is located in the southeast portion of TNX Area, running east from Building 677-G to the X-001 Outfall. An area 10-feet by 4-feet in the X-001 Drainage Ditch was contaminated with uranium, thorium, and decay products from a drainage line emanating from Building. 677-T Cross Flow Pit some time before May 1995. The concrete pit was decontaminated in May/June 1995 and returned to clean area standards. Both ends of the line were plugged at that time. The top two feet of surface soil was removed in an unsuccessful attempt to clean up the area. Radiological survey readings of up to 25,000 dpm/cm^2 were encountered at the two-foot level, and all cleanup efforts were terminated and the excavation was backfilled with clean soil. This normally dry outfall carries stormwater runoff primarily from the technical and chemical storage areas to the Savannah River Swamp.

Activities Accomplished Prior to Fiscal Year 1998
None

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

STATUS OF STEEL CREEK WATERSHED OPERABLE UNITS

STEEL CREEK WATERSHED OPERABLE UNIT 1

L Lake, NBN

Operable Unit 1 of the Steel Creek Watershed consists of one unit: the L-Lake. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The L- Lake was constructed in 1985 to receive the heated discharge water generated by operation of the L-Area Reactor. The lake functioned as a cooling reservoir. It is situated south of SRS Road B near L-Reactor. L-Lake covers approximately 1,000 acres and was formed by damming Steel Creek. The discharge water from the Disassembly Basin and

the Cooling Water System was contaminated by cesium-137. Approximately 283 curies of cesium-137 were discharged over the period of reactor operations. Additional studies are planned before remediation of L-Lake is begun.

Activities Accomplished Prior to Fiscal Year 1998
No Action prior to Fiscal Year 1998.

Activities Accomplished in Fiscal Year 1998
An evaluation was performed on the impact of reactor shutdown of the River Water System on the CERCLA waste unit (L-Lake). Funding was deleted due to other compliance scopes in Fiscal Year 1998 that required funding.

Activities Planned for Fiscal Year 1999
No document revisions are due to U.S. EPA/SCDHEC until 2001.

STEEL CREEK WATERSHED OPERABLE UNIT 2

L-Area Hot Shop, 717-G

Operable Unit 2 of the Steel Creek Watershed consists of one unit: the L-Area Hot Shop. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
The L-Area Hot Shop (717-G) is one of three interconnected buildings that was used to repair equipment from the reactor areas. The other two buildings are 712-G and the 707-G. These buildings were constructed in the 1960s. They were last used in 1983, and maintenance work has been minimal since that time. These buildings were used extensively during the L-Area Restart Program to repair equipment. Identifying 712-G as a building is a misnomer; it is really a concrete pad with two concrete walls and large steel doors at either end. Equipment was brought to the outside door of the pad and suspended from a monorail; it was then moved along the pad via the monorail to a wash area where it was hosed down and decontaminated. The equipment was then carried along the monorail and passed through the second set of doors into Building 717-G, where it was repaired. Repaired equipment included welding tables, a lathe, a mill, a radial drill, a drill press, a grinder, a hack saw, a sink, and a tool storage area.

The third building, 707-G, was a "clean" administration area, with offices, a lunch room, a change room, and a lavatory. This facility was dismantled under the Decommissioning & Decontamination Program.

There are two drain lines located in the concrete pad/decontamination area; they join to discharge into the L-Area Oil/Chemical Basin.

The L-Area Hot Shop was originally listed in FFA Appendix G, Site Evaluation List. A Site Evaluation Report was prepared, which recommended that the unit should be included in the Appendix C, RCRA/CERCLA Units List,. U.S. EPA and SCDHEC received the report on September 19, 1991. U.S. EPA and SCDHEC concurred with the report's recommendation on June 19, 1992, and January 28, 1993, respectively. Prior to its inclusion on Appendix C, an engineering survey conducted in September 1993 raised serious concerns regarding the buildings' structural integrity. Because the buildings had been declared "excess," it was more cost-effective to demolish the buildings than to stabilize them. A characterization of the buildings was required before demolition to ensure proper disposal.

Health protection radiation surveys were performed in November and December 1993. This inspection included surveys for alpha, beta-gamma, beta-gamma dose rate, and an alpha and beta-gamma scaler. The results indicated that the average general area dose rate was within the range defined as not requiring protective clothing. The survey for transferable contamination for both alpha and beta-gamma radiation for all scans was below detection. However, the survey did reflect various elevated levels of beta-gamma radioactivity permanently embedded in the concrete floor.

Activities Accomplished Prior to Fiscal Year 1998
The three buildings (717-G, 712-G, 707-G) were demolished as an operation and maintenance activity from June to September 1993. The debris was properly disposed in accordance with SRS procedures. The concrete pads were sealed to fix the contamination.

In 1996, soil-gas surveys were performed at the L-Area Hot Shop Unit.

SRS prepared and submitted the Revision.0 RFI/RI Work Plan for the L-Area Hot Shop to U.S. EPA and SCDHEC, which they received on April 4, 1996. The field start for this unit is in Fiscal Year 2004. According to the 1997 FFA Appendix E, SRS attempted to accelerate and move the field start to Fiscal Year 1996 to expedite the final remediation of the unit. SCDHEC and U.S. EPA comments were received on the Revision.0 Work Plan on July 19, 1996, and September 4, 1996, respectively. Due to the nature of these comments, it was decided that the field start for the L-Area Hot Shop would not be accelerated in Fiscal Year 1996. It was decided by the three Parties to resubmit a Revision.0 RFI/RI Work Plan.

Activities Accomplished in Fiscal Year 1998
Preparation of the Revision.0 RFI/RI Work Plan began on September 30, 1998.

Activities Planned for Fiscal Year 1999
SRS will prepare the Revision.0 RFI/RI Work Plan and submit it to the regulators on September 30, 1999.

STEEL CREEK WATERSHED OPERABLE UNIT 3

L-Area Rubble Pit, 131-1L

Operable Unit 3 of the Steel Creek Watershed consists of one unit: the L-Area Rubble Pit (131-1L). This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The L-Area Rubble Pit (131-1L) is located 150-feet east of the inactive L-Area Reactor in the central region of the SRS.

The L-Area Rubble Pit is approximately 150-feet long by 40-feet wide. The depth of the pit is unknown although historically, the SRS practice was to use 10-feet deep disposal trenches. Exact dates of operation and specific materials disposed here are unknown although it is suspected to be some type of construction debris such as metal, lumber, poles, and concrete. It is unknown whether hazardous wastes are present at the site. The constituents of concern (COCs) based on preliminary soil-gas survey data are volatile organic compounds (VOCs).

Activities Accomplished Prior to Fiscal Year 1998
In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan that was received by U.S. EPA and SCDHEC on November 6, 1991.

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

STEEL CREEK WATERSHED OPERABLE UNIT 4

L-Area Northern Groundwater, NBN

Operable Unit 4 of the Steel Creek Watershed includes the groundwater beneath Northern L-Area. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
L-Reactor Area is located in the south-central portion of the Savannah River Site (SRS). Acceptable past disposal practices associated with historical reactor operations have produced waste units and potential units within the area. These areas may have contributed contamination to the area groundwater with operational waste materials. Groundwater characterization activities scheduled for the L-Area Northern Groundwater Unit will not duplicate previous or planned waste unit characterization activities in the

vicinity of the L-Area Northern Groundwater Operable Unit. The combined data will be used to develop an acceptable regulatory path forward for groundwater remediation, if warranted. The scope and rule of the L-Area Northern Groundwater Operable Unit is currently being defined.

Activities Accomplished Prior to Fiscal Year 1998
None

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

STEEL CREEK WATERSHED OPERABLE UNIT 5

L-Area Oil/Chemical Basin and L-Area Acid/Caustic Basin, 904-83G, -79G ,

Operable Unit 5 of the Steel Creek Watershed consists of two units: the L-Area Oil/Chemical Basin, and the L-Area Acid/Caustic Basin. This unit is listed as two separate entries in FFA Appendix C, RCRA/CERCLA Units List.

Description
L-Area Oil/Chemical Basin
The L-Area Oil and Chemical Basin (904-83G) is located in the southeastern portion of L Area, just outside L-Area perimeter fence.

The basin measures 118-feet long by 79-feet wide. It was designed and constructed as an unlined seepage basin for the purpose of disposing small volumes of wastes that were not appropriate for discharge to local streams, regular seepage basins, or the 200-Area waste management system. The basin was put in operation in 1961 and continued to receive waste liquids until 1979 even though the L Area was placed on standby status in 1967. Wastewater flowed into the basin from both a bermed concrete drainage pad that was located outside the basin perimeter fence and from an underground pipeline originating from Building 717-G (maintenance hot shop). Most of the waste liquids came from the reactor areas and possibly M Area and Separations Areas. The waste liquids consisted of small volumes of oil on top of wastewater and solvents. Undocumented amounts of radioactivity were released to the basin through infrequent repair work at the basin or in Building 717-G and via drums and tanker trucks.

Description
The L-Area Acid/Caustic Basin - The basin was integrated into the L-Area Oil and Chemical Basin Operable Unit. The L-Area Acid/Caustic Basin (904-79G) is located in an

open area about 900-feet southeast of L Reactor. The L-Area Acid/Caustic Basin is an unlined earthen basin 50-feet long by 50-feet wide by 7-feet deep. The basin operated between 1955 and 1968 and received wastes from the L-Area Water Treatment Plant.

The SRS Groundwater Monitoring Program data indicated elevated levels of halogenated hydrocarbons, radionuclides, and tritium. Based on a literature review, it was found that extraction procedure (EP) toxicity tests for metals were performed on soil and sediment samples within the basin. Analyses confirmed the presence of radionuclides and metals. Conducted in April 1990 and August 1992, a ground penetrating radar (GPR) study found two underground pipes suspected of extending from 717-G Building to the L-Area Oil and Chemical Basin.

Activities Accomplished Prior to Fiscal Year 1998

In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan that was submitted to U.S. EPA and SCDHEC on October 11, 1990. U.S. EPA comments on the Revision.0 RFI/RI Work Plan were received on April 19, 1991. The Revision.1 RFI/RI Work Plan was submitted to U.S. EPA on July 1, 1991. Comments were received from SCDHEC on the Revision.1 RFI/RI Work Plan on October 5, 1992. The Revision.2 RFI/RI Work Plan was submitted to U.S. EPA on February 4, 1993. Comments were received from SCDHEC on the Revision.1 RFI/RI Work Plan on April 19, 1993.

An addendum to the Revision.2 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on August 26, 1993. This addendum combined the L-Area Oil and Chemical Basin and Acid/Caustic Basin into one operable unit. (These units will be characterized and remediated together.)

The field characterization activities were completed in Fiscal Year 1996, and the Revision.0 RFI/RI and Baseline Risk Assessment Report was submitted, which U.S. EPA and SCDHEC received on June 30, 1995, for the L-Area Oil/Chemical Basin and Acid/Caustic Basin Units. A new chain link fence was installed around the L-Area Oil/Chemical Basin Unit.

SRS addressed U.S. EPA and SCDHEC comments received on the Revision.0 RFI/RI and Baseline Risk Assessment Report for the L-Area Oil/Chemical and Acid/Caustic Basins, revised the document and submitted a Revision.1 document to U.S. EPA and SCDHEC on February 27, 1996. SCDHEC and U.S. EPA approved the document on April 1 and April 5, 1996, respectively.

SRS prepared and submitted the Revision.0 CMS/FS for the L-Area Oil/Chemical and Acid/Caustic Basins on March 31, 1996. The U.S. EPA and SCDHEC submitted comments on September 4 and July 1, 1996, respectively.

SRS addressed the U.S. EPA and SCDHEC comments received in Fiscal Year 1996 on the Revision.0 CMS/FS. SRS submitted a Revision.1 document on November 3, 1996. U.S. EPA and SCDHEC provided comments on the document on January 24, 1997, and November 27, 1996, respectively. SRS addressed the comments and submitted a Revision.1.1 document to U.S. EPA and SCDHEC on February 24, 1997. U.S. EPA and SCDHEC approved the CMS/FS on March 7 and 26, 1997, respectively.

SRS prepared and submitted the Revision.0 Statement of Basis/Proposed Plan to U.S. EPA and SCDHEC on October 13, 1996. U.S. EPA and SCDHEC provided comments on January 24, 1997, and November 27, 1996, respectively. SRS addressed the comments and submitted a Revision.1 document on February 24, 1997. U.S. EPA approved the Statement of Basis/Proposed Plan on March 7 and April 1, 1997, respectively.

U.S. EPA, SCDHEC, and SRS issued the Statement of Basis/Proposed Plan for a 45-day public comment period from April 4 through May 18, 1997. On May 7, 1997, a public meeting was held to discuss the proposed remedial action and to receive public comments.

At the close of the public comment period, SRS prepared and submitted the Revision.0 Record of Decision (including the Responsiveness Summary) to U.S. EPA and SCDHEC on June 2, 1997. SCDHEC provided comments on the document on July 10, 1997. SRS addressed the comments and submitted a Revision.0 document. U.S. EPA provided comments on the document on August 18, 1997, which SRS addressed. The U.S. EPA and SCDHEC approved the Revision.1 document, which was received by U.S. EPA and SCDHEC on June 3, 1997. SCDHEC comments were received on July 10, 1997. U.S. EPA and SCDHEC received the Revision.1 Record of Decision on July 31, 1997. The comments received on August 18, 1997, from U.S. EPA required minor changes. The Revision.1 Record of Decision was revised and subsequently approved by U.S. EPA on September 15, 1997, and SCDHEC on August 22, 1997. The signed Record of Decision was received by U.S. EPA on September 3, 1997, signed on October 3, 1997, and forwarded to SCDHEC for signature. The remedial actions documented in this Record of Decision are "No Action" for the L-Area Acid/ Caustic Basin and "in situ stabilization and capping" for the L-Area Oil and Chemical Basin. The remedial action for the L-Area Oil and Chemical Basin Pipeline is "in-situ stabilization and disposal in the L-Area Oil and Chemical Basin."

Activities Accomplished in Fiscal Year 1998

SRS submitted the Revision 1 CM/RD Work Plan to U.S. EPA and SCDHEC on October 7, 1998. (U.S. EPA had earlier approved the Revision 0 document contingent upon resolution of the SCDHEC comments). SRS submitted the Revision 0 CMI/RDR/RAWP to U. S. EPA and SCDHEC on January 21, 1998. SRS received comments from SCDHEC on March 10, 1998, and U.S. EPA on March 26, 1998. SRS submitted the Redline Revision 1 CMI/RDR RAWP to U. S. EPA and SCDHEC on June 24, 1998, and received approval from U.S. EPA on July 15, 1998, and SCDHEC on July 27, 1998. The

remedial action start was achieved on August 31, 1998, two days ahead of the FFA milestone of September 2, 1998. Field activities completed during the fiscal year include the preparation of the L-Area Acid/Caustic Basin for the grouting demonstration and preparation of the LAOCB for basin sampling, which included vegetation removal and pushing the top of the berms and side slopes into the basin.

Activities Planned for Fiscal Year 1999
The remediation of the LAOCB is the major activity for Fiscal Year 1999. It will include the removal of pipe from the Hot Shop, pipe grouting, placement of vegetation and debris in the LAOCB, in situ grouting of waste, placement of the soil cover, and back-filling and grading of the LAOCB.

STEEL CREEK WATERSHED OPERABLE UNIT 6

L-Area Reactor Seepage Basin, 904-64G

Operable Unit 6 of the Steel Creek Watershed consists of one unit: the L-Area Reactor Seepage Basin. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The L-Reactor Seepage Basin (LRSB) (904-6G) is an unlined, L-shaped, earthen basin located in the south-central part of the Savannah River Site (SRS) and outside the perimeter fence south of L-Reactor. Basin dimensions are about 200 feet on each side of the L-shape, 36 feet in width, and 7 feet in depth.

In 1958 SRS began using the earthen LRSB to dispose of low-level radioactive purge water from the L-Reactor Disassembly Basin. The disassembly basin was used to store irradiated reactor fuel and target rods prior to their shipment to the Separations Area. Purge water was necessary to keep tritium concentrations in the disassembly basin at levels that ensured safe working conditions. The LRSB received purge water between 1958 and 1968 and between 1985 and 1988 when L-Reactor was placed on warm standby. There was no activity in the basin from 1968 to 1985. In 1993, L-Reactor was placed in shutdown status and has not been restarted. During the period from 1985 to 1988, mixed-bed deionizers and sand filters intercepted the purge water before discharge into the LRSB.

Activities Accomplished Prior to Fiscal Year 1998
None

Activities Accomplished in Fiscal Year 1998
Pre-work plan characterization began in June 1998 with samples collected from around the basin and sample analysis being conducted.

Activities Planned for Fiscal Year 1999
Completion of analyses of samples collected in Fiscal Year 1998. It is planned to complete the pre-work plan characterization started in Fiscal Year 1998. Preparation and submittal of the work plan with the Plug-In Decision Document on September 30, 1999.

STEEL CREEK WATERSHED OPERABLE UNIT 7

L-Area Southern Groundwater, NBN

Operable Unit 7 of the Steel Creek Watershed includes the groundwater beneath Southern L-Area. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
L-Reactor Area is located in the south-central portion of the Savannah River Site (SRS). Acceptable past disposal practices associated with historical reactor operations have produced waste units within the area. These waste units have contaminated the area groundwater with operational wastes. The L-Area Southern Groundwater Operable Unit consists of groundwater impacted by the following waste units: Reactor Seepage Basin, Oil and Chemical Basin, Acid Caustic Basin and Hot Shop.

Activities Accomplished Prior to Fiscal Year 1998
None

Activities Accomplished in Fiscal Year 1998
Commencement of the Pre-Work Plan preparation to allow for the task order award in the first quarter of Fiscal Year 1999 for Work Plan development.

Activities Planned for Fiscal Year 1999
Pre-work plan preparation will be completed. The contract for the work plan preparation will be awarded and the work plan will be developed and submitted to regulators.

STEEL CREEK WATERSHED OPERABLE UNIT 8

P-Area Burning/Rubble Pit, 131- P

Operable Unit 8 of the Steel Creek Watershed consists of one unit: the P-Area Burning/Rubble Pit. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
The P-Area Burning/Rubble Pit (131-P) is located 1/2 mile west of P Area and just south of Road F.

The 131-P Pit, which operated from 1951 to 1973, is approximately 210-feet long by 60-feet wide by 14-feet deep. During operation of the pit, spent organic materials of

unknown use and origin, oil rags, paper, plastics, wood, telephone poles, cardboard, oil, and rubber were disposed of and periodically (monthly) burned. In 1973, the burning of wastes ceased at SRS. A layer of soil was placed over the pit debris, and the site was then filled to capacity with rubble such as concrete, paper, tile, asphalt, wood, wallboard, rubber, and non-returnable empty drums. The pit reached capacity in 1978 and was closed and covered with soil to grade level.

Early groundwater monitoring near the pit identified low levels of chlorinated and organic solvents, iron, and manganese in the groundwater. Concurrently, a soil-gas survey showed chlorinated solvents in the area soil. Other soil constituents of concern (COCs) include silver, lead, chromium, and toluene.

Since the wells were installed, four monitoring wells surrounding the P-Area Burning/Rubble Pit have been sampled to obtain groundwater data. Results show that the above-mentioned substances have exceeded U.S. EPA maximum contaminant levels (MCLs) at least once. A ground penetrating radar (GPR) was run to delineate pit boundaries. A soil-gas survey was conducted in 1986 and 1991; the results of the survey indicated the presence of chlorinated solvents.

Activities Accomplished Prior to Fiscal Year 1998

In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan (as part of the Eight Burning/Rubble Pits Work Plan) that was received by U.S. EPA and SCDHEC on December 7, 1990. U.S. EPA comments on the P-Area Burning/Rubble Pit were received on October 1, 1991. This unit was taken out of the Eight Burning/Rubble Pits Work Plan according to U.S. EPA direction.

Pre-work plan characterization started in February 1997 and was completed in March 1997. This characterization effort targeted the suspected worst case soils within the pit as well as background soil sampling to confirm previous results and to identify any additional site-specific contaminants for the unit. SRS prepared and submitted a Revision.0 RFI/RI Work Plan to the U.S. EPA and SCDHEC on July 30, 1997 (21 days ahead of schedule).

Activities Accomplished in Fiscal Year 1998

The Revision.1 RFI/RI Work Plan (Addendum) was submitted to U.S. EPA and SCDHEC on January 26, 1998. The U.S. EPA conditionally approved the document on March 6, 1998. SCDHEC commented on February 25, 1998. Revision.1.1 was sent to the regulatory agencies on March 16, 1998. The U.S. EPA notified SRS of their official approval on May 6, 1998. SCDHEC approved the revised document on March 19, 1998.

The RFI/RI Field Start was initiated on March 25, 1998.

The initial phase II characterization was conducted and completed in Fiscal Year 1998. The four original groundwater monitoring wells were reconditioned by cleaning, replacing

the pumps and fittings, and redeveloping. However, detailed analysis of the data identified the need for additional sampling. This sampling was performed to more accurately determine the pathway and extent of groundwater contamination. This additional sampling will be conducted the first part of Fiscal Year 1999.

Activities Planned for Fiscal Year 1999
SRS plans to complete the extended groundwater characterization as well as complete the Validation and Verification of the sampling data, and issue the Data Summary Report. SRS will prepare and submit a Revision.0 RFI/RI/BRA report to the regulators for review and approval.

STEEL CREEK WATERSHED OPERABLE UNIT 9

P-Area Reactor Discharge Canal, NBN

Operable Unit 9 of the Steel Creek Watershed consists of one unit: the P-Area Reactor Discharge Canal. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The P-Area Reactor Discharge Canal is located approximately 500 feet outside the northwest corner of the P-Area perimeter fence. In the past, this canal served as a cooling water effluent and process sewer outfall that carried contaminated and potentially contaminated water, including reactor basin purge water pumped from reactor building sumps to process sewers.

Activities Accomplished Prior to Fiscal Year 1998
None

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

STATUS OF UPPER THREE RUNS WATERSHED OPERABLE UNITS

UPPER THREE RUNS WATERSHED OPERABLE UNIT 1

211-FB Pu-239 Release, 081-F

Operable Unit 1 of the Upper Three Runs Watershed consists of one unit: the 211-FB Pu-239 Release. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
A small quantity of plutonium solution was accidentally released in December 1954 through the F-Area sanitary sewer system, Building 607-1F, from Building 221-F. The sludge was removed and placed in a marked burial trench outside the F-Area fence.

Activities Accomplished Prior to Fiscal Year 1998
This unit was originally listed in FFA Appendix G, Site Evaluation List. A Site Evaluation Report was written recommending that the area needed further investigation and should be moved to FFA Appendix C, RCRA/CERCLA Units List. U.S. EPA and SCDHEC received Revision.0 of this report on July 7, 1992. Regulatory agency comments were incorporated in the document and Revision.1 was approved by both U.S. EPA and SCDHEC on March 31, 1994.

Activities Accomplished in Fiscal Year 1998
None. This unit is currently scheduled in FFA Appendix E.3, Field Start, ROD Issuance and RA Start Dates for Current Fiscal Year + 3 and Beyond, for field start of characterization during Fourth Quarter Fiscal Year 2007.

Activities Planned for Fiscal Year 1999
None

UPPER THREE RUNS WATERSHED OPERABLE UNIT 2

716-A Motor Shop Seepage Basin, 904-101G

Operable Unit 2 of the Upper Three Runs Watershed consists of one unit: 716-A Motor Shop Seepage Basin (904-10G). This unit is listed in FFA Appendix C, RCRA/CERCLA Units List. A final Record of Decision was issued for this unit on September 17, 1998.

Description
The Motor Shop Seepage Basin was constructed and placed in service in 1977 to receive liquid waste from the 716-A Motor Shop oil/water separator. The basin dimensions are 210-feet long by 35-feet wide by 7-feet deep. Effluent discharges from the motor shop

included wastewater with trace amounts of engine oil, grease, kerosene, antifreeze (ethylene glycol), and soapy water. In August 1983, all discharges to the basin were terminated. Constituents of concern detected during groundwater sampling analysis include trichloroethylene (TCE), tetrachloroethylene (PCE), carbon tetrachloride, and chloroform.

Activities Accomplished Prior to Fiscal Year 1998

Three monitoring wells were installed around the basin, one in April 1989 and two in May 1993. The above-mentioned substances were detected, but none have exceeded U.S. EPA maximum contaminant levels at any time. Soil-gas sampling was performed in 1991, with trace concentrations of arsenic, cadmium, mercury, thallium, and vanadium detected. Samples were collected from four soil borings and one surface sample. Low to moderate concentrations of antimony, barium, copper, lead, nickel, and zinc were also found as well as some volatile organic compounds (VOCs).

SRS prepared and submitted the Revision.0 RFI/RI Work Plan for the 716-A Motor Shop Seepage Basin to U.S. EPA and SCDHEC on April 3, 1996. U.S. EPA and SCDHEC transmitted comments on the Revision.0 document on July 31 and August 5, 1996, respectively.

Phase I (pre-work plan characterization), which included the cutting of vegetation inside the basin to facilitate preliminary soil sampling, was performed during April 1996. Validated soil sample results were presented to the U.S. EPA and SCDHEC during the Revision.0 RFI/RI Work Plan comment resolution meeting that was held on September 18, 1996. The U.S. EPA, SCDHEC, and SRS agreed that the results of the sampling justified the elimination of further unit characterization. The U.S. EPA, SCDHEC, and SRS also agreed that no further action would be taken to finalize the RFI/RI Work Plan. The next step would be the preparation and submittal of the RFI/RI with BRA Report. Based on the meeting, a revised implementation schedule was developed and submitted to U.S. EPA and SCDHEC for approval on September 30, 1996. The U.S. EPA and SCDHEC approved the revised implementation schedule on October 10 and October 21, 1996, respectively.

SRS submitted the Revision.0 RFI/RI with BRA Report on March 27, 1997 followed by the submittal of the Appendix J Data Package on April 25, 1997. U.S. EPA and SCDHEC comments were received on the Revision.0 document on July 1 and June 30, 1997, respectively. SRS submitted the Revision.1 RFI/RI with BRA Report on August 27, 1997. U.S. EPA approved the Revision.1 document on September 30, 1997; SCDHEC approved the Revision.1 document on September 24, 1997.

Activities Accomplished in Fiscal Year 1998

There were no constituents of concern identified in the approved Revision.1 RFI/RI with BRA Report. Therefore, a CMS/FS Report was not submitted for this unit. The next

document submittal was the Revision.0 Statement of Basis/Proposed Plan, which was submitted on December 4, 1997. U.S. EPA and SCDHEC had no comments and approved the Revision.0 document on January 27 and January 19, 1998, respectively.

The 45-day public comment period began on February 12, 1998, and ended on March 28, 1998 with no public comments received. The U.S. EPA and SCDHEC received the Revision.0 Record of Decision, which was signed by the Department of Energy, on April 24, 1998. The Revision.0 Record of Decision specified No Further Action as the appropriate remedy for the unit. The U.S. EPA approved the Revision.0 document on June 3, 1998; SCDHEC approved the Revision.0 document on May 26, 1998. The U.S. EPA signed the Record of Decision on June 26, 1998. SCDHEC, after issuing the Final RCRA Permit Modification for a 15-day appeal, signed the Record of Decision on September 17, 1998. Consequently, the Record of Decision was issued on September 17, 1998.

Activities Planned for Fiscal Year 1999
There are no activities planned for this unit during Fiscal Year 1999 due to the No Action decision reached during Fiscal Year 1998.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 3

A-001 Outfall, NBN

Operable Unit 3 of the Upper Three Runs Watershed consists of one unit: the A-001 Outfall. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The A-001 Outfall is located east of the Savannah River Technology Center and slightly north of the SRL Seepage Basins, approximately fifty meters from SRS Road 1-A. The A-001 Outfall receives noncontact cooling water, steam condensate, laboratory waste, cooling tower overflow, well flush water, steam cleaning rack wastewater, groundwater air stripper effluent from Outfall A-1A and stormwater. Evidence suggests that some of the laboratory drain discharges may have contained mercury or mercury compounds.

Activities Accomplished Prior to Fiscal Year 1998
None.

Activities Accomplished in Fiscal Year 1998
None.

Activities Planned for Fiscal Year 1999
None.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 4

A-Area Coal Pile Runoff Basin, 788-3A

Operable Unit 4 of the Upper Three Runs Watershed consists of one unit: A-Area Coal Pile Runoff Basin. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The A-Area Coal Pile Runoff Basin (788-3A) is located approximately 550 feet southeast of the A-Area coal storage site.

Steam and electricity for SRS activities were produced by seven coal-fired power plants located in A, C, D, F, H, K, and P Areas. Coal was stored at each of the seven power plant locations. Surface runoff from the coal storage piles used to be discharged to surface streams until the National Pollution Discharge Elimination System (NPDES) took effect in 1977. To meet NPDES discharge requirements and in response to SCDHEC requests, seven unlined, earthen containment basins were constructed near each coal storage location to intercept, stabilize, and treat surface runoff from the coal piles. All seven coal pile runoff basins were constructed between 1978 and 1981. The C- and F-Area basins have been inactive since late 1985 when the coal piles at these areas were removed.

Constituents of concern within the basins include low pH, sulfate, iron, manganese, magnesium, aluminum, cadmium, chromium, and arsenic.

Soil borings were drilled at each of the basins during June and July 1988. Monitoring data at each unit indicate the presence of the above-mentioned compounds and metals in the groundwater and soils.

Activities Accomplished Prior to Fiscal Year 1998
The Revision.0 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on October 23, 1990. After receiving U.S. EPA's comments on the Revision.0 RFI/RI Work Plan on October 30, 1991, SRS revised the work plan and submitted the Revision.1 RFI/RI Work Plan, which U.S. EPA and SCDHEC received January 29, 1992. Both Revision.0 and the Revision.1 RFI/RI Work Plans addressed all seven of the SRS Coal Pile Runoff Basins. Since that submittal, U.S. EPA, SCDHEC, and SRS have developed the Operable Units List, and the seven Coal Pile Runoff Off Basins will be addressed either individually or with the other RCRA/CERCLA units in their respective operable units.

Activities Accomplished in Fiscal Year 1998
This unit is still active. Field start for characterization is scheduled in FFA Appendix E.3 for the fourth quarter of Fiscal Year 2008.

Activities Planned for Fiscal Year 1999
None.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 5

A-Area Burning/Rubble Pits, 731-A, -1A and A-Area Rubble Pit, 731-2A

Operable Unit 5 of the Upper Three Runs Watershed consists of three units: the A-Area Rubble Pit and the two A-Area Burning/Rubble Pits. The Parties have separated these units, but they are presented together in the FFA Appendix C, RCRA/CERCLA Units List.

Description
A-Area Burning/Rubble Pits (731-A and -1A & A-Area Rubble Pit (731-2A))

The A-Area Burning/Rubble Pits and Rubble Pit are located approximately 1.5 miles south of M Area and just west of Roads D and C-1. The pits are surrounded by gravel access roads and a mix of relatively flat grassy and wooded terrain. An open ditch and ephemeral drain are located east and north, respectively, of the pits.

An additional pit (or potential pit) has been tentatively identified approximately 50 feet east of the pits. The potential pit was identified based on physical evidence (depression and subsidence) at the unit's surface and on interviews with SRS personnel. Ground Penetrating Radar results suggest the presence of a trench boundary; however, further interpretation is difficult since soils have been disturbed over the entire area.

A depressional area is also located approximately 600 feet east of the potential pit.

Facility documentation indicates that the A-Area Burning/Rubble Pits were constructed in 1951. Ground Penetrating Radar data show each pit to be approximately 22-feet wide by 9 to 10-feet deep by 25-feet long. Waste types collected included paper, plastics, wood, rubble, rags, cardboard, oil, degreasers, and drummed solvents. Wastes were usually burned on a monthly basis until October 1973 when burning was discontinued. A layer of soil was placed over the burned remains, and the pits were filled with paper, wood, concrete, empty galvanized steel barrels, and cans. The pits reached capacity in 1978 and were taken out of service and covered with soil to grade level.

A literature review indicates that the A-Area Rubble Pit is located beneath the A-Area Ash Pile (788-2A), an active unit located immediately to the east of the A-Area Burning/Rubble Pits. However, an ongoing investigation indicates that the A-Area Rubble Pit is actually located west of the A-Area Burning / Rubble Pits based on ground penetrating radar. The depth of the A-Area Rubble Pit is unknown, but is suspected to be up to 20 feet. The aereal dimensions are believed to be approximately 40 feet by 650 feet.

No specific disposal records are known to exist for the A-Area Rubble Pit; however, SRS rubble pits were used to dispose of dry inert rubble such as concrete, metal, brick, tile, asphalt, high density plastics, glass, rubber products, wood products, and non-returnable empty drums. No radioactive or hazardous material is reported to have been disposed of at the unit. After the last use of the A-Area Rubble Pit in 1983, the area was backfilled and seeded.

The A-Area Ash Pile (788-2A) is listed in FFA Appendix G, Site Evaluation List. At one time, petroleum-contaminated soil was stored in two areas located west of the A-Area Rubble Pit. The contaminated soil was removed in early 1996.

Soil-gas surveys conducted at the A-Area Burning/Rubble Pits and A-Area Rubble Pit in 1988 and 1991 indicated the presence of chlorinated solvents at both locations.

Activities Accomplished Prior to Fiscal Year 1998

In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan (as part of the Eight Burning/Rubble Pits Work Plan) that was received by U.S. EPA and SCDHEC December 7, 1990. U.S. EPA comments on the A-Area Burning/Rubble Pits (731-A and 731-1A) portion of that work plan were received on October 1, 1991. Based on U.S. EPA comments, the A-Area Burning/Rubble Pits were taken out of the Eight Burning/Rubble Pits Work Plan and incorporated with the A-Area Rubble Pit (731-2A). The resultant Revision.1 RFI/RI Work Plan for the A-Area Burning/Rubble Pits and A-Area Rubble Pit was received by U.S. EPA and SCDHEC on September 2, 1992. SCDHEC comments were received on the Revision.1 RFI/RI Work Plan on June 28, 1993. The Revision.1.1 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on October 26, 1993. The Revision.1.1 Report was approved by U.S. EPA and SCDHEC on May 4, and March 22, 1994, respectively.

SRS submitted the Revision.0 RFI/RI and Baseline Risk Assessment Report to U.S. EPA and SCDHEC on July 29, 1996. After incorporating comments received from both regulators, U.S. EPA and SCDHEC approved the Revision.1.2 report on August 20 and July 21, 1997, respectively.

SRS prepared and submitted the Revision.0 ASCAD™ Combined Document to U.S. EPA and SCDHEC on March 30, 1997. After incorporating comments from both regulators, U.S. EPA and SCDHEC approved the Revision.1 document on September 9, 1997.

U.S. EPA, SCDHEC, and SRS issued the Revision.1 Statement of Basis/Proposed Plan for a 45-day public comment period on September 14, 1997 (to end on October 28, 1997). This document specified the use of in situ bioremediation to clean up solvent-contaminated groundwater at this unit.

Activities Accomplished in Fiscal Year 1998

The public comment period for the Revision.1 SB/PP began on September 14, 1997 and concluded on October 28, 1997, without any comments from the public.

The Revision.0 Record of Decision (ROD) was submitted to the regulators on November 11, 1997. SRS submitted an extension request to move the Final Approved ROD milestone to February 24, 1998 based on conversations with the regulators that indicated that they would take more time to review the Revision.0 ROD than indicated in the implementation schedule and that comments were forthcoming. The regulators concurred that this extension request was appropriate. U.S. EPA and SCDHEC approved the extension request on December 15 and December 12, 1997, respectively. Revision.0 ROD comments were received from U.S. EPA and SCDHEC on December 30, 1997. A Revision.0 ROD comment resolution meeting was conducted on January 20, 1998. At this time the regulators requested that SRS reevaluate the selected remedy for the surface unit's soils (i.e., maybe a soil cover would be more appropriate). On January 23, 1998, SRS submitted notification of a 30-day extension request for submittal of the Revision.1 ROD to further pursue resolution of the regulatory comments and to assess the impact of adding and evaluating the suggested soil cover alternative. SRS indicated that an extension request would be processed to adjust milestones once the soils remedy was finalized. On February 3, 1998, SRS submitted to the regulators the extension request to move the Final Approved ROD milestone to March 30, 1998. The extension request was approved on February 24 and February 20, 1998 by U.S. EPA and SCDHEC, respectively. While SRS was evaluating the soil cover alternative, new technical information suggesting that benzo(a)pyrene in soils is best remedied by remaining in situ was discovered. Therefore, SRS submitted an extension request to the regulators on February 26, 1998 to move the Revision.1 ROD submittal date to March 30, 1998 in order to evaluate this new technical information. U.S. EPA conditionally approved the extension request on February 27, 1998; SCDHEC approved the extension request on March 2, 1998.

The three Parties conducted a teleconference on March 2, 1998 to discuss the new geotechnical data and remedy alternatives for benzo(a)pyrene, which affected the selected remedy for the ABRP soils. The three Parties agreed to change the preferred soils remedy to institutional controls. This change required revision of the approved SB/PP and reissuing it for public comment once approved, and developing and submitting a revised implementation schedule for regulatory approval. In order to accomplish this, on March 5, 1998 SRS requested an extension for the Revision.1 ROD submittal. A revised implementation schedule was included in this extension request. This schedule accommodated review and approval of the revised SB/PP, a public comment period, and movement of the remedial action (RA) start date. U.S. EPA and SCDHEC approved the extension request on March 26 and March 30, 1998, respectively.

U.S. EPA and SCDHEC received the Revision.1 SB/PP on March 31, 1998. U.S. EPA

and SCDHEC comments were received on May 21 and May 8, 1998, respectively. The three Parties conducted a comment resolution meeting on June 3, 1998. At the meeting, the regulators suggested that SRS provide additional information on the degradation of benzo(a)pyrene toward further justification of the natural attenuation soil remedy. U.S. EPA and SCDHEC received the Revision.1.2 SB/PP, as well as the additional benzo(a)pyrene information, on June 22, 1998. U.S. EPA and SCDHEC comments on the Revision.1.2 document were received on August 4 and July 23, 1998, respectively. The three Parties are currently working toward developing an operable unit strategy for remediation of the surface unit soils and the groundwater.

Activities Planned for Fiscal Year 1999

During Fiscal Year 1999, efforts will focus on developing an operable unit strategy to comprehensively identify all important operable unit characteristics and remedial action objectives, and agree on an appropriate operable unit strategy and implementation schedule that will support the remedy selection process for the surface unit soils and groundwater.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 6

A-Area Miscellaneous Rubble Pile, 731-6A

Operable Unit 6 of the Upper Three Runs Watershed consists of one unit: A-Area Miscellaneous Rubble Pile. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description

The A-Area Miscellaneous Rubble Pile is located in the northwest portion of the SRS. The unit was originally estimated to be 2 acres in size. Subsequent investigations indicate that the area of the unit is approximately 4 acres in size.

The pile was used for bulk solid waste disposal during construction of the SRS plant. Although there is no record of the dates of operation of the pile, it may have received waste from the time of original plant construction in the 1950s to the early 1970s. The waste in the area is suspected to consist of construction rubble. Visual surveys have noted the presence of concrete, wood, asphalt, vegetation, tree stumps, scrap metal, and old metal containers. Based on a soil-gas survey, the constituents of concern are methane, propane, ethane, pentane, octane, propylene, and ethylene.

Activities Accomplished Prior to Fiscal Year 1998

Soil-gas sampling was performed in May 1991. Neither groundwater sampling nor soil sampling has been performed.

In accordance with the SRS RCRA Permit, SRS prepared and submitted a Revision.0

RFI/RI Work Plan that was received by U.S. EPA and SCDHEC on August 6, 1991.

The A-Area Miscellaneous Rubble Pile (731-6A) was entered into the Approved Standard Corrective Action Design (ASCAD™) Program via the regulatory approval of Appendix E on February 12, 1996. With this change, development of an ASCAD™ RFI/RI work plan was initiated.

SRS submitted the Revision.0 ASCAD™ Work Plan on April 9, 1997. U.S. EPA comments on the Revision.0 document were received on August 11, 1997. SCDHEC comments were received on August 6, 1997. On September 24, 1997, SRS revised and submitted a Revision.1 ASCAD™ Work Plan that incorporated regulator comments.

Activities Accomplished in Fiscal Year 1998
The Revision.1 Work Plan was approved by both regulators on October 27, 1997. The field start began as scheduled on November 10, 1997. Phase I characterization was completed December 4, 1997. Validated data noted significant levels of polychlorinated biphenyls and metals in the soils, making phase II sampling required. Due to the nature of contamination, the Parties agreed that this unit should be taken out of the ASCAD™ process. A revised Operable Unit Strategy and Implementation Schedule were submitted to the regulators on March 20, 1998. U.S. EPA and SCDHEC approval of the revised Operable Unit Strategy and Implementation Schedule was received on March 31 and March 24, 1998, respectively. To accommodate the change in operable unit strategy and to further document additional characterization efforts as discussed in the March 11, 1998, phase II scoping meeting, SRS submitted the Revision.1.1 RFI/RI Work Plan Addendum on March 31, 1998. U.S. EPA submitted comments on the Revision.1.1 Work Plan Addendum on June 4, 1998; SCDHEC submitted comments on May 28, 1998. A comment resolution meeting was held on June 17, 1998. The Revision.1.2 Work Plan Addendum was submitted on June 26, 1998. U.S. EPA and SCDHEC approved the Revision.1.2 Work Plan Addendum on July 10 and July 20, 1998, respectively. Phase II characterization began in early August and continues.

Activities Planned for Fiscal Year 1999
Phase II characterization of the A-Area Miscellaneous Rubble Pile (731-6A) will be completed and the Revision.0 RFI/RI and Baseline Risk Assessment Report will be submitted to the regulators by May 13, 1999.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 7

Burial Ground Complex Groundwater (associated with Mixed Waste Management Facility)

Operable Unit 7 of the Upper Three Runs Watershed includes the groundwater beneath the Burial Ground Complex (BGC). The BGC Groundwater consists of three defined

plumes: Southwest Plume, Northwest Plume, Northeast Plume, and one plume requiring further characterization, the Southeast Plume. This operable unit is associated with the Mixed Waste Management Facility listed in FFA Appendix H. Activities at this unit are SCDHEC-led RCRA actions.

Description

The BGC occupies approximately 194 acres in the central part of SRS between the F and H Separations Areas. The BGC consists of several adjacent facilities that were former disposal sites for hazardous and radioactive wastes and spent solvents generated from plant processes. It is divided into a northern area (118 acres) and a southern area (76 acres). The southern region, named the Old Radioactive Waste Burial Ground (ORWBG) (643-E), began receiving radioactive wastes in 1952 and was filled in 1972. The ORWBG also contains twenty-two underground tanks (650-01E - 22E), which were once used for the storage of spent radioactive solvents. By 1972, all radioactive waste disposal activities had moved to the northern area.

The northern area is called the Low-Level Radioactive Waste Disposal Facility (LLRWDF) (643-7E) and began initial waste receipt in 1970. A portion of the LLRWDF, the Mixed Waste Management Facility (MWMF), was closed in April 1991, utilizing a cap in accordance with an SCDHEC-approved RCRA Closure Plan. The RCRA status of the MWMF was necessitated by the inadvertent disposal of radioactively contaminated hazardous waste into the trenches. It was later determined that another portion of the LLRWDF had received radioactive contaminated hazardous wastes. This area is currently in the process of closure in accordance with a RCRA Closure Plan. Other portions of the LLRWDF that receive or have received low- level radioactive wastes include Transuranic Waste Storage Pads (TRU Pads), Greater Confinement Disposal Engineered Trench and Boreholes, engineered trenches, and slit-trenches (Non-RCRA portion of LLRWDF).

Activities Accomplished Prior to Fiscal Year 1998

An extensive system of groundwater monitoring wells around the BGC is monitored by SRS. Currently, 144 wells monitor groundwater quality in the uppermost aquifer beneath the BGC. Samples from the wells are analyzed for selected heavy metals, indicator parameters, radionuclides, VOCs, and other constituents. Current data indicate that metals, radionuclides, tritium, and VOCs have been released to the groundwater.

Characterization efforts at the BGC to determine the vertical and horizontal extent of groundwater and vadose zone soil contamination are conducted in accordance with the SCDHEC- approved BGC Field Investigation Plan (FIP). The BGC FIP includes installation of monitoring wells to characterize groundwater, collection of soil and surface water samples, direct push technology for collection of groundwater samples, and aquifer testing. Phase I characterization of the BGC FIP was approved in March 1994 by SCDHEC.

Phase I ecological and hydrogeological activities for the BGC FIP included a collection of wetland soil and water samples and ambient air monitoring for tritium along the Old F-Area Effluent Stream seep line south of the BGC; installation of 12 groundwater monitoring wells to characterize the groundwater divide; collection of 78 deep soil-gas samples; and completion of initial hydrogeological characterization southwest of the BGC at 35 locations near the Old F-Area Effluent Stream Area (5 cores, geophysical logs, cone penetrometer data, water samples). Other field activities included abandonment of non-RCRA wells on the southern perimeter of the BGC. Preliminary Data Report #1 was submitted to SCDHEC and U.S. EPA on January 31, 1995.

In Fiscal Year 1995, phase II of the BGC FIP was implemented. Activities included: cone penetrometer soil and water sampling; coring and geophysical logging; 11 groundwater monitoring well installations; and Hydropunch® water sampling at approved locations around the perimeter of the BGC. Ecological activities included soil and water sampling, soil and water toxicity testing, and biological tissue sampling in the F-Area Effluent Stream area. An ecological database was prepared for the Southwest Plume area (F-Area Effluent Stream). Preliminary Data Report #2 was submitted to SCDHEC in April 1996.

The MWMF (including the RCRA-regulated portions of LLRWDF) is listed as a RCRA unit in Appendix H of the FFA. The unit is considered an Interim Status Treatment/Storage/Disposal (TSD) facility. The MWMF RCRA Part B Post-Closure Care Permit Application, Revision 2, was submitted to SCDHEC for review in November 1993.

All groundwater associated with the burial ground complex is being addressed under the RCRA Permit for the MWMF in accordance with the Settlement Agreement 87-52-SW, second amendment, signed in September 1995. Revision 3, November 15, 1995, of the RCRA Part B Permit Application for the MWMF identifies three groundwater plume areas (Southwest Plume, Northwest Plume, and Northeast Plume) at the BGC and proposes a phased, plume-by-plume approach to assessment and remediation of each of the plumes.

Southwest Plume
The Southwest Plume is fully characterized. The nature and extent of the plume of contamination has been documented in the RCRA Part-B permit application (Revision 3, November 1995). The ACL/MZ proposes risk-based levels as Groundwater Protection Standards (GWPS) for constituents detected in the plume. Two contaminants, tritium and tetrachloroethylene, exceed the ACL/MZ proposed limits and will require remediation. Evaluation of corrective action alternatives continues while SCDHEC reviews the permit application.

Northwest and Northeast Plumes
The detection of these plumes has been identified in the RCRA permit application. Field

investigation activities in the northwest and Northeast Plumes are complete except for aquifer testing. Results of the characterization have been submitted to SCDHEC as part of Field Investigation Plan Report #2. The hydrogeologic characterization will also be submitted to SCDHEC as a revision to the permit application. Future work includes preparation of an ACL/MZ demonstration for each plume.

Southeast Plume
The Southeast Plume was not identified or discussed in the RCRA Part-B permit application. Detection of this plume has been identified in the FIP report #2. Characterization of the Southeast Plume is underway. This plume is in close proximity to the injection wells for the H- Area seepage basin groundwater remediation project. Further actions will depend on the results of the characterization activity. After characterization is complete, the delineation of the nature and extent of this plume will be submitted to SCDHEC as a revision to the permit application.

SRS submitted the Revision 3 MWMF RCRA Part-B Post-Closure Care Permit Application on November 15, 1995, in accordance with the settlement agreement. This revision represented a phased approach for the three groundwater plumes (Southwest Plume, Northwest Plume, and Northeast Plume) underneath the BGC.

Quarterly meetings to discuss issues pertinent to the MWMF RCRA Part-B Post-Closure Care Permit Application were held in November 1995, January 1996, June 1996, and September 1996.

On August 13, 1996, SRS submitted the Revision 4 MWMF RCRA Part-B Post-Closure Care Permit Application to SCDHEC. This revision included ACL/MZ risk-based cleanup levels for remediation of the Southwest Plume. The seven constituents of concern (COCs) were identified as 1,1-dichloroethylene, carbon tetrachloride, tetrachloroethylene, trichloroethylene, radium, tritium, and uranium-238. Two of the COCs, tetrachloroethylene and tritium, exceed the ACL/MZ risk-based cleanup limits and are proposed for remediation.

Groundwater characterization efforts, in accordance with the BGC FIP, continued during Fiscal Year 1996. Cone penetrometer and Hydropunch® pushes were made at 67 locations around the BGC to delineate the Southwest, Northwest, and Northeast Plumes. Shallow well, stream water, wetland water, and soil sediment samples were collected from the Old F-Area Effluent Stream to support ecological investigations for the Southwest Plume. Eleven monitoring wells were installed along the groundwater divide to better characterize the effect of the divide on contaminant transport. Data Report #2 for the BGC FIP was issued to SCDHEC on April 29, 1996. This data report summarized these activities in addition to the background soil sampling activities conducted around the BGC and the General Separations Area.

SRS continued work throughout Fiscal Year 1997 on technology selection for remediation of the Southwest Plume, on groundwater modeling to support the corrective action planning, and on characterization of the Southeast Plume.

Additional groundwater characterization was conducted at the Southeast Plume area during the summer of 1997. This groundwater characterization included installation of six multi-screened wells. These wells are different from traditional wells in that the samples will be collected from depth-discrete intervals instead of from a standard elevation. This provides for additional samples to be collected from the locations where higher levels of groundwater contamination resides. These are currently on the southwest monitoring program.

Activities Accomplished in Fiscal Year 1998

SCDHEC issued a Notice of Deficiency (NOD) on revisions 3 and 4 of the MWMF RCRA Part-B Permit Application in May 1998. A majority of the NODs were centered on the ACL demonstration and MZ request of the revision 4 Permit Application. SRS submitted responses to the NODs to SCDHEC with a revision 5 Part-B Permit Application in August 1998. The application proposes alternate groundwater protection standards versus an ACL/MZ and a corrective action schedule. The corrective action schedule depicts the approach to implementing future corrective actions at the MWMF.

Seep line sampling of surface water was conducted during the summer of 1998 at the Southwest Plume area of the MWMF. This sampling was conducted to further evaluate groundwater movement and outcropping in this area.

Comments on a Revision 0 Aquifer Test Plan were received from SCDHEC in May 1998. A Revision 1 Aquifer Test Plan was submitted to SCDHEC for approval in September 1998. The Aquifer Test Plan describes the approach for pump installation and 21 observation wells at 3 separate test pads around the MWMF. The aquifer tests will be conducted on the 3 aquifers beneath the MWMF to ascertain hydraulic values of the aquifers. These data will be used for future groundwater modeling to support future groundwater corrective actions at the MWMF.

Phase I of the evaluation of interim technologies was conducted to determine the appropriate technology(s) to be implemented at the Southwest Plume area of the MWMF. This evaluation is contaminated groundwater outcropping to surface.

Activities Planned for Fiscal Year 1999

In Fiscal Year 1999, the Pump Test Wells for Southwest, Northwest and Northeast Plumes will be installed and operational. The seep line sampling and analysis for the Southwest Plume will be completed. The monthly monitoring well sampling at the Southwest Plume Area. The transport model/source term will be developed. The groundwater modeling in support of the Southwest Interim Measures Plan/Corrective

Measures Study will be developed. The groundwater flow modeling in support of the Southwest Corrective Action Plan will be developed.

In preparation of responses from SCDHEC on revision 5 of the MWMF RCRA Part-B Permit Application, SRS is performing groundwater modeling to support Corrective Action Plan development at the Southwest Plume area. Recent groundwater information will also be incorporated in the next revision of the permit application.

Installation of the pumping and observation wells along with performance of the aquifer tests, is being planned for the Southwest, Northwest, and Northeast Plume areas. Seep line sampling for the Southwest Plume area will be conducted during fourth and second quarters of Fiscal Year 1999.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 8

Burma Road Rubble Pit, 231-4F

Operable Unit 8 of the Upper Three Runs Watershed consists of one unit: the Burma Road Rubble Pit. This operable unit is listed in FFA Appendix C, RCRA/CERCLA Units List. A No Action Record of Decision (ROD) was issued for this unit on July 8, 1996.

Description
The Burma Road Rubble Pit (231-4F) is located just south of old Burma Road near F Area and approximately 0.1 mile west of the intersection of Road C and the entrance road to F Area.

Waste disposal at the Burma Road Rubble Pit began in 1973. The unit consisted of two elongated, irregularly shaped trenches, approximately 400-feet long by 50-feet wide by 10-feet deep. Dry rubble, metal, concrete, lumber, poles, fluorescent light fixtures, and glass were deposited at this unit. The total volume of these waste deposits are unknown. No hazardous substances are documented to have been buried at this unit. The pit was backfilled and seeded after its last use in 1983. The constituents of concern are light hydrocarbons, aromatic hydrocarbons (BTEX), trichloroethylene, tetrachloroethylene, and mercury.

Activities Accomplished Prior to Fiscal Year 1998
U.S. EPA and SCDHEC provided comments on the Revision.0 Proposed Plan (which SRS submitted August 30, 1995) on October 25 and October 3, 1995, respectively. SRS addressed the comments and submitted the Revision.1 Proposed Plan to U.S. EPA and SCDHEC on November 24, 1995. U.S. EPA and SCDHEC approved the document on January 2, 1996, and December 21, 1995, respectively. The Proposed Plan, recommending no action, was issued for a 30-day public comment period from January 10 through February 8, 1996. SRS prepared a responsiveness summary and submitted the

Revision.0 ROD to U.S. EPA and SCDHEC on February 21, 1996. After incorporating comments received from both regulators, the ROD for no action was signed by DOE, U.S. EPA, and SCDHEC on May 6, June 18, and July 8, 1996, respectively.

SRS transmitted a letter to SCDHEC and U.S. EPA on March 6, 1997, requesting that the deed notification language in the No Action ROD be modified to be consistent with the language in other No Action RODs.

Activities Accomplished in Fiscal Year 1998
U.S. EPA, SCDHEC, and SRS finalized the deed notification language for the No Action RODs.

Activities Planned for Fiscal Year 1999
None; all activities associated with the unit have been completed.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 9

F-Area Acid Caustic Basin, 904-47G

Operable Unit 9 of the Upper Three Runs Watershed consists of one unit: the F-Area Acid/Caustic Basin. This operable unit is listed on FFA Appendix H, RCRA-Regulated Units. Activities on this unit are SCDHEC-led RCRA actions.

Description
The F-Area Acid/Caustic Basin (904-74G) is located within F Area on SRS. The basin was used until 1982 to support processes needed for power generation activities at F Area. The basin is associated with boiler feed water conditioning for the removal of inorganic salts from well water before it is used in the boiler.

At SRS, boiler feed water contains natural salts that affect boiler operation, and thus must undergo a demineralization process. This process uses cation and anion resins to remove the salts. The cation resin exchanges hydrogen for cations, and the anion resin exchanges hydroxyl ions for the anions. When these resins become saturated with cations or anions, they must be regenerated. This is accomplished by passing a dilute solution of sulfuric acid over the cation resin and a dilute solution of sodium hydroxide over the anion resin. The influent to the acid/caustic basin comprises the partially spent, regenerant solutions and associated rinse water.

The basin provided mixing and neutralization of the regenerants before discharging to local surface streams. The F-Area Acid/Caustic Basin has been inactive since 1982 when new SRS neutralization facilities went on line.

The basin is approximately 50-feet long by 50-feet wide by 7-feet deep and has a capacity

of approximately 75,000 gallons. When in operation, the basin received 3.8 million gallons/year.

The regenerant solutions consisted of calcium and magnesium cations, sulfates, chlorides, carbonic acid, silicic acid, and any acid or base in the original solution that was unused. No known hazardous waste constituents were discharged to the basin. Analyses, using toxicity characteristic leaching procedures, of sediment samples from the basin indicated that concentrations of analyzed metals were well below U.S. EPA guideline concentration. The main environmental concern with the acid/caustic basin is the pH of the solutions in the basin. It has not been proven that the pH did not go below 2 or above 12.5.

Activities Accomplished Prior to Fiscal Year 1998
The initial issue of the Interim Status Closure Plan for the F-, H-, K-, and P-Area Acid/Caustic Basins was submitted to SCDHEC on January 25, 1989. The Closure Plan was submitted for public comment in August 1990 and the only changes since that time have been the addition of data and a Health-based Risk Assessment supporting the initial closure proposal. The final closure plan (Revision 3) was submitted on July 13, 1991, and updated on February 5, 1992, to include a dewatering plan and groundwater data through the third quarter of 1991.

An F-, H-, K-, P-Area Acid/Caustic Basin Interim Status Closure Plan (WSRC-RP-94-1259, Revision 6, dated June 19, 1995) was approved by SCDHEC on November 8, 1995. The plan approved the clean closure of the basins so filling of the basins was warranted for safety and housekeeping purposes. Filling of the basins has been completed, and in Fiscal Year 1996, groundwater monitoring wells associated with the basin characterization were abandoned. All activities associated with the unit have been completed.

Activities Accomplished in Fiscal Year 1998
None; all activities associated with this unit have been completed.

Activities Planned for Fiscal Year 1999
None; all activities associated with this unit have been completed.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 10

F-Area Burning/Rubble Pits, 231-F, -1F, -2F

Operable Unit 10 of the Upper Three Runs Watershed consists of three units: two F-Area Burning/Rubble Pits and one F-Area Rubble Pit. A final Record of Decision (ROD) was issued on April 22, 1997, for these units.

Description
The F-Area Burning/Rubble Pits (231-F and 231-1F) and the F-Area Rubble Pit (231-2F)

are located off Road C, near the F-Area facility.

Burning/Rubble Pits: The 231-F Pit is approximately 275-feet long by 50-feet wide by 10-feet deep, and the 231-1F Pit is approximately 325-feet long by 50-feet wide by 10-feet deep. The burning/rubble pits operated from 1951 to 1973. During operation of the pits, spent organic solvents, waste oils, rags, paper, plastics, wood, telephone poles, and rubber were disposed of and periodically (monthly) burned. In 1973, the burning of wastes ceased at SRS. A layer of soil was placed over the pit debris and then was filled to capacity with rubble such as concrete, brick, tile, asphalt, plastics, wallboard, rubber, and non-returnable empty drums. When the pits were filled to capacity, a layer of soil was placed over the pit. All burning/rubble pits were closed by 1981.

Rubble Pit: The 231-2F is approximately 200-feet long by 40-feet wide by 10-feet deep. The F-Area Rubble Pit operated from approximately 1951 to 1970. Rubble disposed of in the pit includes dry inert concrete, lumber, cement, fence and telephone poles, brick, tile, wallboard, paneling, metal scraps, drums, electrical conduit, and plastics. No burning took place at this rubble pit. The pit was filled with soil and closed by 1983.

The constituents of concern for the unit are low concentrations of metals (arsenic, barium, chromium, lead, mercury, and nickel), semi-volatile organics in soil, metals (radium, lead, and iron), nitrates, and semi-volatiles in groundwater.

Activities Accomplished Prior to Fiscal Year 1998

Four monitoring wells surrounding the F-Area Burning/Rubble Pits (231-F and 231-1F) were installed in September 1983 and July 1984. Quarterly groundwater data has been collected since the wells were installed. Results show that the above-mentioned substances have exceeded U.S. EPA limits at least once. Additional characterization and monitoring activities included Ground Penetrating Radar data collected in 1988, soil-gas sampling performed in 1986 and 1991, and unit screening conducted in November 1989. A backhoe was used to trench across the pits for sampling and to identify the pit boundaries. Samples were collected from five soil borings to various depths.

In accordance with the SRS RCRA Permit, SRS prepared and submitted the Revision.0 RFI/RI Work Plan (as part of the Eight Burning/Rubble Pits Work Plan) that was received by U.S. EPA and SCDHEC on December 7, 1990. U.S. EPA comments on the F-Area Burning/Rubble Pit were received on October 1, 1991. This unit was taken out of the Eight Burning/Rubble Pits Work Plan according to U.S. EPA direction. The Revision.0 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on August 6, 1990. U.S. EPA comments were received on January 29, 1991. The Revision.1 RFI/RI Work Plan on the F-Area Burning/Rubble Pit was received by U.S. EPA and SCDHEC on April 30, 1991. Comments from SCDHEC were received on July 27, 1992. The Revision.2 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on November 18, 1992. SCDHEC approved the Revision.2 RFI/RI Work Plan on April 6, 1993.

As part of the Revision.2 RFI/RI Work Plan, a characterization of the unit was performed from May 4 to August 6, 1993. Twelve soil borings were taken within the pits (four in each pit) and four deep soil borings for geohydrologic data were completed. Seven temporary monitoring wells and six permanent monitoring wells were installed. Approximately 228 soil and water samples were sent to contract laboratories for analyses.

U.S. EPA and SCDHEC approved the Revision.1.1 RFI/RI and Baseline Risk Assessment Reports on April 16 and April 12, 1996, respectively.

SRS addressed comments and submitted the Revision.1 CMS/FS to U.S. EPA and SCDHEC on March 13, 1996. SRS addressed the comments and U.S. EPA and SCDHEC approved Revision.1.1 of the document on June 27 and July 10, 1996, respectively.

SRS prepared and submitted the Revision.0 Proposed Plan to U.S. EPA and SCDHEC on November 20, 1995. SCDHEC transmitted comments on the document on February 12, 1996. SRS addressed the comments and submitted the Revision.1 Proposed Plan on March 13, 1996. SCDHEC instructed SRS, on April 15, 1996, to revise the Proposed Plan to include RCRA permit requirements. SRS, U.S. EPA, and SCDHEC held meetings from April through June to reach agreement on how the three Parties would address the additional RCRA requirements. The subsequent document, the Statement of Basis/Proposed Plan, was approved by the U.S. EPA and SCDHEC on September 3, 1996, and August 29, 1996, respectively.

The Statement of Basis/Proposed Plan was issued for a 45-day public comment period that was initiated on September 17, 1996. SRS, U.S. EPA, and SCDHEC held a public meeting on the Statement of Basis/Proposed Plan on October 15, 1996. The 45-day public comment period closed on October 31, 1996.

SRS prepared and submitted the Revision.0 ROD to SCDHEC and U.S. EPA on November 13, 1996, stating that the remedy will be institutional controls. U.S. EPA and SCDHEC provided comments on the document on January 14 and January 2, 1997, respectively. SRS addressed the comments and submitted a Revision.1 document on February 6, 1997. U.S. EPA and SCDHEC notified SRS that they approved the ROD for signing by their Agencies on February 25 and 21, 1997, respectively. The U.S. EPA signed the ROD on March 27, 1997. SCDHEC, after issuing the final RCRA Permit Modification for a 15-day appeal, signed the ROD on April 22, 1997. Consequently, the ROD was issued on April 22, 1997.

SRS prepared a Technical Memorandum and Summary Report that was transmitted to SCDHEC and U.S. EPA on November 22, 1996. SCDHEC provided comments on the report on January 8, 1997, requesting additional sampling.

SRS prepared and submitted a Revision.2.2 RFI/RI Work Plan Addendum to U.S. EPA and SCDHEC on September 30, 1997. This addendum proposed additional groundwater assessment at the F-Area Burning Rubble Pit unit.

SRS prepared and submitted the Revision.0 Corrective Measure Implementation/Remedial Action Report to SCDHEC and U.S. EPA on August 13, 1997. U.S. EPA provided conditional approval of the report on September 30, 1997.

Activities Accomplished in Fiscal Year 1998
SRS submitted a Revision.2.2 RFI/RI Work Plan to U.S. EPA and SCDHEC on December 19, 1997. The U.S. EPA approved the document on November 18, 1997. SCDHEC notified SRS that they approved it on January 30, 1998. SRS achieved field start of Groundwater Characterization on February 9, 1998.

The Revision.2.3 Work Plan Addendum for the F-Area Burning Rubble Pits was forwarded to U.S. EPA and SCDHEC on December 18, 1997. The Revision.1 Final Remediation Report was submitted to U.S. EPA and SCDHEC on January 16, 1998. SCDHEC approval of the program plan and the Revision.2.3 Work Plan Addendum were received on January 30, 1998. A field start was initiated February 6, 1998. The Revision.1.1 Final Remediation Report was submitted to the regulators on March 23, 1998. SCDHEC approval was received on April 16, 1998 for the Revision.1.1 Final Remediation Report. A letter from U.S. EPA noted that as they had no comments on the Revision.1 Final Remediation Report, the report would be considered approved. The clean copy of the Revision.1.1 Final Remediation Report was submitted on May 13, 1998. The remedial action start was achieved on June 25, 1998. The Revision.1 Technical Memorandum was developed and submitted to the regulators on August 20, 1998.

Activities Planned for Fiscal Year 1999
Plans for Fiscal Year 1999 include obtaining U.S. EPA and SCDHEC approval on a Revision.2 Technical Memorandum demonstrating an upgradient trichloroethylene/tetrachloroethylene source.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 11

F-Area Inactive Hazardous Waste Transfer Lines from Building to the Security Fence, 081-1F

Operable Unit 11 of the Upper Three Runs Watershed consists of a single unit: the F-Area Inactive Process Sewer Lines from Building to the Security Fence (081-1F). However, this unit and Operable Unit 15 of the Fourmile Branch Watershed, the H-Area Inactive Process Sewer Lines from Building to the Security Fence (081-H), are addressed in one work plan. Both of these units are listed in FFA Appendix C, RCRA/CERCLA

Units List.

To prevent any possible confusion, it should be noted that a unit with a similar name, the F-Area Inactive Process Sewer Lines from the Security Fence to the F-Area HWMF (904-41G, -42G, and -43G), is a RCRA-regulated unit under the terms of the FFA.

Description
The F- and H-Area Inactive Hazardous Waste Transfer Lines run throughout the whole of F and H Area. The primary sewer lines were used from 1955 to 1982. The process sewers, 4.6 miles in total length, were used to transport liquid wastes from Separations, Tritium, and Waste Management Facilities to their respective seepage basins (gravity fed). There are more than 8,000 feet of various types and sizes of lines from Buildings FB-221 and HB-221 to the security fence, roughly 2,000 feet in F Area, and 6,000 feet in H Area. The majority of the lines are made of vitrified clay. Portions of lines are slip-lined with active lines and some with inactive lines. Based on soil sampling, the constituents of concern include low-levels of radionuclides, metals, nitrates, and low-pH liquids. Sample results for metals are less than toxicity characteristic leaching procedure (TCLP) regulatory limits.

Construction of a security system for Separations facilities has allowed SRS to propose and conduct soil sampling. Sample results indicate no significant soil contamination problems.

Activities Accomplished Prior to Fiscal Year 1998
In 1988, SRS environmental engineers took preliminary soil samples near the Inactive Hazardous Waste Transfer Lines outside the security fence. The samples indicated low levels of radioactive materials and traces of metals, nitrates, and low-pH liquids, indicating leaks in the sewer lines.

The Revision.0 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on March 31, 1992. SCDHEC comments were received on December 22, 1993. FFA Appendix E.3 lists the field start of characterization activities for the first quarter of Fiscal Year 2002.

Activities Accomplished in Fiscal Year 1998
None.

Activities Planned for Fiscal Year 1999
None.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 12

Grace Road Site, 631-22G

Operable Unit 12 of the Upper Three Runs Watershed consists of one unit: the Grace Road Site. A no action Record of Decision (ROD) was issued for this unit on April 22, 1997.

Description

The Grace Road Site (631-22G) is located about 800 feet east of Road 2, 0.8 miles from the intersection of Road C and Road 2 and 0.8 miles south of B Area. Examination of photographic evidence associated with the Grace Road Site indicates that in January 1951, the unit was part of a larger active agriculture site known as the Grace Family Farm. The Grace Road Site appears to be located on the southern edge of a group of cultivated fields. A rapid transition in land use occurred about this time and aerial photography of the area four months later indicates the entire southwest corner of the farm had been transformed into a storage and laydown area for equipment to support B-Area construction activity.

The Grace Road Site consists of numerous concrete slabs, brick foundations, and spoil debris. Small mounds of concrete, bricks, shingles, and large concrete blocks, which appear to be pieces of a bridge, were placed at the unit. The unit also has numerous drums and cans of varying sizes. There is no evidence of any recent disposal activity here or of a more widespread disposal activity. As a result of the remedial investigation, no constituents of concern were identified.

A unit-screening program at the Grace Road was completed in March 1990. All compounds detected were either less than or near background levels, or barely exceeded detection limits. All soil substance concentrations were significantly less than available U.S. EPA health-based action levels. Soil-gas sampling data, generated in March and April 1988, indicated the soils contained trace levels of chlorohydrocarbons. Also, five samples were found to have elevated levels of methane, which could be attributed to the natural decay of plant and animal material.

Based on the available literature and screening data, there is no evidence that hazardous substances have been managed or are present at the Grace Road unit. As a result, no further field investigation is required and no assessment sampling will be conducted. No remedial action is required for this unit.

Activities Accomplished Prior to Fiscal Year 1998

The Revision.0 RFI/RI Work Plan recommending No Further Action was received by U.S. EPA and SCDHEC on January 9, 1991. U.S. EPA agreed with the recommendation in a letter received on November 8, 1991. Subsequently, SRS prepared a Revision.0 Proposed

Plan that was received by U.S. EPA and SCDHEC on May 29, 1992.

SCDHEC submitted comments on the Revision.0 RFI/RI Work Plan that SRS received on January 25, 1994. The three Parties held a comment resolution meeting on the Revision.0 RFI/RI Work Plan in February 1994. Based on the outcome of the comment resolution meeting, the three Parties recognized the need to extend the due date for the submittal of the Revision.1 RFI/RI Work Plan in April 1994. U.S. EPA and SCDHEC granted the extension in their letter dated May 5, 1994. Surface sampling was conducted at the unit and soil borings were completed in August 1994. During July and August 1994, further discussions were held with U.S. EPA and SCDHEC regarding the need to revise the work plan for Grace Road. It was decided that no revision was needed and that SRS would submit an RFI/RI report (including the baseline risk assessment) incorporating the new data.

SRS prepared and submitted an abbreviated RFI/RI Report and Baseline Risk Assessment at the request of U.S. EPA and SCDHEC during March 1995.

U.S. EPA and SCDHEC comments on the Revision.0 RFI/RI Report and Baseline Risk Assessment were received October 10, 1995, and July 6, 1995, respectively. SRS addressed the comments and U.S. EPA and SCDHEC approved the Revision.1.1 report on April 25, 1996, and August 15, 1996, respectively.

SRS prepared and submitted the Revision.0 Proposed Plan to U.S. EPA and SCDHEC on March 8, 1996. U.S. EPA and SCDHEC provided comments on the document on August 15, 1996, and April 25, 1996, respectively. SRS addressed the comments and submitted a Revision.1 Statement of Basis/Proposed Plan on August 5, 1996. U.S. EPA and SCDHEC approved the document on September 3, 1996, and August 29, 1996, respectively. The Statement of Basis/Proposed Plan was issued for a 45-day public comment period that was initiated on September 17, 1996.

SRS, U.S. EPA, and SCDHEC held a public meeting on the Statement of Basis/Proposed Plan on October 15, 1996. The 45-day public comment period closed on October 31, 1996.

SRS prepared and submitted the Revision.0 ROD to SCDHEC and U.S. EPA on November 13, 1996, stating that the remedy will consist of institutional controls. U.S. EPA approved the document on December 30, 1996. SCDHEC provided comments on the document on January 2, 1997. SRS addressed the comments and submitted a Revision.1 document on January 30, 1997. U.S. EPA and SCDHEC notified SRS that they approved the ROD for signing by their Agencies on February 27 and 21, 1997, respectively. U.S. EPA signed the ROD on March 27, 1997. SCDHEC, after issuing the Final RCRA Permit Modification for a 15-day appeal, signed the ROD on April 22, 1997. Consequently, the ROD was issued on April 22, 1997.

Activities Accomplished in Fiscal Year 1998
None; all activities associated with the unit have been completed.

Activities Planned for Fiscal Year 1999
None; all activities associated with the unit have been completed.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 13

Gunsite 113 Access Road, 631-24G

Operable Unit 13 of the Upper Three Runs Watershed consists of one unit: the Gunsite 113 Access Road. A No Action Record of Decision (ROD) was issued for this unit on April 22, 1997.

Description
Gunsite 113 Access Road (631-24G) is located in the northeast corner of SRS. This RFI/RI unit is located in a mature pine forest adjacent to the Gunsite 113 Access Road, approximately 300 feet from the point where Road 8 crosses the facility boundary.

The unit covers an area approximately 80-feet long by 50-feet wide. It consists of three "mounds" of dirt and construction rubble adjacent to a grassy area containing several dead pine trees. It appears to have been used as a surface disposal area for construction debris and/or spoil dirt. No documentation or records of any hazardous substances being managed or disposed of at this unit exist. This unit was not one of the original Solid Waste Management Units placed on the RCRA Facility Investigation list. It was voluntarily added in 1988 because of the presence of the dirt/construction debris piles, several dead trees, and positive soil-gas results. There are no constituents of concern at this unit.

Activities Accomplished Prior to Fiscal Year 1998
A Unit-Screening Program at the Gunsite 113 Access Road unit was completed in February 1990. All substances detected were less than unit-specific or regional background levels, or U.S. EPA health-based action levels. Soil-gas sampling data, generated in 1988, indicated trace levels of dichloroethylene and light hydrocarbons. These compounds were not detected during the Unit Soil Screening.

In February 1993, a ground penetrating radar survey was performed, but it gave no indication of buried objects or previous excavation activities at the unit. In addition, an extensive soil-gas survey was performed and no constituents of concern were detected. Based on the results of the unit screening, no further sampling or other remedial action is planned for the Gunsite 113 Access Road unit.

The Revision.0 RFI/RI Work Plan recommending no further action at the unit was received by U.S. EPA and SCDHEC on September 21, 1990. U.S. EPA approved the Revision.0 RFI/RI Work Plan and its no further action recommendation on June 5, 1991. Subsequently, SRS prepared a No Further Action Proposed Plan that was received by U.S. EPA and SCDHEC on November 28, 1992. SCDHEC did not agree with the no further action recommendation and submitted comments on the Revision.0 RFI/RI Work Plan that were received December 1, 1992. SRS subsequently revised the work plan and submitted a Revision.1 RFI/RI Work Plan to U.S. EPA and SCDHEC on July 15, 1993. On August 16, 1993, U.S. EPA declared the Federal Facility Agreement effective and issued an Appendix D for Fiscal Year 1994. Within that appendix was the commitment to finalize a ROD for Gunsite 113 by September 30, 1994. SRS prepared and submitted an abbreviated RFI/RI Report and Baseline Risk Assessment at the request of U.S. EPA and SCDHEC on July 28, 1995.

U.S. EPA and SCDHEC comments on the Revision.0 RFI/RI and Baseline Risk Assessment Report were received February 2, 1996, and December 21, 1995, respectively. SRS addressed the comments and submitted the Revision.1 report to U.S. EPA and SCDHEC on April 18, 1996. U.S. EPA and SCDHEC approved the document on August 15, 1996, and May 21, 1996, respectively.

SRS prepared and submitted the Revision.0 Proposed Plan to U.S. EPA and SCDHEC on May 19, 1996. U.S. EPA and SCDHEC provided comments on the document on August 2, 1996, and July 1, 1996, respectively. SRS addressed the comments and submitted a Revision.1 Statement of Basis/Proposed Plan on August 5, 1996. U.S. EPA and SCDHEC approved the document on September 3, 1996, and August 29, 1996, respectively.

The Statement of Basis/Proposed Plan was issued for a 45-day public comment period that was initiated on September 17, 1996.

SRS, U.S. EPA, and SCDHEC held a public meeting on the Statement of Basis/Proposed Plan on October 15, 1996. The 45-day public comment period closed on October 31, 1996.

SRS prepared and submitted the Revision.0 ROD to SCDHEC and U.S. EPA on November 13, 1996, specifying institutional controls as the remedy. U.S. EPA and SCDHEC provided comments on the document on January 14 and January 2, 1997, respectively. SRS addressed the comments and submitted a Revision.1 document on February 6, 1997. U.S. EPA and SCDHEC notified SRS that they approved the ROD for signing by their Agencies on February 25 and 21, 1997, respectively. U.S. EPA signed the ROD on March 27, 1997. SCDHEC, after issuing the Final RCRA Permit Modification for a 15-day appeal, signed the ROD on April 22, 1997. Consequently, the ROD was issued on April 22, 1997.

Activities Accomplished in Fiscal Year 1998
None; all activities at this unit are complete.

Activities Planned for Fiscal Year 1999
None; all activities at this unit are complete.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 14

Gunsite 720 Rubble Pit, 631-16G

Operable Unit 14 of the Upper Three Runs Watershed consists of one unit: the Gunsite 720 Rubble Pit. A No Action Record of Decision (ROD) was issued for this unit on April 22, 1997.

Description
The Gunsite 720 Rubble Pit Unit is located on the west side of SRS. This RFI/RI unit is located approximately 300-feet west of SC Hwy. 125, 170-feet north of Road A-2, and 1.5 miles from the nearest site boundary.

A former anti-aircraft gun emplacement, the Gunsite 720 Rubble Pit consists of an open area covered with natural shrub growth and pine trees. The unit encompasses approximately 25,000 square feet. Two concrete slabs are located within the cleared area. Nine 30-gallon drums were found partially buried at the unit. The drums have since been removed from the unit. There is no evidence or documentation of any hazardous substances being managed or disposed of at this unit. There are no constituents at this unit.

Activities Accomplished Prior to Fiscal Year 1998
A unit-screening program at the Gunsite 720 Rubble Pile was completed in February 1990. All compounds detected were either less than or near background levels, or barely exceeded detection limits. All soil substance concentrations were significantly less than available U.S. EPA health-based action levels. Soil-gas sampling data, generated in 1988, indicated the soils contained no chlorinated solvents. Magnetometer and ground penetrating radar surveys conducted in 1986 and 1989 indicated the possible presence of debris. Trenching at the unit revealed no buried tanks or other objects of significance.

Based on the available literature and screening data, there is no evidence that hazardous substances have been managed or are present at the Gunsite 720 Rubble Pile. As a result, no further field investigation is required and only limited confirmation sampling is anticipated. No remedial action is planned for this unit.

The Revision.0 RFI/RI Work Plan recommending no further action at the unit was

received by U.S. EPA and SCDHEC on October 11, 1990. U.S. EPA approved the Revision.0 RFI/RI Work Plan and its no further action recommendation on June 6, 1991. Subsequently, SRS prepared a No Further Action Proposed Plan that was received by U.S. EPA and SCDHEC on November 28, 1992. SCDHEC submitted comments on the Revision.0 RFI/RI Work Plan. The comments were received on December 28, 1992. SCDHEC did not agree with the no further action recommendation and submitted comments on the Revision.0 RFI/RI Work Plan that were received December 28, 1992. SRS subsequently revised the work plan and submitted a Revision.1 RFI/RI Work Plan to U.S. EPA and SCDHEC on May 1, 1993. On August 16, 1993, U.S. EPA declared the FFA effective and issued an Appendix D for Fiscal Year 1994. The appendix contained the commitment to finalize a ROD for the Gunsite 720 by September 30, 1994.

A ground penetrating radar and electromagnetic survey were performed in early 1993. No major debris or tanks were located. The surveys were performed to confirm that the 30-gallon drums had been removed. SCDHEC provided comments on the Revision.0 RFI/RI Work Plan in January 1993 and requested further sampling at the unit. In May 1993, SRS submitted an addendum to the Revision.0 RFI/RI Work Plan, provided additional ground penetrating radar data, and recommended soil sampling at two locations with a maximum of eight samples to be taken. The samples are to confirm that the tanks and drums excavated from the unit did not leak and that no residuals remain.

U.S. EPA and SCDHEC comments on the Revision.0 RFI/RI report and Baseline Risk Assessment were received February 21, 1996, and December 21, 1995, respectively. SRS addressed the comments and submitted the Revision.1 report to U.S. EPA and SCDHEC on April 18, 1996. U.S. EPA and SCDHEC approved the document on August 15, 1996, and May 21, 1996, respectively.

SRS prepared and submitted the Revision.0 Proposed Plan to U.S. EPA and SCDHEC on May 19, 1996. U.S. EPA and SCDHEC provided comments on the document on August 2, 1996, and July 1, 1996, respectively. SRS addressed the comment and submitted a Revision.1 Statement of Basis/Proposed Plan on August 5, 1996. U.S. EPA and SCDHEC approved the document on September 3, 1996, and August 29, 1996, respectively.

The Statement of Basis/Proposed Plan was issued for a 45-day public comment period that began on September 17, 1996.

The SRS, U.S. EPA, and SCDHEC held a public meeting on the Statement of Basis/Proposed Plan on October 15, 1996. The 45-day public comment period closed on October 31, 1996.

SRS prepared and submitted the Revision.0 ROD to SCDHEC and U.S. EPA on November 13, 1996, specifying institutional controls as the remedy. U.S. EPA and

SCDHEC provided comments on the document on January 14 and January 2, 1997, respectively. SRS addressed the comments and submitted a Revision.1 document on February 6, 1997. U.S. EPA and SCDHEC notified SRS that they approved the ROD for signing by their Agencies on February 25 and 21, 1997, respectively. The U.S. EPA signed the ROD on March 27, 1997. SCDHEC, after issuing the Final RCRA Permit Modification for a 15-day appeal, signed the ROD on April 22, 1997. Consequently, the ROD was issued on April 22, 1997.

Activities Accomplished in Fiscal Year 1998
None; all activities at this unit are complete.

Activities Planned for Fiscal Year 1999
None; all activities at this unit are complete.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 15

H-Area Canyon Groundwater, NBN

Operable Unit 15 of the Upper Three Runs Watershed includes the groundwater beneath the H-Area Canyon. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The H-Area Canyon Groundwater consists of the groundwater underlying H-Area Canyon Facility. The groundwater was impacted by operation of the H-Area Canyon and surrounding support facilities. FFA Appendix E .3, Field Start, ROD Issuance and RA Start Dates for Current Fiscal Year +2, lists the field start of characterization activities for the first quarter of Fiscal Year 2008.

Activities Accomplished Prior to Fiscal Year 1998
None.

Activities Accomplished in Fiscal Year 1998
None.

Activities Planned for Fiscal Year 1999
None.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 16

H-Area Coal Pile Runoff Basin, 289-H

Operable Unit 16 of the Upper Three Runs Watershed consists of one unit: the H-Area Coal Pile Runoff Basin. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
The H-Area Coal Pile Runoff Basin (289-H) is located approximately 1,000 feet east of the H-Area coal storage site.

Steam and electricity for the SRS activities were produced by seven coal-fired power plants located in the A, C, D, F, H, K, and P Areas. Coal was stored at each of the seven power plant locations. Surface runoff from the coal storage piles was discharged to surface streams until the National Pollution Discharge Elimination System (NPDES) took effect in 1977. To meet NPDES discharge requirements and in response to SCDHEC requests, seven unlined earthen containment basins were constructed near each coal storage location to intercept, stabilize, and treat surface runoff from the coal piles. All seven coal pile runoff basins were constructed between 1978 and 1981. The C- and F-Area basins have been inactive since late 1985 when the coal piles at these areas were removed.

Constituents of concern within the basins include low pH, sulfate, iron, manganese, magnesium, aluminum, cadmium, chromium, and arsenic.

Soil borings were drilled at each of the basins during June and July 1988. Monitoring data at each unit indicate the presence of the above mentioned compounds and metals in the groundwater and soils.

Activities Accomplished Prior to Fiscal Year 1998
The Revision.0 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on October 23, 1990. After receiving U.S. EPA's comments for Revision.0 RFI/RI Work Plan on October 30, 1991, SRS revised the work plan and submitted the Revision.1 RFI/RI Work Plan, which U.S. EPA and SCDHEC received January 29, 1992. Both the Revision.0 and the Revision.1 RFI/RI Work Plans addressed all seven of the SRS Coal Pile Runoff Basins. Since that submittal, U.S. EPA, SCDHEC, and SRS have developed the operable units and the seven basins will be addressed either individually, or with the other RCRA/CERCLA units in their Operable Unit. FFA Appendix E.3 lists the field start of characterization activities for the fourth quarter of Fiscal Year 1998.

Activities Accomplished in Fiscal Year 1998
None. FFA Appendix E.3 lists the field start of characterization activities for the Fourth Quarter Fiscal Year 2008.

Activities Planned for Fiscal Year 1999
None. The FFA Appendix E.3 lists the field start of characterization activities for the Fourth Quarter Fiscal Year 2008.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 17

H-Area Inactive Hazardous Waste Transfer Lines from Building to the Security Fence, 081-H

Operable Unit 17 of the Upper Three Runs Watershed consists of a single unit: the H-Area Inactive Process Sewer Lines from Building to the Security Fence (081-1H). However, this unit and Operable Unit 11 of the Fourmile Branch Watershed, the F-Area Inactive Process Sewer Lines from Building to the Security Fence (081-F), are addressed in one work plan. Both units are listed in FFA Appendix C, RCRA/CERCLA Units List.

To prevent any possible confusion, it should be noted that a unit with a similar sounding name, the H-Area Inactive Process Sewer Lines from the Security Fence to the H-Area Hazardous Waste Management Facility (HWMF) (904-44G, -45G, -46G, and -56G), is a RCRA-regulated unit under the terms of the FFA.

Description

The F- and H-Area Inactive Hazardous Waste Transfer Lines are throughout the whole of F and H Area. The primary sewer lines were used from 1955 to 1982. The process sewers, 4.6 miles in total length, were used to transport liquid wastes from Separations, Tritium, and Waste Management Facilities to their respective seepage basins (gravity fed). There are more than 8,000 feet of various types and sizes of lines from Buildings FB-221 and HB-221 to the security fence, roughly 2,000 feet in F Area and 6,000 feet in H Area. The majority of the lines are made of vitrified clay. Portions of lines are slip-lined with active lines and some with inactive lines. Based on soil sampling, the constituents of concern include low-levels of radionuclides, metals, nitrates, and low-pH liquids. Sample results for metals are less than toxicity characteristic leaching procedure regulatory limits.

Construction of a security system for Separations facilities has allowed SRS to propose and conduct soil sampling. Sample results indicate no significant soil contamination problems.

Activities Accomplished Prior to Fiscal Year 1998

In 1988, SRS environmental engineers took preliminary soil samples near the inactive Hazardous Waste Transfer Lines outside the security fence. The samples indicated low levels of radioactive materials and traces of metals, nitrates, and low-pH liquids indicating leaks in the sewer lines.

The Revision.0 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on March 31, 1992. SCDHEC comments were received on December 22, 1993. FFA Appendix E.3 lists field start of characterization activities for first quarter of Fiscal Year 2002.

Activities Accomplished in Fiscal Year 1998

None.

Activities Planned for Fiscal Year 1999
None.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 18

Low Level Radioactive Waste Disposal Facility (non-hazardous waste disposal portion of 643-7E), 643-7E

Operable Unit 18 of Upper Three Runs Watershed consists of one unit: the RCRA portions of the Low-Level Radioactive Waste Disposal Facility (LLRWDF). This unit is listed in the FFA Appendix C, RCRA/CERCLA Units List.

Description
The Burial Ground Complex (BGC) occupies approximately 194 acres in the central part of SRS between F and H Separations Areas. The BGC consists of several adjacent facilities that were former disposal sites for hazardous and radioactive wastes and spent solvents generated from plant processes. The BGC is divided into a northern area (size 118 acres) and a southern area (size 76 acres). The southern region is named the Old radioactive Waste Burial Ground (ORWBG) (643-E). It began receiving radioactive wastes in 1952 and was filled in 1972. The ORWBG also contains twenty-two underground tanks (650-01E - 22E), once used for the storage of spent radioactive solvents. By 1972, all radioactive waste disposal activities had moved to the northern area.

The northern area is called the Low-Level Radioactive Waste Disposal Facility (LLRWDF) (643-7E) and began initial waste receipt in 1970. A portion of the LLRWDF, the Mixed Waste Management Facility (MWMF), was closed in April 1991, utilizing a cap in accordance with an SCDHEC-approved RCRA Closure Plan. The RCRA status of the MWMF was necessitated by the inadvertent disposal of radioactively contaminated hazardous waste into the trenches. It was later determined that another portion of the LLRWDF had received radioactively contaminated hazardous wastes and is currently in the process of closure in accordance with a RCRA Closure Plan. However, there are other portions of the LLRWDF that have received low-level radioactive wastes, including Transuranic Waste Storage Pads (TRU Pads), Greater Confinement Disposal Engineered Trench and Boreholes, engineered trenches, and slit-trenches. These areas will be evaluated under the FFA program. The field start for this unit is scheduled for the First Quarter Fiscal Year 2010.

Activities Accomplished Prior to Fiscal Year 1998
None

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

UPPER THREE RUNS WATERSHED OPERABLE UNIT 19

M-Area Hazardous Waste Management Facility: A/M Area Groundwater Portion, 904-110

Operable Unit 19 of the Upper Three Runs Watershed consists of one unit: the A/M Area Groundwater Portion of the M-Area Hazardous Waste Management Facility (HWMF). This unit is included with the entry on FFA Appendix H and is entitled, M-Area HWMF (643-28G). Activities on this unit are SCDHEC-led RCRA actions.

Description
The M-Area HWMF (904-51G, and -112G) is located near the Fuel and Target Fabrication Facility within M-Area (300-Area). The nearest SRS boundary is approximately one mile northwest of the M-Area HWMF.

In 1954 manufacturing operations started in M-Area included aluminum-forming and metal finishing. Process wastewaters from these operations were discharged to a nearby stream known as Tims Branch. This wastewater contained slightly enriched uranium.

The M-Area Basin was an unlined, man-made depression (i.e., surface impoundment) constructed in 1958 to settle out and contain uranium and other metals discharged from aluminum-forming and metal-finishing operations. Since surface water flowed from this basin, it is classified as a settling basin rather than a seepage basin. Dimensions at the top of the berm were 331 feet by 279 feet. The sides sloped inward at about a 20-degree angle, giving bottom dimensions of approximately 280 feet by 230 feet. The depth of the basin, as constructed, was approximately 17 feet. The total original liquid capacity of the basin, allowing for a two-foot freeboard, was just under 8,000,000 gallons.

The settling area of the basin is estimated to be about two acres in size. An estimated 50% of all liquids that over-flowed from the basin ran to Lost Lake and seeped into the ground in this area. When normal process discharges to the basin were discontinued in July 1958, this area quickly dried up.

Lost Lake is approximately 25 acres in size. It is a natural, shallow depression that, prior to construction of the settling basin, was dry except during periods of heavy precipitation. Since diversion of process effluents to the basin in 1958, water accumulated in Lost Lake. Lost Lake had no outlet so all liquids entering the area either seeped into the ground or

evaporated. Beginning in 1985, process wastes from M-Area were diverted from the M-Area HWMF to the Liquid Effluent Treatment Facility, which is a permitted wastewater treatment facility.

The basin received process wastewater from M-Area production facilities from 1958 to July 1985. Although the concentration and quantity of chemicals in the process wastewater have varied over time, the identity of specified chemicals used in the process is well known. Various metal-degreasing solvents such as 1,1,1-trichloroethane, trichlorethylene (TCE), and perchloroethylene (PCE) have been used to clean metal components and organic phthalate compounds used as components in the lubricants for metal-forming and extrusion processes. These solvents are classified as F006 wastes and are the primary constituents of groundwater contamination in the A/M Areas, which are being remediated as part of the corrective action program.

Activities Accomplished Prior to Fiscal Year 1998

In 1980, SRS submitted a Part A Permit Application for M-Area Basin and received interim status designation. The following year groundwater contamination was identified beneath M-Area. A prototype/experimental groundwater recovery system began operation in 1983 in M Area with a 20-gpm air stripper linked to a single recovery well.

SRS upgraded the M-Area groundwater recovery system to a 50-gpm air stripper linked to a second and third recovery well in 1984. On September 30, 1984, SRS submitted the M-Area Closure Plan for the basin to SCDHEC.

In February 1985, the RCRA Part B Post-Closure Permit Application and groundwater/remediation of M-Area was submitted, and in April, a full scale recovery system with a 400-gpm air stripper and 11 recovery wells went into operation. In July, the amended M-Area Closure Plan was submitted to SCDHEC.

SRS began submitting quarterly groundwater monitoring reports for the M-Area HWMF in 1987. In March of that year, U.S. EPA and SCDHEC approved the closure plan. The RCRA Part B Post Closure Permit Application and a Hazardous Waste Permit were approved in September.

The M-Area Basin closure was initiated in April 1988. The closure of the M-Area HWMF consisted of dewatering, sludge stabilization, contaminated soils excavation, backfill into the basin, and placement of a RCRA cap and vegetative cover over the basin area. There is no basin liner system associated with the M-Area HWMF. The only liners used for closure are the kaolin clay and the Hypalon[a] liner located below the drainage layer of the cap. Closure construction was completed in 1990.

In March 1990, SRS upgraded the full scale groundwater recovery system and the flow to the air stripper from 400 to 500 gpm, and in April the Corrective Action Plan in the Part B

Permit Application for Post-Closure was modified and submitted to SCDHEC. In 1991 the Vadose Zone Characterization was completed and the presence of dense non-aqueous phase liquids (DNAPLs) was confirmed in the groundwater below the M-Area Basin. SRS received closure certification for the M-Area Basin from SCDHEC on April 26, 1991.

On March 31, 1992, the 1992 RCRA Part B Permit Renewal Application (Revision.0) was submitted to SCDHEC in accordance with the regulatory requirement to update and resubmit permit applications every five years.

The 1992 RCRA Part B Permit Renewal Application (Revision.1) was submitted to SCDHEC in February, 1993. This modification addressed streamlining the current sampling/analysis program and quarterly groundwater reports and was approved during November 1993 (Revision.2). Revision.3 was approved during 1994.

During 1995, the closed M-Area Basin was inspected monthly in accordance with the Part B Permit Application for Post-Closure. The hydrogeologic framework M Area was completed and submitted in February. Additional characterization was completed in the Western Sector, Southern Sector, and Northern Sector of M Area, including aquifer flow tests in the Southern Sector. That information was used to develop the A/M Area Groundwater Quality Assessment Plan that was submitted in June 1995. This plan included updated master well lists and zone of capture maps. Support of the integrated demonstration site was continued along with the continued effort to develop new technologies through the Office of Technology Development Projects. Approval of the Groundwater Monitoring Optimization Plan, which reduced groundwater monitoring requirements for the area without the lost of sufficient groundwater plume definition, was gained in August. Groundwater monitoring reports were completed on time for all quarters of data. The M-1 Air Stripper, A-1 Air Stripper, and the Purged Water Disposal Station were all operational within their respective permit conditions during the year. The M-1 Air Stripper reached the two-billion-gallons-treated mark in November 1994. The A-1 Air Stripper recirculation system was hydro-tested and accepted, and construction of the A-2 Air Stripper and Catox Unit and the M-1 off gas treatment unit was initiated in Fiscal Year 1995.

Construction was completed and the start-up of the A-2 Air Stripper and Catox Unit began during Fiscal Year 1996. Several reports for the A/M Area were submitted including a format for a Electronic Database File, Hydrogeology and Water Quality Report for the Met Lab and Influent Process Sewer Line, a List of Background Wells for the Met Lab, a Crouch Branch Characterization Report, a Met Lab CAP Status Report #1, and two Southern Sector CAP Status Reports. Reports for A/M Area submitted include Hydrogeology and Water Quality Report for each sector of A/M Area, a CAP for A/M Area, and a Performance Evaluation of A/M Area CAP. A CAP Status Report #1 was submitted for the Western Sector. Demonstrations of DNAPL investigation,

characterization and remediation techniques and instruments were performed during Fiscal Year 1996.

Over 80,000 pounds of solvents were removed from the soil and groundwater during Fiscal Year 1996. The M-1 Off-Gas Treatment Unit became fully functional. Dense non-aqueous phase liquids (DNAPL) characterization and remediation demonstration program took place. Over 480 pounds of DNAPL were destroyed in a 5-day test demonstrating in situ chemical oxidation aimed at DNAPL destruction. Startup of the in situ bioremediation facility located along the abandoned process sewer line was completed.

The Oleofilter Unit (a DNAPL treatment facility) was operated intermittently and in June 1997, SCDHEC granted SRS a 1-year extension of the wastewater permit for this unit. The 311-M tank farm was removed to allow for future characterization beneath this facility. Cone Penetrometer Technology and Rotosonic drilling efforts were initiated to determine the extent of soil contamination. The operation of the M-1 and A-2 Air Stripper continued.

In the Southern Sector, two recirculation wells were operated to demonstrate remediation efficiencies. Corrective Action Plans for this sector were submitted to SCDHEC, noting that a total of 12 recirculation wells were needed for the first phase of remediation. Ninety-five percent of the electrical system for this project was completed during Fiscal Year 1997.

In April 1997, a correction action plan for the Western Sector was submitted to SCDHEC as well as a proposal the recirculation well design for groundwater treatment. The United States Forestry Service has cleared a 1/4 mile corridor to support the groundwater treatment system.

Semi-Annual sampling and reporting was conducted for the A/M Area Groundwater Portion of the M-Area HWMF.

During the Fiscal Year 1997, over 100,000 pounds of solvents were removed from the soil and groundwater. More than 500,000 pounds of solvents have been removed since the start of remediation through Fiscal Year 1997.

Activities Accomplished in Fiscal Year 1998

Vadose zone and DNAPL characterization activities were conducted at the M-Area Basin and A14 Outfall Areas. Assessment of the Northern Sector Plume, (groundwater contamination near site boundary) was completed. DNAPL and Lithologic Zone Plume characterizations were also completed. The hydrophobic lance technology (new DNAPL technology) was successfully deployed. Operational testing of the olefiltration system was completed and in situ oxidation of DNAPL contamination was successfully deployed. Corrective action plans for the Northern Sector and Western Sector Plumes and the

vadose zone were submitted.

A field trial using cone penetrometer-based Raman spectroscopy was successful as DNAPL contamination was detected. On June 10, 1998, the A/M Area Vadose Zone Monitoring Plan was submitted to SCDHEC. The Raman Field Evaluation Report, "Development and Deployment for Innovative DNAPL Characterization Methods", using soil plug analysis data for the cone penetrometer-based Raman evaluation is complete. Rotosonic drilling activities for DNAPL characterization have been completed. Northern Sector characterization began on August 31, 1998. Drilling was initiated in the Southern Sector for the installation of ten additional recirculation wells. Five Soil borings were completed in the Western Sector as part of the effort to determine if recirculation well technology is appropriate for groundwater remediation in this area.

Activities Planned for Fiscal Year 1999

Vadose Zone characterization will be conducted in the Central and Northern Sector, A-014 outfall, A-01 outfall and drainage area, Bldg. 773-A (backside of the building) and associated buildings in the vicinity of existing solvent contamination in the groundwater. Work on data collection and document development to support scheduled renewal of the Part B Permit. Complete installation of new recirculation wells and operation of all twelve wells is planned in Southern Sector. Soil boring and Simulprobe data will be used to determine a remediation technology in the Western Sector.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 20

M-Area Hazardous Waste Management Facility: M-Area Settling Basin, 904-51G

Operable Unit 20 of the Upper Three Runs Watershed consists of one unit: the M-Area Settling Basin. This unit is included with the entry in FFA Appendix H and is entitled M-Area Hazardous Waste Management Facility (904-51G, 904-112G). Activities on this unit are SCDHEC-led RCRA actions.

Description

The M-Area Hazardous Waste Management Facility (HWMF) (904-51G, and -112G) is located near the Fuel and Target Fabrication Facility within M Area (300-Area). The nearest SRS boundary is approximately one mile northwest of the M-Area HWMF. In 1954 manufacturing operations including aluminum-forming/metal finishing started in M Area. Process wastewaters from these operations were discharged to a nearby stream known as Tims Branch. This wastewater contained slightly enriched uranium.

The M-Area Basin was an unlined, man-made depression (i.e., surface impoundment) constructed in 1958 to settle out and contain uranium and other metals discharged from aluminum-forming/metal finishing operations. Since surface water flowed from this basin, it is classified as a settling basin rather than a seepage basin. Dimensions at the top of the

berm were 331 feet by 279 feet. The sides sloped inward at about a 20-degree angle giving bottom dimensions of approximately 280 feet by 230 feet. Depth of the basin, as constructed, was approximately 17 feet. The total original liquid capacity of the basin, allowing for a two-foot freeboard, was just under 8,000,000 gallons. The settling area of the basin is estimated to be about two acres in size. An estimated 50% of all liquids that over flowed from the basin ran to Lost Lake and infiltrated the ground in this area. When normal process discharges to the basin were discontinued in July 1958, this area quickly dried up.

Lost Lake is approximately 25 acres in size. It is a natural shallow depression that, prior to construction of the settling basin, was dry except during periods of heavy precipitation. Since diversion of process effluents to the basin in 1958, water accumulated in Lost Lake. Lost Lake had no outlet so all liquids entering the area either seeped into the ground or evaporated.

Beginning in 1985, process wastes from the M-Area were diverted from the M-Area HWMF to the Liquid Effluent Treatment Facility that is a permitted wastewater treatment facility. The basin received process wastewater from M-Area production facilities from 1958 to July 1985. Although the concentration and quantity of chemicals in the process wastewater have varied over time, the specific chemicals used in the process are well known. Various metal-degreasing solvents such as 1,1,1-trichloroethane, trichloroethylene (TCE), and tetrachloroethylene (PCE) have been used to clean metal components and organic phthalate compounds used as components in the lubricants for metal-forming and extrusion processes. These solvents are classified as F006 wastes and are the primary groundwater constituents being remediated as part of the corrective action program.

Activities Accomplished Prior to Fiscal Year 1998

In 1980, SRS submitted a Part A Permit Application for M-Area Basin and received interim status designation. On September 30, 1984, SRS submitted the M-Area Closure Plan for the basin to SCDHEC. In February 1985, the RCRA Part B Post-Closure Permit Application and groundwater/remediation of M Area was submitted. In July, the amended M-Area Closure Plan was submitted to SCDHEC. In March of that year, U.S. EPA and SCDHEC approved the closure plan. The RCRA Part B Post-Closure Permit Application and a Hazardous Waste Permit were approved in September.

Closure of the M-Area Basin was initiated in April 1988. The closure of the M-Area HWMF consisted of dewatering, sludge stabilization, contaminated soils excavation, backfill into the basin, and placement of a RCRA cap and vegetative cover over the basin area. There is no basin liner system associated with the M-Area HWMF. The only liners used for closure are the kaolin clay and the Hypalon[a] liner located below the drainage layer of the cap. Closure construction was completed in 1990.

In April the Corrective Action Plan in the Part B Permit Application for Post-Closure was modified and submitted to SCDHEC. In 1991 the Vadose Zone Characterization was completed and the presence of dense non-aqueous phase liquids (DNAPLs) was confirmed in the groundwater below the M-Area Basin. SRS received closure certification for the M-Area Basin from SCDHEC on April 26, 1991.

On March 31, 1992, the 1992 Revision.0 RCRA Part B Permit Renewal Application was submitted to SCDHEC in accordance with the regulatory requirement to update and resubmit permit applications every five years. The 1992 RCRA Part B Permit Renewal Application Revision.1 was submitted to SCDHEC in February, 1993. This modification addressed streamlining the current sampling/analysis program and quarterly groundwater reports and was approved during November 1993 (Revision.2). Revision 3 was approved during 1994. During 1995, the closed M-Area Basin was inspected monthly in accordance with the Part B Permit Application for Post-Closure. The Hydrogeologic Framework of M Area was completed and submitted in February. Groundwater monitoring reports were completed on time for all quarters of data.

Activities Accomplished in Fiscal Year 1998
Surveillance and cap maintenance were ongoing in Fiscal Year 1998.

Activities Planned for Fiscal Year 1999
Surveillance and cap maintenance will be ongoing in Fiscal Year 1999.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 21

M-Area Hazardous Waste Management Facility: Vadose Zone Portion

Operable Unit 21 of the Upper Three Runs Watershed consists of one unit: the vadose zone (unsaturated zone) underlying the M-Area Hazardous Waste Management Facility. This unit is included with the entry on FFA Appendix H, entitled M-Area Hazardous Waste Management Facility (643-28G). Activities on this unit are SCDHEC-led RCRA actions.

Description
The vadose zone is a media-specific operable unit within the Upper Three Runs Watershed. The A/M Area is located in the triangle formed by SRS Roads 1, 2, and C. The nearest SRS boundary is 0.3 miles. The area geology is consolidated, unsorted sediments, and the vadose zone is approximately 120 - 140 feet in thickness. From the early 1950s to the mid-1980s, waste effluents (primarily containing degreasing solvents) used in the manufacturing process in the A/M Area were disposed in the area process sewer systems. The primary sources of vadose zone contamination are the A-014 Outfall, the 321-M Solvent Storage Area, the M-Area Process Sewer, and the M-Area HWMF (the Settling Basin). The disposal practices eventually allowed some of the solvent to

enter the subsurface, contaminating the vadose zone.

Activities Accomplished Prior to Fiscal Year 1998
Four vadose units that were purchased in Fiscal Year 1994 were installed and start-up occurred during Fiscal Year 1995. A fifth unit was obtained from the integrated demonstration site and outfitted to operate as a full-scale remediation unit. All units met the air quality permit limits as reported in the stack test report. Details of the corrective action operating progress of the units were reported in the M-Area Groundwater Quarterly Reports.

A Phase II Corrective Action Plan was submitted in Fiscal Year 1996. SRS initiated the installation of the control system on 4 of the units, allowing for automated operational capabilities.

An additional unit was installed and put into operation during Fiscal Year 1997, bringing the total to six operational units. Monitoring of the correction action efficiency of the units continued to ensure operation was within Air Quality Permit limitations. In January 1997, SCDHEC granted approval to increase air emissions on three of the units to increase contamination removal rates. In March 1997, SRS submitted a report entitled, Extent of the A/M Area Vadose Zone Contamination Monitoring and Corrective Action, to SCDHEC.

Activities Accomplished in Fiscal Year 1998
SRS completed Zone of Capture Assessments on the four large systems. To allow for expansion of the Vadose Zone remediation, SRS will expand characterization within the area. Stack modifications and catalyst changeouts have been completed. In September 1998, two Soil Vapor Extraction Units (ID Numbers 5M and 8M) were shut down for three months. Consistent with the Part B Permits, once a unit produces extracts less than 40 pounds of solvent contamination per week, it can be shut down for three months, restarted, and evaluated for permanent shutdown.

Activities Planned for Fiscal Year 1999
Continued vadose zone remediation at the A/M Areas is planned for Fiscal Year 1999.

SRS will submit a modification to the Air Quality Control Permit to discontinue operation of the catalytic oxidation off-gas treatment system on all six soil vapor extraction units.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 22

M-Area Hazardous Waste Management Facility: M-Area Settling Basin Inactive Process Sewers to Manhole 1 Portion, 081-M

Operable Unit 22 of the Upper Three Runs Watershed consists of one unit: the M-Area

Settling Basin Inactive Process Sewers to Manhole 1. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
The M-Area Setting Basin Inactive Process Sewers to Manhole 1 (NBN) run throughout the whole of the M Area within the perimeter fence. The line consists of three sections of process sewer about 1,600 feet in total length. It is made of vitrified clay pipe of various diameters that conveyed process wastewater from Buildings 313-M, 321-M, and 320-M to the M-Area Settling Basin. In 1985, the industrial wastewaters were diverted to an effluent treatment facility in M Area. The sewer lines were addressed by regulators as a separate waste unit.

Activities Accomplished Prior to Fiscal Year 1998
The Revision.0 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on March 7, 1992. A soil-gas survey was completed at the unit in August of 1992.

Activities Accomplished in Fiscal Year 1998
None. The FFA Appendix E.3 states that Field Start of characterization activities is scheduled for the third quarter of Fiscal Year 2007.

Activities Planned for Fiscal Year 1999
None. The FFA Appendix E.3 states that Field Start of characterization activities is scheduled for the third quarter of Fiscal Year 2007.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 23

Met Lab Basin/Carolina Bay, 904-110

Operable Unit 23 of Upper Three Runs Watershed consists of two units: the 723-A Met Lab Basin and the Carolina Bay. This operable unit is listed in FFA Appendix H. Activities on this unit are SCDHEC-led RCRA actions.

Description
The Met Lab Basin/Carolina Bay (904-110G) is located in the eastern part of the A Area (700-Area). It is located 1.4 miles away from the SRS boundary to the northwest of the facility. In all other directions, the SRS property boundary lies beyond a 4-mile radius of the unit. The closest surface water body is Tims Branch, a tributary of Upper Three Runs, located approximately 4,400 feet east-southeast of the unit.

The unit consists of the process sewer line that runs from the fence to the basin, the Met Lab Basin, the drainage outfall to the Carolina Bay, and the Carolina Bay itself. The Met Lab Basin is a small, unlined, man-made surface impoundment approximately 5 feet deep. Dimensions at the top of the basin are approximately 60 by 120 feet. The basin sides slope

inward at a nearly 25 degree angle (from the horizontal), giving the bottom dimensions of approximately 40 by 100 feet. The resulting volume capacity of the basin is approximately 27,600 cubic feet. The Carolina Bay is a marshy, oval-shaped, natural depression that covers approximately 6 acres and is adjoined to the Met Lab Basin via the drainage outfall.

The Met Lab Basin was constructed in 1956. It received effluent consisting primarily of noncontact cooling water and small quantities of laboratory rinse water (containing small quantities of metals, solvents, and caustics) from the Met Lab. Effluent was discharged continuously at approximately 1,000 gallons per day throughout the operating period of the basin, which was 1956 to 1985. During periods of heavy rainfall, wastewater and surface water runoff overflowed the Met Lab Basin via a drainage outfall (A-007) and were discharged to the adjacent Carolina Bay.

The Carolina Bay also received process effluent from the A/M Area powerhouse (a maximum of 300,000 gallons per day) through Outfall A-008. Currently this powerhouse effluent is being collected and transported by tanker truck to another onsite powerhouse location for discharge. Effluent into the A-008 outfall from the A/M Area powerhouse consisted of stormwater overflow, powerhouse yard and floor drains effluent or discharge, and cooling water from pumps. All other effluent from the powerhouse is tanked and shipped to D Area for disposal. Stormwater runoff from the spare parts machinery storage area presently flows into the Carolina Bay at the A-009 outfall. There are no plans to divert this flow.

The unit received F001, F003, F007, and D011 waste. F001 waste includes spent halogenated solvents used in degreasing (trichloroethylene, 1,1,1-trichloroethane, and carbon tetrachloride). F003 waste includes spent nonhalogenated solvents (acetone). F007 waste consists of spent cyanide plating bath solution. Extract from D011 waste obtained using the Extraction Procedure toxicity test contains silver in concentrations greater than 5 mg/L.

The release of hazardous waste from the Met Lab (Building 723-A) to the Met Lab Basin was discontinued in 1983. Since 1983, hazardous wastes from the Met Lab have been stored at a permitted hazardous waste facility in the central portion of SRS while awaiting final treatment and disposal. All discharges to Met Lab Basin were terminated on November 8, 1985.

Activities Accomplished Prior to Fiscal Year 1998

Groundwater sampling was begun at the Met Lab Basin/Carolina Bay unit to monitor the constituents released to the groundwater in 1984. Since that time, SRS has added numerous monitoring wells around the unit and within the entire A/M Area to comply with RCRA requirements for groundwater. Also, during 1984, SRS began a characterization program of the Met Lab Basin and a portion of the process sewer line.

In 1985, a portion of the process sewer line was plugged and abandoned in place. In addition, the overflow pipe from the basin to the Carolina Bay was excavated after discharges to the basin were stopped. In 1988, the first phase of characterizing the Carolina Bay was initiated. Characterization included preliminary sampling to identify constituents and areas of concern within the perimeter of the bay.

A Technical Data Summary on the Met Lab Basin was submitted to SCDHEC through a consent decree. The decree identified the unit as being subject to RCRA. In 1989, the coal-fired power plant process effluent received from the A-Area powerhouse since 1953 was discontinued from flowing to the Carolina Bay through Outfall A-008. During this same year, the RCRA Part B Permit Application (Rev. 0) was submitted to SCDHEC.

The unit experienced a great deal of activity in 1990. The RCRA Groundwater Quality Assessment Plan for the Metallurgical Laboratory Hazardous Waste Management Facility (HWMF) (Rev. 0) was submitted to SCDHEC, and the initial characterization of Carolina Bay was completed. The RCRA Groundwater Quality Assessment Plan for the Metallurgical Laboratory (HWMF) (Rev. 1) was resubmitted to SCDHEC regarding the installation of eight additional monitoring wells. Finally, the pre-closure sampling of the basin liquids (rainwater) was conducted to determine if the fluid could be disposed through a National Pollution Discharge Elimination System (NPDES) outfall under a temporary permit modification.

In 1990, SRS addressed a Notice of Deficiency (NOD) from SCDHEC. The NOD addressed inadequacies noted within the revision of the permit application regarding the monitoring well network and the hydrogeologic characterization of the Met Lab HWMF.

In 1991, SRS revised and resubmitted the RCRA Groundwater Quality Assessment Plan for the Metallurgical Laboratory (HWMF)(Rev. 2) to SCDHEC in response to comments. The second phase of the characterization of the Carolina Bay was conducted in May to determine the extent of contamination, and in June, the RCRA Groundwater Quality Assessment Plan for the Metallurgical Laboratory (HWMF) (Rev. 2) was approved by SCDHEC. Further, a phased Closure Plan (Rev. 5) for the HWMF was approved by SCDHEC. Construction to close the Met Lab Basin began in September 1991, and dewatering began in November 1991.

The Draft Carolina Bay Technical Data Summary was submitted to SCDHEC on November 25, 1991. In December 1991, the RCRA Part B Permit Application (Rev. 1) was re-submitted to SCDHEC. All SCDHEC comments cited in the NOD were addressed. In response to the NOD, additional wells were installed to monitor the Metallurgical Laboratory HWMF and a detailed hydrogeologic characterization was prepared for Revision. 1 of the permit application. In May 1992, closure construction of the Metallurgical Laboratory Basin was finished and closure of the Metallurgical

Laboratory Basin became official on May 11, 1992. The closure certification of the Metallurgical Laboratory HWMF Basin was submitted to SCDHEC on July 10, 1992.

The 1994 Annual Groundwater Monitoring Report for the Metallurgical Laboratory was submitted. Characterization activities for the Metallurgical Laboratory HWMF were finishing at the end of the Fiscal Year. The seven new monitoring wells installed in Fiscal Year 1994 were tested for comprehensive analysis, and the results are presented in the Groundwater Quarterly Reports. The Hydrogeologic Framework for the Metallurgical Laboratory Area was completed and submitted in February for approval.

A revision of the Carolina Bay Closure Plan was submitted in First Quarter Fiscal Year 1995 that included an Ecological Characterization of the Metallurgical Laboratory Basin/Carolina Bay. This revision had a no further action response as the preferred option.

SCDHEC issued the Part B Permit for the unit in October 1995. SCDHEC approved the Revision 2 of the Metallurgical Laboratory Basin/Carolina Bay Closure Plan on August 12, 1996. The plan granted a no further action at the Carolina Bay. Additionally, several reports were submitted during 1996, including a Hydrogeology and Water Quality Report for the Metallurgical Laboratory and Influent Process Sewer Line, a List of Background Wells for the Metallurgical Laboratory, and a Metallurgical Laboratory Corrective Action Plan (CAP) Status Report #1. Fiscal Year 1996 field activities for the Metallurgical Laboratory included continued characterization (phase II) via cone penetrometer testing and the installation of two recovery wells (adjacent to the basin). These wells will pump solvent-contaminated groundwater to the existing M-1 Air Stripper. Tie-in to the stripper will be performed at a later date. Sampling of monitoring wells continued in accordance with RCRA Part B permit requirements.

SRS completed activities for the Metallurgical Laboratory project that included report generation for the cone penetrometer technology work, a submittal of a Corrective Action Plan outlining soil and groundwater remediation, and continued monitoring and reporting. Vadose zone remediation has been accelerated by the installation of 20 wells. A device known as a Baroball that allows for passive volatile organic compounds removal was affixed to the wells. A Temporary Authorization was submitted to SCDHEC to operate these wells.

Activities Accomplished in Fiscal Year 1998

On April 29, SCDHEC granted Temporary Authorization to install Baroballs on 19 existing wells for vadose zone treatment. This passive remediation constitutes the first phase of cleanup at this facility. Baroball installation was completed for nineteen wells installed in May 1998.

On August 21, 1998, SRS received written confirmation from SCDHEC on the approval

of the Revision 6 to the M-Area HWMF Part B Permit. This revision pertains to the Metallurgical Laboratory HWMF, including approval to operate the Baroballs. A Preliminary Engineering Report was submitted to SCDHEC on September 21 as part of the Part B permit requirement. Efforts have started to tie the existing recovery wells to the air stripper.

Activities Planned for Fiscal Year 1999
Operation of Baroballs and redevelopment of existing recovery wells is planned. Mechanical and electrical tie-in of two Metallurgical Laboratory wells to the M-1 Air stripper System and turnover to operations will also be completed.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 24

Miscellaneous Chemical Basin/Metals Burning Pit, 731-4A, -5A

Operable Unit 24 of the Upper Three Runs Watershed consists of two units: the Miscellaneous Chemical Basin and the Metals Burning Pit (MCB/MBP). These units are presented together in the FFA Appendix C, RCRA/CERCLA Units List.

Description
The MCB/MBP (731-5A and 731-4A) is located one and one-half miles south of A/M Area operations (northwest portion of the SRS), one-quarter mile from Road D, on either side of dirt Road C-1, three miles east of the SRS boundary.

This unit is actually comprised of two separate areas in close proximity. The MCB is a 20-feet long by 20-feet wide by 1-foot deep borrow pit on the east side of Road C-1, and the MBP is approximately a 400-feet long by 400-feet wide irregularly shaped cleared area on the west side of Road C-1. Records indicate no excavation despite the pit designation. Groundwater flow in the M-Area aquifer zone (water table) is from the southeast and west towards the unit where a localized groundwater ""low"" exists. In the underlying Lost Lake aquifer zone, groundwater flow is generally in a southerly direction.

Miscellaneous Chemicals Basin (731-5A): Photographs indicate that the basin was used to receive liquid chemical waste from approximately 1956 to 1974. The basin was regraded in 1974 and allowed to revegetate. No records exist as to the creation or original purpose of the borrow pit. No records of specific materials disposed were kept, but its presumed use was for disposal of waste solvent and used oil. It is believed that partially full drums were emptied here and then discarded at the MBP. Exact basin boundaries have not been determined.

Metals Burning Pit (731-4A): The pit was in service from 1960 to 1974 and was used as a burning area for lithium-aluminum alloys, scrap, and cuttings from the A/M Area operations. Wastes were primarily contained in two discrete areas, in one large pile and a

series of small piles oriented in a semicircular arc. In 1974, waste piles were regraded with onsite soil, and the area was allowed to revegetate.

The potential contaminants in the basin are volatile organic chemicals, cleaning and degreasing solvents, aluminum, and trace amounts of lithium and lead. For the pit, the constituents are solvents, lithium, and aluminum metals.

Activities Accomplished Prior to Fiscal Year 1998

On September 26, 1995, field characterization at the MCB/MBP was restarted. During the phase II investigation, hydropunch data collected during January 1995 and February 1996 indicated that the solvent contamination in the Lost Lake Plume is vertically and laterally more extensive than previously expected. On February 13, 1996, the SRS requested SCDHEC approval (Letter, J. W. Cook, WSRC to K. A. Collinsworth, SCDHEC) to install up to an additional ten hydropunch locations to determine downgradient plume boundary conditions in the Lost Lake aquifer zone. Approval from SCDHEC was received on February 22, 1996 (Letter, D. L. Siron, SCDHEC to J. W. Cook, WSRC).

After the additional locations were investigated, the downgradient plume locations were identified and approval for installation for two downgradient monitoring wells (MCB14B, C) was requested on May 2, 1996 (Letter, J. W. Cook, WSRC to K. A. Collinsworth, SCDHEC). Approval was received on May 6, 1996 (Letter, H. H. Gilkerson, SCDHEC to J. W. Cook, WSRC). On April 15, 1996, the SRS requested SCDHEC approval to install a replacement well for background monitoring well MCB-10D because the original well installed during this phase of characterization was experiencing mechanical problems. Approval was received on April 19 (Letter, H. H. Gilkerson, SCDHEC to J. W. Cook, WSRC). Fourteen wells were installed including five wells in the M-Area aquifer zone (water table), five wells in the Upper Lost Lake, and four wells in the Lower Lost Lake.

The additional Hydropunch locations were investigated in late May 1996. Data collected at each hydropunch location was analyzed and reviewed to determine the downgradient well locations (MSB 14B and MSB 14C), which were installed during May 1996 to monitor downgradient conditions in the lower Lost Lake aquifer zone. Sampling at these wells was performed from June through July of 1996.

SRS installed 25 passive soil vapor extraction wells (PSVE) (Barometric Pumping Wells) in the vicinity of the MCB. The implementation schedule was modified and approved as this unit was added to a Recovery Program as a result of protocol changes and complexities of this unit (See the explanation of Recovery in the Overview of Fiscal Year 1997 Section). Phase III groundwater characterization was initiated consistent with the submitted Work Plan Addendum.

SRS prepared and submitted the Revision.0 RFI/RI and Baseline Risk Assessment Report

to U.S. EPA and SCDHEC on October 28, 1996. U.S. EPA and SCDHEC, after notifying SRS that they were extending the review/comment period by 30 days, provided comments on the Revision.0 Report on February 21 and February 7, 1997, respectively. SRS addressed the comments and, after notifying U.S. EPA and SCDHEC that it was extending the revision period by 30-days, submitted a Revision.1 report to U.S. EPA and SCDHEC on June 16, 1997. U.S. EPA and SCDHEC, after notifying SRS that they were extending the approval period by 30 days, provided comments on the Revision.1 Report on August 21 and August 15, 1997, respectively. Due to recovery, the Revision.1.1 will be submitted in Fiscal Year 1998.

Activities Accomplished in Fiscal Year 1998

A meeting was held with U.S. EPA and SCDHEC on December 9, 1997 to discuss the MCB/MBP operable unit strategy and associated deliverables. Based on the comments from SCDHEC, it has been decided not to submit a mixing zone (MZ) for this unit since the source has not yet been remediated. The planned actions for this unit are considered final, except that they will be conducted in a phased approach.

A passive soil vapor extraction treatability study report on the Baroball investigation was completed on December 18, 1997.

Three monitoring wells were installed in February 1998. Based upon screening level data, no additional wells or soil borings were planned. Drilling to locate the downgradient edge of the plume was completed.

The Revision.1.1 RFI/RI/BRA Report was submitted to the regulators on March 2, 1998. U.S. EPA and SCDHEC comments on the Revision.1.1 Report were received on April 17 and April 9, 1998, respectively. SRS submitted the Revision.1.2 RFI/RI/BRA Report on June 10, 1998. U.S. EPA and SCDHEC approved the Report on July 16 and July 23, 1998, respectively.

The next document to be submitted was the combined Revision.0 Corrective Measures Study/Feasibility Study/Proposed Plan/Draft Record of Decision (CMS/FS/PP/Draft ROD), which would also include a MZ application. Based on discussions with the regulators, the MZ and Draft ROD were not submitted with the combined document. U.S. EPA and SCDHEC received the Revision.0 CMS/FS/PP on April 2, 1998. U.S. EPA comments on the Revision.0 document were received on July 17, 1998; and SCDHEC comments were received on August 4, 1998. SCDHEC submitted significant comments on the groundwater cleanup goals and selection of recirculation well technology.

Based on these comments, SRS personnel met with the regulators on August 26 and 27, 1998 to discuss the MCB/MBP operable unit strategy. It was decided that a revised operable unit strategy is warranted based upon a change in direction from the regulators.

On September 11, 1998, SRS submitted a revised Operable Unit Strategy and Implementation Schedule that proposed an interim versus final approach for the remediation of this unit. The interim approach for the unit will implement final remedies for the unit's surface soil and vadose zone media and a comprehensive, interim remedy for the groundwater.

Activities Planned for Fiscal Year 1999
During Fiscal Year 1999, efforts will focus on obtaining approval of the Interim Action Proposed Plan and Interim Record of Decision and submitting a combined Revision.0 Corrective Measures Implementation/Remedial Design Work Plan/Remedial Design Report/Remedial Action Work Plan (CMI/RDWP/RDR/RAWP).

UPPER THREE RUNS WATERSHED OPERABLE UNIT 25

Mixed Waste Management Facility (including the RCRA-Regulated Portions of LLRWF 643-7E), 643-28E

Operable Unit 25 of Upper Three Runs Watershed consists of one unit: the Low-Level Radioactive Waste Disposal Facility (LLRWDF) (643-7E). This operable unit is listed on FFA Appendix H, RCRA-Regulated Units. Activities on this unit are SCDHEC-led RCRA actions.

Description
The Burial Ground Complex (BGC) occupies approximately 194 acres in the central part of SRS between F and H Separations Areas. The BGC consists of several adjacent facilities that were former disposal sites for hazardous and radioactive wastes and spent solvents generated from plant processes. The BGC is divided into a northern area (size 118 acres) and a southern area (size 76 acres). The southern region, Old Radioactive Waste Burial Ground (ORWBG) (643-E), began receiving radioactive wastes in 1952 and was filled in 1972. The ORWBG also contains twenty-two underground tanks (650-01E - 22E), once used for the storage of spent radioactive solvents. By 1972, all radioactive waste disposal activities had moved to the northern area. The northern area, called the Low-Level Radioactive Waste Disposal Facility (LLRWDF) (643-7E), began receiving waste in 1970. A portion of the LLRWDF, the Mixed Waste Management Facility (MWMF), was closed in April 1991 utilizing an engineered clay cap in accordance with an SCDHEC-approved RCRA Closure Plan. The RCRA status of the MWMF was necessitated by the inadvertent disposal of radioactively contaminated hazardous waste in the trenches. It was later determined that another portion of the LLRWDF had received radioactively contaminated hazardous wastes and is currently in the process of closure in accordance with a RCRA Closure Plan. This unit consists of a 58-acre MWMF and the LLRWDF, which is divided into six closure areas.

Activities Accomplished Prior to Fiscal Year 1998
SRS completed the installation of the Geosynthetic cap in A and D Areas in accordance with the approved closure plan. Dynamic compaction of Areas C, D, and E began in 1997.

Activities Accomplished in Fiscal Year 1998
Achieved Mechanical Completion of the Dynamic compaction contract on March 26, 1998. Continued construction of a RCRA permitted geosynthetic cap, with completion expected by 1999.

Activities Planned for Fiscal Year 1999
In Fiscal Year 1999, the Fiscal Year 1998 subcontracted scope for the Closure Cap construction of Areas B, C , and E of the LLRWDF will continue. The construction, and design engineering support for the closure cap will continue. The closure certification for closure cap Areas B, C , and E from Independent Registered Professional Engineer (IRPE) will be obtained. Completion of the post-closure certification documentation will occur.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 26

Old F-Area Seepage Basin, 904-49G

Operable Unit 26 of the Upper Three Runs Watershed consists of one unit: Old F-Area Seepage Basin. This operable unit is listed in FFA Appendix C, RCRA/CERCLA Units List. A final Record of Decision (ROD) was issued for this unit on June 19, 1997.

Description
The Old F-Area Seepage Basin (904-49G) is located northwest of the F-Area perimeter fence. The basin measures 200-feet long by 300-feet wide by 13-feet deep. It is split into two compartments by a berm 10-feet high and 5-feet wide. The Old F-Area Seepage Basin was the first basin constructed in F Area and received effluent from the F-Area canyon building from startup in November 1954 to mid-May 1955. During its use, the basin received a variety of wastewaters, including evaporator overheads, laundry wastewater, and an unknown amount of chemicals. Roughly 9- to 14-million gallons of wastewater were discharged to the basin. Between October 1969 and January 1970, 3,700 to 5,550 gallons of spent etching solution (nitric acid) containing 2,400 to 7,275 pounds of total uranium (U-238) were discharged to the basin.

Constituents detected in the groundwater above Drinking Water Standards (DWS) include iron, manganese, gross alpha, nonvolatile beta, radium, tritium, barium, chromium, lead, nitrate, uranium, strontium-89/90, and iodine. Soil constituents of concern are mercury, cesium-137, strontium-90, plutonium-238, -239, and uranium-234, -235, -238. Mercury has been detected in the soil above detection limits but below extraction procedure toxicity limits. Trichloroethylene has been detected in groundwater monitoring wells

above DWS but below background. Four groundwater monitoring wells have been installed around the basin and measure a variety of inorganic chemicals and radionuclides. Soil core samples were taken in 1986 and 1988 to measure chemical and radionuclide constituents.

Activities Accomplished Prior to Fiscal Year 1998

The Revision.0 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on August 6, 1990. SRS received U.S. EPA comments on the Revision.0 RFI/RI Work Plan on March 22, 1991. Following a series of comment resolution cycles, U.S. EPA and SCDHEC approved the Revision.2 RFI/RI Work Plan and Work Plan Implementation Schedule on April 19, 1994, and November 8, 1993, respectively.

All field characterization activities delineated in the work plan were completed in Fiscal Year 1994. Among those activities were wetland surface water and sediment sampling; effluent ditch line surface soil sampling; sampling with the Hydropunch™ in four locations; installation of three monitoring wells in the Congaree formations and one water table well; four samples from the inactive process sewer line; downgradient soil sampling; completion of flora and fauna analytical work; surveying of all soil boring, soil sampling, and monitoring well locations; and validating the unit assessment analytical data.

The Revision.0 Baseline Risk Assessment and RI Report were submitted to U.S. EPA and SCDHEC December 12, 1994. After regulatory comments were received and resolved, approval of the Revision.1 Baseline Risk Assessment and RI summary were received from U.S. EPA August 28, 1995, and from SCDHEC September 25, 1995.

The Revision.0 CMS/FS was submitted to U.S. EPA and SCDHEC on September 13, 1995. The U.S. EPA and SCDHEC approved the Revision.1 CMS/FS on March 26, 1996, and April 2, 1996, respectively.

SRS submitted the Revision.0 Proposed Plan to U.S. EPA and SCDHEC on December 27, 1995. After SRS incorporated comments received from the regulators, U.S. EPA and SCDHEC approved the Revision.1 Statement of Basis/Proposed Plan on June 27, 1996, and July 26, 1996, respectively. The Statement of Basis/Proposed Plan was issued for a 45-day public comment period on September 17, 1996. The SRS, U.S. EPA, and SCDHEC held a public meeting on the Statement of Basis/Proposed Plan on October 15, 1996. The 45-day public comment period closed on October 31, 1996.

The bench scale treatability study that was planned for Fiscal Year 1996 was not performed. Data that was collected during other treatability studies at operable units that use the same technical requirements proposed for this unit satisfied the design need.

SRS prepared and submitted the Revision.0 ROD to SCDHEC and U.S. EPA on November 13, 1996, specifying the remedy as institutional controls. U.S. EPA and

SCDHEC provided comments on the document on January 14 and January 13, 1997, respectively.). On January 30, 1997, U.S. EPA and SCDHEC issued an extension of the final ROD date from February 27, 1997, to March 31, 1997, so that SRS could submit a Groundwater Mixing Zone (GWMZ) application prior to the final ROD. SRS addressed the U.S. EPA and SCDHEC comments and submitted a Revision.1 document on February 27, 1997. U.S. EPA and SCDHEC notified SRS that they approved the ROD for signing by their Agencies on March 28 and 31, 1997, respectively. The U.S. EPA signed the ROD on March 14, 1997. SCDHEC, after issuing the Final RCRA Permit Modification for a 15-day appeal, signed the ROD on June 19, 1997. The ROD, which specifies in situ soil mixing/stabilization and an engineered low permeability cover, was issued on June 19, 1997.

After drafting a GWMZ application and conducting working meetings with SCDHEC and U.S. EPA in February 1997, SRS submitted a Revision.0 GWMZ application submitted to SCDHEC and U.S. EPA on February 21, 1997. After receiving comments from U.S. EPA and SCDHEC, SRS prepared and submitted the Revision.1 GWMZ application on March 25, 1997. U.S. EPA and SCDHEC approved the GWMZ application on March 28, 1997. This was the first GWMZ application approved in the state of South Carolina for a RCRA/CERCLA unit.

SRS initiated the removal of radioactively contaminated vegetation to facilitate the remedial action on June 30, 1997. As of September 30, 1997, 458,332 pounds of vegetation were being stored at the unit awaiting final disposition.

SRS prepared and submitted the Revision.0 Corrective Measures Implementation/Remedial Design Work Plan to SCDHEC and U.S. EPA on July 2, 1997. U.S. EPA and SCDHEC comments were received on August 26 and 18, 1997, respectively. SRS addressed the comments and submitted a Revision.1 document on September 25, 1997.

Activities Accomplished in Fiscal Year 1998

Approval of the Revision.1 CMI/RD Work Plan was received from U.S. EPA on October 22, 1998, and SCDHEC on October 17, 1998.

SRS submitted the Revision.0 CMI/RDR/RA Work Plan on February 11, 1998. Comments were received from both U.S. EPA and SCDHEC on the document on May 18, 1998. The Revision.1 CMI/RDR/RA Work Plan was submitted to U.S. EPA and SCDHEC on July 10, 1998. SCDHEC approval of the Revision.1 document was received on August 13, 1998. U.S. EPA provided comments on the Revision.1 document on August 13, 1998.

An Explanation of Significant Differences (ESD) to the Revision.1.1 ROD was determined to be necessary to place the chipped vegetation at the waste unit. A Revision.0 ESD was

submitted to U.S. EPA and SCDHEC on July 20, 1998. Comments on the Revision.0 ESD were received from U.S. EPA on August 13, 1998, while SCDHEC approved the Revision.0 ESD on August 13, 1998. U.S. EPA comments were incorporated into the Revision.1 ESD which was issued on September 10, 1998. U.S. EPA approved the Revision.1 ESD on September 16, 1998.

SRS submitted the Revision.1.1 CMI/RDR/RA Work Plan on September 3, 1998. U.S. EPA approval of the work plan was received on September 9, 1998. The remedial action field start activities commenced on September 10, 1998.

SRS submitted the Appendix A to the Revision.1.1 CMI/RDR/RA Work Plan on September 4, 1998. U.S. EPA and SCDHEC conditional approvals of the appendix were received on September 24, 1998 and September 21, 1998, respectively.

Activities Planned for Fiscal Year 1999
Appendices B & C to the CMI/RDR/RA Work Plan will be submitted to support the construction activities.

The final closure for the basin is anticipated this year with soil mixing and capping activities. Remediation activities will begin with bench scale tests to develop a grout mix that will bind the constituents of concern as required in the project specification. The bench scale testing will be followed by a pilot scale test. The test will be performed in the basin to ensure that the grout mix and related equipment are properly calibrated. Capping activities will commence after the soil mixing has been completed.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 27

Sanitary Landfill Groundwater

Operable Unit 27 of the Upper Three Runs Watershed includes the groundwater beneath the Sanitary Landfill. This operable unit is listed in FFA Appendix H. Activities on this unit are SCDHEC-led RCRA actions.

Description
The Sanitary Landfill is located approximately one-quarter mile south of B Area, west of Road C and approximately one-half mile north of the Upper Three Runs Creek. The Sanitary Landfill is an approximately 70-acre site. It was opened in 1974 as a 32-acre site and received solid waste from a variety of sources, including site construction areas, offices, shops, and cafeterias. In 1987, as the Main Section reached its capacity, a 16-acre Northern Expansion and a 22-acre Southern Expansion were permitted, and the Southern Expansion began receiving waste. During 1993, the Southern Expansion reached capacity. Closure activities are underway for both the Southern Expansion and Main Section. The Northern Expansion opened and began receiving solid waste in July 1993.

During the course of its operation, the Sanitary Landfill was suspected to have received small quantities of rags and wipes used with F-listed solvents. In 1988, the Sanitary Landfill became a subject of a RCRA Facility Investigation and was designated a RCRA solid waste management unit due to the recurring evidence of RCRA hazardous constituents in the groundwater beneath the site. In December 1989, SRS was added to the National Priority List (NPL). At that time, the Sanitary Landfill was included in a combined RCRA/CERCLA units list in the FFA. As a result of an ongoing RCRA Permit, the Sanitary Landfill was removed from the combined RCRA/CERCLA units list on August 29, 1991.

Activities Accomplished Prior to Fiscal Year 1998

The RCRA Part A Application for the Sanitary Landfill was submitted to SCDHEC in 1991.

DOE and SCDHEC reached a Settlement Agreement (SW-91-51) in August 1991, outlining the steps DOE would take to comply with the RCRA regulations. Principally, DOE would close the portion of the landfill containing the suspected solvent rags in compliance with Subpart G (Closure and Post-Closure) of Part 265 (Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities) of the South Carolina Waste Management Regulations. Pursuant to the settlement agreement, SRS submitted Volume XXIII of the 1992 RCRA Part B Permit Renewal Application on March 31, 1993, covering the portions of the landfill that received the suspected solvent rags. The post-closure application contained sufficient information to establish an Alternate Concentration Limit (ACL) demonstration.

SRS prepared and submitted a White Paper, outlining the proposed groundwater remediation system, to SCDHEC. Two groundwater plumes exist, one consisting of vinyl chloride and the other trichloroethylene. Demonstration tests concluded that in situ bioremediation was an appropriate technology for the Sanitary Landfill Groundwater.

Late in Fiscal Year 1997, a drilling contractor mobilized and initiated installation of two horizontal wells. Upon completion, each will be approximately 1,300-feet in length. These wells will be connected to an aboveground, air-nutrient injection system for bioremediation groundwater treatment.

Activities Accomplished in Fiscal Year 1998

SRS completed installation of and performance testing on the two horizontal wells and aboveground infrastructure that will be used to inject nutrients for bioremediation of the contaminated groundwater. Groundwater monitoring and report submittals continued as required. Groundwater baseline modeling was also completed during Fiscal Year 1998.

Activities Planned for Fiscal Year 1999
SRS will seek SCDHEC approval of the operations permit to inject nutrients into the groundwater for bioremediation. SRS will initiate and complete startup of the bioremediation system for groundwater remediation. SRS will revise the RCRA Part B Permit for Fiscal Year 2000 submittal.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 28

Sanitary Landfill, 740-G

Operable Unit 28 of the Upper Three Runs Watershed consists of one unit: the Sanitary Landfill. This operable unit is listed in FFA Appendix H. Activities on this unit are SCDHEC-led RCRA actions.

Description
The Sanitary Landfill is located approximately one-quarter mile south of B Area, west of Road C, and approximately one-half mile north of the Upper Three Runs Creek. The Sanitary Landfill is an approximately 70-acre site. It was opened in 1974 as a 32-acre site and received solid waste from a variety of sources, including site construction areas, offices, shops, and a cafeteria. In 1987, as the Main Section reached its capacity, a 16-acre Northern Expansion and a 22-acre Southern Expansion were permitted, and the Southern Expansion began receiving waste. During 1993, the Southern Expansion reached capacity. Closure activities are underway for both the Southern Expansion and Main Section. The Northern Expansion opened and began receiving solid waste in July 1993.

During the course of its operation, the Sanitary Landfill is suspected to have received small quantities of rags and wipes used with F-listed solvents. In 1988, the Sanitary Landfill became the subject of a RCRA Facility Investigation and was designated a RCRA solid waste management unit due to recurring evidence of RCRA hazardous constituents in the groundwater beneath the site. In December 1989, SRS was added to the National Priority List. At that time, the Sanitary Landfill was included in a combined RCRA/CERCLA unit list in the FFA. As a result of an ongoing RCRA permit investigation, the Sanitary Landfill was removed from the combined RCRA/CERCLA unit list on August 29, 1991.

Activities Accomplished Prior to Fiscal Year 1998
DOE and SCDHEC reached a Settlement Agreement (SW-91-51) in August 1991, outlining the steps DOE would take to comply with the RCRA regulations. Principally, DOE would close the portion of the landfill containing the suspected solvent rags in compliance with Subpart G (Closure and Post-Closure) of Part 265 (Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities) of the South Carolina Waste Management Regulations.

Pursuant to the Settlement Agreement, SRS submitted the Revision.0 Sanitary Landfill Closure Plan in March 1993, covering the portions of the landfill that received the suspect solvent rags. SCDHEC issued a Notice of Deficiencies/Warning Letter (NOD) on November 17, 1993. SRS revised the Closure Plan, incorporating the responses to the NOD, and submitted the Revision.1 Closure Plan to SCDHEC in January 1994. SCDHEC issued NODS on the Revision.1 document on August 21, 1995. SRS revised the Closure Plan and submitted the Revision.2 Sanitary Landfill Closure Plan on October 18, 1995. The Revision.2 Closure Plan was approved and issued for public comment. The public comment period began on November 6, 1995 and ended on December 6, 1995. There were no comments received on the Closure Plan. SCDHEC provided conditional approval of the Revision.2 Closure Plan on December 7, 1995. The plan approved a geosynthetic closure system of the landfill versus a two-foot thick kaolin clay closure.

Construction mobilization was initiated in January 1996 and continued throughout Fiscal Year 1996. Groundwater monitoring wells were abandoned, relocated, and extended in support of the closure.

Revision.3 of the Closure Plan was submitted to SCDHEC in February 1996 and provided the technical information on the geosynthetic clay liner material requested by SCDHEC in their approval letter. SRS submitted the Revision 4 Sanitary Landfill Closure Plan to SCDHEC on March 5, 1996 to bring the testing frequencies in line with current standards as they existed at that time. SCDHEC approval of the Revision 4 Closure Plan was received on March 21, 1996. Revision 5 of the Closure Plan was submitted to SCDHEC on April 29, 1996 to revise the geosynthetic clay liner material to be used on steep slopes, provide the technical data sheets for the new material, and to reduce the frequency of destructive testing on the flexible membrane liner seams. SCDHEC approved this revision on May 7, 1996. The Revision 6 Closure Plan was submitted on May 21, 1997 to address modifications to the proposed foundation layer configuration and included a complete set of final as-built drawings.

SRS completed construction of the cover system in accordance with the approved closure plan in April 1997. On July 7, 1997, the closure certification documentation was submitted to SCDHEC for approval.

Activities Accomplished in Fiscal Year 1998
Certification of closure was received from SCDHEC on October 26, 1997. SRS will continue to maintain erosion controls and cover systems.

Activities Planned for Fiscal Year 1999
Certification of closure was received from SCDHEC on October 26, 1997. SRS will continue to maintain erosion controls and cover systems.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 29

SRL 904-A Process Trench, 904-A

Operable Unit 29 of the Upper Three Runs Watershed consists of one unit: the SRL 904-A Process Trench. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description

The SRL 904-A Process Trench is located in the northwestern section of the SRS 700 Area, within the boundaries of the Savannah River Technology Center (SRTC). The trench, active since 1953, is an enclosed underground concrete pipe trench containing high activity and low activity waste lines between Building 773-A and the waste storage and shipping complex at Building 776-A. In December 1971, decontamination procedures were undertaken in the High Level Caves of the E-Wing of Building 773-A. The resulting contaminated wash water was collected in a separator pit. The separator pit released an estimated 2,500 gallons of radioactive wash water into the trench box, where it flowed by gravity through the system. The trench box plug was in place at Building 776-2A, resulting in a collection of the wash water within the trench. Calculated trench volumes indicated a possible release of radioactive wash water to surrounding soils if overlying concrete-slab seals had deteriorated.

A trade waste sewer line at SRTC parallels, then crosses the trench. Due to this proximity, it may contribute to subsurface impacts in the area. Known to be breached, this line had the potential of releasing uranium-contaminated water to the surrounding subsurface. Deterioration of seals on the trench overlying-concrete. Slab may have resulted in release of contaminated water from the trade waste line to the trench box.

The constituents of concern include inorganics (barium, cadmium, chromium, magnesium, manganese, nickel, and lead) and radionuclides (tritium, cobalt-60, thorium, cesium-137, plutonium -239 and -240, strontium, and uranium).

The U.S. EPA and SCDHEC granted approval during 1998 to include a portion of the process sewer line leading to the SRL Seepage Basins with the 904-A Process Trench remedial activity. This portion ends at a manhole which is located inside of the SRL Security Fence.

Activities Accomplished Prior to Fiscal Year 1998

A preliminary unit assessment for the 904-A Trench was performed by SRS in August 1984. The objective of the assessment was to determine if chemical and radiological waste materials were released to the surrounding soil. Six soil cores were taken and analyzed for a variety of inorganic and radioactive constituents. In May 1992, soil borings were drilled at seven locations along the trench. The borings were drilled immediately adjacent to the trench and sampled at depths approximately 4, 6, 10, and 14 feet below the

surface. The trench depth is 2.66 feet, with the top believed to be 6 to 10 feet below the surface. The project also included the generation of a map indicating core locations and elevations.

The Revision.0 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on March 7, 1992.

Activities Accomplished in Fiscal Year 1998
No regulatory documents were submitted for Fiscal Year 98. The FFA Appendix E.3 lists the field start of characterization for this unit as second quarter Fiscal Year 2005. The U.S. EPA and SCDHEC granted SRS approval to include a portion of the sewer line leading to the SRL Seepage Basins with this unit.

Activities Planned for Fiscal Year 1999
There are no actions planned for Fiscal Year 1999. The FFA Appendix E.3 lists the field start of characterization for this unit as second quarter Fiscal Year 2005.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 30

SRL Seepage Basins, 904-53G1, 904-53G2, 904-54G, 904-55G

Operable Unit 30 of the Upper Three Runs Watershed consists of four units: the four SRL Seepage Basins. These units are covered under a Consent Decree settled under Civil Act No. 1:85-2583-6 and are listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The SRL Seepage Basins (904-53G1, -53G2, -54G, and -55G) are located in the southern part of A-Area. The basins are rectangular in shape and were constructed by removing soil from within the basins to form surrounding dikes. The basins were used to dispose low-level radioactive liquid waste generated in the laboratories located in Buildings 735-A and 773-A. The basins are connected to the underground waste tanks by a process sewer line constructed of 10-inch diameter vitrified clay at a depth of approximately 10 feet. The process sewer line is about 950-feet long.

The first two basins were placed into operation in 1954, and Basins 3 and 4 were added in 1958 and 1960, respectively. The basins were removed from service in October 1982. Pipes in the 904-A trench, which tied into the low-level drains in these laboratories, transferred the waste to one of four 22-cubic meter underground tanks located in Building 776-A. When a tank accumulated about 20-cubic meters of waste, a grab sample was taken for analysis, and another of the tanks was valved on-line. Wastewater not exceeding 100 d/m/ml alpha and/or 50 d/m/ml beta-gamma was discharged to the basins. Waste exceeding the standards was sent by tank trailer to the 200-F Area Separations Facility for disposal. During the 28-year loading history, approximately 130,000 cubic meters of

water was discharged to the basins.

The constituents of concern (COCs) for the basins are radionuclides (tritium, uranium, thorium, radium, strontium, manganese, potassium, curium, cobalt, cesium, plutonium, and americium), organic chemicals (including phthalates, acetone, methyl isobutyl ketone, dichlorodifluoromethane, methyl chloride, and toluene), and inorganic chemicals (such as ammonia, nitrogen, arsenic, barium, cadmium, chromium, copper, cyanide, fluoride, lead, mercury, nickel, selenium, silver, and zinc).

Activities Accomplished Prior to Fiscal Year 1998
In 1982, soil samples were taken from the basin. The sampling indicated that radionuclides and metals had not moved further than the first two feet of soil. In March 1992, the process sewer line was characterized. Nine sampling locations were selected along the sewer line. Three samples, at depths greater than the depth of the sewer line, were taken at each location.

In 1982, a volume reduction program, consisting of rerouting noncontact cooling water, was implemented. In 1990, three monitoring wells were installed in the Upper Congaree Aquifer to determine if there has been any groundwater impact due to vertical migration. Twenty-one groundwater monitoring wells have been installed in the vicinity of the basins and are sampled and analyzed quarterly for a variety of constituents.

Sampling of vegetation in the basins found radiological and metal contamination. Modeling of the data for air emissions due to burning the vegetation indicates the release of radionuclides to be 1% of the 10 millirem (mrem) set by U.S. EPA.

In accordance with the Consent Decree settled under Civil Act No. 1:85-2583-6, SRS was required to submit documentation, including a Closure Plan for the SRL Seepage Basins. SRS submitted the Revision. 0 Closure Plan to SCDHEC on March 26, 1992.

SRS submitted the Revision.0 RFI/RI Work Plan to U.S. EPA and SCDHEC on December 18, 1995. U.S. EPA and SCDHEC provided comments on the document on April 26 and April 24, 1996, respectively. SRS addressed the U.S. EPA and SCDHEC comments and submitted the Revision.1 RFI/RI Work Plan on July 16, 1996. U.S. EPA and SCDHEC approved the document on August 9 and August 21, 1996, respectively. The field start of characterization for this unit was initiated on September 25, 1996.

Field characterization activities were completed and the data was verified and validated. SRS initiated the development of a combined document (consisting of the RFI/RI and Baseline Risk Assessment, CMS/FS, and Statement of Basis/Proposed Plan). A Focus Group Meeting was held with the interested public and regulators to discuss project acceleration.

SRS prepared and submitted a Removal Site Evaluation Report to U.S. EPA and SCDHEC on June 5, 1997. This report outlined the need for the time-critical removal of radioactively contaminated vegetation. SRS initiated the vegetation removal on September 1, 1997.

Activities Accomplished in Fiscal Year 1998

SRS chipped all vegetation and placed it in SRL Seepage Basin 4 awaiting approval for offsite disposition. An optimization study on treatment alternatives and optimum design requirements for final remediation was also completed.

SRS submitted the Revision.0 RFI/RI and Baseline Risk Assessment Report to the regulators on December 4, 1997. Comments were received from the regulators and Revision.1 was submitted to the regulators on June 16, 1998. U.S. EPA approved the Revision.1 RFI/RI and BRA Report on August 5, 1998.

The Revision.0 Statement of Basis/Proposed Plan was received by the regulators on December 4, 1997. Comments on this document were received from U.S. EPA and SCDHEC on July 13, and March 17, 1998 respectively.

SRS submitted the Revision.0 CMS/FS to the regulators on July 31, 1998. Regulator comments were incorporated and SRS submitted the Revision.1 document to the regulators on June 16, 1998. U.S. EPA and SCDHEC comments were received on this document on August 5 and July 22, 1998, respectively.

On September 18, 1998, SRS submitted a consensus schedule for the submittal of the Revision.1 Statement of Basis/Proposed Plan and response to comments, and for the submittal of all subsequent documents for this unit necessary to achieve the final remediation. On September 23, 1998, SCDHEC approved the Schedule. On September 28, 1998, the Revision.1 Statement of Basis/Proposed Plan was submitted to the regulators.

Activities Planned for Fiscal Year 1999

SRS will seek regulator approval of the Revision.1 Statement of Basis/ Proposed Plan submittal.

SRS will develop and submit the Revision.0 Record of Decision (ROD) for this unit.

SRS will facilitate a public comment period and submit Post-ROD documents.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 31

Steed Pond, NBN

Operable Unit 31 of the Upper Three Runs Watershed consists of one unit: the Steed Pond. This unit is on FFA Appendix C, RCRA/CERCLA Units List.

Description

Steed Pond is approximately 11 acres and is located on Tims Branch just upstream of Road 2. Tims Branch flows from A and M Areas through Steed Pond and continues downstream until it empties into Upper Three Runs Creek at Road C. Steed Pond consists of an earthen dam, approximately 525-feet long, with an open spillway located on Tims Branch, about 75 feet from the West End of the earthen dam. The spillway (once a wooden dam) is commonly referred to as the Steed Pond Dam. Its building number is 685-22G although the building number for the actual earthen dam is 908-2G. The wooden dam at Steed Pond has failed twice, once in early 1960 and most recently in 1984. From 1984 until 1996, Tims Branch flowed in a braided channel across the former pond bed of Steed Pond.

Tims Branch currently receives most of the National Pollution Discharge Elimination System (NPDES) effluents from A and M Areas. Between 1954 and 1989, approximately 96,000 pounds of natural and depleted uranium containing about 25 curies of gross alpha activity was discharged from M Area to Tims Branch via the M-Area drainage ditch. The majority of the uranium was released between 1966 and 1969. The source of the uranium was process wastewater from Building 313-M resulting from production of fuel and target slugs. Most of the uranium came from uranium core plating and recovery operations and autoclave testing of aluminum-clad uranium slugs. The chemical forms of uranium that were discharged include uranium oxide (50%), sodium diuranate, uranyl nitrate, and uranyl phosphate. In addition to uranium, the process wastewater contained sodium nitrate as well as a mixture of other metals, including nickel, aluminum, lead, copper, cadmium, chromium, and mercury.

Activities Accomplished Prior to Fiscal Year 1998

In 1966, a survey for uranium in sediments from the Tims Branch system was made in Steed Pond. Greater than 95% of the uranium in Steed Pond was in the upper 6 inches of sediment. The uranium concentration was near background concentrations (about 5 pCi/g) between a depth of 12 to 24 inches. In a 1984 Steed Pond survey, the percent of uranium in the upper 6 inches of sediment had decreased from 90 to 58% of the total. In some of the sample cores, the highest uranium concentration was in the fraction below 6 inches. This decrease in concentration probably reflects an increase in sediment deposition in Steed Pond between the 1966 and the 1984 surveys. Steed Pond area is gently sloped and dissipates energy very easily. A 1997 radiological field survey along the banks of Steed Pond and the Tims Branch braided stream bed revealed little to no surface contamination.

However, surveys of the root balls of uprooted trees and underneath the top layer of soil/mulch revealed radiological contamination.

The contaminants present include radionuclides and metals.

Activities Accomplished in Fiscal Year 1998
No regulatory documents were submitted. A maintenance action to remove the wooden dam was completed.

Activities Planned for Fiscal Year 1999
No scope is planned for Fiscal Year 1999 except for site maintenance. FFA Appendix E.3 lists the field start for characterization as fourth Quarter Fiscal Year 2010.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 33

Stormwater Outfall A-013, NBN

Operable Unit 33 of the Upper Three Runs Watershed consists of one unit: the Stormwater Outfall A-013. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The A-013 Stormwater Outfall is located in the southernmost portion of the 3/700 Area, just south of Building 763-A, adjacent to the railroad tracks. This normally dry outfall carries stormwater runoff from the 763-A tire storage building and railroad to an unnamed tributary of Tims Branch that empties into the Savannah River.

Activities Accomplished Prior to Fiscal Year 1998
None. Field Start of characterization activities has not yet been scheduled in the FFA Appendix E.3.

Activities Accomplished in Fiscal Year 1998
None. Field Start of characterization activities has not yet been scheduled in the FFA Appendix E.3.

Activities Planned for Fiscal Year 1999
None. Field Start of characterization activities has not yet been scheduled in the FFA Appendix E.3.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 34

Stormwater Outfall A-024, NBN

Operable Unit 34 of the Upper Three Runs Watershed consists of one unit: the

Stormwater Outfall A-024. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The Stormwater Outfall A-24 is an active non-permitted outfall located north of the main 700-Area parking lot. The outfall receives discharges from air-conditioning condensate and stormwater from offices in 700 Area and the parking lots. At one time, a photography laboratory discharged to the outfall. Open drainage ditches and stormwater sewer lines in the 700 Area drained into the outfall. The outfall is located north of Building 703-41A and Road 1. The outfall discharges into a natural (open) drainage channel, approximately 100 feet north of Road 1. The drainage channel runs approximately ½ mile, where it ends, and the outfall water seeps into the ground. There is no catch basin at this discharge end location. Another non-contaminated, clean water outfall (A-25) discharges into this drainage channel.

The outfall consists of approximately 3,200 feet of open ditches and seven standard catch basins that drained parking lot areas and grounds around various buildings. Approximately 5,500 feet of stormwater sewer pipe and 17 manholes are included in the outfall. The pipe conveyed the stormwater from the different buildings. The buildings that discharged into the outfall included 702-A, 703-A, -4A, -6A, -15A, -16A, -17A, -18A, -34A, -41A, -43A, -44A, -46A, -61A, -63A, -65A, -69A, -70A, 770-A, and 773-51A. The majority of the pipe and ditches are located under parking lots, walkways, or equipment.

Pollutants that may have been discharged into the outfall include chlorine, iron, potassium, ammonia, phosphate and surfactants. It is uncertain if the following pollutants were discharged in the outfall but they are identified as suspect since they are associated with the different discharge sources: acetate, silver, bromine, chromate, cyanide, formaldehyde, methylene, magnesium, nitrate, lead, oil, grease, organic nitrogen, zinc.

Activities Accomplished Prior to Fiscal Year 1998
None.

Activities Accomplished in Fiscal Year 1998
None.

Activities Planned for Fiscal Year 1999
None.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 35

West of SREL "Georgia Fields" Site, 631-19G

Operable Unit 35 of the Upper Three Runs Watershed consists of one unit: the West of SREL ""Georgia Fields"" Site. This unit is listed in FFA Appendix C, RCRA/CERCLA Units List.

Description
The West of SREL "Georgia Fields" Site is located in the southwest section of SRS, approximately 1 mile west of SC Highway 125 and 1/2 mile south of Upper Three Runs Creek. The unit is situated just west of SREL research area.

Debris located on the unit includes two empty steel drums, six 5-gallon buckets, piles of burlap, wood waste, wire coils, rolls of wire, ladders, chain link fence parts, and miscellaneous kitchen pots and pans. One 55-gallon drum, located adjacent to the burlap pile, was labeled ""Selig Chemicals"" and ""Solvent.""

The unit was formerly used for live mammal trapping and collection. No hazardous substances are known to have been disposed at the unit. No chemicals or preservatives are reported to have been used in the collection, tagging, or tracking of biological specimens.

Unit screening consisted of two soil-gas surveys and a radiation survey. The initial soil-gas survey was conducted in March 1988 for chlorinated solvents with a sample depth of 18 to 24 inches. Ten soil-gas samples were collected and analyzed. Trans 1,2-dichloroethene was detected in three locations with a concentration range of 3.2 to 9.4 parts per billion. Chloroform was detected at five locations with a concentration range of 0.19 to 10.10 parts per billion. A second soil-gas survey was conducted in July and August 1991 with a sample depth of 3 feet and was analyzed for 27 organic compounds. Fifty-seven soil-gas samples were taken (including five duplicates). Samples were collected on a random grid with stations at 20-feet intervals. Chloroform was detected at 18 sites with a concentration range of 5 to 310 parts per billion while no trans 1,2-dichloroethene was detected. Methane, ethane, propane, ethylene, propanol, and oxylene were detected. A radiation survey was conducted in September 1990; no radioactive contamination was detected.

A 20 feet by 20 feet sampling grid was established over the entire unit. Soil samples from 15 of the grids were collected at depths of 0 to 6 inches and 3 to 10 feet (grids were selected based on previous data collected). Soil was analyzed for physical properties and contaminant concentrations. One grab soil sample from underneath each drum at a depth of 6 to 18 inches and background soil samples were also collected.

Activities Accomplished Prior to Fiscal Year 1998
The Revision.0 RFI/RI Phase I Work Plan was received by U.S. EPA and SCDHEC on October 11, 1990. SRS received U.S. EPA comments on December 2, 1991. The Revision.1 RFI/RI Work Plan was received by U.S. EPA and SCDHEC on March 2, 1992.

SRS initiated and completed the pre-characterization on the West of SREL "Georgia Fields" Site.

In August 1996, a field reconnaissance was performed for the purpose of developing a limited Sampling and Analysis Plan (phase I of the characterization process). Development of this plan, as well as conducting soil sampling activity, began in October 1996. A draft of the Sampling and Analyses Plan, Quality Assurance Project Plan (QAPP) and a Site-Specific Health and Safety Plan (SSHASP) were submitted to the project team for review and approval. A project kick-off meeting was held December 19, 1996, to gear-up for the characterization effort. The SSHASP was approved on February 3, 1997. Field start was initiated February 10, 1997 and field work for the phase I characterization process was completed February 20, 1997.

Activities Accomplished in Fiscal Year 1998
Based on the results of the waste unit pre-characterization activities, SRS began development of the Revision.0 RFI/RI Phase II Work Plan Report in May 1998.

Activities Planned for Fiscal Year 1999
The Revision.0 RFI/RI Phase II Work Plan Report will be completed and submitted to the regulators by December 1998. Regulator comments will be incorporated into the Revision.1 RFI/RI Phase II Work Plan Report for submittal to the regulators by July 1999, with mobilization for the phase II Characterization field start scheduled to occur by September 1999.

UPPER THREE RUNS WATERSHED OPERABLE UNIT 36

F-Area Canyon Groundwater, NBN

Operable Unit 36 of the Upper Three Runs Watershed includes the groundwater beneath the F-Area Canyon. This unit is listed on FFA Appendix C, RCRA/CERCLA Units List.

Description
The F-Area Canyon Groundwater consists of the groundwater underlying F Area Canyon Facility. This groundwater was impacted by operation of the F-Area Canyon and surrounding support facilities. The FFA Appendix E.3 lists the field start of characterization for this unit in the first quarter of Fiscal Year 2008.

Activities Accomplished Prior to Fiscal Year 1998
None

Activities Accomplished in Fiscal Year 1998
None

Activities Planned for Fiscal Year 1999
None

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SITE EVALUATION PROGRAM

Section X of the Federal Facility Agreement requires SRS to submit to U.S. EPA and SCDHEC a Site Evaluation Report for those areas listed in Appendix G.1 of the Agreement. U.S. EPA in a letter dated May 23, 1995, delegated U.S. EPA's authority to review/comment on the Site Evaluation Reports to SCDHEC. The FFA was modified such that: "Failure of the U.S. EPA to provide written concurrence by the close of the review/comment period or prior to DOE's receipt of SCDHEC concurrence, whichever comes later, shall be deemed agreement with SCDHEC's concurrence.

Activities Accomplished in Fiscal Year 1998
SRS submitted Site Evaluation Reports for the following areas:

- Combined Spills from 672-T (NBN) and the Construction Sandblast Area (CMT-001)(NBN)
- Combined Spills from 105-R, 106-R, 109-R (NBN) and the Purge Water Storage Basin (109-R)
- Combined Spills from 643-G
- Construction Sandblast Area (CMT-002) (NBN)
- Cooling Water Effluent Sump (107-R)
- F-Area Erosion Control Site (080-28G)
- F-Area Sanitary Sludge Land Application Site (NBN)
- Gun Emplacement 407A & 407B Rubble Pile (NBN)
- Gunsite 012 Rubble Pile (NBN) and Rubble Pile Across from Gunsite 012 (NBN)
- Patterson Mill Road Rubble Pile (NBN)
- Potential Release of Diesel Fuels and Benzene from 730-M (NBN)
- Rubble Pile North of SRL (NBN)
- Spill on 01/01/57 of < 1 Ci Beta-Gamma (NBN)
- Spill on 03/08/86 of 1/2 Pint of Water-Rad (NBN) and the Spill on 08/18/86 of 20 Gallons of Water-Rad (NBN)
- Spill On 08/31/87 of Bromocide Solution From 607-14D (NBN)
- Spill on 09/28/87 of <30 Gallons of Bromocide Solution from 607-22P (NBN)
- Spill on 10/09/85 of 15 Gallons of Aropol from 690-G (NBN)
- Stadia Lights with Poles (NBN)
- Un-numbered Gun Emplacement Rubble Pile (NBN)
- Thirty-three Site Evaluation Areas

SRS received written comments from SCDHEC on the following Site Evaluation Reports:

- 3-G Pumphouse Erosion Control Site (631-8G)
- Combined Spills from 105-C, 106-C and 109-C and Spill on 5/23/75 of 3 Gallons of Water-Rad (NBN)

- Combined Spills from 105-P, 106-P and 109-P (NBN)
- Combined Spills from 183-2C (NBN)
- Combined Spills from 672-T (NBN) and the Construction Sandblast Area (CMT-001)(NBN)
- Cooling Water Effluent Sump (107-R)
- F-Area Sanitary Sludge Land Application Site (NBN)
- P-Area Sandblast Area (CMP-001 & CMP-004)
- Spill on 05/09/85 of 375 Gallons of Process Water from 106-P (NBN)
- Spill on 09/28/87 of <30 Gallons of Bromocide solution From 607-22P (NBN)
- Substation 51 Erosion Control Site (080-27G)

SRS responded to comments received on the following Site Evaluation Reports:

- 3-G Pumphouse Erosion Control Site (631-8G)
- C-Area Sandblast Area (CMC-002 and CMC-003)
- Combined Spills from 183-2C (NBN)
- Combined Spills from 672-T (NBN) and the Construction Sandblast Area
- F-Area Scrap Lumber Pile (231-3F)
- P-Area Sandblast Area (CMP-001 & CMP-004)
- Spill on 05/09/85 of 375 Gallons of Process Water from 106-P (NBN)
- Substation 51 Erosion Control Site (080-27G)

SRS received concurrence from U.S. EPA on the following Site Evaluation Reports:

- 3-G Pumphouse Erosion Control Site (631-8G)
- C-Area Erosion Control Site (131-1C)
- C-Area Sandblast Area (CMC-002 and CMC-003)
- Combined Spills from 105-R, 106-R, 109-R (NBN) and the Purge Water Storage Basin (109-R)
- Combined Spills from 643-G
- D-Area Sandblast Area (CMD-001)
- F-Area Scrap Lumber Pile (231-3F)
- Gunsite 012 Rubble Pile (NBN) and Rubble Pile Across from Gunsite 012 (NBN)
- H-Area Sanitary Sludge Land Application Site (NBN)
- Lower Kato Road Site (761-1G)
- Orangeburg Site (761-2G)
- P-Area Sandblast Area (CMP-001 & CMP-004)
- Patterson Mill Road Rubble Pile (NBN)
- Potential Release of NaOH/H2SO4 from 183-2R (NBN)
- Second Par Pond Site (761-8G) (U)
- Spill on 03/04/86 of 5 Gallons of 50% NaOH from 341-M and the Spill on 3/20/86 of <1 Gallon of Water-Rad

- Spill on 03/08/86 of 1/2 Pint of Water-Rad (NBN) and the Spill on 08/18/86 of 20 Gallons of Water-Rad (NBN)
- Spill on 05/09/85 of 375 Gallons of Process Water from 106-P (NBN)
- Spill on 10/09/85 of 15 Gallons of Aropol from 690-G (NBN)
- Stadia Lights with Poles (NBN)
- Substation 51 Erosion Control Site (080-27G)

SRS received concurrence from SCDHEC on the following Site Evaluation Reports:

- 3-G Pumphouse Erosion Control Site (631-8G)
- C-Area Sandblast Area (CMC-002 and CMC-003)
- Combined Spills from 105-R, 106-R, 109-R (NBN) and the Purge Water Storage Basin (109-R)
- Combined Spills from 643-G
- F-Area Sanitary Sludge Land Application Site (NBN)
- F-Area Scrap Lumber Pile (231-3F)
- Gunsite 012 Rubble Pile (NBN) and Rubble Pile Across from Gunsite 012 (NBN)
- H-Area Sanitary Sludge Land Application Site (NBN)
- Orangeburg Site (761-2G)
- P-Area Sandblast Area (CMP-001 & CMP-004)
- Patterson Mill Road Rubble Pile (NBN)
- Potential Release of $NaOH/H_2SO4$ from 183-2R (NBN)
- Spill on 03/08/86 of 1/2 Pint of Water-Rad (NBN) and the Spill on 08/18/86 of 20 Gallons of Water-Rad (NBN)
- Spill on 05/09/85 of 375 Gallons of Process Water from 106-P (NBN)
- Spill on 09/20/87 of Unknown Water Rad (NDN)
- Spill on 09/28/87 of <30 Gallons of Bromocide Solution from 607-22P (NBN)
- Spill on 10/09/85 of 15 Gallons of Aropol from 690-G (NBN)
- Stadia Lights with Poles (NBN)
- Substation 51 Erosion Control Site (080-27G)

Activities Planned for Fiscal Year 1999

SRS will submit Site Evaluation Reports on six (6) areas per Fiscal Quarter for U.S. EPA and SCDHEC review and approval. First quarter Site Evaluation Reports include: P-Area Erosion Control Site (313-1P), Combined Spills from 679-T (NBN), L-Area Erosion Control Site (080-26G), Spill on 01/01/81 of 200 Gallons of 34% Aluminum Nitrate, Spill on 04/07/76 of 200 Gallons of 50% Nitric Acid and Spill on 01/01/80 of 5600 Pounds of 50% Nitric Acid.

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PUBLIC INVOLVEMENT

In an effort to involve the public in SRS activities and decisions, SRS uses a variety of public participation techniques. SRS personnel have actively solicited public involvement and participation in many site decisions since 1990. Historically, SRS held formal hearings during the National Environmental Policy Act to solicit comments during the scoping process and on draft environmental impact statements (EISs). Since the FFA was signed, the site has dramatically increased its public involvement activities. These activities and opportunities include public meetings, information exchanges, newspaper notices, Environmental Bulletins, public mailings, public notifications through DOE Reading Rooms and recommendations by the Citizens Advisory Board.

The signing of the Federal Facility Agreement (FFA) was one factor that led to the development of a site-specific advisory board for SRS in 1994 which provides recommendations to the Department of Energy (DOE), South Carolina Department of Health and Environmental Control (SCDHEC), and the Environmental Protection Agency (U.S. EPA) on environmental management and related issues. This board, called the SRS Citizens Advisory Board (CAB), has developed and passed 64 recommendations since its inception. The CAB is composed of 25 non-partisan, independent individuals from South Carolina and Georgia. The members, who serve two-year terms, represent all walks of life, including the business world, academia, local government, environmental, labor, and special interest groups, and the general public. The recommendations have been on the SRS budget, future planning activities, nuclear materials management, environmental remediation, and waste management activities.

To study and learn more about SRS activities, the SRS CAB formed four issue-based subcommittees:

Environmental Remediation and Waste Management Subcommittee
Nuclear Materials Management Subcommittee
Risk Management and Future Use Subcommittee
Public Outreach Subcommittee

The Environmental Remediation and Waste Management Subcommittee provided 15 recommendations to the full board on environmental remediation and waste management activities in FY 1998. The Nuclear Materials Management Subcommittee sponsored several significant recommendations regarding future operations at SRS. During 1998 the Risk Management and Future Use Subcommittee reviewed and discussed the Integrated Priority List, 1998 and 1999 budget overviews, the *Accelerated Cleanup: Paths to Closure* document, and the *Future Use Plan.* This group submitted a CAB recommendation on the SRS and DOE Headquarters *Accelerating Cleanup: Paths to Closure* document.

Other activities directed to involving the public included the SRS CAB's co-sponsorship of the American Nuclear Society's Third Topical Meeting on Spent Nuclear Fuel and Fissile Material Management. The plenary session focused on DOE's fissile material management issues and the public. For the first time, citizens were encouraged to attend the plenary and exhibit program without paying a conference fee.

In addition to SRS CAB meetings, DOE Savannah River Operations Office co-sponsored information exchange meetings with SCDHEC and U.S. EPA. These meetings, held in Augusta, Georgia and Barnwell, South Carolina, were to provide more information to the public and to stimulate discussion of issues. A Public Workshop was held to discuss the remedial options associated with the cleanup of the Old Radioactive Waste Burial Ground (ORWBG). Over 12 meetings were held on the SRS budget and the SRS and DOE Headquarters Draft *Accelerating Cleanup: Paths to Closure* documents were mailed out to over 600 stakeholders in an effort to obtain their input. In addition, the Risk Management and Future Use Subcommittee initiated a sub-group called the Risk Management Working Group. The purpose of this group is to analyze and understand the risk management at SRS by reviewing the risk assessment by Program, the roll-up of the risk assessments into the Integrated Priority List, the balance of compliance verses risk, and the communication if relevant risk to the public. This sub-group is divided into four teams that plan to meet over the next two years in an effort to understand risk at SRS.

To better inform the public of possible risks of eating fish from the Savannah River, SRS joined U.S. EPA, SCDHEC and the Georgia Department of Natural Resources in developing and distributing a fact sheet to Georgia and South Carolina stakeholders. The intense effort to reach subsistence fishermen involved distribution of the fact sheet to people living along the river, to SRS employees, to the media and to health care organizations using several innovative techniques.

Public notices and comments were provided for remedial actions, limited actions, and no action waste units. Public comment periods were also held for sections of the FFA and the CERCLA Proposed Plan on several SRS Operable Units. Notices of Availability for three Records of Decision and two Removal Actions were provided in newspapers, using both display and legal advertisements.

In support of National Environmental Policy Act (NEPA) activities, public meetings were held in 1998 for the Accelerator Production of Tritium, Tritium Extraction Facility and Surplus Plutonium and Commercial Light Water Reactor draft environmental impact statements. The SRS Spent Nuclear Fuel draft EIS public meeting is planned for the end of 1998.

Plans for public participation for FY 1999 have begun. The CAB will continue in its efforts to provide recommendations with their bimonthly meetings in cities near and downstream from SRS. Secretarial decisions on the Accelerator Production of Tritium,

Tritium Extraction Facility, Surplus Plutonium Disposition, and Spent Nuclear Fuel Management at SRS are expected in Fiscal Year 1999. Additionally, public meetings will be held to discuss the site 1999 and 2000 budget, the Comprehensive Plan which is starting to be formulated, the next update on the *Accelerating Cleanup: Paths to Closure*, Risk Management Working Group meetings as well as other issues or concerns of the SRS stakeholders. The site will continue efforts to meet the needs of its stakeholders using timely, cost-effective techniques.

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HIGH-LEVEL RADIOACTIVE WASTE TANK SYSTEMS

The high-level radioactive waste tank systems are identified in Appendix B of the FFA.

Description

The chemical separations processes used to recover uranium and plutonium from production reactor fuel and target assemblies at SRS generated liquid radioactive waste. This high level waste (HLW), which currently amounts to approximately 34-million gallons, has been stored in fifty-one, large, underground, carbon-steel tanks near the center of the site. DOE is required to remove from service and close twenty-four HLW tanks that do not meet secondary containment requirements of the FFA. In January 1996, SRS began negotiations with U.S. EPA and SCDHEC on a plan for closure of the HLW tank farms. In July 1996, SCDHEC and U.S. EPA approved the general plan for HLW tank system closure. However, SCDHEC review and approval of individual tank system or tank system grouping closure configurations is required prior to initiating closure. Tank system closure modules will be developed and submitted to SCDHEC for this purpose.

The primary regulatory goal of the closure plan development process was to close the HLW tank systems in such a manner as to protect public health and the environment in accordance with South Carolina Regulation R.61-82, "Proper Closeout of Wastewater Treatment Facilities" while remaining consistent with the requirements of the Resource Conservation and Recovery Act (RCRA) and CERCLA, under which the HLW Tank Farms will eventually be remediated. The plan presented the environmental regulatory standards and guidelines pertinent to closure of the waste tanks and describes the process for evaluating and selecting the closure configuration (i.e., residual source term and method of stabilizing the tank system and residual waste material). The plan also describes the integration of HLW tank system closure activities with existing commitments to remove waste from the tanks before closure and to ultimately remediate the entire area (including soils and groundwater) surrounding the tank farms.

Activities Accomplished Prior to Fiscal Year 1998

Tank 20, a 1.3-million-gallon capacity, single-shelled, carbon-steel vessel, was officially closed on July 31, 1997. Prior to the initiation of closure activities, all but approximately 1,000 gallons of waste was removed from Tank 20 for further processing.

SCDHEC approved the closure plan module for HLW Tank 17 in Fiscal Year 1997.

Activities Accomplished in Fiscal Year 1998

Tank 17, a 1.3-million-gallon capacity, single-shelled, carbon-steel vessel, was officially closed on December 15, 1997. Prior to the initiation of closure activities, all but approximately 2,400 gallons of waste was removed from Tank 20 for further processing.

The closure configuration for Tank 17 included filling the tank with a "sandwich" of grouts. The first layer consists of a minimum of 6 feet of chemically reducing grout. The fill material was formulated with chemical properties that retard the movement of the radionuclides and chemical constituents from the closed tank. On top of the reducing grout is a layer of controlled low-strength material (CLSM), which is a self-leveling concrete fill material. CLSM provides sufficient strength to support the overbearing weight. The CLSM layer extends to within 12 inches of the top of the vertical wall of the tank (spring line). The final layer is a free-flowing, strong grout comparable in strength to normal concrete (2,000 pounds per square inch). The purpose of the strong grout is to fill the voids around the risers and to discourage an intruder from accessing the waste.

The assessment of soils and groundwater around the waste tanks will be deferred until closure of a geographical grouping of tank systems and their associated support services has been completed. The Tank 17 system cannot practically be isolated from other operational systems for the purposes of assessing potential remedial actions.

A revised waste removal plan and schedule (WRP&S) was submitted to SCDHEC and U.S. EPA for approval on 1/15/98. SCDHEC approved the revised WRP&S on 2/26/98. U.S. EPA approval was granted on 6/22/98. The revised WRP&S is consistent with the three-party consensus tank closure strategy outlined in the HLW Tank Closure Program Plan. The revised plan and schedule supersedes the original WRP&S, which was submitted to SCDHEC and U.S. EPA in November 1993.

Activities Planned for Fiscal Year 1999

Three tank closure activities are planned for Fiscal Year 1999. First, sampling and analysis of the Tank 16 annulus will be completed. Results of this effort will be used to determine impacts (through groundwater modeling) of Tank 16 closure on the established performance objectives. Secondly, waste removal will be completed on Tank 19. A Tank 19 closure module may be submitted to SCDHEC later in the fiscal year. Lastly, sampling and analysis of the 1F Evaporator structure will be performed. As with Tank 16, results will be used to determine impacts of 1F Evaporator closure.

INSTITUTIONAL CONTROL UNITS

Records of Decision have been issued for RCRA/CERCLA Units at the Savannah River Site in which the selected alternative is or contains requirements for Institutional Control. In order to assure to U.S. EPA, SCDHEC, and the public that SRS is maintaining the Institutional Controls as stipulated in the Records of Decision and unit-specific Post-Record of Decision Documents, the Director of the Environmental Restoration Division, U.S. Department of Energy, Savannah River Operations Office and the Vice-President and General Manager of the Environmental Restoration Division, Westinghouse Savannah River Company shall certify that these units are currently being controlled in accordance with the institutional controls corrective actions described in their respective Records of Decision.

The following certifications are applicable to the RCRA/CERCLA Units:

- Silverton Road Waste Site (731-3A)
- F-Area Burning/Rubble Pits(231-F, -1F, and 2F)
- D-Area Burning/Rubble Pits (431-D, and -1D)

I certify to the U. S. Department of Energy, Savannah River Operations Office that Westinghouse Savannah River Company, Environmental Restoration Division, in accordance with Contract No. DE-AC09-96SR18500, will continue compliance with all unit-specific Land Use Controls Implementation Plans as described in *the Federal Facility Agreement Annual Progress Report for Fiscal Year 1998.*

3 NOV 98

Richard R. Harbert
Vice President and General Manager
Environmental Restoration Division
Westinghouse Savannah River Company

Date

I certify that the Savannah River Site will continue compliance with all unit-specific Land Use Controls Implementation Plans as described in *the Federal Facility Agreement Annual Progress Report for Fiscal Year 1998.*

12 NOV 98

Cynthia V. Anderson
Director, Environmental Restoration Division
U.S. Department of Energy, Savannah River Operations Office

Date

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POST-RECORD OF DECISION GROUNDWATER MONITORING

The Final Remediation Reports for the D-Area Burning/Rubble Pits and Silverton Road Waste Site stipulate that the results of groundwater monitoring, a discussion of the analytical results, and any trends in the data will be provided in the FFA Annual Progress Report.

Silverton Road Waste Site

Two new wells were installed in late Fiscal Year 1998 in support of the groundwater sampling at this unit. The first sampling event at these wells is planned to occur in First Quarter Fiscal Year 1999 and the results will be provided in the *Federal Facility Agreement Annual Progress Report for Fiscal Year 1999.*

D-Area Burning/Rubble Pits

In Second Quarter Fiscal Year 1998, wells DB1, DB2, DB3, DB4, and DB5 were sampled for the following constituents: arsenic, benzene, benzo(a) anthracene, benzo(b) fluoranthene, benzo(k) fluoranthene, chromium, chrysene, 1,2-dichloroethane, dichloromehtane, endirn manganese, ocachlorodibenzo-p-dioxin, PCB-1260, total radium, 1,1,2-trichlorethane, and tritium.

Table 2 provides the data from that sampling event for all detected chemicals and compares the results to their relevant maximum concentration limit (MCL). All the chemicals detected are well below the MCL except for manganese, which is considerably above the non-enforceable secondary MCL. The manganese data does not indicate that the manganese is coming from the D-Area Burning/Rubble Pits because the upgradient and side gradient wells do not have significantly less manganese concentrations then the downgradient well. In fact, the side gradient well (DBP4) has the highest manganese concentration.

The results of one sampling event do not make it possible to provide an analysis of any trends in the data. An analysis of the trends will be provided in the *Federal Facility Agreement Annual Progress Report for Fiscal Year 1999*, if appropriate.

Table 2. Analytical Results from the Sampling at the D-Area Burning/Rubble Pits

Well Name	Location	Sample Date	Analyte	RQ	Result	MCL	Percent of MCL	Units
DBP 1	Upgradient	05/04/1998	Chromium, total recoverable	J	2.2E+00	1E+2	2.2	ug/L
DBP 3	Upgradient	04/16/1998	Chromium, total recoverable		8.1E+00	1E+2	8.1	ug/L
DBP 3	Upgradient	04/17/1998	Chromium, total recoverable	J	1.3E+00	1E+2	1.3	ug/L
DBP 3	Upgradient	04/16/1998	Chromium, total recoverable	J	5.3E+00	1E+2	5.3	ug/L
DBP 4	Side Gradient	04/16/1998	Chromium, total recoverable	J	1.0E+00	1E+2	1	ug/L
DBP 1	Upgradient	05/04/1998	Manganese, total recoverable		1.1E+01	5E+1 (1)	22	ug/L
DBP 2	Downgradient	04/17/1998	Manganese, total recoverable		2.8E+02	5E+1 (1)	560	ug/L
DBP 3	Upgradient	04/17/1998	Manganese, total recoverable		7.1E+01	5E+1 (1)	142	ug/L
DBP 3	Upgradient	04/16/1998	Manganese, total recoverable		7.3E+01	5E+1 (1)	146	ug/L
DBP 4	Side Gradient	04/16/1998	Manganese, total recoverable		6.3E+02	5E+1 (1)	1260	ug/L
DBP 5	Downgradient	04/16/1998	Manganese, total recoverable	J	3.0E+00	5E+1 (1)	6	ug/L
DBP 2	Down Gradient	04/17/1998	Radium, total alpha-emitting		1.8E-03	5E-3	36	pCi/mL
DBP 4	Side Gradient	04/16/1998	Radium, total alpha-emitting		6.0E-04	5E-3	12	pCI/mL
DBP 5	Downgradient	04/16/1998	Radium, total alpha-emitting		7.0E-04	5E-3	14	pCi/mL
DBP 1	Upgradient	05/04/1998	Tritium		1.2E+00	2E+1	6	pCi/mL
DBP 2	Down Gradient	04/17/1998	Tritium		1.3E+00	2E+1	6.5	pCi/mL
DBP 3	Upgradient	04/17/1998	Tritium		8.5E-01	2E+1	2.3	pCi/mL
DBP 3	Upgradient	04/16/1998	Tritium		1.1E+00	2E+1	5.5	pCi/mL
DBP 3	Upgradient	04/16/1998	Tritium		1.2E+00	2E+1	6	pCi/mL
DBP 4	Side Gradient	04/16/1998	Tritium		8.8E-01	2E+1	4.4	pCi/mL
DBP 5	Downgradient	04/16/1998	Tritium		1.9E+00	2E+1	9.5	pCi/mL

Notes:
MCL is the maximum concentration limit
RQ is the result qualifier
Manganese limit is a secondary MCL
J designates an estimated value

ENVIRONMENTAL RESTORATION PROGRAM FUNDING

At the request of U.S. EPA, the following Fiscal Year 1998 financial information has been included in this report. Table 3 below lists for each operable unit:

- **Original FY 98 Funding (AOP)** - the amount of funds allocated for that unit at the beginning of the fiscal year [original Annual Operational Plan (AOP) amount];
- **Work Accomplished** - the value of the scope accomplished during the year (BCWP = Budgeted Cost of Work Performed); and
- Actual **Expenditures** - the actual expenditures (ACWP = Actual Cost of Work Performed) for each unit throughout the year.

The funding allocated at the beginning of Fiscal Year 1998, when compared to work performed and expenditures at the end of the year, may differ due to scope changes for the unit agreed to by U.S. EPA, SCDHEC, and U.S. DOE. These scope changes were documented through the established change control process. The difference between the value of scope accomplished and actual expenditures for that same scope is a measure of the cost efficiency achieved. During Fiscal Year 1998, the total SRS Environmental Restoration Program accomplished $112,900,000 in approved scope for $103,300,000, yielding a cost efficiency of $9,600,00.

Figure 3.
Environmental Restoration Program
Funds vs. Spend Comparison for Fiscal Year 1998
($ X 1000)

Fourmile Branch Water Shed Operable Units			
Unit or Description	**Original FY98 Funding (AOP)**	**Work Accomplished (BCWP)**	**Actual Expenditures (ACWP)**
Burial Ground Complex Groundwater	$1,192	$1,166	$951
Coal Pile Runoff Basins (189-C, 289-F, 189-K & 189-P)	$343	$306	$274
C-Area Burning/Rubble Pits (131-C)	$1,555	$1,809	$1,817
C-Area Reactor Seepage Basins (904-066G, 067G, 068G)	$1,692	$1,826	$1,748
Central Shops Burning/Rubble Pit (631-5G) & Heavy Equipment Wash Basin	$0	$363	$344

Table 3 (Continued)
Environmental Restoration Program Funds vs.
Spend Comparison for Fiscal Year 1998
($ X 1000)

Central Shops Burning/Rubble Pits (631-1G and -3G)	$1,335	$1,873	$1,814
Central Shops Sludge Lagoon (080-24G)	$0	$252	$248
F-Area and H-Area Inactive Process Sewer Lines	$1,915	$1,388	$1,481
F Retention Basin (281-3F)	$537	$605	$673
F- and H-Area Seepage Basins Groundwater	$10,363	$11,286	$13,574
High-Level Waste Tank Farms	$144	$98	$61
Ford Building Seepage Basin (904-91G)	$435	$1,737	$2,221
Ford Building Waste Site (643-11G)	$495	$683	$505
H-Area Retention Basin (281-3H)	$1,092	$2,033	$2,035
H-Area Tank Farm GW Operable Unit	$402	$587	$720
Burial Ground Complex	$1,299	$1,999	$1,680
Old Radioactive Waste Burial Ground Solvent Tanks	$1,221	$1,264	$1,305
SRL Oil Test Site (080-16G)	$0	$0	$117
Warner's Pond (685-23G)	$378	$178	$221
Watershed Subtotal	$24,398	$29,453	$31,789
Lower Three Runs Watershed Operable Units			
Unit or Description	**Original FY98 Funding (AOP)**	**Work Accomplished (BCWP)**	**Actual Expenditures (ACWP)**
108-4R Overflow Basin	$399	$71	$60
R-Area Reactor Seepage Basins (904-57G, -58G, -59G, -60G, -103G, -104G)	$2,928	"$3,010	$2,496
Bingham Pump Outage Pits (643-4G, -8G, -9G, -10G, -1G, -2G, -3G)	$1,053	"$1,274	$890
P-Area Reactor Seepage Basin (904-61G, -62G, -63G)	$207	"$1,636	$946
Par Pond Sludge Land Application Site (761-5G)	$0	$0	$0
R-Area Acid/Caustic Basins (904-79G)	$0	$86	$73
R-Area Burning/Rubble Pits (131-R/1R)	$0	$0	$0
Watershed Subtotal	$4,587	$6,077	$4,465

Table 3 (Continued)
Environmental Restoration Program Funds vs.
Spend Comparison for Fiscal Year 1998
($ X 1000)

Pen Branch Watershed Operable Units			
Unit or Description	**Original FY98 Funding (AOP)**	**Work Accomplished (BCWP)**	**Actual Expenditures (ACWP)**
Central Shops Burning/Rubble Pit (631-6G)	$0	$23	$22
CMP Pits (080-170G, -171G, -180G, -181G, -182G, -183G, -190G)	$900	$1,373	$1,311
L-Area Rubble Pit (131-2L)	$2,368	$3,423	$3,361
L-Area Burning/Rubble Pit (131-L)	$0	$0	$0
Hydrofluoric Acid Spill (631-4G)	$0	$281	$132
K-Area Rubble Pile (631-20G)	$0	$0	$0
K-Area Burning/Rubble Pit (131-K)	$744	$1,054	$928
K-Area Reactor Groundwater	$0	$791	$774
K-Area Reactor Seepage Basin (904-65G)	$931	$614	$609
Watershed Subtotal	$4,943	$7,559	$7,137
Savannah River Swamp Watershed Operable Units			
Unit or Description	**Original FY98 Funding (AOP)**	**Work Accomplished (BCWP)**	**Actual Expenditures (ACWP)**
488D Ash Basin	$839	$757	$725
D-Area Burning/Rubble Pits (431-D, -1D)	$53	$110	$95
D-Area Oil Seepage Basins (631-G)	$896	$682	$555
D-Area Waste Oil Facility (484-D)	$780	$0	$0
M-Area West (631-21G)	$0	$0	$0
Road A Chemical Basin(904-111G)	$542	$343	$197
Silverton Road (731-3A)	$300	$261	$210
New TNX Seepage Basin (904-102G)	$0	$0	$0
TNX Burying Ground (634-5G)	$0	$0	$0
TNX Groundwater (082-G)	$1,877	$2,471	$2,113
Old TNX Seepage Basin (904-076G)	$1,717	$1,965	$1,948
Watershed Subtotal	$,004	$6,589	$5,843

Table 3 (Continued)
Environmental Restoration Program Funds vs.
Spend Comparison for Fiscal Year 1998
($ X 1000)

Steel Creek Watershed Operable Units			
Unit or Description	**Original FY98 Funding (AOP)**	**Work Accomplished (BCWP)**	**Actual Expenditures (ACWP)**
L Lake	$0	$0	$5
L-Area Oil/Chemical Basin (904-83G, -79G)	$2,535	$1,232	$1,254
L-Area Reactor Seepage Basin (904-64G)	$0	$405	$502
L-Area Reactor Groundwater	$0	$26	$11
P-Area Burning/Rubble Pits (131-P)	$751	"$1,052"	$705
Watershed Subtotal	$3,286	$2,715	$2,477
Upper Three Runs Watershed Operable Units			
Unit or Description	**Original FY98 Funding (AOP)**	**Work Accomplished (BCWP)**	**Actual Expenditures (ACWP)**
716-A Motor Shops Seepage Basin (904-101G)	$626	$2,720	$66
A-Area Coal Pile Runoff (788-3A)	$0	$9	$8
A-Area Rubble Pit (731-2A)	$824	$658	$332
A-Area Rubble Pits (731-A, -1A)	$0	$0	$0
A-Area Miscellaneous Rubble Pile (731-6A)	$1,260	$2,133	$1,441
Burma Road Rubble Pit (231-4F)	$0	$0	$0
F-, H-, K-, and P-Area Acid/Caustic Basins (904-47G, -75G, -78G, -80G)	$0	$7	$7
F-Area Burning/Rubble Pits (231-F, -1F, -2F)"	$748	$739	$711
Grace Road Site (631-22G)	$0	$0	$0
Gunsite 113 Access Road Rubble Pit (631-24G)	$0	$0	$0
Gunsite 720 Rubble Pile (631-16G)	$0	$0	$0
H-Area Coal Pile Runoff Basin (289-H)	$0	$0	$0
A&M Groundwater	$3,625	$2,751	$2,405
Met Lab Basin	$0	$0	$0
SRL Groundwater	$830	$856	$745
Southern Sector Groundwater	$1,202	$1,679	$1,882

Table 3 (Continued)
Environmental Restoration Program Funds vs.
Spend Comparison for Fiscal Year 1998
($ X 1000)

Vadose Zone Groundwater	$1,668	$1,763	$1,813
3/700 Area Strippers	$941	$965	$896
Western Sector	$95	$261	$366
Met Lab Groundwater	$72	$115	$74
Misc Chemical Basin/Metals Burning Pits (731-4A, -5A)	$1,981	$1,859	$1,378
Low-Level Radioactive Waste Disposal Facility	$7,554	$6,662	$6,278
Old F-Area Seepage Basin (904-49G)	$1,455	$1,147	$1,186
Sanitary Landfill Groundwater	$0	$1,840	$1,597
Non-Radioactive Waste Disposal Facility (740-G)	$0	$5	$6
SRL Seepage Basin (904-53G1, -53G2, -54G, -55G)	$450	$1,032	$1,029
Steed Pond	$0	$13	$9
West of SRL Georgia Fields (631-19G)	$0	$203	$111
Watershed Subtotal	$23,331	$27,417	$22,340
Subtotal for all Watersheds	$67,549	$79,810	$74,051
Remaining ERD Activities			
Unit or Description	**Original FY98 Funding (AOP)**	**Work Accomplished (BCWP)**	**Actual Expenditures (ACWP)**
Watershed Assessment	$1,819	$2,119	$1,826
Site Evaluations	$2,947	$4,627	$1,703
Facility Operations & Centralized Functions	$26,012	$21,597	$20,916
DOE-SR	$6,916	$4,770	$4,770
Other Subtotals	$37,694	$33,113	$29,215
Total	**$105,243**	**$112,923**	**$103,266**

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CONTRACTOR ASSIGNMENTS

Each Federal Facility Agreement (FFA) Progress Report is required to provide a list of the identity and assignment of each of the Department of Energy (DOE) contractors performing work under the FFA. The primary contractors are the Westinghouse Savannah River Company (WSRC), Bechtel Savannah River Incorporated (BSRI), Wackenhut Services Incorporated (WSI), Savannah River Ecology Laboratory (SREL), and the U.S. Forest Service (USFS). These contractors will be performing work at all locations within the SRS. Table 4 is the list of contractors and their assignments.

Table 3 Contractor Assignments

Contractor	Assignment
A-1 Masonry Construction.	Concrete/masonry
Advanced Sciences	Soils & Groundwater Remediation
Adtechs	F/H Water Treatment
Aiken & Action	Scaffolding
Alliance Environmental.	Well Drilling
Allied Fabrication & Construction	Light Commercial
Allied Fabricators	Soils & Groundwater Remediation
Allied Technology	Soils & Groundwater Remediation
Analysas Corporation	Soils & Groundwater Remediation
Apex Environmental	Soils & Groundwater Remediation
Applied Research	Cone Penetrometry
ASI	F/H Clear/Grub
AWK Consulting	Soils & Groundwater Remediation
B&W Nuclear	Soils & Groundwater Remediation
BAT Assoc. Inc.	Environmental Energy Services
Balt Engineering Inc	Soils & Groundwater Remediation
Beams Pavement	Paving
Bechtel Nat	OPWR
Blackhawk Geosciences	Electromagnetic survey
Black & Veatch	ER-Services & Construction
CDM Fed. Programs	Environmental Energy Services
CET Environmental Services	Soils & Groundwater Remediation
Columbia Mech. Inc	HVAC
E&I Environment	Environmental Services
Echota Industrial Co	Painting
EES Corp.	Environmental Support Services
Environmental Monitoring	Well Drilling
Environmental Exploration	Well Drilling

Contractor	Assignment
ERDA	Research & Development
ETT Environmental	Toxicity Testing
Exploration Resources	Data Management & Records
Foster Wheeler	ER-Services & Construction
Fugro Geosciences	Cone Penetrometry
General Engineering	Analytical Services
General Physics	A/E Services
Graves	Well Drilling
Hampton-Clarke	Soils & Groundwater Remediation
IT Corp.	Air Quality Services
Ivey's Construction	Road Clear & Grub
Jefferson Construction.	Earth Work
Law Engineering	Soil Testing
Lockwood-Greene	A/E
Maner Builders Supply	Fencing
Mars Construction	IDW Cover/Shelter
Merrick	A/E
Microseeps	Soil & Gas Analyses
NES Government Services	Soils & Groundwater Remediation
Ogden Environmental. & Energy	Environmental Energy Services
OHM Remediation	ER-Services & Construction
Parallax	Site Evaluation
Parson Environmental	Environmental Services
Quality Electric	Electrical
R&R International	Soils & Groundwater Remediation
Radian Corp.	ER-Services & Construction
Ralph M Parsons	A/E Services
RCS Corporation	Groundwater Sampling
Roy F. Weston	Analytical Services
Rust	Environmental Services
SAIC	Environmental Services
SCURFF	Research & Development
Security Consultants	Soils & Groundwater Remediation
Sevenson Environmental. Services	Soils & Groundwater Remediation
STEP Inc.	Environmental Energy Services.
U.S. Energy	Soils & Groundwater Remediation
Weiss Associates	Soils & Groundwater Remediation

LIST OF ACRONYMS AND ABBREVIATIONS

ACL	Alternate concentration limit
ASCAD™	Approved Standardized Corrective Action Design
BGC	Burial Ground Complex
bls	below land surface
BTEX	benzene, toluene, ethylene, and xylene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMP Pits	Chemical, Metals, and Pesticides Pits
Ci	curie
CMS/FS	Corrective Measures Study/Feasibility Study
COC	constituents of concern
CS	Central Shops
CSWE	Central Services Works Engineering
d/m/ml	disintegrations/minute/milliliter
DNAPL	dense nonaqueous phase liquid
DOE	U.S. Department of Energy
DWS	Drinking Water Standards
EP	Extraction Procedure
U.S. EPA	U.S. Environmental Protection Agency
ER	Environmental Restoration
ESC	Expedited Site Characterization
FFA	Federal Facility Agreement
FIP	Field Investigation Plan
FImP	FFA Implementation Plan
FPIT	FFA Process Improvement Team
ft	foot/feet
ft^3	cubic feet
FY	Fiscal Year
gpd	gallons per day
gpm	gallons per minute
GPR	ground penetrating radar
GWPS	Groundwater Protection Standards
HGCA	Hybrid Groundwater Correction Action
HWMF	Hazardous Waste Management Facility
IAPP	Interim Action Proposed Plan
in	inch/inches
IROD	Interim Record of Decision
IWT	Industrial Wastewater Treatment
IOU	Integrator Operable Unit
KOH	potassium hydroxide

lb	pound
LLRWDF	Low-Level Radioactive Waste Disposal Facility
MCL	maximum contaminant level
Met Lab	Metallurgical Laboratory
mR/hr	milliroentgen per hour
mrem	millirem
MWMF	Mixed Waste Management Facility
NBN	No Building Number
ng/g	nanograms per gram
NOD	Notice of Deficiency
NPDES	National Pollution Discharge Elimination System
NPL	National Priority List
ORWBG	Old Radioactive Waste Burial Ground
OU	Operable Unit
PCB	polychlorinated biphenyl
PCE	tetrachloroethylene
pCi	picocurie
pCi/g	picocurie per gram
pCi/ml	picocurie per milliliter
ppb	parts per billion
ppm	parts per million
Pu	plutonium
RCA	Radiologically Controlled Area
RCRA	Resource Conservation and Recovery Act
RD/RA	Remedial Design/Remedial Action
RFI/RI	RCRA Facility Investigation/Remedial Investigation
ROD	Record of Decision
SAFER	Streamlined Approach for Environmental Restoration
SCDHEC	South Carolina Department of Health and Environmental Control
sq	square
SREL	Savannah River Ecology Laboratory
SRL	Savannah River Laboratory (now SRTC)
SRS	Savannah River Site
SRTC	Savannah River Technology Center
SSHASP	Site-Specific Health and Safety Plan
TCE	trichloroethylene
TIC/TAL/TCL	tentatively identified compound/target analyze list/target compound list
TCLP	Toxicity Characteristic Leaching Procedure
TPH	total petroleum hydrocarbons
TRU Pads	Transuranic Waste Storage Pads
TSCA	Toxic Substances Control Act
TSD	treatment storage disposal

UIC	underground injection control
UST	underground storage tank
VOC	volatile organic compound
WMO	Waste Management Operations
WSRC	Westinghouse Savannah River Company