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SITE SPECIFIC PLAN(U)

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Reviewing Official: C J Banick

(C. J. Banick, Asst. Classification Officer)

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Westinghouse Savannah River Company
Savannah River Site
Aiken, SC 29808

FOREWORD

This is the first in a series of annual Site Specific Plans (SSPs) that will follow the Department of Energy (DOE) Environmental Restoration and Waste Management (ER&WM) Five-Year Plan. In the future, the DOE's annual Five -Year Plan will be issued in May and the SSP will be issued the following October. The funding and activities in the SSP will be consistent with the appropriations for the fiscal year it is issued (e.g., the next Site Specific Plan to be issued in October 1990 will be consistent with the appropriation for the Fiscal Year 1991 and funding for the 1992-1996 will tie to the Five-Year Plan issued in May 1990.) The SSPs are being issued four months later than usual this first year because the Five-Year Plan was issued in August instead of May. In some cases, there are significant differences between what we expect to do in the 1991-1995 and what appeared in the August 1989 Five-Year Plan (Plan for FY 1991-1995) and, therefore, what appears in this Site Specific Plan. However, since the primary purpose of the SSP is to describe the activities for the fiscal year it is issued, we believe that the difference in funding from the Five-Year Plan in the out years will not significantly affect the usefulness of the SSP.

We appreciate your cooperation in working with the Department during our first year of implementing this process. Your suggestions and recommendations are most welcome.

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1.0 INTRODUCTION

1.1 Purpose and Scope

Environmental Restoration and Waste Management Five-Year Plan (DOE 1989a)

The *Environmental Restoration and Waste Management Five-Year Plan* (FYP) covers the period for FY 1989 through FY 1995. The plan establishes a Department of Energy - Headquarters (DOE-HQ) agenda for cleanup and compliance against which overall progress can be measured. Participation in the planning process was obtained through independent review by involved states, affected Indian Nations, the National Governors Association, the National Association of Attorneys General, the National Conference of State Legislatures, the Environmental Protection Agency (EPA), the Office of Management and Budget, and the National Academy of Sciences. The plan was made available for public review and comment from September through November, 1989, in order to provide input for the next annual update.

The FYP covers three areas: Corrective Activities (CA), Environmental Restoration (ER), and Waste Management (WM) Operations. Corrective Activities are those activities necessary to bring active or standby facilities into compliance with local, state, and federal environmental regulations. Environmental Restoration activities include the assessment and cleanup of surplus facilities and inactive waste sites. A surplus facility is a facility that is not essential to the mission of the site. Waste Management Operations includes the treatment, storage, and disposal of wastes which are generated as a result of ongoing operations. Also included in the FYP are Research and Development (R&D) activities necessary for the ER and WM activities in the FYP. These R&D activities are included in the ER and WM categories.

The FYP establishes four priority levels that reflect these discrete goals (DOE 1989a):

- Limiting immediate or short-term health risk and contamination
- Complying with in-place or pending agreements
- Reducing risk, promoting compliance, addressing public concern, and protecting Departmental missions
- Accelerating overall compliance.

The FYP starts with FY 1989 execution, establishes the FY 1990 amended President's budget, establishes a baseline for FY 1991 budget formulation, and includes projections through FY 1995 (DOE 1989a).

The SSP purpose is to develop a baseline for policy, budget, and schedules for the DOE Environmental Restoration and Waste Management Activities. The plan shows how activities are prioritized, identifies currently funded projects, projects that are planned to be funded in the upcoming fiscal year, and future projects that DOE is considering. The SSP is not intended to provide a detailed cost analysis for specific projects and/or activities.

The ability to react to change in priorities, or adapt to new environmental/ regulatory requirements, is an important concern to the management of DOE and the SSP. Activities are planned in advance to anticipate possible roadblocks or unforeseen problems. The degree of uncertainty is reflected in the quality of the estimate, by allowing for some conservatism. In the event a shift in resources is required to address a new concern, the flexibility exists to do this with the check and balance provided by DOE-HQ. Under all circumstances, all regulatory commitments and/or environmental laws and regulations will be met by diverting resources if required. Funding required for environmental cleanup and corrective activities under current or future Federal or State compliance agreements and regulatory requirements will receive top priority in the budgetary decision making of the SSP.

Savannah River Site - Site Specific Plan

This Site Specific Plan (SSP) has been prepared by the Savannah River Site (SRS) in order to show how Environmental Restoration and Waste Management activities that were identified during the preparation of the DOE-HQ *Environmental Restoration and Waste Management Five-Year Plan* (FYP) will be implemented, tracked, and reported. The SSP describes DOE Savannah River (DOE-SR) and operating contractor, Westinghouse Savannah River Company (WSRC), organizations that are responsible for undertaking the activities identified in this plan. The SSP has been prepared in accordance with guidance received from DOE-HQ. DOE-SR is accountable to DOE-HQ for the implementation of this plan.

SRS environmental support, health protection, and emergency preparedness programs are not included in the FYP or SSP based on guidance provided by DOE-HQ. Environmental support activities includes SRS environmental personnel and other programs including: air quality, groundwater, surface water, drinking water, underground storage tanks, spill response, certain permitting and waste handling activities, Environmental Impact Assessments, monitoring and reporting, education and training, and some environmental research studies.

According to the *Environmental Restoration and Waste Management Five-Year Plan* (DOE 1989a), the FYP goal is to provide cleanup at all DOE sites within 30 years (DOE 1989a). The SSP demonstrates the direction that the site is taking toward meeting that goal. Quoting from the FYP, below are specific DOE actions that will be undertaken (DOE 1989a):

- Complying with laws and regulations aimed at protecting human health and the environment.
- Developing a national prioritization system for cleanup activities to be derived with state, tribal, and other public involvement.

- Containing known contamination at inactive sites and vigorously assessing the uncertain nature and extent of contamination at other sites to enable realistic planning, scheduling, and budgeting for cleanup.

- Supporting establishment of interagency agreements and fulfilling the requirements of compliance agreements already in place.

- Releasing, for scientific analysis, the health records of workers at DOE facilities and conducting public health risk assessments at plant sites for past, present, and future operations.

- Implementing programs to minimize current waste generation and future waste disposal requirements.

- Establishing an Applied Research and Development program involving university research capabilities, industry, national laboratories, and other federal agencies to determine and rank research and development needs and pursue new and improved technologies for waste minimization and cleanup.

- Changing DOE culture to one of clear and open communication. DOE must listen to its critics and not contend that all is well or that the Department knows all the answers.

- Working diligently to achieve congressional support for the FYP's objectives.

- Taking innovative steps to develop, motivate, and allocate the human resources needed to implement compliance and cleanup activities.

- Recognizing tribal sovereignty and treaty rights related to tribal and ceded lands.

- Continually examining environmental regulations to ensure that DOE's compliance actions effectively reduce risk to human health and the environment.

The SSP demonstrates that the SRS complies with environmental and health laws and regulations or is working to comply under schedules agreed to with regulatory agencies; has an aggressive program for Environmental Restoration; is implementing waste minimization programs; is planning for future waste storage, treatment, and disposal needs; supports the establishment of interagency agreements; is fulfilling the requirements of existing compliance agreements; continually examines environmental regulations to ensure compliance; openly communicates with interested parties; has taken innovative steps to implement compliance and cleanup activities; and has an active research and development program to develop innovative environmental solutions. The DOE-SR and WSRC will continue to pursue activities at the SRS to ensure compliance with environmental regulations, and the protection of the environment and human health, both onsite and offsite.

A performance tracking system has been drafted to follow SSP implementation. This tracking system would require the various departments at SRS to report the status, on a quarterly basis, of the various activities in the SSP and the FYP. It is anticipated that requests to update the tracking system would be sent to the various departments in February, May, August and October of each year. These quarterly reports will be summarized and reported in the annual update of the SSP.

On-going programs, proposed (unfunded) projects and other activities will need to be reported. Included in this report will be the following information:

- Project Status, describing whether the project is in preliminary planning, design, construction, on-going work, completed, discontinued, deferred or other.
- New Activity Title, which will allow for additional projects that may come up during the year.
- Milestone Status, describing whether the project is on schedule, delayed, ahead of schedule, or completed.
- Milestone Revision Dates, which will allow for revisions in the Milestone Schedule.
- Modification, describing any activity modification.
- Results/Accomplishments, which will allow for a brief description of activity results or accomplishments.
- Revised Responsibility, if the project is shifted to another individual.

These reports will be circulated among the various departments' for review by management. The performance for each department will be measured by each department and site management.

The SSP was prepared during October and November of 1989. Per guidance from DOE-HQ, all information must match the information supplied on the Activity Data Sheets (ADS) that were prepared for the FYP. These ADS were prepared during April 1989. SRS recognizes that many items have changed since April; however, these changes are not reflected in this document, except as noted. These changes will be incorporated in the next version of the SSP.

The SSP draft outline was reviewed with local legislative officials on September 18, 1989, and representatives from EPA Region IV, South Carolina Governor's Office, South Carolina Department of Health and Environmental Control (SCDHEC), and Georgia Department of Natural Resources on September 25, 1989. A draft of this plan was distributed to local and state regulators for review and comment on November 1, 1989, and a meeting was held on November 17, 1989, to receive their comments.

1.2 Mission

The Savannah River Site (SRS) produces nuclear materials, primarily tritium and plutonium, for national defense. Constructed in the early 1950s, this installation near Aiken, South Carolina, is owned by the U.S. Department of Energy and operated by the Westinghouse Savannah River Company (WSRC).

The SRS is located in south central South Carolina and occupies an almost circular area of approximately 325 square miles. The major geophysical feature is the Savannah River, which forms the

southwestern boundary of the site and is also the South Carolina-Georgia border. The SRS occupies parts of three South Carolina counties–Aiken, Barnwell, and Allendale–and is closest to the major population centers of Augusta, Georgia, and Aiken, South Carolina (see Figure 1-1). The site is a controlled area with limited public access. The production facilities occupy less than 5 percent of the SRS area. The remainder of the site is forested (approximately 80 percent) or is wetlands (20 percent).

The SRS comprises 18 production, service, and research and development areas scattered across the 325-square-mile site. Figure 1-2 shows the locations of these areas. Each area is identified by a numerical and letter designation. Table 1.1 summarizes the letter designations.

The SRS produces nuclear materials by manufacturing fuel and target components, irradiating the components in nuclear reactors, chemically extracting the desired nuclear materials from the irradiated fuel and targets, and separating radioactive waste from the desired materials. These radioactive wastes will be solidified in glass for final offsite geological disposal. Figure 1-3 is a simplified materials flow diagram of the site.

The primary facilities are the production facilities. The fuel and target components are manufactured in the 300-M Area for shipment to the site reactors. The targets and fuel are placed in heavy-water-moderated production reactors for irradiation. Originally the site operated five reactors. Currently, three of the reactors, located in the 100-P, K, and L Areas, are operational. The other two reactors, in the 100-C and R Areas, are in cold standby and shutdown status, respectively. The SRS reactors operate at relatively low temperatures and pressures, and they do not produce electricity. The reactors are cooled by a heavy-water moderator, which is then circulated through heat exchangers in a closed loop. Inside the heat exchangers, water withdrawn from the Savannah River and onsite cooling reservoirs is used to remove heat from the heavy water without contacting it. The heavy water is then recirculated through the reactor vessel, and river water is released through an outfall to onsite streams or cooling ponds before returning to the river. The irradiated fuel is transported by shielded railroad cars to either the 200-F or H Area for the recovery of nuclear materials. The 200-F and H separations processes dissolve some of the irradiated components in acid, and extract and separate the desired nuclear materials. Other products are extracted from irradiated components in separate processes in H Area. The liquid radioactive waste generated by the separation facilities is neutralized and stored in underground tanks until it can be processed in the Defense Waste Processing Facility (DWPF), currently under construction in the 200-S and Z Areas. The glass wasteform will be stored onsite until a geological repository is available in early 2000. The nuclear material products are shipped to other Department of Energy (DOE) facilities for additional processing. The reactor, separations, and waste storage areas are at least four miles from the nearest site boundary.

The site also contains many production support, research and development, and waste management facilities. There are five coal-fired powerhouses located in various production areas to generate electricity and steam. The largest powerhouse, which is located in the 400-D Area, produces electricity and exports process steam to C, F, H, and S Area through a seven-mile-long steam line. The heavy-water rework facility used to purify reactor moderator is also located in D Area. A semi-works facility used to study chemical and waste processing problems and to test production scale equipment is located in the 600-T Area. B Area houses the site security contractor, Wackenhut Services Incorporated (WSI), and training facilities. The 700-A Area includes the administrative facilities for DOE and WSRC, the

Savannah River Laboratory (SRL), and the University of Georgia Savannah River Ecology Laboratory (SREL). The Naval Reactor Fuel Material Facility, which was to produce fuel for the Navy's nuclear-powered fleet and is being placed on cold standby, is located in F Area. In addition to the underground radioactive waste storage tanks, the SRS has a centrally located 196-acre site between F and H Areas for the disposal of solid low-level radioactive waste and the storage of transuranic (TRU) radioactive waste and mixed waste. The site also has storage buildings for nonradioactive hazardous wastes located in the Central Shops and U Areas along with a central sanitary landfill.

The site employs more than 20,000 people. About 97 percent are employed by the WSRC and its subcontractors. The remainder are employed by the DOE-SR, WSI, SREL, and the United States Forest Service (USFS).

Within the WSRC, environmental protection and regulatory compliance are line organization responsibilities. Each department is responsible for the facilities it operates (see Section 2.0).

1.3 Overview

The SSP describes Environmental Restoration and Waste Management activities that are planned at the SRS for the period FY 1990 through FY 1995. The plan is consistent with the FYP (DOE 1989); and will focus on near term activities that are scheduled to occur in the FY 1990 and FY 1991 time frame. Activity Data Sheets (ADSs) that were prepared for the SRS to support the FYP are included with the SSP as a separate volume.

SRS activities are divided into three areas: Corrective Activities, Environmental Restoration, and Waste Management. Overviews of each of these activities are presented below. For the SRS, expenditures total over $4 billion for the planning period and are projected to be approximately $81 million for Corrective Activities, $460 million for Environmental Restoration, and $3.6 billion for Waste Management Operations (see Figure 1-4).

	Total Cost ($s in Thousands)
Corrective Activities	$ 81,400
Environmental Restoration	459,778
Waste Management Operations	3,624,310
Total	$4,165,488

According to the *Savannah River Site Environmental Report for 1988* (WSRC 1989), during 1988, as in previous years, SRS operations had no adverse impact on the general public or the environment. The maximum radiation dose commitment to a hypothetical individual at the SRS boundary from 1988 SRS atmospheric releases of radioactive material was 0.46 millirem (mrem). To obtain the maximum dose, an

individual would have had to reside on the SRS boundary at the location of the highest dose for 24 hours per day, 365 days per year, consume a maximum amount of foliage and meat which originated from the general vicinity of the plant boundary, and drink a maximum amount of milk from cows grazing at the plant boundary.

The maximum radiation dose commitment to an individual downriver of SRS who consumed Savannah River water was 0.13 mrem at both the Cherokee Hill Water Treatment Plant at Port Wentworth, GA (near Savannah) and the Beaufort-Jasper Water Treatment Plant near Beaufort, SC. This assumes the individual drinks two liters of water each day, 365 days per year.

The average radiation dose commitment to an employee at SRS was 66 mrem for 1988.

These radiation doses from SRS operations are small when compared to the dose from natural radiation, which averages 295 mrem per year. The largest part of this natural radiation dose is 200 mrem from natural radon gas in homes. The maximum dose from SRS atmospheric releases of 0.46 mrem is only 0.46% of the DOE Revised Interim Radiation Dose Limit from extended exposure, and 0.16% of the average annual dose from natural radiation.

1.3.1 Corrective Activities Overview

Corrective Activities from the *Environmental Restoration and Waste Management Five-Year Plan* (DOE 1989a) are defined as those activities needed to bring active and standby facilities, currently out of compliance with applicable local, state, and federal requirements and internal DOE requirements, into compliance in an expeditious manner. The current definition of Corrective Activities does not include activities that are necessary for maintaining environmental compliance at the site. For example, as the site continues to grow, more domestic water lines are needed. To maintain compliance with state regulations, these water lines must be built. These types of activities are not included in the scope of this plan. However, they are included in the Circular A-106 Report (see Section 2.2).

In addition, SRS is now placing greater emphasis on self-assessment activities to identify potential environmental compliance issues at SRS. SRS is conducting a thorough self-assessment of compliance activities at all SRS facilities. The assessment involves facility inspections (walkdowns) and record reviews. It has identified some radioactive materials as potentially subject to RCRA hazardous waste management requirements. SRS has informally discussed with South Carolina Department of Health and Environmental Control (SCDHEC) the protocol for involving SCDHEC. SCDHEC supports the concept that SRS is implementing.

For the FYP, Corrective Activities are grouped into three categories: air, water, and solid waste, per guidance from DOE-HQ.

Air Corrective Activities are conducted to reduce or eliminate unacceptable releases of contaminants to the atmosphere via regulated sources such as stacks and exhaust vents (DOE 1989a).

Water Corrective Activities are conducted to reduce or eliminate unacceptable discharges of contaminants to surface water, such as those regulated under the National Pollution Discharge Elimination System (NPDES) Program (DOE 1989a).

Solid Waste Corrective Activities are conducted to bring solid waste management operations, that have or may have caused contamination of soil and groundwater into compliance. Solid Waste Corrective Activities are needed to comply with local, state, and federal solid waste (including hazardous waste generation, storage, treatment, and disposal) and groundwater protection statutes, codes, ordinances, and other requirements (DOE 1989a).

The only Corrective Activities that were identified for the FYP were Water Corrective Activities. Only the Water Corrective Activities at SRS met the definitions according to DOE-HQ. Because Corrective Activities must be completed in a timely, effective manner, these activities will generally be accomplished using existing technologies rather than new technologies which would require extensive lead time for research and development.

The SRS complies with the Clean Water Act (CWA) and the South Carolina Department of Health and Environmental Control (SCDHEC) wastewater regulations except for thermal effluent limitations. During reactor operation, reactor cooling water is discharged at greater than 70°C (175°F) to several of the site streams. The site constructed PAR Pond and L Lake to mitigate heated water discharges from P Reactor and L Reactor, respectively. In addition, the DOE entered into a Consent Order with the SCDHEC to mitigate the heated water discharges from K Reactor.

Most operational effluents from SRS facilities discharge through point source outfalls. Discharges from the outfalls are regulated by the SCDHEC under the NPDES permit. Some operational discharges (shielding waters and cooling waters) are presently discharging to seepage areas but will be rerouted to permitted outfalls.

Four corrective activities for the SRS were identified during the preparation of the FYP. One activity is associated with the thermal discharges from K Reactor and the other three deal with NPDES Outfall A-008; a discharge from the A Area powerhouse. The total cost for these activities is estimated to be $81.4 million.

Heated water discharges from K Reactor currently cause exceptions to thermal limits for discharges to Class B streams as set forth in South Carolina Water Quality Stream Standards. A consent order between the DOE and SCDHEC allows the facility to operate outside temperature limits until a mitigation facility is placed in operation. An Environmental Impact Statement (EIS) was prepared on Alternative Cooling Water Systems for K Reactor. The installation of a recirculating cooling tower at K Area was the alternative chosen by the DOE in the Record of Decision (ROD) published February 12, 1988. The total capital cost for the cooling tower is estimated to be $79 million; the FY 1990 cost is $26 million. Project engineering and design is presently underway, and construction has started.

Three activities were identified to correct conditions at an unpermitted outfall (proposed designation Outfall A-008).

The existing 784-A powerhouse (A Area) waste stream effluents which flow to Outfall A-008 consist of discharges from the wet ash scrubber, process cooling water, service and domestic water tank overflows, well blowoff, boiler blowdown, washdown water, and the coal unloading sump. The wet ash scrubber discharge and the washdown water contain suspended solids. These effluents will be diverted to and treated in a sedimentation basin. After completion, no powerhouse effluents will discharge through Outfall A-008. The total estimated cost is $2.4 million.

The corrective activity expenditures account for 2 percent of the total plan (see Figure 1-5).

1.3.2 Environmental Restoration Overview

According to the *Environmental Restoration and Waste Management Five-Year Plan* (DOE 1989a), Environmental Restoration is concerned with the assessment and cleanup of inactive facilities and units. Various amounts and types of waste have accumulated at these facilities and units as a result of operation for almost forty years.

The Environmental Restoration Category has two major parts, Remedial Actions and Decontamination and Decommissioning (D&D). Research and Development are necessary for both.

Remedial Actions are primarily concerned with all aspects of the assessment and cleanup of inactive potential release units. The regulatory requirements for Remedial Actions activities are prescribed by the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); Sections 3004(u) and 3004(v) of the Resource Conservation and Recovery Act (RCRA); the National Environment Policy Act (NEPA); and, with respect to radioactive substances, the Atomic Energy Act (AEA). Certain state and local requirements are also applicable, such as the South Carolina Hazardous Waste Management Regulations (SCHWMR), the South Carolina Classifications and Standards (R.61-68), and the South Carolina Solid Waste Regulations (nonhazardous sites). The tasks associated with Remedial Actions include: (1) site discovery, preliminary assessment, and site inspection; (2) site characterization, analysis of cleanup activities, and selection of remedy; (3) cleanup and site closure; and (4) site monitoring (DOE 1989a).

D&D is primarily concerned with the safe caretaking of surplus facilities until either they are decontaminated for reuse or completely removed. This includes all tasks connected with assessment and characterization, environmental review, engineering, decontamination or decommissioning operations and closeout. Activities connected with D&D are carried out in a accordance with the provisions prescribed by NEPA and AEA and with requirements set forth in various DOE orders, standards and other documents. Although D&D may deal with soil and groundwater contamination, most D&D activities are concerned with facilities such as reactors, hot cells, processing plants, storage tanks, and other structures from which there have been no known releases (DOE 1989a).

The primary objective of the SRS Environmental Restoration (ER) Program is to support efforts in identifying and restoring all inactive waste units and to ensure compliance with all applicable laws and regulations. The major program goal is to remediate inactive waste units with cost-effective, efficient and environmentally acceptable remediation technology. The tasks associated with the SRS ER

Program include site identification, investigation, technology development and demonstration, remedial design, unit closures, and decontamination and decommissioning.

The ER Program at the SRS has been designed to address a wide-range of waste units under a variety of state and federal regulations as well as pertinent DOE orders. A total of 202 active and inactive waste units have been identified at the SRS. The type of waste units range from hazardous/low-level radioactive to nonhazardous/nonradioactive. The units may contain volatile organic compounds, heavy metals, radionuclides, nonhazardous building debris and other scrap materials.

To date, the majority of the waste unit activity associated with the ER Program has been conducted pursuant to the Resource Conservation and Recovery Act (RCRA). Some of the waste units are currently being addressed under a RCRA Part B permit and approved RCRA closure plans. However, waste units at which hazardous substances are present are subject to the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). The nonhazardous/nonradioactive waste units will be closed under the South Carolina Solid Waste Disposal Regulations found in Chapter 61 of the 1976 South Carolina Code of Laws.

On July 14, 1989, the SRS was proposed for placement on the National Priority List (NPL). Discussions have been underway between SRS, EPA-IV and SCDHEC to prepare a Federal Facility Agreement (FFA). The FFA will create a single sitewide program for addressing all waste units at which hazardous substances are present. This will also include RCRA waste units because hazardous waste is a subset of hazardous substances. Since the FFA is a draft document subject to change, it has not been considered in the preparation of this version of the SSP. It is expected to be included in the next version.

Characterization and remediation of inactive waste units under the SRS ER Program will include the following phases: assessment, site inspection, characterization, site assessment, closure plan development, closure, corrective action and remediation. Since characterization and remediation will occur on a site by site basis, ER Program activities will include several or all of these phases at any one time.

Closure options for the waste sites are varied and will be determined on a site-specific basis. Options for remediation include waste stabilization, site capping (to prevent rainwater infiltration), waste removal, and grading. No action may be required at some waste sites, in which case, documentation supporting this option will be provided in a report. Based on preliminary analyses presented in the Environmental Impact Statement (EIS), *Waste Management Activities for Groundwater Protection at the Savannah River Plant*, DOE/EIS-0120D (DOE 1987c), the current plans propose waste removal at the old F-Area seepage basin and the six R-Area seepage basins. Funding for closure for most other waste sites assumes the waste would be left in place with closure techniques, such as capping applied. However, this closure option is dependent on regulatory requirements and approval. The final closure strategy for all waste units will, however, depend on the information developed during characterization and assessment, and applicable regulations and standards.

Groundwater remedial actions will be performed as needed to comply with groundwater protection requirements resulting from negotiated agreements with regulatory agencies. Corrective actions are complex and depend on many variables, which are often site-specific. Remedial actions include *in situ*

treatment, groundwater pumping and treatment, and containment or diversion. Waste unit remediation also includes options for groundwater corrective actions, if necessary. Future options may also include innovative technologies currently being developed. An effective design often combines two or more actions. The removal of chlorocarbons from the uppermost aquifer and vadose zone in the M Area and vicinity is currently the only groundwater remedial action underway at the SRS.

Historically, the SRS Decontamination and Decommissioning (D&D) activities have been directed toward providing space for new facilities in existing buildings. Included in the facilities requiring eventual decontamination and decommissioning are the five production reactors, the two chemical separations plants, the fuel fabrication facilities, and the 51 underground high-level waste tanks. Some D&D activity has been or is being conducted on site facilities such as the Building 305-M Test Pile Reactor and the old HB-Line.

The SRS is actively developing and demonstrating the technologies needed to decontaminate and decommission major site facilities. The Tank 16 sludge removal demonstration in the late 1970s, the planned decontamination activities of Tank 16, the 1984 removal of the Building 305-M Test Pile, and the old HB-Line D&D activities are examples of recent activities.

The Environmental Restoration costs account for 11 percent of the total plan (see Figure 1-5). Waste Area Groups (WAGs) are programmatic groups of tasks and waste units in the Environmental Restoration Program.

Total activity costs (based on the 1989 ADS submittal) for the planning period are as follows:

	Number of Activities	Total Cost ($s in Thousands)
Environmental Restoration (WAGs)	21	$347,137
Research and Development	11	66,021
Decontamination and Decommissioning	9	46,620
Total	41	$459,778

All estimated costs reported in this Site Specific Plan are based upon the 1989 SRS Activity Data Sheet (ADS) submission. For FY90, DOE-HQ provided SRS with an additional $0.7 million for Environmental Restoration activities. Table 1.2 shows the allocation of these funds by activity. A comparison is shown between the DOE-HQ FY90 allocation and the estimates provided in the 1989 ADS submission.

1.3.3 Waste Management Operations Overview

Waste Management Activities is defined as the management of all types of waste (DOE 1989). Radioactive waste is categorized according to how it must be dealt with and managed according to standards established by the EPA and specific DOE orders. High-level waste requires considerable

shielding, is long-lived and will be disposed in a geologic repository. Most transuranic (TRU) waste generally requires little shielding, is extremely long-lived, and will also be disposed of in a geologic repository; however, some TRU waste does require significant shielding. This remote-handled TRU waste will also go to a geologic repository. Hazardous waste is defined by several environmental laws and managed according to requirements established by the EPA and states. Mixed waste is waste that contains both radioactive and hazardous components. It is managed to meet requirements for its radioactive and hazardous components imposed by the EPA, states and DOE. Sanitary waste is also within the scope of the FYP and is managed according to established federal and state regulations (DOE 1989a).

The SRS Waste Management practices are regulated by the DOE, Environmental Protection Agency (EPA), and SCDHEC. The Resource Conservation and Recovery Act of 1976 (RCRA), also known as the Solid Waste Disposal Act, as amended, provides a comprehensive federal EPA regulatory program for hazardous waste management and a state regulatory program for nonhazardous wastes. The SCDHEC has been granted authority by EPA to conduct the RCRA hazardous waste program in South Carolina. The basic framework for the management of hazardous waste, from its generation to its final disposal, is presented in 40 CFR 260-280.

All hazardous waste treatment, storage and disposal facilities at the SRS are either: (1) fully permitted; (2) have interim status; or (3) have entered into settlement agreements or consent orders with the SCDHEC. The SRS is in compliance with or has entered into compliance agreements related to groundwater protection, waste treatment, and waste disposal regulations. There have been several RCRA settlement agreements and consent orders signed from 1985 to February 1989 (see Sections 2.0 and 5.0).

The SRS Site Specific Plan presents a strategy to comply with applicable federal and state regulations, DOE Orders, and WSRC policies related to groundwater protection, waste treatment, storage, and waste activities. The plan covers disposal of certain nonhazardous, hazardous (as defined by the RCRA), radioactive and RCRA hazardous radioactive (mixed) wastes.

Some of the facilities needed for treating, storing or disposing of the wastes are currently operating; others are in active design or construction; still others are in the conceptual planning stage.

The SRS Waste Management objectives are to comply with applicable federal and state regulations, DOE Orders and WSRC policies, to minimize effects on the environment and, to the extent possible, contain waste handling, treatment, storage, and disposal within the site. Exceptions to onsite final disposal are: PCBs, which must go to EPA-approved PCB disposal facilities (environmental base cost); high-level wastes and TRU wastes, for which federal repositories are to be designated; some types of nonradioactive hazardous waste, which are sent offsite for incineration and disposal until onsite facilities are available (environmental base cost); chlorinated hydrocarbons, lead batteries and scrap metal, which are sold to commercial recyclers. The strategy for achieving these objectives is to:

- Ensure that there is a method to dispose of the waste, before the waste is generated:
- Reduce/minimize waste generation.
- Recycle or consume wastes in processes as much as practical.

- Segregate wastes at the generating location for temporary storage in permitted facilities.
- Incinerate to destroy hazardous wastes and reduce waste volume.
- Treat wastes to minimize mobility before final disposal.
- Dispose of newly generated wastes ultimately in monitored repositories.
- Maintain integrity of existing disposal sites to assure performance objectives are met.

The major categories of wastes generated at the SRS are nonradioactive nonhazardous, nonradioactive hazardous, mixed (hazardous and radioactive), low-level radioactive, high-level radioactive and transuranic. Within each of these six categories there are a multitude of waste streams requiring numerous storage and disposal techniques.

The SRS Waste Minimization Program is being developed to reduce the volume and/or avoid the generating of hazardous, mixed, low-level radioactive and nonhazardous waste generated at the site and to reduce the toxicity of all wastes in order to minimize any present or future threat to human health and the environment. The program meets regulatory and WSRC requirements. The program is being developed through a Waste Action Team.

The Site Waste Minimization Program will: (1) identify, inventory and characterize all site waste streams; (2) select candidate streams for source reduction, recycling, or treatment based on regulatory or operating contractor requirements and cost effectiveness considerations; (3) implement facility specific waste minimization programs; and (4) monitor progress on unit production basis, where appropriate. The site has already started or planned many waste reduction or recycling activities.

One hundred thirty-seven waste management operations, and research and development activities were identified for the planning period. Research and development is discussed in Section 1.3.4. Waste Management Operations expenditures account for 87 percent of the total plan (see Figure 1-5). Total activity costs (based on the 1989 ADS submitted) for the planning period are as follows:

	Number of Activities	Total Cost ($s in Thousands)
Treatment	48	$1,984,773
Storage	19	356,471
Disposal	23	381,104
Waste Minimization	4	13,180
Research and Development (Separate Activities)	19	92,998
Continuity and Safety	22	600,471
Program support	2	195,313
Total	137	$3,624,310

Since the completion of the SRS Activity Data Sheets (ADSs) in the summer of 1989, Waste Management Operations activities have been re-baselined and a new Budget and Report (B&R) structure implemented. Activities have been added, modified and deleted. ADSs prepared in February 1990 for the

FY92 Five-Year plan reflect these changes. All estimated costs reported in this Site Specific Plan are based upon the 1989 SRS ADS submission.

For FY90, DOE-HQ provided SRS with an additional $32.1 million for Waste Management Operations activities. Table 1.3 shows the allocation of these funds by B&R type (safety and continuity, treatment, storage, disposal, etc.) and priority. A comparison is shown between the DOE-HQ FY90 allocation and the estimates provided in the 1989 ADS submission. Additional funding was allocated for Safety and Continuity and Waste Treatment activities (Priority 1 items) and allocations were lower for all other B&R categories.

1.3.4 Research and Development (R&D) Overview

According to the *Environmental Restoration and Waste Management Five-Year Plan* (DOE 1989a), the DOE must establish an aggressive national program for Applied Research and Development (R&D) to resolve major technical issues and rapidly advance beyond current technologies for Environmental Restoration and Waste Management Operations in order to support its thirty-year goal for cleanup of its sites and to reduce overall program costs.

It is DOE's intent to initiate actions that will result in the cleanup of all DOE sites, a dramatic reduction in the quantity of wastes generated, and the safe storage and disposal of wastes in the future. Spiraling costs associated with these planned actions in Environmental Restoration and Waste Management Operations have prompted the need for better, less costly technologies. An R&D program applied at DOE sites across the nation and managed by DOE-HQ will be established (DOE 1989a).

A separate Five-Year Plan is being developed for applied research, development, demonstration, testing and evaluation. This plan will describe the program organization, implementation approach, roles and responsibilities, research priorities and projects. Major research initiatives will focus on improved Environmental Restoration technologies and waste minimization technologies (DOE 1989a).

The SRS R&D for the FYP includes those activities that are ongoing and planned for environmental restoration and waste management operations. Environmental Restoration activities include the acquisition of state-of-the-art analytical equipment capable of detecting of small concentrations of contaminants, technical support for geotechnical and hydrogeological investigations, and management support for environmental databases. Waste Management Operations research and development activities include process development support for the DWPF and the high-level waste tank farm; support for high-level tank farm operations and effluent treatment facilities; site metallurgical investigations; investigations into the minimization of hazardous waste; development of new waste treatment technologies; site modeling studies; effluent treatment plant chemical studies; development of incineration technologies; and safety and continuity functions.

Forty-one research and development activities were identified for the planning period (non-additive with costs presented above since some R&D activities are included as a part of other activities). Total costs for the planning period are as follows:

	Number of Activities	Total Cost ($s in Thousands)
Environmental Restoration (R&D)	11	$ 66,021
Waste Management Operations (R&D)	31	$216,273
Total	41	$282,294

1.4 Planning Assumptions

The FYP outlines the expenditures that are projected by the SRS to ensure, during the planning period, full compliance with federal and state regulations, completion of waste site investigations and cleanup activities, management of wastes, construction of new waste facilities, and undertaking innovative research and development programs. Funding must be provided by Congress in order for the plan to be fully implemented. Adequate personnel and contractor support must be provided to enable the completion of the activities described in the plan. Timely agreements and permits must be obtained from regulatory agencies to meet planned schedules. The SSP has assumed that it will take approximately 90 days for the state and EPA to review a wastewater permit application; that it will take approximately six months to one year for the state and EPA to review a NPDES permit modification; that it will take approximately one year for state and EPA to review closure plans; and that it will take approximately two to three years for the state and EPA to review a Part B RCRA permit application.

For planning purposes, assumptions are made regarding the estimated time for regulatory review. These estimates were based on a combination of past experience and the current status of regulatory related items. However, the assumptions are not intended to presume how a regulator should allocate their resources. Regular meetings between DOE, SCDHEC, and EPA are planned during the year to assure all parties have agreement on the permitting activities and their priorities.

The Environmental Restoration Program is based on the assumption that the investigations will not uncover additional constituents. SRS believes that it has good documentation of the types of waste disposed of in various waste sites. This program is also based on the premise that state and federal regulators agree to SRS's assessment and recommended closure options. The ER Program and the costs for the ER Program are also based on the assumption that the disposal of waste will be by *in situ* methods, not by excavation.

The Federal Facilities Agreement (FFA) is a draft document subject to change. The SSP does not include any potential program modifications that will result from the FFA.

Waste Management Operations is based on the assumption that all waste will be treated onsite, that facilities will be built in a timely manner and it is assumed that the facilities, once built, will meet all regulatory requirements for treatment. The SSP also assumes that the treatment standards in the Land Disposal Restriction (LDR) will be met by the proposed facilities.

Corrective Activities is based on the assumption that the onsite self-assessments of compliance activities do not uncover any major Corrective Activities. The SSP assumes that the Tiger Team visit, scheduled for January 1990, does not uncover any major Corrective Activities. The SSP also assumes that SRS is operating within all environmental regulations and regulatory agency agreements/orders.

SRS is conducting a thorough self-assessment of compliance activities at all SRS facilities. The assessment involves facility inspections (walkdowns) and record reviews.

The SSP is consistent with the *Environmental Implementation Plan* (EIP) (WSRC, 1989a). The EIP and the SSP are scheduled to be revised in the spring of 1990.

Each of the above is essential for the successful implementation of the SRS Site Specific Plan.

1.5 Plan Organization

The remainder of the SSP is organized into six sections. Section 2.0 presents an overview of the site's management organization structure (DOE-SR and WSRC). Organizational responsibilities and authorities are discussed. The development process and schedule for future ADSs and SSPs are outlined. The involvement of federal, state, and local regulatory agencies are discussed. Section 3.0 through 5.0 discuss SRS Corrective Activities, Environmental Restoration, and Waste Management Operations. Each of these sections summarize regulatory requirements, activity priorities, technical approaches, schedules, milestones, and costs. Applicable research and development activities are presented in each section. Section 6.0 presents the level of NEPA documentation that will be required for environmental restoration and waste management activities. Section 7.0 provides an overview of reports required by regulatory agencies and DOE, and methods that are utilized to maintain environmental and waste management records. Section 8.0 describes quality assurance programs that will be used to document the implementation of the SSP.

Table 1.1. Summary of SRS Area Names and Letter/Number Designations

Nuclear Production Reactors	100-C Area 100-K Area 100-L Area 100-P Area 100-R Area	Irradiate fuel and target elements for production of nuclear materials.
Chemical Separation Facilities	200-F Area 200-H Area	Chemically separate and process the irradiated materials from the reactors. High-level radioactive wastes are also stored and processed in these areas.
Defense Waste Processing Facility (DWPF)	200-S Area	Will process HLW into Borosilicate glass waste-form for storage until final disposal in an as yet undesignated repository by DOE.
Saltstone Facility	200-Z Area	Will process Saltstone for disposal in early 1990.
Fuel and Target Fabrication	300-M Area	Manufactures fuel and target elements for use in the reactors.
Heavy Water Rework Facility D Area Powerhouse	400-D Area	Purifies heavy water for use as reactor moderator. Generates steam and electricity.

Table 1.1. Summary of SRS Area Names and Letter/Number Designations (Contd)

General Facilities and Services	600 Area	Includes the LLW Disposal Facility. Includes all of SRS that is not within or functionally associated with a fenced area such as designated bridges, roads, parking lots, storage tanks, monitoring stations and towers, transformers, boats ramps, training areas, and repair shops.
TNX Semi-Works Facilities	600-T Area	Facilities used to study chemical processing problems and test production-scale equipment and processes.
Administration, Technical, and Shops	700-A Area	Includes the SRL which performs R&D related to plant changes, improvements, upgrades and waste management. The administration area for DOE, WSRC, SREL, includes medical facilities, automotive shops, warehouses, fire stations, a powerhouse, coal storage, lumber and steel yards, and gas stations.
Security Services Area	700-B Area	The administration and service area for security contractor, WSI, and includes training facilities.
Components Test Area	700-U Area	Includes a test reactor no longer in service. Includes the hazardous waste storage facility.

Table 1.1. Summary of SRS Area Names and Letter/Number Designations (Contd)

Central Shops	CS-Area	Includes a variety of functions, including equipment storage, painting, carpentry, automotive repairing, asphalt storage, blacksmithing, construction storage, concrete mixing, photo processing, structural iron working, coal sampling, and fire department training.
U.S. Forest Service	USFS Area	Includes administrative headquarters, storage, and maintenance sheds. Also contains offices for USC Institute of Archeology and Anthropology, Wildlife and Marine Resources Unit, and AT & T Southern Bell.

Table 1.2. FY90 Five-Year Plan Comparison Between DOE-HQ Funding Allocation and 1989 SRS ADS Submission ($1000) for Environmental Restoration

Activity	Priority	FY90 DOE-HQ	FY90 SRS ADS	Difference
M-Area Groundwater Remediation	1	3,520	1,525	1995
M-Area Settling Basin/Lost Lake	1	1,000	0	1000
Mixed Waste Mgmt. Facility Closure	1	20,865	25,000	(4135)
F/H Seepage Basin Closure	1	16,716	12,000	4716
Met Lab. Basin Closure	2	900	900	0
Acid/Caustic Basins Closure	2	865	800	65
RFI Program Investigations	1	6,972	9,131	(2159)
Waste Transfer		1,434	0	1434
RI/FS (CERCLA) Investigation	2	675	2,750	(2075)
Inactive Reactor Seepage Basins	2	350	700	(350)
F/H Groundwater Remediation Studies		1,050	0	1050
Solvent Tank Closure	1	500	500	0
ER Program Support	1	250	250	0
TCE Biodegradation Demonstration	1	250	250	0
Bingham Pump Outage Pits	2	175	490	(315)
Underground Storage Tanks	1	140	422	(282)
Misc. Waste Site Investigations	1	387	350	37
D&D Old HB-Line	3	2,216	2,500	(284)
Totals		58,265	57,568	697

Table 1.3. FY90 Five-Year Plan Comparison Between DOE-HQ Funding Allocation and 1989 SRS ADS Submission (by B&R and Priority)($1000) for Waste Management Operations

B&R	Priority	FY90 DOE-HQ	FY90 SRS ADS	Difference
Safety & Continuity	1	102,117	48,914	53,203
	3		3,076	(3076)
Waste Minimization	3	1,453	1,500	(47)
Waste Treatment	1	199,676	199,309	367
	3		124	(124)
Waste Storage	1	16,508	23,528	(7,020)
Waste Disposal	1	32,003	36,585	(4,582)
Research & Development	1	9,055	11,768	(2713)
	3		1,100	(1,100)
Program Support	1	20,939	23,737	(2,798)
Totals		$381,751	$349,641	$32,110

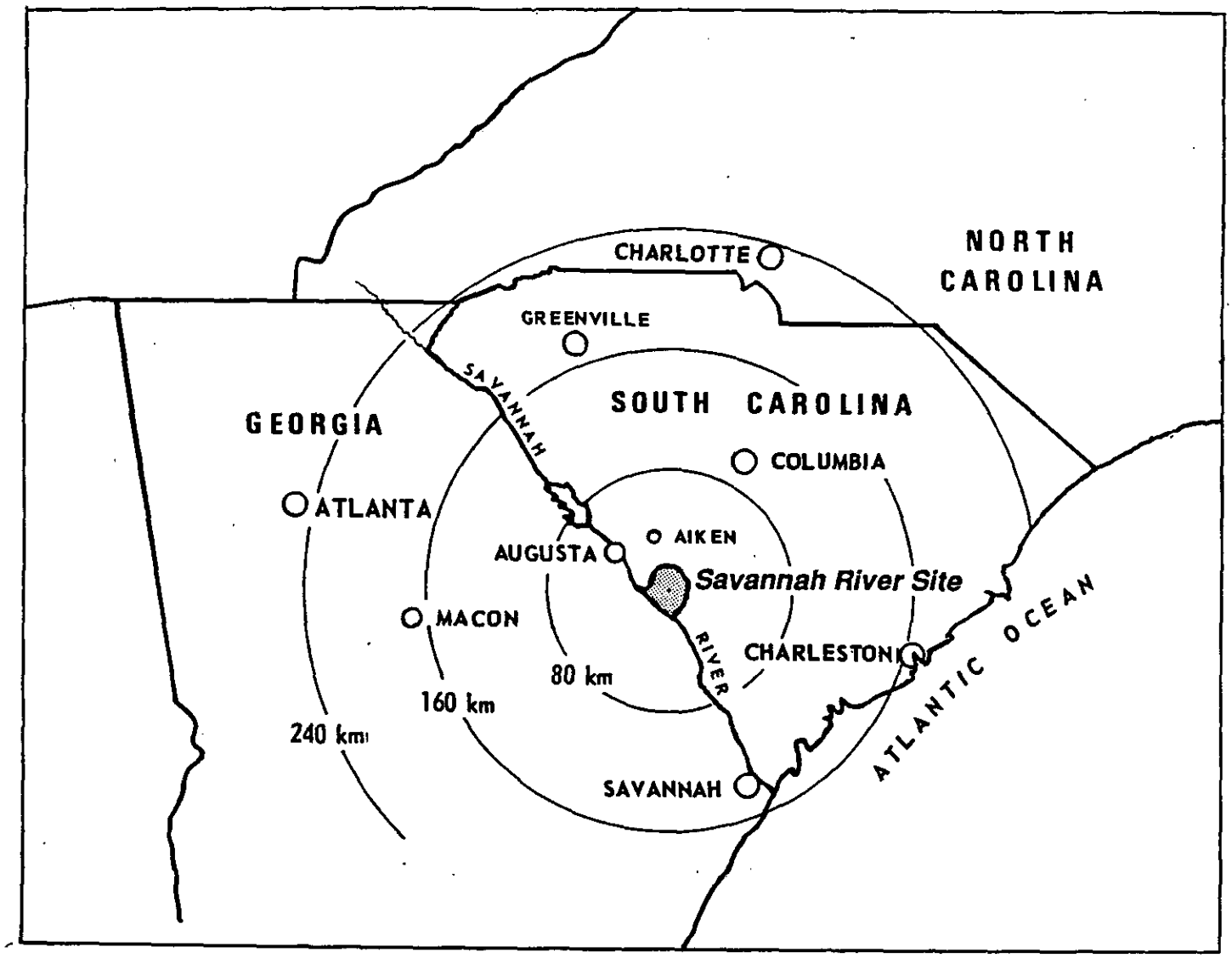

Figure 1-1. Location of the Savannah River Site

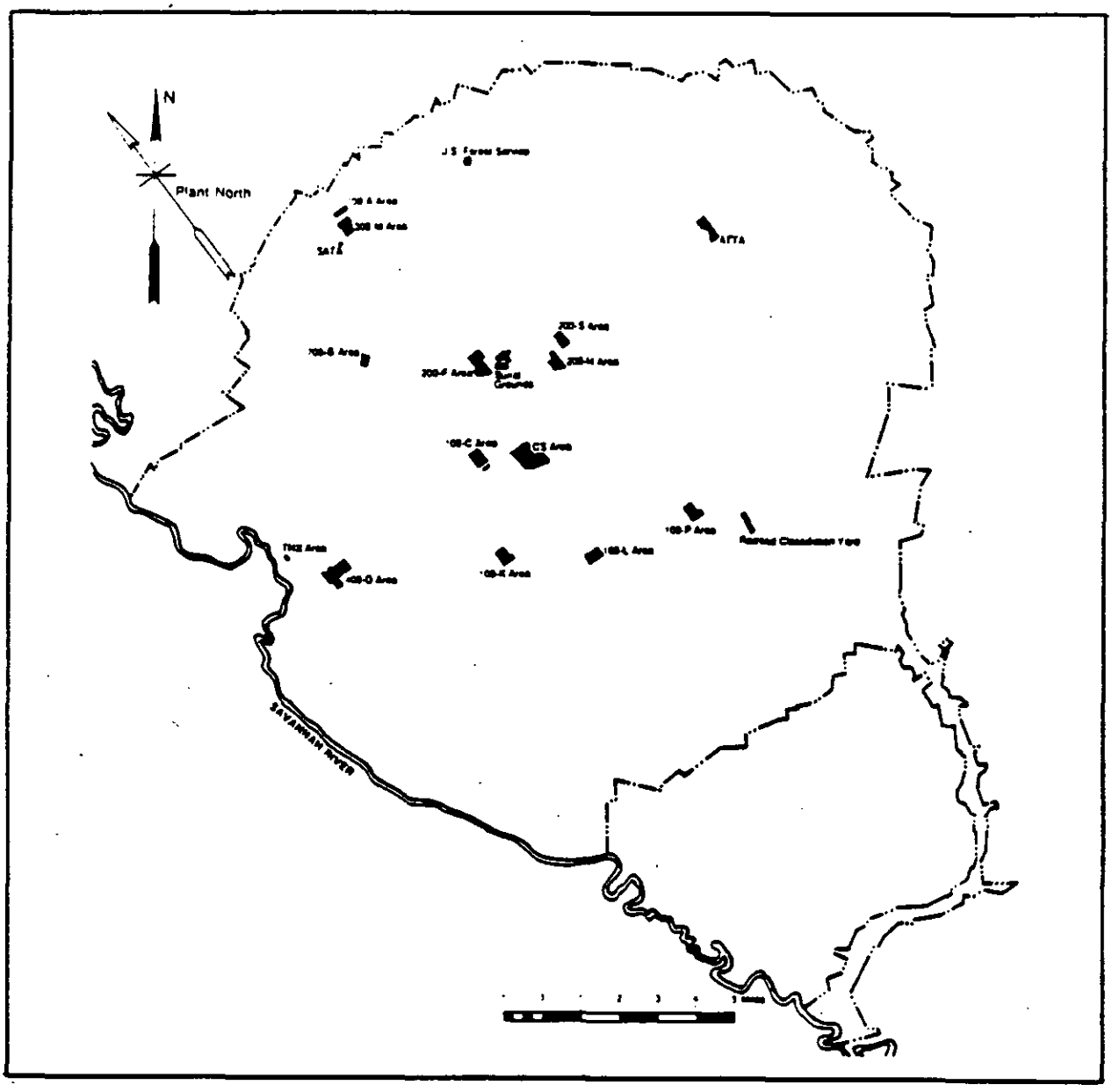

Figure 1-2. Savannah River Site - Location of Areas

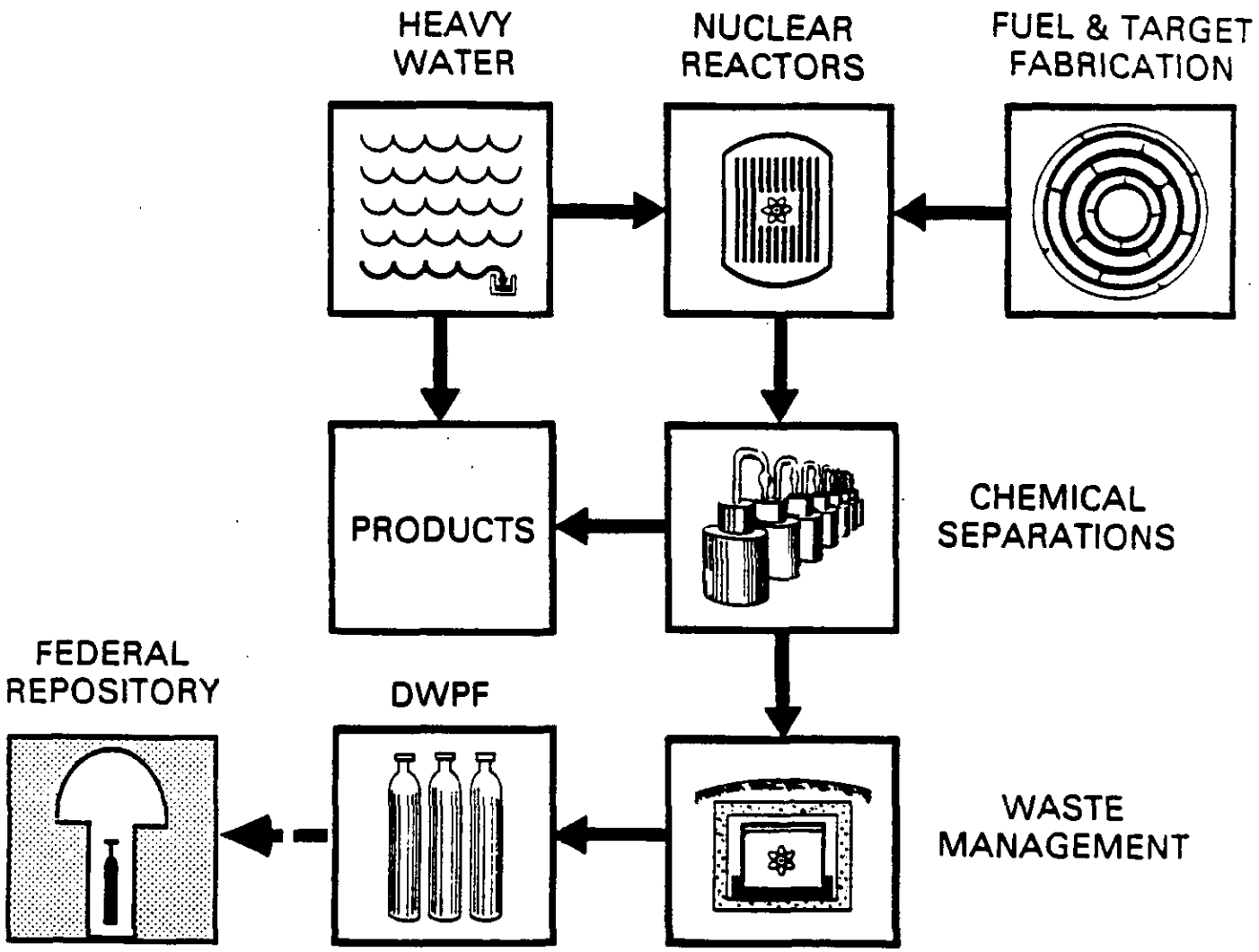

Figure 1-3. The Nuclear Fuel Cycle at the Savannah River Site

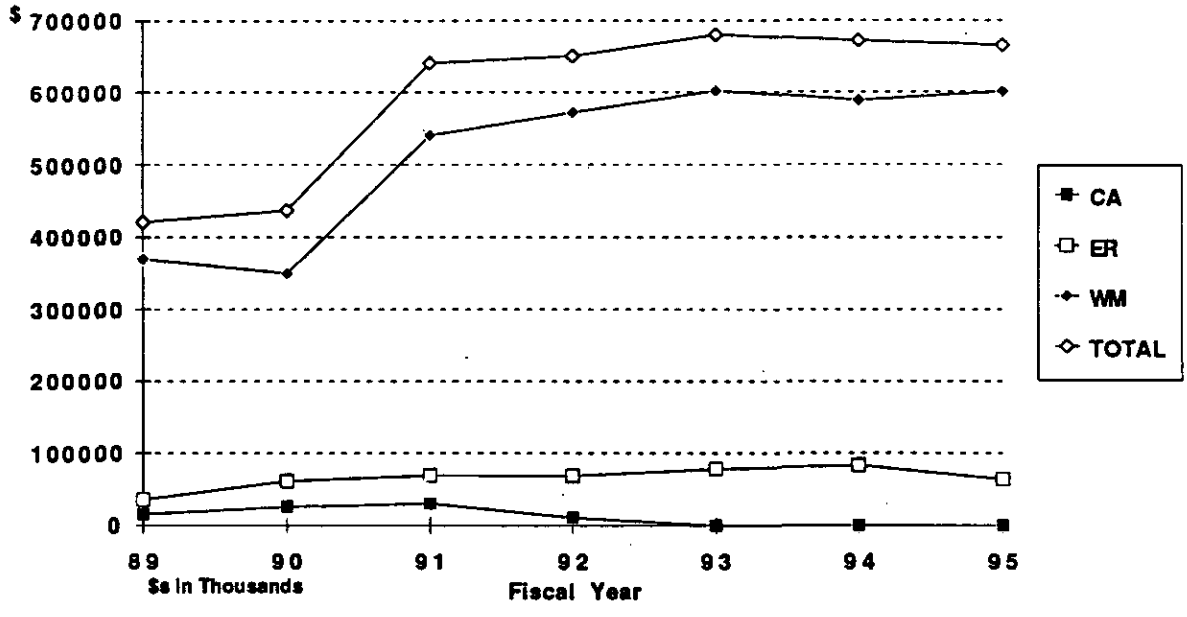

Figure 1-4. Savannah River Site Projected Total Expenditures by Activity Area

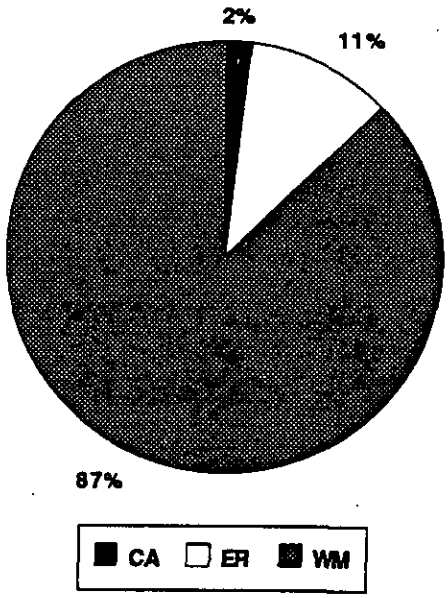

Figure 1-5. Environmental Restoration and Waste Management Five-Year Plan Percentage of Total Expenditures

2.0 MANAGEMENT AND IMPLEMENTATION STRUCTURE

2.1 Organization

2.1.1 Department of Energy-Savannah River (DOE-SR) Organization and Responsibilities

The U. S. Department of Energy - Savannah River Operations Office (DOE-SR) is responsible for coordinating, planning and directing the operations at the Savannah River Site (SRS) (See Figure 2-1). The DOE-SR oversees the day-to-day operation of the facilities at SRS, reviews operating policies and procedures, performs appraisals, and conducts audits.

The Site Specific Plan (SSP) is the responsibility of the DOE-SR. The DOE-SR directs the management and implementation of all Environmental Restoration (ER), Waste Management (WM), and Corrective Activities (CA) in the plan; reviews and checks the budget request for Congress to ensure there is sufficient funding for the SRS to meet its schedules and milestones of the activities in the SSP. DOE-SR also reviews and approves all submittals related to environmental activities to agencies and organizations outside of the SRS.

Within the DOE-SR, the ER, WM and CA responsibilities for each organization are as follows:

- The Assistant Manager for Facility Operations (AMFO) organization has primary responsibility for the environmental compliance, operation, and management of the SRS non-reactor facilities. In addition, they are responsible for directing the implementation of the SSP.

- The Assistant Manager for Health, Safety, and Environment (AMHS&E) organization is responsible for directing, planning, and coordinating all SRS work related to environmental protection, health protection, safety, and quality assurance. In addition, the AMHS&E organization is providing independent oversight for health protection, safety, environmental protection, and quality assurance to activities in the SSP.

- The Assistant Manager for Project Management (AMPM) organization is responsible for engineering design and construction of the SRS facilities. In addition, AMPM organization has primary responsibility for the operation and management of all SRS Power Department facilities such as the powerhouses, sanitary treatment plants, and the Savannah River Laboratory.

- The Processing Division is primarily responsible for directing and managing the environmental compliance and operation of the Chemical Separations facilities, Tritium facility, Naval Fuels facility, and Waste Management facilities. The Director of the Processing Division reports of the AMFO.

- The Waste Management Branch (WMB) has the primary responsibility for directing all work associated with ER and WM activities and implementing and managing the SSP. The WMB is also responsible for coordinating the planning, tracking, and reporting of activities for the SSP. The WMB reports to the Processing Division Director.

  The WMB will ensure the implementation of the SSP by:

  Providing technical oversight and direction to the contractor(s) for Waste Management Planning and Operations.

  Reviewing and approving all ER and WM reports and documents required by DOE-HQ or regulators.

  Coordinating the contractor(s) program/budget submission to DOE-HQ for the ER and WM operations activities.

  Reviewing detail procedures, policies, and practices established by the contractor for compliance with DOE policy, and the safe and environmentally sound operation of the facilities.

  Annually updating the WM plans for all WM activities at SRS.

  Requiring the contractor(s) to perform monthly budget and status reports on all currently funded WM and ER projects.

- The Defense Waste Processing Facility (DWPF) Project Division has primary responsibility for the technology, design, construction and preoperational testing of DWPF, including saltstone. Such responsibility includes consideration of environmental impacts in facility design, construction, and operation, as well as the preparation of requisite environmental permit applications. The Director of the DWPF Project Division reports to the AMFO.

- The Environmental Division (ED) oversees SRS compliance with federal and state environmental regulations and agreements; and DOE environmental orders and policies; implements the National Environmental Policy Act (NEPA); provides advice and support to the Manager, DOE-SR, and to other DOE-SR Offices and Divisions on implementation of environmental requirements, environmental technology development, and natural resource management; and provides an overview of contractor quality performance of environmental requirements. The ED also coordinates all federal and state environmental regulations, agreements, and permits associated with the SSP and with the WMB for planning, reporting and funding. The Director of ED reports to the AMHS&E.

  ED is composed of two branches, the Environmental Compliance Branch (ECB) and Environmental Programs Branch (EPB).

  The ECB supports SRS operations and projects by the review, approval, and submission of documents related to environmental regulatory compliance (except NEPA) such as permit applications, monitoring reports and project plans for environmental concerns. This branch directs the development of

engineering and scientific data related to regulatory permit requirements. The ECB conducts its work through implementation of the following seven general program areas:

Water Supply Program
Waste Management/Environmental Restoration Program
Radiological Environmental Program
Wastewater Management Program
Air Program
Environmental Emergency Response Program
Audits and Appraisal Program

The EPB manages environmental studies and impact mitigation activities to support proposed and ongoing SRS projects. This work covers the following four general areas:

NEPA Implementation
Environmental Technology Development
Natural Resource Management
Geoscience Management

- The Project Engineering Division (PED) maintains an overview of the total WSRC design and construction effort at SRS and has primary responsibility for interim waste management line item project management. PED responsibilities include the review of projects to ensure that all environmental requirements are fulfilled and appropriate permits are obtained. The PED Project Management Manual directs staff to ensure that environmental consideration are part of project plans. The Director of PED reports to the AMPM.

- The Office of Chief Counsel (OCC) provides legal advice to the Manager, DOE-SR, and in conjunction with ED, interprets the requirements of environmental laws and regulations as they apply to SRS.

- The Director of the Personnel and Management Evaluation Division (P&ME), reporting to the Assistant Manager for Administration (AMA), is responsible for maintaining the Recommendations and Findings Tracking System (RAFTS). This computerized database contains recommendations and findings from past inspections, appraisals audits, and other compliance evaluations performed by DOE-SR, DOE-HQ, the General Accounting Office, and regulatory agencies such as the U. S. Environmental Protection Agency (EPA) and the South Carolina Department of Health and Environmental Control (SCDHEC). RAFTS is a newly operational, sitewide system that contains evaluations of all SRS organizations. Findings or recommendations contained in the database are presently being verified to ensure that no findings are mistakenly closed. Two areas that are receiving expedited verification of previously close findings are environmental and reactor safety issues. Once all environmental entries are verified, corrective actions on open findings can be implemented in an efficient manner.

2.1.2 Savannah River Site Contractor Organizations and Responsibilities

The SRS contractors include: Westinghouse Savannah River Company (WSRC), the operating and engineering contractor (Figure 2-2); the Savannah River Ecology Laboratory (SREL), operated by

University of Georgia, handles both basic and applied research designed to show how ecological entities (e.g., populations, terrestrial or aquatic systems, groundwater, etc.) function under both SRS induced or relaxed stresses and natural conditions; Wackenhut Services Incorporated (WSI), handles site security; U. S. Forest Service (USFS), handles land management ; and the Army Corps of Engineers, handles onsite construction activities (design and construction management). Each contractor is responsible for the safe, environmentally sound maintenance and operation of its designated facilities, specific facility upgrades, operational support, waste management, and monitoring of operations and effluents for environmental compliance. Facility or building managers have the responsibility to operate their facilities in a safe, environmentally sound manner.

Most waste operations activities, environmental corrective and remedial actions, and decontamination and decommissioning (D&D) of facilities, conducted at the SRS are performed by or under contract to the WSRC, the operations and engineering contractor. WSRC has been assigned responsibility for management of the Waste Management Program, implementation of the Environmental Restoration (ER) Program, and management of the site. The WSRC ensures environmental design requirements are met and provides project support. The WSRC also performs environmental research and development, provides an independent sitewide environmental surveillance program, remediates assigned facilities, and applies waste management technology to support operations and environmental restoration. The WSRC is responsible for waste management and environmental compliance at its assigned facilities.

A brief summary of department operations follows. The Raw Materials Department operates the M Area fuel and target production facilities, the M Area Liquid Effluent Treatment Facility, and the A/M Area groundwater remediation facilities. The Separations Department is responsible for the 221-F and H-Canyon buildings and associated facilities in F and H Areas. The Tritium Department operates the tritium facility located in H Area. The Waste Management Department is responsible for the high-level radioactive waste storage facility, the TRU waste storage facilities, the hazardous and mixed waste storage buildings, the sanitary landfill, and the F/H Effluent Treatment Facility in H Area. The Defense Waste Processing Facility Production Department is responsible for the defense waste processing facilities under construction in S and Z Areas. The Power Operations Department operates the powerhouses in all areas; the sanitary treatment plants in all areas with the exception of DWPF; the drinking, process, and cooling water systems in all areas; the Savannah River and PAR Pond pumphouses; PAR Pond and L Lake cooling reservoirs; and the site electrical distribution system. Central Services Works Engineering is responsible for site roads, grounds, railroad, and rolling stock. SRL operates the various A Area laboratories and the T-Area semi-works (TNX).

Organizational Responsibilities

Corrective Activities

Reactor Operations

The Reactor Operations Department is responsible for corrective activities associated with the oversight and installation of a cooling tower to meet thermal discharge requirements.

Power

The Power Department is responsible for corrective activities associated with the oversight and installation of modifications for National Pollutant Discharge Elimination System (NPDES) permit Outfall A-008 (see Section 3.0).

Environmental Restoration

Waste Site Remediation Task Force

A Waste Site Remediation Task Force (WSRTF) was established in January 1984 to assist the SRS waste site operating organizations in developing closure plans and carrying out remediation projects. The WSRTF objectives include developing closure criteria, advising operating organizations on closure plans and environmental documentation, achieving consistency in approach, and providing coordination of overall site remediation activities. The implementing arm of the WSRTF is the seven-member executive committee, chaired by the Manager of the Environmental Restoration Group, and includes the SRS WSRTF Coordinator and representatives from the Savannah River Laboratory (SRL) and Environmental Protection Section (EPS). This committee reviews and approves the waste site closure plans prior to submittal to the DOE or regulatory agencies.

Environmental Protection Section (EPS)

The Environmental Protection Section (EPS) is the lead organization responsible for overall coordination of the waste site closure and environmental restoration program. The EPS is responsible for ensuring that all waste site operating organizations are aware of and in compliance with the appropriate requirements, and interfaces with the DOE and South Carolina Department of Health and Environmental Control (SCDHEC) on topics associated with the RCRA, CERCLA/SARA, and SCHWMR. The SRS WSRTF Coordinator maintains a full-time point-of-contact to centralize and coordinate waste site closure activities.

Operating Organizations

The operating organizations (Central Services Works Engineering, Construction Management, Power Operations, Raw Materials, Reactor, Separations, Fire Department, SRL, and Waste Management) are responsible for the identification, characterization, assessment, closure, and groundwater remediation, if necessary, of each of their waste sites. This includes performing and documenting all activities necessary for waste site closure. Each organization must acquire the funding for closure activities and provide oversight for the work performed by subcontractors. The operating organizations for each waste site are shown in Table 4.1 of Section 4.0.

Savannah River Laboratory (SRL)

The SRL assists the EPS and the operating organizations with the technical aspects of waste site characterizations, closure, and remediation. The SRL develops the technical data necessary to design

closure plans for solid waste sites. This includes mathematical modeling, laboratory and field experimentation, site characterization, and performance assessments as required for closure.

Waste Management Operations

Environmental Protection Section (EPS)

The EPS is responsible for coordinating and directing the permitting for waste disposal facilities. The EPS is also responsible for reporting the status of waste disposal compliance to the DOE and SCDHEC. The Environmental Protection Section (EPS) is the lead organization for the coordination of a comprehensive sitewide waste minimization program. The EPS will monitor program progress to ensure regulatory requirements for minimizing waste are met.

Waste Management (WM)

The Waste Management Department has the primary responsibility for selecting, permitting, constructing and operating waste treatment, storage, and disposal facilities. Waste Management is the lead organization for developing waste operations to support the site Waste Minimization Program.

Operating Departments

The Operating Departments that generate waste are responsible for proper identification and packaging of wastes according to meet, DOE and Department of Transportation (DOT) requirements. The operating departments are responsible for the implementation of facility and process specific waste minimization programs.

Savannah River Laboratory (SRL)

The SRL is responsible for R&D in support of waste minimization treatment, storage, and disposal technology development and operating processes. The SRL is responsible for research and development activities needed to support the site waste minimization goals. Within the SRL, the Actinide Technology Section will review the Separations flow sheets for waste reduction opportunities, while the Interim Waste Technology Section will be the lead organization for proposing and developing waste minimization technologies for site waste streams.

Waste Action Team

A central Waste Action Team (WAT) has been established to coordinate the site's Waste Minimization Program activities. Representatives have been assigned from each site waste-generating group to participate on this team. A draft Waste Minimization Plan has been developed and is being reviewed for approval.

2.2 Management

Activity Data Sheets (ADS) will be prepared and reviewed in accordance with the schedule outlined in the FYP (see Figure 2-3). The preparation of this information will coincide with the annual budget preparation process. The SSP will be updated annually to reflect changes that are developed during the ADS completion process. The FYP will be updated annually, in accordance with the schedule outlined in the FYP (see Figure 2-3). The annual updates of the FYP will be prepared with field office input in the form of ADSs.

ADSs are the backbone of the SSP and FYP. These sheets are a two page report on activities that are included in the FYP and SSP. Included in these sheets is information on funding requirements for the activity, category, priority, milestones, and a brief narrative description. The Environmental Protection Section (EPS) of WSRC sends out guidance for preparation of the ADSs to all departments within WSRC. Each department submits its information to EPS which compiles the information into draft ADSs for DOE-SR to review. The final ADSs are sent to DOE-HQ both on a computer diskette and printed form for DOE-HQ review and comment.

Federal, state and local regulators will be included in the review of the SSP and ADSs each year. The schedule for their review of the SSP will be during the spring/early summer of each year. The SSP will also be available for public review and comment during the review period. Until a formal method is adopted for public review, elected officials from the surrounding communities were invited to conduct the public review. It is expected that a formal method for public review will be prepared for the next SSP.

DOE Order 5400.1 requires that DOE-SR prepare Annual Site Environmental Reports. The reports are required by June for the previous calendar year. WSRC is responsible for the initial draft of the Annual Site Environmental Report. This report is then reviewed and finalized by DOE-SR before submission to DOE-HQ.

Executive Order 12088, Federal Compliance with Pollutions Control Standards, as amended by Executive Order 12580, requires each federal agency to submit to the Director, Office of Management and Budget (OMB), through the EPA, an annual plan for the control of environmental pollution.

Twice each year (June and December), DOE must submit updates of their Pollution Abatement Plans to the OMB through the EPA. Circular A-106 is the OMB Order defining these requests. The Pollution Abatement Plan submitted in accordance with Circular A-106 is a listing of all projects needed to bring an agency's facilities into compliance with environmental laws and regulatory requirements. The report is a complete five year plan and includes all projects expected to be placed in the pollution abatement program during that period. The request or call for the A-106 Report usually is accompanied by the instructions, software, and guidance. The request also includes the latest computer printout which summarize the plan. WSRC reviews and updates the printout and software data files. DOE-SR reviews the WSRC submission before sending this information to DOE-HQ.

The preparation of the A-106 Report is completely separate from preparation of the FYP. Although many projects are in both the FYP and the A-106 Report, there are projects included in the A-106 Report

that are not included in the FYP and there are activities in the FYP that are not included in the A-106 Report.

Federal, state, and local regulators will be involved in the review of the SSP and ADSs each year. The schedule for their review of the draft SSP will be during the spring of each year. See Section 2.4 for federal, state and local interaction. The draft SSP will also be available for public review and comment during this review period.

2.3 Regulations and Orders

The SSP must comply with federal and state statutes and regulations, the Atomic Energy Act, and Department of Energy (DOE) Orders. These legal requirements as well as consent decrees, court orders, and agreements relevant to the SRS are discussed in this section. Interagency agreements and compliance agreements are still under negotiation with federal and state regulators and will be discussed in the next version of the SSP. The major federal and state statutes applicable to Corrective Activities (CA), Environmental Restoration (ER), and Waste Management (WM) are discussed below.

2.3.1 Federal Regulations

The Atomic Energy Act sets forth basic policies and guidance on the production and handling of DOE nuclear materials, worker protection, and emission standards, including the principle of "As Low As Reasonably Achievable" (ALARA). It also sets economic discard limits for materials to be used when determining when a material is a "waste".

The Low-Level Waste Policy Act (LLWPA) effects DOE facilities regarding greater than Class-C materials.

National Environmental Policy Act (NEPA) establishes a national environmental policy and promotes consideration of environmental concerns by federal agencies. It requires every federal agency to publicly address the environmental impact of major federal actions that may significantly affect the environment before such actions are initiated. These concerns are addressed in documents such as Environmental Assessments (EAs) or Environmental Impact Statements (EISs). The NEPA process also includes a public review and comment period.

The **Resource Conservation and Recovery Act of 1976** (RCRA) , as amended by the **Hazardous and Solid Waste Amendment of 1984** (HSWA), regulates hazardous waste management. This law, as amended, mandates that hazardous waste will be treated, stored, and disposed of so as to minimize the present and future threat to human health and the environment. RCRA is a regulatory statute designed to provide "cradle-to-grave" control of hazardous waste by imposing management requirements on generators and transporters of hazardous wastes and upon owners and operators of treatment, storage and disposal facilities. The HSWA mandates changes to RCRA such as waste minimization and a national land disposal ban program. Those disposal sites that were closed or abandoned before November 19, 1980 (effective date of the RCRA regulations), are regulated under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA).

RCRA requires the generator of hazardous waste to have a program to reduce the volume and toxicity of waste to the degree economically practicable and use treatment, storage or disposal methods which minimize the present and future threat to human health and the environment.

The State of South Carolina is authorized by the EPA to administer permitting under a two part process. The first part involves the submittal of a Part A Permit application that contains certain basic facility information. A Part A application was filed with the EPA for the SRS that addresses the F and H Area Seepage Basins, the M-Area Settling Basin and Lost Lake, and the Mixed Waste Management Facility. The second part involves the submittal of a Part B Permit application that contains detailed information about the individual interim-status waste management units, including closure activities. The Site Part B Permit application was filed in February 1985 and has been revised to incorporate additional facilities. The permit was issued in September of 1987.

RCRA includes requirements for groundwater monitoring (40 CFR 264 and 265), including a thorough description of the hydrogeological regime; particularly, the definition of the uppermost aquifer and the determination of groundwater flow rates and directions.

Anyone, including a federal facility, who owns, generates, transports, treats, stores, or disposes of hazardous waste and anyone who produces, burns, distributes or markets any hazardous waste-derived fuels or stores hazardous material in underground tanks must comply with RCRA by notifying the U. S. Environmental Protection Agency (EPA) or authorized states of their activities.

Permitting tanks regulated under RCRA Subtitle C is a two part process. The first part involves the submittal of a Part A application, containing basic information describing the tank system. The second part involves the submittal of a Part B application, containing more detailed information of the tank system and certified tank assessment. The hazardous waste tank regulations require that all new tank systems have secondary containment with release detection, be built from a material which is compatible with the waste type, and be protected from corrosion.

Regulations resulting from Subtitle I require EPA notification of all underground storage tanks in operation which contain petroleum products or a hazardous substance as defined in CERCLA. The SCDHEC was notified of all applicable tanks at SRS on May 8, 1986. All new tanks must have a release detection system, corrosion protection, spill and overfill prevention devices, and be constructed of a material which is compatible with the substance to be stored.

As amended by HSWA, RCRA Section 3004(u) requires corrective actions for releases of hazardous constituents. RCRA Section 3004(v) mandates offsite corrective actions. The RCRA provision for corrective actions overlap to some degree with the CERCLA provision, creating the need for coordination of RCRA and CERCLA activities.

Federal Solid Waste Management Guidelines and Regulations, 40 CFR 240-257, describe the guidelines for the management of nonhazardous solid wastes. Specifically 40 Code of Federal Regulations (CFR) 241, Guidelines for the Land Disposal of Solid Waste and 40 CFR 257, Criteria for Classification of Solid Waste Disposal Facilities and Practices, are applicable to SRS operations.

The **Comprehensive Environmental Response, Compensation and Liability Act** (CERCLA) of 1980, as amended by the **Superfund Amendments and Reauthorization Act of 1986** (SARA), provides for funding and enforcement authority for cleaning up the thousands of hazardous waste sites created in the United States in the past and for responding to hazardous substance spills. While RCRA establishes a "cradle-to-grave" regulatory program for present hazardous waste activities, CERCLA establishes a comprehensive response program for past hazardous waste activities.

Section 105 of CERCLA states that the government's cleanup activity must be conducted in accordance with the National Contingency Plan (NCP). The NCP establishes a blueprint for cleaning up releases to the water, land or air and assigns response authority for federal and state governments and private parties. The NCP details response procedures, including both immediate removal and long-term remedial actions. Section 105 also authorizes EPA to designate sites for inclusion on the National Priorities List (NPL) of sites requiring remedial action.

According to Section 107(g) of CERCLA, agencies of the federal government are procedurally and substantively subject to compliance with CERCLA. This provision mandates the DOE to undertake remedial actions for CERCLA-equivalent sites at all DOE facilities once that facility is listed on the National Priorities List (NPL). Preliminary Assessments have been submitted to the EPA for many of the potential CERCLA sites.

SARA amended CERCLA by adding provisions specifically aimed at federal facilities, and by increasing EPA enforcement authority. It provides the framework for determining cleanup standards, schedules, and evaluating remedies.

SARA also requires all industries in Standard Industry Codes (SIC) 20-39 to participate in local emergency planning committees.

DOE facilities are required to comply with regulations issued by the EPA under the **Clean Air Act** (Title U. S . C. A. 7401, et seq) which include:

- National Primary and Secondary Ambient Air Quality Standards (NAAQS, 40 CFR 50) set primary and secondary standards for criteria pollutants, and reference methods for the determination of criteria pollutants in ambient air.
- Standards of Performance for New Stationary Sources (NSPS, 40 CFR 60) set allowable emission limitations for new sources.
- Prevention of Significant Deterioration (PSD, 40 CFR 52) rules require preconstruction monitoring and permits for construction of major, new stationary sources of air pollutants.
- National Emission Standards for Hazardous Air Pollutants (NESHAP, 40 CFR 61) require approval from the EPA prior to the construction or modification of a source which will release hazardous pollutants.

National Emission Standards for Hazardous Air Pollutants (NESHAP) establishes the guidelines for the atmospheric release of radioactive and certain hazardous pollutants. The primary pollutants of concern for SRS operations are radionuclides, asbestos and benzene.

Federal Water Pollution Control Act (Water Quality Act of 1987) reauthorizes and strengthens the Federal Water Pollution Control Act (commonly known as the **Clean Water Act**). The Water Pollution Control Act requires that discharges to the navigable water meet applicable thermal limitations or demonstrate a balanced indigenous population.

It also requires the DOE to obtain applicable permits before treating wastes and discharging them to navigable waters. Under Section 402, a National Pollutant Discharge Elimination System (NPDES) permit is required. The EPA has granted this regulatory authority to the State of South Carolina. In complying with the provisions of the NPDES permit, the site achieves the following objectives: compliance with SCDHEC Permit SC0000175 and thus with the Federal Water Pollution Control Act; and compliance with the maintenance of site stream water quality criteria and/or stream-specific guides.

40 CFR 125.100, as authorized by Section 304 of the Clean Water Act, specifically addresses the control of runoff, spillage and leakage of hazardous and toxic pollutants. Industries handling or discharging any toxic or hazardous pollutants are subject to requirements relative to all activities which may result in significant amount of pollutants reaching surface waters in the United States. In addition, 40 CFR 125.103 states that Best Management Practices (BMP) shall be incorporated into an NPDES permit. 40 CFR 112.3 requires a Spill Prevention, Control and Countermeasure (SPCC) Plan to address oil pollution prevention.

Safe Drinking Water Act of 1974 requires the DOE to obtain applicable permits and satisfactorily complete required sample analyses and site inspections of public/industrial waste supplies and sources of drinking water. The EPA has authorized South Carolina to regulate both public/industrial water supplies and sources of drinking water. This Act also imposes requirements on the installation and maintenance of drinking water wells.

Toxic Substances Control Act (TSCA) ensures that the manufacture and sale of chemical substances and mixtures do not present an unreasonable risk of injury to health or the environment. The principle applicability of the TSCA to SRS operations is in the management and disposal of polychlorinated biphenyls (PCBs). The EPA-implementing regulation for the handling, storing, and disposal of PCBs and PCB-containing material is found in 40 CFR Part 761.

Endangered Species Act of 1973 requires every federal agency to ensure that its actions and those of its contractors are not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of a critical habitat, unless an exemption, as defined in Sections 1536 (a)(2) and (h), has been granted by the Endangered Species Committee.

National Historic Preservation Act requires a survey listing mitigation actions for historical artifacts.

Public Law 98-181 (passed in 1983) specifies discontinuance of the settling basin in M-Area by November 1985 and requires that the Department of Energy - Savannah River Operations Office (DOE-SR) develop a plan for groundwater protection and submit it to the U. S. Congress. The law includes the authorization to

design and construct the 300-M Area Effluent Treatment Facility (ETF). The SRS met the requirements of Public Law 98-181 by closing the M-Area Settling Basin in July of 1985 and by submitting to Congress a groundwater protection plan in May 1984. The provisions in the plan represent ongoing commitments.

Executive Order 12088 requires federal agencies to comply with applicable administrative and procedural pollution control standards established by federal laws.

Executive Orders 11988 and 11990 obligate the DOE to avoid, minimize or, to the extent practicable, any short- and long-term adverse impacts to the floodplains and wetlands. Even though the site is exempt from the provisions of Aiken County Ordinance 74-10-37, Sediment Control Ordinance, erosion control plans use the ordinance as a model.

2.3.2 State Regulations

South Carolina Pollution Control Act (Title 48, Chapter 1) requires DOE to comply with applicable South Carolina environmental regulations.

South Carolina Water Use Reporting and Coordination Act authorizes the South Carolina Water Resources Commission (WRC) to require reporting information relative to substantial use, withdrawal, or diversion of surface, underground, or other waters of the state. Required information includes identification of the locations of wells or facilities where water is used, withdrawn, or diverted; the source and location of the water; and the total amount of water used, withdrawn, or diverted.

South Carolina Nongame and Endangered Species Act (Title 50, Chapter 15) protects state nongame species in need of management and species listed by the State as endangered. Consultation with the South Carolina Wildlife and Marine Resources Commission is required if a listed species is present in an area to be disturbed by construction or ongoing operation of a new facility.

SCDHEC NPDES Permit (SC0000175) directs SRS to prepare a Best Management Practices Plan to identify and control the discharge of hazardous and toxic substances listed in 40 CFR part 117 and Tables II and III of Appendix D to 40 CFR part 22.

South Carolina Wastewater Regulations (R.61-9) require DOE-SR to obtain Wastewater Treatment Facility Construction Permits for the construction of any wastewater treatment facilities and sewers. After construction is completed, an operating permit must be obtained.

South Carolina Drinking Water Regulations (R.61-58) require the DOE to obtain applicable permits and satisfactorily complete required sample analyses and site inspections of public/industrial waste supplies and sources of drinking water. The EPA has authorized South Carolina to regulate both public/industrial water supplies and sources of drinking water.

Solid Waste Regulation (R.61-61) specifies procedures to be followed for closing or abandoning solid waste disposal sites. Stipulated requirements include postclosure monitoring by at least one monitoring well with readings taken every three months for submittal to the Solid Waste Division, State Board of

Health. Postclosure monitoring requirements that include the use of a monitoring well implies an assessment of the location of the water table and the downgradient direction.

South Carolina Air Pollution Control Regulations (R.61-62) set standard requirements for construction and operating permits and for renewing permits, require open burning and require emergency action plans to deal with releases of hazardous air pollutants.

South Carolina Ambient Air Quality Standards (R.61-62.5) set standards for visible emissions and requirements for opacity monitoring and source tests. This regulation also sets emissions limitations for certain source types and PSD requirements. Recent revisions to this regulation may impact the permitting of the proposed Consolidated Incineration Facility. The state has also released a draft Toxic Air Pollution Standard which could apply to new or propose source modifications after July 1, 1989. This regulation may require an operator to provide information on air toxics and dispersion modeling to show that ambient air concentrations will not exceed specified limits at the plant boundary. This proposed regulation is to be promulgated in February 1990.

Industrial Solid Waste Disposal Site Regulation (R.61-66) requires a permit for operating any industrial solid waste system. If the industrial waste system involves hazardous waste, than a groundwater monitoring system must be developed into the site plan. If hazardous waste is present, groundwater monitoring requirements imply an assessment of the water table and downgradient direction.

South Carolina Water Classification Standards (R.61-68) require that all SRS navigable waters meet Class B Water Quality Standards. The standards require Class B stream temperatures to be 90 degrees Fahrenheit or less, or not to cause ambient temperatures to increase by more than 5 degrees Fahrenheit.

Classified Waters (R.61-69) defines the usability of surface and ground waters of the State and for what they are suitable. This regulation stresses the importance of the waters of the State and how they should be maintained.

South Carolina Landfill Regulation (R.61-70) requires an owner or operator of a solid waste disposal facility to obtain a permit to operate a sanitary landfill. In addition, observation test wells that provided reliable data on groundwater contamination must be included in the site design. The requirement for monitoring wells implies an assessment of the location of the water table and downgradient direction.

South Carolina Well Standards and Regulations (R.61-71) are applicable to most newly constructed wells, including water supply wells, monitoring wells, and piezometers. These regulations establish certain minimum standards for well construction, well locations, and well closure. To satisfy this requirement, a water well record form for each well must be submitted to SCDHEC within thirty days after the completion of the well.

South Carolina Hazardous Waste Management Regulations (R.61-79.124 through R.61-79.270) describe the requirements of the hazardous waste management program administered by the state. Hazardous waste management in the hazardous Waste Storage Buildings (except 643-29G, Mixed Waste Storage Building) are operated under a Part B permit issued in 1987. All other hazardous waste management activities at the SRS are currently being conducted under Interim Status Standards. As such,

facilities must comply with the Interim Status Standards (R.61-79.265) and must not engage in hazardous waste activities or processes not specified in the RCRA Part A application.

Parts R.61-79.264 and 265 of the Hazardous Waste Management Regulations establish minimum standards on the management of hazardous waste for owners or operators of permitted hazardous waste treatment, storage, and disposal facilities. The groundwater protection standards required by this regulation will be met once the SRS obtains its complete permit. Groundwater monitoring requirements require extensive knowledge of the hydrogeological regime.

South Carolina Standards of Performance for Asbestos Removal Operations (R.61-86.1) set requirements for the removal and handling of asbestos when a facility is either renovated or dismantled.

Underground Injection Control Regulations (R.61-87) specify under what circumstances materials can be injected into the ground.

South Carolina Water Classification Standards (R.61-88) require that all SRS navigable waters meet Class B Water Quality Standards, which include limits on total suspended solids and pH.

Underground Storage Tank Control Regulations (R.61-92) require that all tanks installed after January 1, 1986 prevent releases due to corrosion, have a release detection system, and maintain an inventory recordkeeping system. The regulations also include requirements for notifications, permitting, installation, general operations, corrective actions, and abandonment activities.

2.3.3 Consent Orders

CO-84-4-W In a Consent Order dated January 3, 1984, the DOE and SCDHEC mutually agreed to temporarily supersede the NPDES permit temperature requirements. The order was subsequently amended in 1985, 1987 and 1988. The Consent Order also required the DOE to assess the impact of the SRS thermal discharges on site streams, lakes, and the Savannah River and to install facilities to mitigate thermal discharges from the D-Area powerhouse and the C and K Reactors. The order was amended in August 1987 to exclude the shutdowns C Reactor and to establish a new compliance schedule.

CO 85-70-SW In this Consent Order, the DOE agreed to additional groundwater assessment activities in the M-Area Settling Basin and vicinity and the F and H Area Seepage Basins, under the terms of an Administrative Consent Order signed November 17, 1985, and amended in 1988. These assessment activities require a detailed understanding of the hydrogeological regime at each site.

SA 85-52-W A Settlement Agreement signed June 20, 1986, also requires groundwater quality assessments at several sites along with a biennial update of the Technical Summary of the Groundwater Quality Protection Program.

SA 86-52-W A Settlement Agreement that was signed on June 20, 1986, also requires groundwater quality assessments at several sites along with a biennial update of the Technical Summary of the Groundwater quality Protection Program.

All hazardous waste treatment storage and disposal facilities at the SRS are either (1) fully permitted, (2) have interim status, or (3) are part of settlement agreements or consent orders with the SCDHEC. The SRS is in compliance with or has entered into compliance agreements related to groundwater protection, waste treatment, and waste disposal regulations.

There have been several RCRA settlement agreements and consent orders signed from 1985 to February 1989 which are listed below:

Date	Agreement/Order	Number	Description
07/19/85	Consent Order	85-57-W,SW	Spills
11/07/85	Consent Order	85-70-SW	Groundwater Monitoring (Hazardous Waste Sites)
9/14/88	Consent Order	85-70-SW	Groundwater Monitoring (Hazardous Waste Sites), amended
10/06/86	Settlement Agreement	86-52-SW	M-Area Drums
05/01/87	Settlement Agreement	87-27-SW	Part B Deficiencies
11/12/87	Settlement Agreement	87-51-SW	EPA Multimedia Inspections Resulting in RCRA Violations
11/12/87	Settlement Agreement	87-52-SW	Mixed Waste Management Facility (MWMF) Part B Deficiencies
12/29/87	Settlement Agreement	87-60-SW,W	L Tank Hazardous Waste Storage
05/26/88	Consent Decree	N/A	Natural Resources Defense Council (NRDC) Lawsuit
11/23/88	Settlement Agreement	88-28-SW	Transuranic (TRU) Pads Interim Status Closure Plan
02/16/89	Settlement Agreement	89-06-SW	Naval Fuel Drums

2.3.4 DOE Orders

DOE Order 4300.1B, Real Property and Site Development Planning, states that all installations having suitable land and water areas will have programs for the harvesting of fish and wildlife by the public, provided it does not interfere with the site mission. It also requires that the DOE will manage its real properties in a way that conserves soil, water, and plants.

DOE Order 5400.1, General Environmental Protection Program, requires the development of groundwater protection management and groundwater monitoring programs for the site. It also establishes

the requirements for waste minimization plans as required by RCRA, including the establishment of a Pollution Awareness program for the site. It requires the compilation of a site annual environmental report.

DOE Order 5400.3, Hazardous and Radioactive Mixed Waste Management, establishes hazardous waste management procedures for DOE facilities that generate, transport, threat, store, and/or dispose of hazardous waste. Hazardous waste management procedures are established by this order for facilities operated under the authority of the Atomic Energy Act, and instructions for implementing RCRA, to the extent possible, are provided. This DOE Order requires groundwater monitoring at all solid, hazardous, and mixed waste management facilities to ensure that groundwater quality is not degraded. The assessment of groundwater degradation requires knowledge of the hydrogeological regime.

DOE Order 5400.4, Comprehensive Environmental Response, Compensation, Liability Act Program, establishes instructions for implementing the DOE CERCLA program and defines actions to identify and evaluate inactive hazardous waste sites at DOE installations, and directs the custodian to take remedial action where necessary to improve control of hazardous substance migration from such sites.

DOE Order 5440.1C, National Environmental Policy Act (NEPA), was adopted on April 9 ,1985. This order has been amended through Secretary of Energy Notice (SEN) 15 issued on February 8, 1990. The order will be formally amended at a later date. The order and SEN-15 describe DOE's process for implementing NEPA.

DOE Order 5480.1B, Environmental, Safety and Health Program for the DOE Operations, was adopted on September 23, 1986. This orders sets environmental, safety and health requirements for all DOE or DOE-controlled operations.

DOE Order 5480.10, Contractor Industrial Hygiene Program, was adopted on June 26, 1985 and sets worker industrial hygiene programs and requirements.

DOE Order 5480.11, Radiation Protection for Occupational Workers, sets standard limits and requirements for radiation protection for workers and was adopted on December 21, 1988.

DOE Order 5480.12, Environmental Pollution Control, requires that releases of radionuclides be characterized and their impact on the public and the environment be assessed.

DOE Order 5480.14, Environment, Safety, and Health Program for Department of Energy Operations, establishes instructions for implementing the DOE CERCLA program and defines actions to identify and evaluate inactive hazardous waste sites at DOE installations, and directs the operating organization to take remedial action where necessary to improve control of hazardous substance migration from such sites.

DOE Order 5480.3, Safety Requirements for the Packaging and Transportation of hazardous Materials, Hazardous Substances, and Hazardous Wastes, establish the requirements for the packaging and transportation of hazardous (including radioactive) materials, substances, and wastes.

DOE Order 5480.4, Environmental Protection, Safety, and Health Protection Standards, establish the radiation standards for the protection of the public in the vicinity of the SRS.

DOE Order 5484.1, Environmental Protection, Safety and Health Protection Information Reporting Requirements, establish the requirements and procedures for reporting and investigating matters of environmental, safety, and health protection significance to DOE operations. This includes the annual environmental monitoring report.

DOE Order 5500.1A, Emergency Management System and **DOE Order 5500.2A Emergency Notification, Reporting, and Response Levels,** set forth the structure and procedures for the emergency response system, notification and reporting.

DOE Order 5500.3, Reactor and Nonreactor Nuclear Facility Emergency Planning Preparedness and Response Program, requires SRS to develop and improve monitoring and meteorological systems to detect, track, and assess radiological or other effluent plumes. This order was most recently updated on October 17, 1989.

DOE Order 5820.1, Radioactive Waste Management, establishes administrative controls and requirements for the generation, treatment, packaging, storage, transportation and disposal of transuranic (TRU) contaminated material and TRU waste. These requirements include segregation and certification programs for TRU generated material, reduction of TRU waste, and the preparation for offsite disposal of TRU material that meets offsite disposal acceptance criteria.

DOE Order 5820.2A, Radioactive Waste Management, establishes polices and guidelines by which the DOE manages its radioactive waste, waste by-products, and radioactively-contaminated surplus facilities. Under this order, the waste management plan required for each radioactive waste management facility must include a section on radioactive and nonradioactive monitoring programs, including groundwater monitoring, at these sites. Individual decommissioning projects are also required in this order.

Secretary of Energy Notice (SEN) 4-89, Negotiation of Consent Decrees and Compliance Agreements, states the policy and procedures to be followed in these negotiations.

SEN-7-89, Policy on Line Management's Responsibility to Achieve Environmental Compliance, states the policy to be achieved and establishes reporting requirements for determining environmental compliance.

SEN-13-89, Establishment of Office of Environmental Restoration and Waste Management, establishes this new office which is responsible for the Environmental Restoration and Waste Management Five-Year Plan and oversight on the SSP.

SEN-15-90, National Environmental Policy Act (NEPA) Guidance, establishes new guidance on the implementation of NEPA.

SR Announcement No. SR-86-35, Fish and Wildlife Management Policy, for the Savannah River Plant (now known as the Savannah River Site), states that it is the policy of the DOE-SR to effectively manage

fish and wildlife resources for the SRS to maintain their biological productivity and diversity. In addition, animals are hunted and trapped only to control safety hazards or excessive property damage.

2.4 Federal, State, and Local Interactions

Several federal, state, and local agencies are responsible for enforcing environmental regulations at the SRS. Principal among these agencies are the EPA and SCDHEC. These agencies issue permits, review compliance reports, participate in joint monitoring programs, inspect facilities and operations, and enforce compliance with environmental regulations. Applicable settlement agreements, and consent orders and decrees are discussed in Section 2.3.

The EPA develops, promulgates, and enforces environmental protection standards and regulations as directed by statutes passed by the U. S. Congress. In instances where regulatory authority can be delegated, the EPA delegates regulatory authority to SCDHEC for state programs which meet or exceed the EPA's requirements. Where regulatory authority is not delegated, the EPA Region IV is responsible for reviewing and evaluating compliance with the EPA regulations as they pertain to the SRS. This includes interpreting regulations, consulting with DOE-SR and its contractors to aid regulation implementation, inspecting facilities and operations at the site, and assisting appropriate state agencies in regulating operations at the SRS.

All questions, investigations, surveillances, etc. from the regulators go to DOE-SR for response. Frequently, DOE-SR asks WSRC for assistance in response to contacts from the regulators. If SRS needs to contact the regulators for interpretations of the regulations or to contact them in the event of a spill, WSRC will contact DOE-SR who will then contact the regulators. This situation may change if WSRC becomes a cooperator for the site. Informally, the lines of communication are open among the regulators, DOE-SR and WSRC.

On July 14, 1989, the EPA proposed the SRS for inclusion on the National Priorities List (NPL). In anticipation of this, DOE is negotiating a Federal Facilities Agreement (FFA) with the EPA and SCDHEC to coordinate cleanup activities at SRS into one comprehensive strategy. A site included on the NPL falls under the jurisdiction of CERCLA. Public participation requirements are listed in CERCLA and include the establishment of an Administrative Record file that documents the selection of cleanup alternatives, and provides for review and comment by the public of those alternatives. A Community Relations Plan (CRP), designed specifically for SRS to facilitate public involvement, will outline those activities necessary to fulfill CERCLA requirements. At this time the CRP is undergoing development and there are no milestones for the CRP. EPA concurs that SRS is proceeding in the correct way and on the right schedule.

The CRP will facilitate the interaction between the communities and DOE to obtain resolution of issues and public comment in a timely manner to enable effective decisionmaking and implementation of selected remedial actions.

To successfully implement a CRP at the SRS, segments of the public that may be affected by or may be interested in the remediation of waste sites at SRS must be identified. Because SRS is a complex Federal facility, there are several distinct segments of the public whose needs must be assessed. Some of these are:

- Residents of the surrounding communities
- Employees of SRS and their families
- Residents who live downstream of SRS
- Local officials, both city and county
- State elected officials, both South Carolina and Georgia
- State agency officials, both South Carolina and Georgia
- Congressional representatives
- Congressional committees with SRS oversight responsibilities
- Other federal agencies
- Public interest groups
- The media
- Other groups not yet identified.

DOE-SR uses programmatic appraisals, facility audits and inspections, and activity surveillances to evaluate SRS contractor performance. The Monthly Environmental Compliance Report describes the status of DOE-SR evaluations of WSRC environmental performance that have open environmental findings. These findings are characterized as having either potential regulatory basis or a nonregulatory basis (DOE Order). In addition, the potential regulatory findings are characterized as major or minor.

Other external organizations are also involved in the SRS environmental activities. The U. S. Army Corps of Engineers regulates activities and land use between the high water marks on the banks of the Savannah River. The U. S. Department of Transportation regulates the interstate transport of commodities, including hazardous substances and hazardous waste. The SCDHEC provides radiological support to state agencies, is the primary authority for South Carolina State drinking water and radionuclide air emission permit programs, and participates with DOE-SR in radiological monitoring of the environment. The South Carolina State Department of Wildlife and Marine Resources assists in wildlife and fisheries management on and around the SRS. Clemson University certifies and licenses all site applications of pesticides.

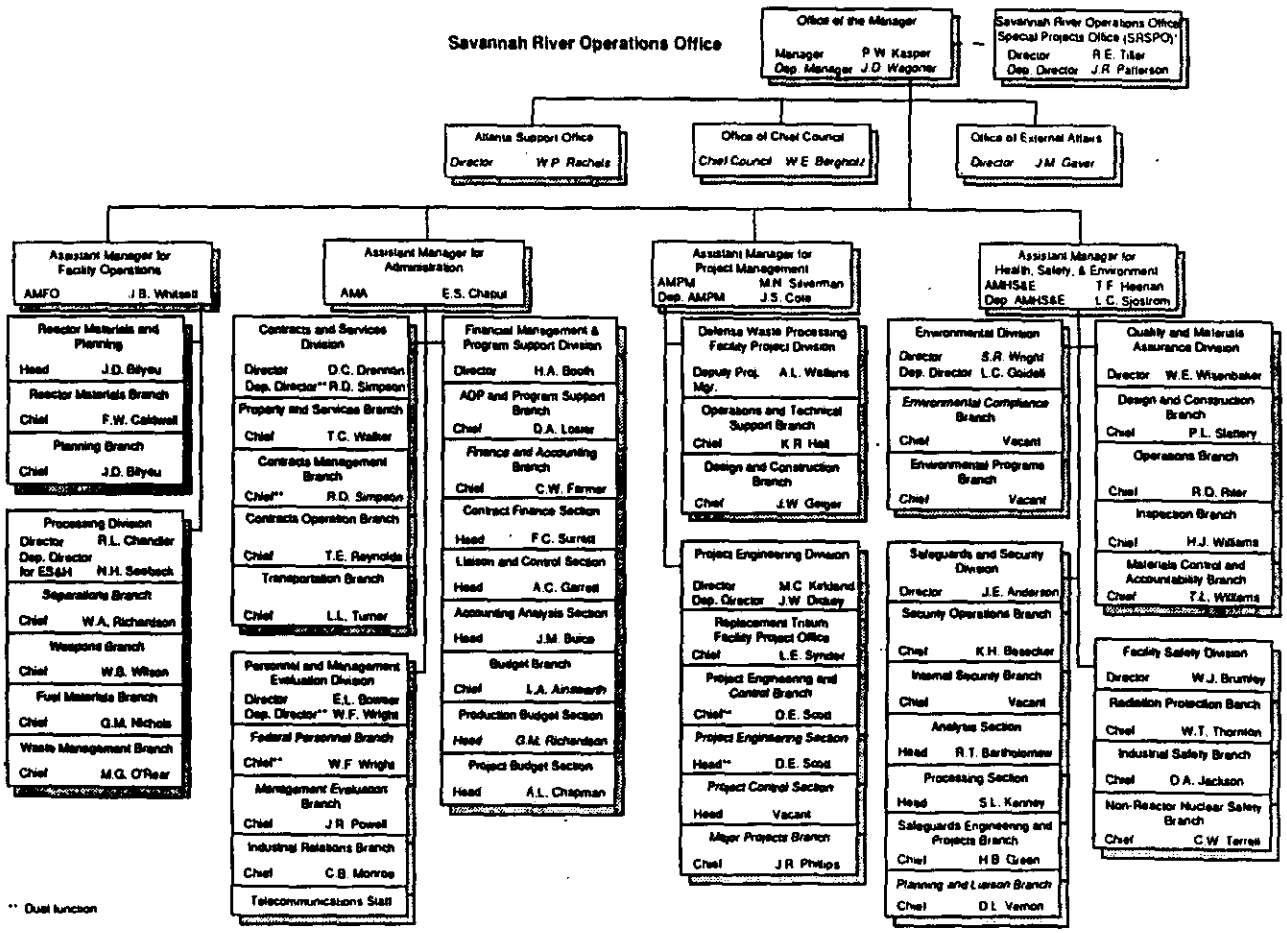

Figure 2-1. Savannah River Operations Office Organization Chart

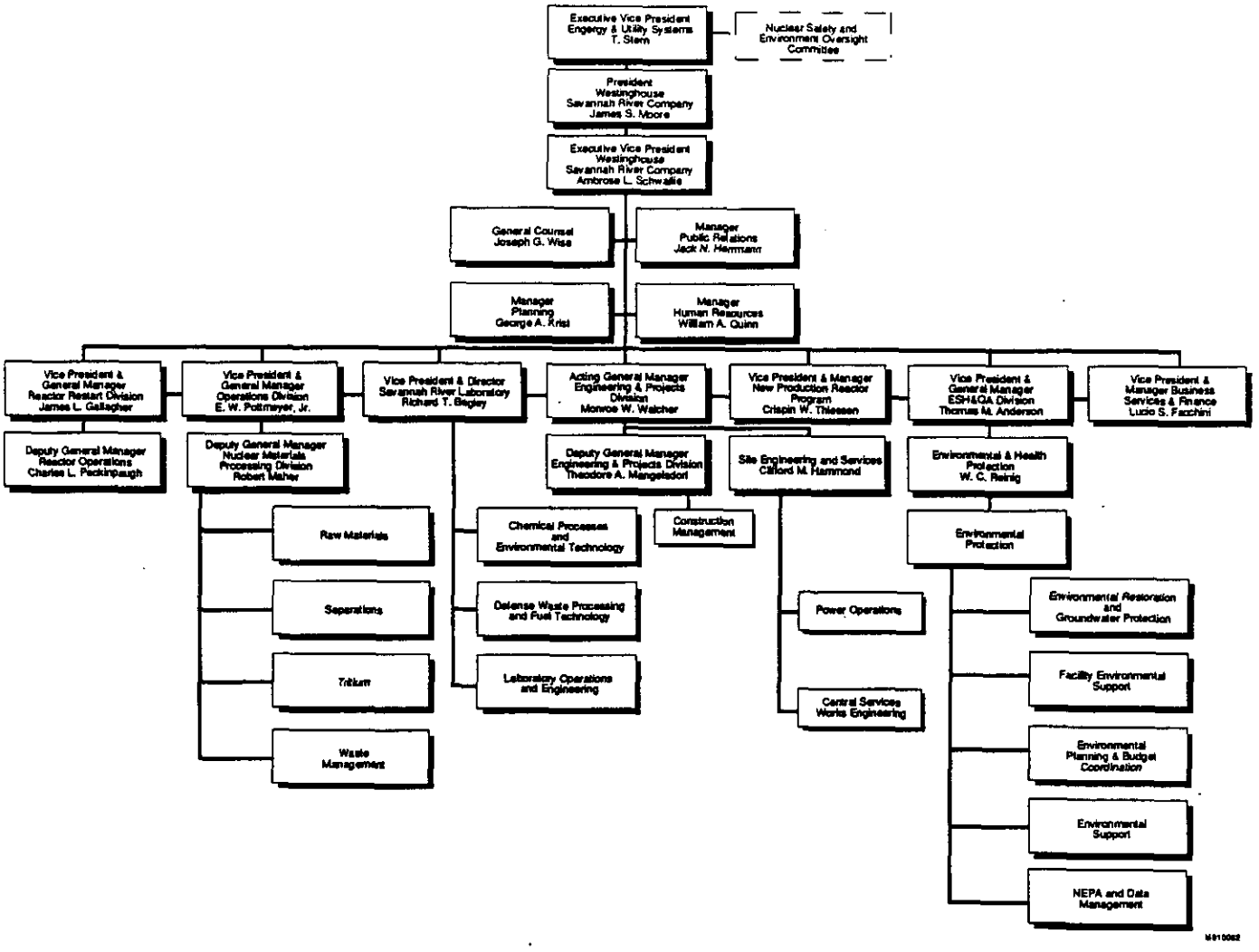

Figure 2-2. Westinghouse Savannah River Company Organization Chart for Site Specific Plan

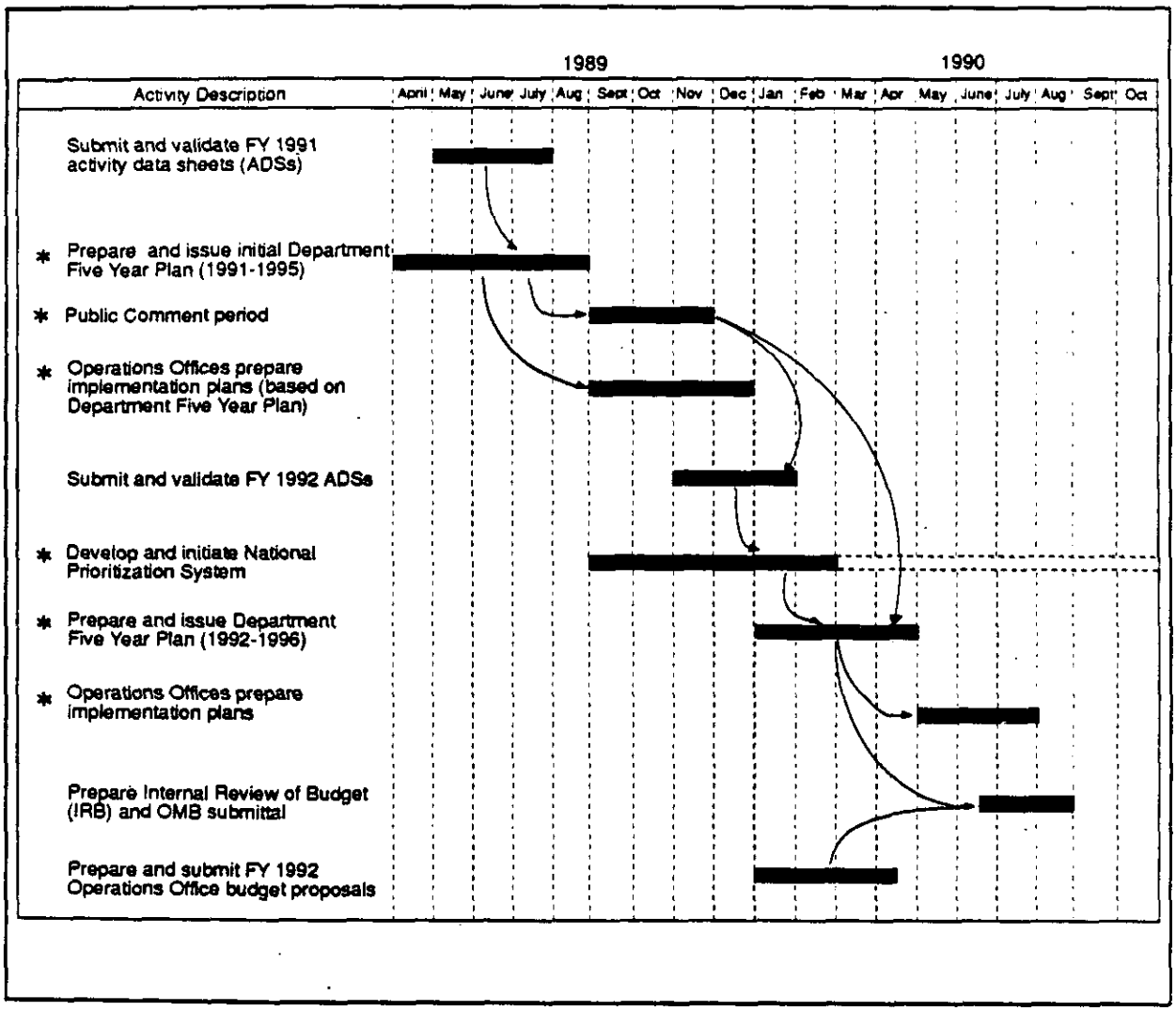

Figure 2-3. Schedule for Preparation of Future Activity Data Sheets and Site Specific Plans (DOE 1989)

3.0 CORRECTIVE ACTIVITIES

3.1 Requirements/Strategy

3.1.1 Site Program Overview

The Savannah River Site (SRS) strives to comply with all environmental regulations both state and federal, and all Department of Energy (DOE) orders and operating contractor policies related to the environment. The Environmental Protection Agency (EPA) monitors all federal regulations; South Carolina Department of Health and Environmental Control monitors all state regulations and oversees some federal regulations. The Department of Energy at Savannah River (DOE-SR) and Westinghouse Savannah River Company (WSRC) monitors all DOE orders and site policies, as well as oversight on state and federal regulations. There are numerous audits and surveillances performed by DOE, DOE-SR, and WSRC to ensure compliance (see Section 8.0).

The SRS complies with the Clean Water Act (CWA) and the SCDHEC wastewater regulations for Class B streams except for thermal effluents. During reactor operation, reactor cooling water is discharged at greater than 70°C (175°F) to several of the site streams. The site constructed PAR Pond and L Lake to mitigate heated water discharges from P Reactor and L Reactor, respectively. In addition, the Department of Energy entered into a Consent Order with the SCDHEC to mitigate the heated water discharges from K Reactor.

Cooling water discharges from K Reactor currently cause exceptions to thermal limits for discharges to Class B streams as set forth in South Carolina Water Quality Stream Standards. A consent order (CO-84-4-W) between the DOE and South Carolina Department of Health and Environmental Control (SCDHEC) allows the discharge of cooling water outside the temperature limits until mitigation facilities are placed in operation. An Environmental Impact Statement (EIS) (DOE 1987a) was prepared on alternative cooling water systems for the K Reactor. The installation of a recirculating cooling tower at K Area is the alternative chosen by the DOE in the Record of Decision (ROD) published February 12, 1988.

A discharge from the A-Area powerhouse goes to an outfall which is not identified in the site's National Pollutant Discharge Elimination System (NPDES) permit. The proposed designation of this outfall is A-008. The wastewater is presently being collected in tankers and treated at a site wastewater treatment plant. Projects will be undertaken to divert the effluent into a sedimentation basin for treatment prior to discharge.

3.1.2 Justification/Regulatory Requirements

Federal Laws

- **Federal Water Pollution Control Act (Water Quality Act of 1987)**—The Water Quality Act of 1987 reauthorized and strengthened the Federal Water Pollution Control Act (commonly known as the Clean Water Act). The Water Pollution Control Act requires that discharges to navigable waters meet applicable thermal limitations or demonstrate a balanced indigenous population.

- **Executive Order 12088**—This executive order requires federal agencies to comply with applicable administrative and procedural pollution control standards established by federal laws.

South Carolina Standards

- **South Carolina Water Classification Standards (SCDHEC 61-68)**—These standards require that all Savannah River Site (SRS) streams, lakes, and navigable waters meet Class B water quality standards. The standards require Class B stream temperatures to be 90°F or less, or not to cause ambient temperatures to increase by more than by 5°F.

State Consent Orders/Memorandum of Understanding

- **CO-84-4-W (Thermal Mitigation)**—In a consent order dated January 3, 1984, the DOE and SCDHEC mutually agreed and subsequently amended in 1985, 1987, and 1988, to temporarily supersede the NPDES temperature requirements. The consent order also required the DOE to assess the impact of SRS thermal discharges to site streams, lakes, and the Savannah River and to install facilities to mitigate thermal discharges from the D Area Powerhouse and the C and K Reactors. The Consent Order was amended in August 1987 to exclude the shutdown C Reactor and to establish a new compliance schedule.

See Section 2.3, Regulations and Orders, for more details.

3.2 Priorities

Priorities (DOE 1989) for the purposes of the FYP are defined in the following paragraphs:

Priority 1

Priority 1 includes activities necessary to prevent near-term adverse impact to workers, the public, or the environment. Examples include containment to prevent the spread of contamination, actions to prevent or minimize releases to the environment, and ongoing waste management activities required to maintain safe conditions. Also included as Priority 1 are ongoing activities which, if terminated, could result in significant program and/or resource impacts. Impacts could include increased risk to the environment or to workers, loss of trained staff, or increased costs.

Priority 2

Priority 2 items encompass those activities required to meet the terms of agreements (in place or in negotiation) between DOE and local, state, and federal agencies. These agreements represent legal commitments to complete activities on the schedules agreed to by DOE. A major goal of this Site Specific Plan is to document DOE's commitment to comply with these agreements.

Priority 3

Priority 3 includes activities required for compliance with external environmental regulations that were not captured by Priority 1 or 2. Other actions included in Priority 3 are compliance with DOE Orders that implement external regulations or that set specific DOE regulatory standards, actions that would reduce risks or costs, and actions that would prevent disruption of the DOE mission.

Priority 4

Priority 4 includes activities that are not required by regulation but would be desirable to do or activities that will be required by future legislation. Examples of Priority 4 actions include complying with DOE Orders that are more stringent than external regulations, implementing good management practices, reducing personnel exposures below levels required by regulations or standards, and accelerating actions to satisfy an agreement or milestone ahead of schedule.

All of the activities included in the FYP and SSP are currently funded and there are no projects for CA that are unfunded. The K-Reactor Cooling Tower, which is a priority 1, is funded and scheduled to be completed by December 31, 1992.

3.3 Technical Approach

Four corrective activities for the SRS were identified during the preparation of the FYP. One activity is associated with the thermal discharges from K-Reactor and the other three deal with NPDES Outfall A-008 a discharge from the A Area powerhouse.

Cooling water discharges from K-Reactor currently cause exceptions to thermal limits for discharges to Class B streams as set forth in South Carolina Water Quality Stream Standards. The installation of a recirculating cooling tower at K Area was the alternative chosen by the DOE in the Record of Decision (ROD) published February 12, 1988. The cooling tower is presently under construction at the site. This activity is the responsibility of Reactor Operations (see Section 2.0).

All operational effluents from the SRS facilities discharge through point source outfalls. Surface water discharges from the outfalls are regulated by the SCDHEC under the NPDES Permit.

The existing 784-A powerhouse (A Area) waste stream effluents which flow to Outfall A-008 consist of discharges from the wet ash scrubber, process cooling water, service and domestic water tank overflows, well blowoff, boiler blowdown, washdown water, and the coal unloading sump. The wet ash

scrubber discharge and the washdown water contain high levels of suspended solids. These effluents will be diverted to and treated in a settling basin provided by the three activities. After completion of this project, no powerhouse effluents will discharge through Outfall A-008, but will be discharged through Outfall A-014. This activity is the responsibility of Power Operations (see Section 2.0).

There are no other water discharges that are known to need corrective activity. Also, there are no known air discharges that need corrective activity.

The performance evaluation and tracking system are described in Section 1.1.

3.4 Schedule, Milestones, and Costs

Information concerning SSP activity schedules, milestones, and costs is presented below for Corrective Activities. A priority has been assigned to each activity. Estimated costs are presented for the entire planning period (FY 1989 through FY 1995). Brief descriptions of each activity are presented in Section 3.3.

Four projects have been or will be initiated during the FY 1989 through FY 1991 time period (Table 3.1).

The Corrective Activities projected expenditures over the planning period will total approximately $81 million with annual total costs increasing from approximately $15 million in FY 1989 to $30 million in FY 1991 (Figure 3.1). The increase in cost is associated the construction of the K-Reactor cooling tower. In the *Environmental Restoration and Waste Management Five-Year Plan* (DOE 1989a), the construction cost for the K-Reactor cooling tower was $127 million. The Total Estimated Cost has been reduced to $79 million. The construction of the K-Reactor cooling tower and the pollution control system for outfall A-008 are Priority 1 (Table 3.1).

Activity Area	Total Cost ($s in Thousands)
Cooling Tower	$79,000
Outfall A-008	$ 2,400
Total	$81,400

3.4.1 K-Reactor Cooling Tower

- Reactor Effluent Cooling Thermal Mitigation—The Reactor Division, and the SRL will implement a thermal mitigation plan to maintain the K-Reactor cooling water discharge temperatures below the 90°F NPDES permit requirements. The preferred alternative was a once-through, gravity fed, natural draft hyperbolic cooling tower. A recirculating cooling tower which will be constructed near Pen Branch to treat the K Area heated water discharge. The total capital cost for the cooling tower is estimated to be $79 million.

Milestones:	Project Engineering and Design	First Quarter FY 1989
	Construction Start	Fourth Quarter FY 1989
	Construction End	First Quarter FY 1993

3.4.2 Outfall A-008

- Removal of 784-A Powerhouse Waste Streams from A-008 Outfall (three activities)—The existing 784-A powerhouse waste stream effluents which flow to Outfall A-008 consist of discharges from the wet ash scrubber, process cooling water, service and domestic water tank overflows, well blowoff, boiler blowdown, washdown water, and the coal unloading sump. The wet ash scrubber discharge and the washdown water contain high levels of suspended solids. These effluents will be diverted to and treated in a sedimentation basin provided by this project. The separate projects will include the installation of a settling basin, reroute boiler blowdown, and install a pollution control system. After completion of these projects, no powerhouse effluents will discharge through Outfall A-008. The total estimated cost is $2.4 million.

Table 3.1. Corrective Activities Funding Summary (Dollars in Thousands)

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
1. SR 0121	POWER Pollution Control System, A-8 Outfall	1	400							400
2. SR 0236	Reactor Effluent Cooling Thermal Mitigation	1	15,000	26,000	28,000	10,000				79,000
	Subtotal by Priority	1	15,400	26,000	28,000	10,000				79,400
3. SR 0115	POWER Install Settling Basin, 700-Area	3			1,000					1,000
4. SR 0127	POWER Reroute Boiler Blowdown Discharge	3			1,000					1,000
	Subtotal by Priority	3			2,000					2,000
	Grand Totals		15,400	26,000	30,000	10,000				81,400

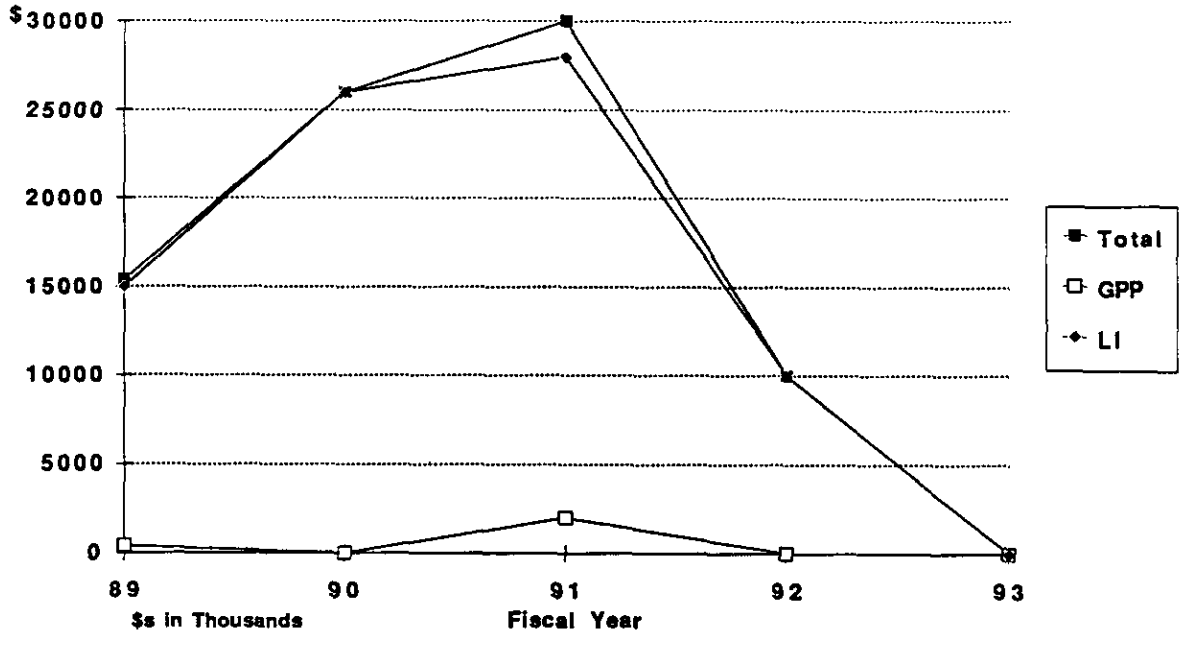

Figure 3-1. Corrective Activities Projected Expenditures

4.0 ENVIRONMENTAL RESTORATION

4.1 Requirements/Strategy

4.1.1 Waste Site Closure/Remedial Actions

Sitewide Program Overview

The Savannah River Site (SRS) Environmental Restoration Program provides a consistent strategy for compliance with applicable federal and state regulations, Department of Energy (DOE) orders, and operating contractor policies related to waste site closure, groundwater protection and remedial activities. The procedures established in the *Waste Site Closure Manual* (Du Pont 1988b) are applied to the closure of all waste units, including radioactive, hazardous, mixed and nonhazardous nonradioactive waste.

Regulatory Requirements

The basic framework for assessing all waste units and developing closure, post-closure, and remedial action plans is based on the hazardous waste requirements of the Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) as amended, South Carolina Solid Waste Regulations (nonhazardous sites), and South Carolina Hazardous Waste Management Regulation (SCHWMR). Closure and remedial activities are also regulated by the DOE. The RCRA has been the primary regulatory driver at the SRS. The RCRA units are included in the SRS RCRA Part A and Part B permit program. Some of these waste sites are currently undergoing RCRA closures and 79 sites are in the RFI Program. However, the SRS is currently in the process of negotiating a Federal Facility Agreement (FFA) with the State and Environmental Protection Agency (EPA) Region IV. Since the agreement is a draft subject to change, potential program modifications have not been addressed in this Site Specific Plan. Changes will be incorporated into the next version of this Plan.

Federal Requirements

- Resource Conservation and Recovery Act (RCRA)—The State of South Carolina is authorized by the EPA to administer the RCRA. Permitting under RCRA is a two part process. The first part involves the submittal of a Part A Permit application that contains certain basic facility information. A Part A application was filed with the EPA for the SRS includes the F and H Area Seepage Basins, the M-Area Settling Basin and Lost Lake, the Acid/Caustic Basins, and the Mixed Waste Management Facility. The second part involves the submittal of a Part B Permit application that contains detailed information about the individual hazardous Waste Management facilities, the Met Lab Basin including closure and post closure activities. The Site Part B Permit application was filed in February 1985 and has been revised to incorporate additional facilities. The permit was issued in September 1987.

- CERCLA/Superfund Amendments and Reauthorization Act (SARA) (Superfund)—CERCLA is administered by EPA. According to Section 107(g) of CERCLA, agencies of the federal government are procedurally and substantively subject to compliance with CERCLA. This provision mandates the DOE to undertake remedial actions for CERCLA-equivalent sites at all DOE facilities once that facility is listed on the National Priorities List (NPL). The Savannah River Site was placed on the NPL in December 1989. DOE-SR is currently in the process of negotiating a Federal Facility agreement with the state and EPA-IV.

DOE Orders

- DOE Order 5400.4—This order establishes instructions for implementing the DOE CERCLA program, and defines actions to identify and evaluate inactive hazardous waste sites at DOE installations, and directs the custodian to take remedial action where necessary to improve control of hazardous substance migration from such sites.

- DOE Order 5400.3—This order establishes hazardous waste management procedures for facilities operated under the authority of the Atomic Energy Act, and provides instruction for implementing the RCRA, to the extent practicable.

State Requirements

State requirements include the following:

• R.61-58	State Primary Drinking Water Regulations
• R.61-61	Solid Waste Regulation
• R.61-66	Industrial Solid Waste Disposal Site Regulation
• R.61-68	Water Classification and Standards
• R.61-69	Classified Waters
• R.61-70	South Carolina Landfill Regulations
• R.61-71	Well Standards and Regulations
• R.61-79.264/265	Hazardous Waste Management Regulations (SCHWMR)
• R.61-87	Underground Injection Control Regulations
• R.61-92	South Carolina Underground Storage Tank Control Regulations

In addition, other state regulations may apply to the format or other aspects of closure plans. Until the investigations are complete, it is not known exactly which regulations may apply.

See Section 2.3, Regulations and Orders, for more details.

Closure/Environmental Restoration Strategy

The SRS strategy for prioritizing waste site closures and remedial groundwater actions is to: (1) address sites that pose an imminent threat to human health and the environment; (2) meet regulatory requirements; (3) address sites close to the boundary; and (4) address the remaining sites according to the type of waste disposed at the site.

Closure options for the waste units are varied and will be determined on a unit specific basis. Options for remediation include waste stabilization, site capping, waste removal, and grading. No action may be required at some waste sites, in which case, documentation supporting this option will be provided in a report. Based on preliminary analyses presented in the Environmental Impact Statement (EIS), *Waste Management Activities for Groundwater Protection at the Savannah River Plant*, DOE/EIS-0120D (DOE 1987c), the current plans propose waste removal at the old F Area seepage basin and the six R Area seepage basins. Closure for most other waste sites would entail the waste being left in place with closure techniques, such as capping, applied. The final closure strategy for all waste sites will, however, depend on the information developed during characterization and assessment. However, groundwater corrective action plans are currently being developed for the TNX and F/H-Areas.

Groundwater remedial actions will be performed as needed to comply with groundwater protection requirements resulting from negotiated agreements with regulatory agencies. Corrective actions are complex and depend on many variables, which are often unit-specific. Remedial actions include *in situ* treatment, groundwater pumping and treatment, and containment or diversion. An effective design often combines two or more actions. The removal of chlorocarbons from the shallow groundwater and vadose zone in M Area and vicinity is currently the only groundwater remedial action underway at SRS.

RCRA Part B/RFI Activities

There are 15 waste sites that are currently subject to RCRA permitting and compliance action by the SCDHEC under the authorized state hazardous waste program. Ten of these waste sites are currently undergoing closure under approved RCRA closure plans. Closure plans for the remaining five sites are currently under regulatory review.

In September 1989, the Savannah River Site received final regulatory approval of the RCRA Facility Investigation (RFI) Program. There are currently 79 waste units in the SRS RFI Program. Unit-specific work plans will be developed for these units to determine the nature and extent of potential releases of hazardous substances and the necessity for corrective actions, if any.

Programs

Closure Activities/Phases

Waste site closure activities include many phases, such as characterization, assessment, closure plan development, site closure, and remedial activities (see Figure 4-1).

Funding for closure for most other waste sites assumes the waste would be left in place with closure techniques, such as capping, applied. However, this closure option is dependent on regulatory requirements and approval. Therefore, final closure strategy for all waste sites will depend on the information developed during characterization and assessment and applicable regulations and standards.

- Waste Site Investigation and Remediation Manual—The SRS Waste Site Remediation Task Force (WSRTF) Coordinator is responsible for updating the waste site closure manual as new specifications and requirements are set forth.

- Characterization—Characterization of SRS waste units includes the various data gathering activities necessary to determine the rate and extent of contaminant migration resulting from the waste site, if applicable, and the concentration of any contaminants that may be present. Characterization addresses:

  - The compilation of all available data
  - Identification of data gaps
  - Gathering of additional information through soil-gas and soil boring analyses, preliminary well drilling, and groundwater analyses.

- Assessment—SRS waste units are assessed as follows:

  - Compile and interpret the data collected during the characterization phase
  - Identify applicable regulations
  - Discuss closure alternatives.

  Site specific assessments include:

  - The properties of the known contaminants, if any
  - The sources
  - The rate and extent of contamination
  - The groundwater flow directions and elevations.

  Based on this information a closure option is recommended.

- Site Closure Criteria—Procedures and criteria for characterizing, remediating and closing of the inactive waste sites are set by applicable federal and state regulations and DOE orders. There is a minimum amount of information that must be developed for each site. A different level of activity is required at each waste site due to the type of waste deposited and the requirements of different regulations. The definition of the unit-specific closure criteria is developed during the characterization and assessment phases of closure for each site.

- Closure Plan Development and Approval—The closure plans for all SRS waste sites will be developed to minimize or eliminate the postclosure migration of wastes, and to keep future maintenance at a minimum. This goal may be obtained by immobilization or extraction of the contaminant. Closure plans address:

  - Closure performance standards
  - A detailed waste inventory
  - Waste removal, treatment, and disposal requirements
  - Sampling and analyses needs
  - Backfill requirements
  - Cover systems
  - Equipment decontamination

- Surface water controls
- Closure schedules
- Closure costs.

- Postclosure/Remedial Action Plan Development—An integral part of each waste site closure plan is the postclosure maintenance and monitoring activities to assure integrity and security of the closed waste site. Postclosure plans include:

  - Inspection checklist
  - Inspection frequency
  - Facility custodian
  - Monitoring and compliance (if necessary)
  - Postclosure costs.

  Remedial action plans are required if residual contamination remains in the closed site and the characterization analysis requires it. Remedial action plans include:

  - Predetermined groundwater protection standard
  - Hazardous constituents present
  - Compliance point and duration of monitoring requirements
  - Remedial action and monitoring program.

  Postclosure/remedial action plans for specific waste sites must be reviewed and approved by the appropriate regulatory agencies.

- Closure—The major portion of work outlined in the closure plan will be performed by subcontractors. The waste site custodian is responsible for managing the subcontractor(s) and ensuring that the contractor is following the approved closure plan.

- Postclosure Activities/Remedial Action—The waste site custodians are responsible for ensuring the implementation of the activities specified in the approved Postclosure/Remedial Action Plan. Postclosure inspection, maintenance and monitoring may be required following closure in order to assure the integrity and security of the closed waste site. The effectiveness of any required remedial actions is verified through postclosure monitoring. The scope of these activities will vary from site to site depending on the type and amount of waste, waste residue, or residual contamination remaining in place following site closure.

4.1.2 Decontamination and Decommissioning

The SRS is actively developing and/or demonstrating the technologies needed to decontaminate and decommission major site facilities. The Tank 16 sludge removal demonstration in the late 1970s, the planned decontamination activities of Tank 16, the 1984 removal of the Building 305-M Test Pile, and the old HB-Line D&D activities are examples of recent activities.

In the future D&D activities will include the five production reactors, the two chemical separations plants, the fuel fabrication facilities, and the 51 underground high-level waste tanks. Some D&D activity has been or is being conducted at site facilities such as the Building 305-M Test Pile Reactor and the old HB-Line, but little has been done toward the decommissioning of a large production facility.

Because of the guidance from the Department of Energy Headquarters (DOE-HQ) for the Five-Year Plan (FYP), only the following D&D projects were included:

Facility	Activity Data Sheet Number
SRL SED I Facility	(SR0326)
SRL SED II Facility	(SR0327)
SRL CPF Facility	(SR0328)
Heavy Water Components Test Reactor (HWCTR)	(SR0329 & SR0345)
Old HB-Line	(SR0330)
R-Reactor Support Facilities	(SR0331)
284-D Powerhouse	(SR0349)
Heavy Water Facility	(SR0350)

Most of the D&D activities do not require any major routine surveillance and maintenance costs. The grass around the facilities may need to be mowed occasionally and someone does examine each of the facilities monthly, but the costs for these activities is minimal. The exception is the surveillance and maintenance costs for the Heavy Water Components Test Reactor (HWCTR). There are some costs included in the FYP for surveillance and maintenance activities for HWCTR to remove asbestos as needed.

4.2 Priorities

4.2.1 Priorities in Accordance with FYP Guidance (DOE 1989a)

Priority 1

Priority 1 includes activities necessary to prevent near-term adverse impact to workers, the public, or the environment. Examples include containment to prevent the spread of contamination, actions to prevent or minimize releases to the environment, and ongoing waste management activities required to maintain safe conditions. Also included as Priority 1 are ongoing activities which, if terminated, could result in significant program and/or resource impacts. Impacts could include increased risk to the environment or to workers, loss of trained staff, or increased costs.

Priority 2

Priority 2 items encompass those activities required to meet the terms of agreements (in place or in negotiation) between the DOE and local, state, and federal agencies. These agreements represent legal

commitments to complete activities on the schedules agreed to by the DOE. A major goal of this Site Specific Plan is to document DOE's commitment to comply with these agreements.

Priority 3

Priority 3 includes activities required for compliance with external environmental regulations that were not captured by Priority 1 or 2. Other actions included in Priority 3 are compliance with the DOE orders that implement external regulations or that set specific DOE regulatory standards, actions that would reduce risks or costs, and actions that would prevent disruption of the DOE mission.

Priority 4

Priority 4 includes activities that are not required by regulation but would be desirable to do. Examples of Priority 4 actions include complying with DOE orders that are more stringent than external regulations, implementing good management practices, reducing personnel exposures below levels required by regulations or standards,and accelerating actions to satisfy an agreement or milestone ahead of schedule.

There is only one Priority 4 project, Decontamination and Decommission of the SRL SED 1 Facility. According to guidance from DOE-HQ, priority 4 activities will not be funded.

4.2.2 Environmental Restoration Priority System for the SRS

Fiscal Years 1990 and 1991

Each year the Department of Energy-Savannah River (DOE-SR) Program budget is prepared by identifying and prioritizing all the clean-up activities needed to comply with state and federal laws and court orders. The DOE-SR ER budget request is then submitted to DOE-HQ and funding is allocated based on a complex national ranking system including all other DOE facilities in the program.

The identification and prioritization of ER activities at the SRS for FY 1990 and FY 1991 were performed prior to the executing of this agreement and were based upon informed judgments of the participants in the program.

Fiscal Year 1992 and Later

The EPA, SCDHEC, and DOE will use the following procedures to prioritize environmental activities starting with the FY 1992 budget. Procedures now being developed with public participation will be used for identifying and prioritizing activities for the ER Program. This new mode of operation is being driven by the implementation of the FYP. Two systems will be used: (1) the DOE-SR system for identifying and ranking activities at the SRS to prepare the budget to be submitted to DOE-HQ; and (2) a national system called Priority Optimization System (POS), which will be used to optimize the distribution of the national budget among all the DOE facilities. The Pos System is still under development.

Annual Procedure

When preparing SRS budgets for FY 1992 and the following years, the proposed list of tasks will reflect at least two budget cases: a target guidance issued by the Office of Management and Budget, and a "needs" case based upon the judgment of the DOE with participation by the SCDHEC, and the EPA. The exact number of activities to be worked on in the proposed budget is not known at this time because the Congressional authorization and appropriations process will not commence for one year from the time DOE submits its budget request. In April each year, DOE-SR with other DOE operations offices, will optimize the national budget allocation using the POS. The results of the POS will be by the DOE-HQ to allocate funds once the final budget is authorized by the Congress 18 months into the future.

Once the DOE-SR has received either the formal financial plan guidance or guidance on a continuing resolution for the start of the fiscal year, DOE-SR will meet with the EPA and SCDHEC to agree upon the precise number of activities to be accomplished for that fiscal year and the attendant schedules and deliverables.

4.3 Technical Approach

4.3.1 Waste Site Closure

The following sections are presented by Waste Area Groups (WAGs). WAGs are programmatic groups of tasks and waste units in the Environmental Restoration Program. Expenditures are summarized based on WAGs.

Table 4.1 identifies the inactive waste units currently in the SRS ER Program. The table lists the waste sites by name, building number, custodial department, WAG ID and primary regulatory program. Multiple regulatory programs exist for many of the sites however, for simplicity, only the primary regulatory authority has been listed in the table.

Waste Area Groups (WAGs)

The WAGs are arranged in order of priority, and the ADS number and priority are provided in parentheses.

- ***A/M Area Groundwater Remediation (SR 0302) (Priority 1)***

  The groundwater under the A/M Area is being pumped through an Air Stripper to remove halogenated hydrocarbons to a residual concentration acceptable to the SCDHEC. This remediation program is now in its fifth year and it is currently estimated that the program will continue through the year 2017. An average of 15 to 17 million gallons of water are treated per month. Plans to increase the rate of flow to the air stripper from 400 to 610 gallons per minute (gpm) are being implemented.

An associated area of groundwater contamination has been identified under the SRL. The first step toward implementing a remedial action program in this northern sector of the A/M Area is the relocation of a Prototype Air Stripper from the Raw Materials Engineering Technology Department. Permit applications must be submitted for each proposed air stripper used for groundwater remediation. Construction may not begin before obtaining written approval from SCDHEC.

A groundwater remediation system will also be installed in the southern sector of the A/M Area. The plan includes installing recovery wells and stripper units.

This task also includes the vadose zone project. The objective of this task is to remove the residual contaminate from the vadose zone before it reaches the groundwater.

- ***Environmental (ER) Program Support (SR 0307) (Priority 1)***

  Support is required to satisfy DOE management requirements of the ER Program. The objectives are to assure adequate program documentation and submission of required reports. It is necessary to secure the support of consultants in the implementation and continuation of this program to ensure achievement of the objectives.

- ***F/H Area Seepage Basin Closure (SR 0316) (SR 0351) (Priority 1)***

  The F/H Area Seepage Basins received wastewater containing radionuclides and other chemicals from the F/H Separations Areas. Influent to the basins stopped in November 1988. The F/H Effluent Treatment Facility (ETF) was brought on line at that time and now treats the wastewater from the Separations Areas. The closure plan was approved in June 1989. Closure of the basins consists of physical and passive chemical stabilization of the sludge and supernate and a closure cap which conforms to state regulations. A Request for Proposal was issued in September 1989 and the subcontractor is expected on site by March 1990.

- ***M Area Settling Basin/Lost Lake (SR 0301) (Priority 1)***

  The M-Area Settling Basin/Lost Lake is in the northwest portion of the SRS. The basin received electroplating waste from the M Area operations. A RCRA Part B Permit was issued by the SCDHEC. Closure of the M-Area Basin/Lost Lake is currently 98% complete and is scheduled for closure certification by the end of FY 1990.

- ***Miscellaneous Waste Sites (SR 0315) (Priority 1)***

  The nonhazardous/nonradioactive waste units will be closed in accordance with the South Carolina Solid Waste Regulations. Newly discovered waste units will be placed in this WAG until the waste has been characterized and the unit assigned to a specific program such as the RFI Program.

- ***Mixed Waste Management Facility Closure (SR 0305) (Priority 1)***

  Closure of the Mixed Waste Management Facility (MWMF) consists of compacting and capping a 58 acre section of the Radioactive Waste Burial Ground (RWBG) as required by the RCRA. The unit contains hazardous and radioactive waste. The first phase of construction, clay cap and dynamic compaction tests, began in October 1987 and March 1988 respectively. Dynamic compaction began in February 1989. The MWMF is scheduled to complete closure by May 1991.

- ***RFI Program Investigations (SR 0306) (Priority 1)***

  The Resource Conservation Recovery Act (RCRA) Facility Investigation (RFI) Program was developed to provide a framework for the preparation of unit-specific RCRA facility investigations. The SRS RFI Program Plan will allow the development of unit-specific RFI Plans for all RFI waste units to determine the extent of potential releases of hazardous substances and the necessity for nature and corrective action if any. The findings will then be summarized in final RFI reports. At the Unit Investigation Phase, a detailed soils assessment is made and can include studies of the surface water, groundwater and ambient air. For the purposes of budgeting, the costs through FY 1993 include the RFI investigations. A separate Waste Area Grouping was established to reflect the costs associated with corrective actions for the units in the RFI Program.

- ***Solvent Tank Decommissioning (SR 0311) (Priority 1)***

  There are 22 underground storage tanks which have been used for the storage of radioactive waste. The tanks are located within the Old Radioactive Burial Ground (RWBG). The tanks have been emptied of all but the unpumpable heel. These tanks are to be closed in place before the Old RWBG can be restored. This has to be done as an interim measure at an RFI Unit because the Old RWBG is the RFI Program under RCRA.

- ***SRL Seepage Basin Closure (SR 0309) (Priority 2)***

  The SRL Seepage Basins are located in the northwestern section of the SRS in the 700 Area. The basins received low-level radioactive wastewater from the Savannah River Lab. These basins are being closed in a manner described in a June 1, 1988 Consent Decree resulting from the NRDC settlement. The current proposed closure method consists of stabilization of basin liquids followed by backfill and capping of the basin. A program for characterization of the influent piping is being developed. A feasibility study of several closure options has been prepared in the waste management EIS.

- ***Trichloroethylene (TCE) Biodegradation Demonstration (SR 0308) (Priority 1)***

  A number of waste sites at the SRS and across the U.S. are known to have contaminated the groundwater with volatile organic compounds, such as trichloroethylene. The TCE Biodegradation Demonstration provides direct application of biotechnology for remediation of wastes and waste sites at the SRS. *In situ* bioremediation is recognized as an acceptable RCRA cleanup technique and offers the potential to save millions of dollars in closure activities at waste sites. It can also be used to cleanup petroleum spills and to reduce the volume of waste materials. The first portion of the

project involves design of an above-ground bioreactor to remediate trichloroethylene-contaminated groundwater. A micro-organism that degrades trichloroethylene has been discovered and a patent has been submitted. This micro-organism will be utilized during the design of the bioreactor. A successful demonstration is highly likely because of successful laboratory tests already conducted.

- ***Underground Storage Tank (SR 0314) (Priority 1)***

  This task covers the activities involved with the underground tank abandonment process and associated corrective action activities. The objective is to comply with the EPA and SCDHEC regulations. Tanks will be evaluated for leaks by means of inventory records, and if found to be leaking, remedial action will be taken for the tank, contaminated soil and/or groundwater. Inactive tanks will be removed and the necessary remedial action will be taken.

- ***Acid/Caustic Basin Closure (SR 0304) (Priority 2)***

  The Acid/Caustic Basins at F, H, K, and P Areas were addressed in a June 1, 1988 Consent Decree. A formal closure plan has been prepared which includes an assessment plan for the underground process sewer lines which fed the four basins. This plan was submitted to the SCDHEC in June 1989 and is currently under review. The four Acid/Caustic Basins should be closed within six months after approval of the closure plan. Additional funds have been allocated for FY 1991 through FY 1994 to address any remediation work that may be required at the underground process sewer lines.

- ***Bingham Pump Outage Pits Investigation (RI/FS) (SR 0318) (Priority 2)***

  In 1957 and 1958 the SRS reactors underwent major modifications to their primary and secondary cooling water systems. The reactor shutdowns necessitated by these upgrade activities became known as the Bingham Pump Outages. Low-level radioactive refuse generated during pump outages at the K, L, P, and R reactors, was disposed of in pits excavated in each of the respective areas. Waste materials deposited include pipes, cables, ladders, drums, wooden boxes, and miscellaneous hardware. The radiation level for these materials was <25 mRad/hr and 7.6 cm when buried, with no detectable alpha activity. A total of approximately one Ci of activity (primarily Cesium 137 and Strontium 90) is estimated to remain at the seven sites. Following construction activities, the outage pits were backfilled with clean soil, graded and seeded. The Bingham Pump Outage Pits are included on the operable units list in the draft Federal Facility Agreement. Therefore, the investigation and subsequent remediation of these waste units will be addressed under CERCLA and other appropriate regulations.

- ***Bingham Pump Outage Pits Remediation (SR 0320) (Priority 2)***

  The Bingham Pump Outage Pits received very low-level solid waste when modifications of cooling water systems at the reactors were made in 1957 and 1958. The waste included miscellaneous construction equipment such as pipes, cables, ladders, drums and boxes of hardware.

  The DOE-SR is in the process of negotiating an FFA with the state and EPA. The Bingham Pump Outage Pits are addressed in the FFA. Therefore, this Waste Area Grouping was established to reflect estimated costs for CERCLA remediation of these outage pits.

- ***RI/FS (CERCLA) Investigation (SR 0312) (Priority 2)***

  The Savannah River Operations Office (DOE-SR) is currently in the process of negotiating an FFA with EPA Region IV and the SCDHEC. The SRS may then be required to conduct Remedial Investigations and Feasibility Studies (RI/FS) at some waste sites.

  CERCLA Section 120 requires federal facilities placed on the NPL to enter into a FAA. The SRS was proposed for inclusion to the NPL in July 1989 and placed on the NPL in December 1989.

- ***CERCLA Remediations (SR 0342) (Priority 2)***

  The DOE-SR is currently negotiating an FFA with the EPA Region IV and SCDHEC. The SRS may be required to conduct RI/FS programs at some waste sites followed by remediation. This WAG is for CERCLA remediation activities. Remediation activities at these sites will begin upon completion of the RI/FS.

- ***Inactive Reactor Seepage Basins Investigations (RI/FS) (SR 0317) (Priority 2)***

  The Reactor Seepage Basins were constructed and operated beginning in 1957 to receive low-level radioactive purge water from the reactor disassembly basins. This water purge is necessary to keep the tritium concentration in the disassembly basin water within safe levels for working conditions. Many different radionuclides have been discharged to the basins, however, most of the radioactivity is due to tritium, Sr-90, and Cs-137. In 1960, a kaolinite dike (down to the clay layer) was constructed around basin 1 and the northwest end of basin 3 in R-Area to contain lateral movement of the radioactive contamination.

  All of the Reactor Seepage Basins are presently included on the operable units list in the draft Federal Facility Agreement. The R and K-Area basins are inactive and plans are currently underway to perform a Remedial Investigation (RI) at these sites. The C-, L-, and P-Area basins are still active.

- ***Inactive Reactor Seepage Basins Remediation (SR 0332) (Priority 2)***

  As noted above, the Reactor Seepage basins received low-level radioactive waste from the reactor disassembly basins. The basins are addressed in the FFA. Therefore, this grouping was established to reflect the estimated CERCLA remediation costs for these basins.

- ***Met Lab Basin Closure (SR 0303) (Priority 2)***

  The Met Lab Basin received wastewater effluent from the Metallurgical Laboratory. The waste generally consists of degreasing, cleaning and etching compounds. The basin is being closed in accordance with a June 1, 1988 Consent Decree resulting from the NRDC settlement. Current proposed closure consists of removal and treatment of basin water followed by backfill and capping of the basin. Plans for the characterization of both the influent piping and the Carolina Bay

associated with the basin discharge are being developed. A closure plan has been prepared and was submitted to SCDHEC on June 30, 1989 and is currently under review.

- ***New TNX Seepage Basin Closure (SR 0310) (Priority 2)***

  The New TNX Seepage Basin received neutralized waste from TNX Pilot Scale Testing Programs. The objective is to close the basin as stated in a June 1, 1988 Consent Decree. The proposed method for closure consists of removal and treatment of basin liquids followed by backfill and capping of the basin. A program for the characterization of the influent piping is being developed. A feasibility study of several closure options has been prepared in the waste management EIS.

- ***RFI Program Corrective Actions (SR 0319) (Priority 3)***

  The RFI Program Plan was developed to provide a framework for the preparation of the RCRA facilities investigation and is mandated by the SRS RCRA Part B permit. Upon completion of the investigation, a RFI report will be submitted to the regulators and a choice for corrective action determined. The units in the RFI Program follow a staggered schedule. In FY 1993 some of the units will begin corrective action while other sites in the program will be ending the investigation stage. However, by FY 1994, all of the sites in the RFI Program are scheduled to undergo corrective action measures, if needed.

- ***Waste Site and Facility Closure (SR 0347) (Priority 4)***

  A major area of activity at SRS over the next decade will be the closure and remediation of old waste sites and areas impacted by previous SRS operations. This activity will focus on developing methodologies and technologies for biological restoration of areas damaged by previous SRS operations, particularly as those studies might have applicability in the southeastern U. S. or other regions. Technology development will be oriented toward both biotic restoration of damaged habitats, and the use of biological principles to minimize the movement/mobilization of contaminants through biological vectors.

4.3.2 Decontamination and Decommissioning

- ***HWCTR Surveillance and Maintenance (SR 0329) (Priority 4)***

  Reactor—Reactor Operations provides ongoing monitoring and surveillance of the HWCTR to ensure that public health and the environment are protected.

  Decommissioning Study

  The Waste Management Division plans to begin a three-year study in FY 1991 leading to a decommissioning plan for the HWCTR. Other departments/divisions will be involved as needed. Decommissioning activities are projected to begin in FY 1993.

- ***Old HB-Line (SR 0330) (Priority 1)***

  Decontamination and decommissioning (D&D) of the old HB-Line began in 1984 and was approximately 20 percent complete. Work on the project was temporarily suspended until 1988. The project will be completed by June 1993. There are no appropriate milestones for this activity.

  The old HB-Line project will resume in FY 1989. The Separations Department will be involved in the necessary activities for decontamination/ decommissioning work.

- ***284-F Powerhouse (SR 0349) (Priority 4)***

  The 284-F Powerhouse was shutdown in 1954 and is not needed. There is no contamination present, however, asbestos is present as insulation.

  The plan is to begin definitive design in FY 1992.

- ***412-D Heavy Water Facility (SR 0350) (Priority 4)***

  Building 412-D and associated facilities are the last of the heavy water production facilities; 412-D and 413-D were dismantled several years ago. The facility has no alternative use. As deterioration progresses, there is an increasing potential hazard due to asbestos. Conceptual design work and basic data development should begin in FY 1992 or sooner.

- ***Decommission SRL CPF Facility (SR 0328) (Priority 4)***

  This activity covers the decommissioning and removal of equipment used in the californium industrial source packaging facility. The californium program was moved to Oak Ridge. The facility will become usable space after decommissioning. The plan is to begin work in FY 1993 and complete by FY 1996.

- ***Decommission SRL SED I Facility (SR 0326) (Priority 4)***

  This activity covers the decommissioning and removal of classified experimental equipment from the SRL Technical Area. Detailed information of the activity cannot be provided because of the classified nature of the facility. The facility will be returned to service after decommissioning. The plan is to begin decommissioning in FY 1990.

- ***Decommission SRL SED II Facility (SR 0327) (Priority 4)***

  This activity cover the decommissioning and removal of classified experimental equipment from the SRL Technical Area. Detailed information of the activity cannot be provided because of the classified nature of the facility. The facility will be returned to service after decommissioning. The plan is to begin decommissioning in FY 1992.

- ***Decommission SRL SED II Facility (SR 0327) (Priority 4)***

  This activity cover the decommissioning and removal of classified experimental equipment from the SRL Technical Area. Detailed information of the activity cannot be provided because of the classified nature of the facility. The facility will be returned to service after decommissioning. The plan is to begin decommissioning in FY 1992.

- ***Heavy Water Components Test Reactor (HWCTR) (SR 0345) (Priority 4)***

  The Heavy Water Components Test Reactor (HWCTR) is the only Savannah River Site (SRS) facility in the DOE Surplus Facilities Management Program (SFMP). The HWCTR has been inactive since 1964 and is currently monitored and maintained to protect human health and the environment. A study is expected to begin in FY 1990 which will lead to a decommissioning plan for the HWCTR by FY 1992.

- ***R Reactor Support Facilities (SR 0331) (Priority 4)***

  R Reactor and associated support facilities were shutdown in 1964 and are candidates for D&D. Plans are to D&D these reactors by entombment. Currently the reactor does not present a contamination hazard to personnel or the environment. Wackenhut Services, Inc., has used R-Reactor in the past for security training and may do so again. However, it will eventually have to be decontaminated and decommissioned. The plan is to begin design and basic data development in FY 1992.

4.3.3 Research and Development (R&D)

- ***SRL Data Base Management Ecology (SR0337) (Priority 1)***

  Regulatory compliance monitoring programs generate large volumes of data that are stored on SRS computer systems. These data bases require maintenance and documentation to support regulatory compliance and quality assurance programs.

- ***SRL Regulatory Hydrogeologic Support (SR0336) (Priority 1)***

  SRL Regulatory Hydrogeologic Support provides technical support to all departments at SRS. It uses state-of-the-art methods to gather and interpret hydrogeologic data for regulatory activities such as RCRA and CERCLA waste-site closures and support for EISs and Safety Analysis Reports (SARs) that are required to maintain site operations. Studies are aimed toward characterizing the chemical and physical aspects of the aquifers and the groundwater, the lateral and vertical extent of the various aquifers and aquitards, flow rates and flow paths of the groundwater, modeling of the groundwater systems, groundwater resource management, and site seismology.

- ***SRL Accelerator Mass Spec Facility (SR0333) (Priority 3)***

  A 2000 sq. ft. facility is needed to house an accelerator mass spectrometer planned for 1992. The facility would be a center for high sensitivity measurement of long-lived radionuclides increasing

detection sensitivity levels by several orders of magnitude. Increased sensitivity is necessary to determine the extent of radionuclide transport and its impact on restoration of the environment.

- ***SRL Accelerator Mass Spectrometer Equipment, 735-A (SR0334) (Priority 3)***

  SRL Accelerator Mass Spectrometer equipment is needed to support site restoration programs by providing specialized measurement technology, for long lived radionuclides. Advances in accelerator mass spectrometry make this technology not only competitive but a major improvement in the detection sensitivity of long-lived radionuclides of iodine, carbon and technecium as well as many others that are necessary to accomplish restoration activities. As waste decays these long-lived isotopes will be the major dose contributors.

- ***SRL Gas Chromatograph-Mass Spectrometer Equipment (SR0341) (Priority 3)***

  Environment Restoration activities require the need for specialized equipment to detect certain contaminants that are organic. To support site environmental restoration activities, a state-of-the-art Gas Chromatograph Mass Spectrometer for trace organic effluent research is needed. There is a need to support the SRS in identifying potential trace organic releases in stack and aqueous effluents. Identification of hazardous waste sources will provide onsite capability to monitor the effectiveness of closure activities.

- ***SRL Geotechnical Support (SR0340) (Priority 3)***

  SRL Geotechnical Support provides for the application of new technologies for remediation of groundwater and soil at contaminated sites. The innovative techniques are designed to solve waste management needs by enhancing the understanding of waste transport so that better closure options at waste sites can be developed. This work directly supports regulatory imposed remediation programs. Examples of technologies under investigation are vacuum extraction, *in-situ* air-stripping, a combination of the two technologies using horizontal wells, deep soil mixing, *in-situ* vitrification, bioreactor degradation of contaminants (*in-situ* bioremediation, degradation of tritiated oil, microbiology of the deep subsurface, nucleic acid probes for bacteria), waste site cap designs, soil gas, and ground-penetrating radar. Investigation of groundwater beneath coal piles and transport of metals and organics in groundwater and groundwater modeling are being pursued to increase our understanding of groundwater systems and contaminant transport so that corrective actions at contaminated sites can be improved.

- ***SRL ICP/MS, Equipment (SR0192) (Priority 3)***

  This activity is to provide the technology development and measurement capability for site environmental restoration activities. It will include the modification of equipment necessary to achieve low level detection or organic contamination for assessment and measurement of success during closure work. The ICP/MS is a rapidly advancing highly sensitive technology which is adaptable to large numbers of sample analyses as required in environmental studies needed for improving waste management.

- ***SRL Ion Microscope Equipment (SR0195) (Priority 3)***

  This activity is to provide the technology development and measurement capability for site environmental restoration activities. It will include the modification or equipment necessary to achieve low-level detection for particulate samples containing long-lived isotopes. This capability is needed for restoration work associated with environmental assessment and closure activities.

- ***SRL Accelerator Mass Spectrometer, 735-A (SR0175) (Priority 4)***

  This project will purchase a state-of-the-art Chromatograph for trace organic effluent research. There is a need to support the SRS in identifying potential trace organic releases in stack and aqueous effluents before they become embarrassing problems.

  The performance evaluation and tracking system are described in Section 1.1. SRS also prepares a monthly Environmental Restoration report for DOE-HQ that reports on the status of the tasks in the ER program. This monthly report was initiated in FY88 and has been very successful in tracking the status and performance of the ER program.

4.4 Schedule, Milestones, and Costs

Information concerning SSP activity schedules, milestones, and costs is presented below for Environmental Restoration. The activities have been broken down into three areas: Environmental Restoration, Decontamination and Decommissioning, and Research and Development. Within each activity group, tables are presented, based on FYP priorities. Schedule and milestone discussions focus on the entire planning period. Estimated costs (based on the 1989 Activity Data Sheet submittal) are presented for the planning period (FY 1989 through FY 1995). Brief descriptions of each activity are presented in Section 4.3.

Long term schedules for Environmental Restoration WAGs are presented in Figure 4-3. Current ongoing activities include closure of the M-Area Settling Basin/Lost Lake, Mixed Waste Management Facility (MWMF) and the F/H Seepage Basins. As of the end of December 1989, the M-Area Settling Basin/Lost Lake closure project was approximately 98% complete. FY 1990 activities include final grading and closure certification. SRS is continuing to pump and treat the contaminated groundwater in M-Area and plans are underway to relocate an inactive Prototype Air Stripper to the SRL area. This is the first step toward implementing a remedial action program in this northern sector.

Closure of the MWMF is scheduled for December 1990 and the F/H Seepage Basins are scheduled for closure in FY 1991. Other RCRA closures include the Met Lab Basin/Carolina Bay and the Acid/Caustic Basins. Closure plans for these sites were developed in FY 1989 and are currently under regulatory review.

The SRS received final regulatory approval of the RFI program Plan in September 1989 and is presently developing unit-specific work plans for these sites. Plans are to develop and submit 16 workplans in FY 1990, 21 in FY 1991 and 8 in FY 1992. Therefore, corrective actions at the RFI sites are scheduled to

begin in the FY 1992-1993 time frame. Remediation milestones for these sites will be developed after the investigation is complete.

DOE-SR is continuing to negotiate a Federal Facility Agreement with the State and EPA. FY 1990 plans include obtaining DOE-HQ approval of the FFA. Once the FFA is final, CERCLA activities will begin and milestones developed. However, preplanning for CERCLA activities is continuing.

All documents, reports, and permits that pertain to Environmental Restoration activities will be submitted to DOE-HQ for approval or concurrence prior to being submitted to the State and/or EPA-Region IV. The actual dates between HQ milestones and SRS milestones are not definitive because of regulatory uncertainties and pending approvals from EPA and/or SCDHEC.

Milestones for decontamination and decommissioning activities are presented in Table 4.2. Once D&D studies are completed, most D&D activities will take place in the latter part of the planning period.

Research and Development activities include specific milestones as well as ongoing activities (Table 4.3).

Environmental Restoration projected expenditures over the planning period will total approximately $460 million with annual total costs increasing from approximately $35 million in FY 1989 to $82 million in FY 1994 (Figure 4-4). The increase in cost is associated with increased site remediation, and decontamination and decommissioning activities.

Figure 4-5 presents environmental expenditures by priority. Over the planning period, Priority 1 activities require greater funding from the FY 1989 through FY 1991 period, and Priority 2 and 3 activities require more funding in later years.

Activity Area	Total Cost ($1000)
Environmental Restoration	$347,137
Decontamination and Decommissioning	46,620
Research and Development	66,021
Total	$459,778

Additional information concerning Environmental Restoration, Decontamination and Decommissioning, and Research and Development planned expenditures are provided in the following sections. Activity specific descriptions were provided in Section 4.3.

4.4.1 Environmental Restoration

Estimated Environmental Restoration costs for the planning period total approximately $347 million (Table 4.4) and constitute 76 percent of Environmental Restoration estimated costs (Figure 4-6). Thirty-two activities were identified for the planning period. Annual costs are approximately $55 million per year

(Figure 4-7). Operating costs total approximately $347 million, which include activities such as environmental restoration waste unit investigation and remediation, and several Savannah River Laboratory (SRL) support and monitoring activities (Table 4.6).

4.4.2 Decontamination and Decommissioning (D&D)

Estimated D&D costs for the planning period total approximately $47 million (Table 4.4) and constitute 10 percent of Environmental Restoration estimated costs (Figure 4-6). Annual costs increase from approximately $3.5 million in FY 1989 to $13.1 million in FY 1995 (Figure 4-8). Nine D&D activities were identified for the planning period. All of the D&D activities are operating costs and include D&D of the Heavy Water Components Test Reactor (HWCTR), several SRL facilities, old HB-Line, and the 284-D Powerhouse (Table 4-7).

4.4.3 Research and Development (R&D)

R&D costs for the planning period total approximately $66 million (Table 4-4) and constitute 16 percent of Environmental Restoration estimated costs (Figure 4-6). Annual costs increase from approximately $2.2 million in FY 1989 to $12 million in FY 1995 (Figure 4-9). Eleven separate activities were identified for the planning period. All of the activities identified are operating costs and include SRL support and monitoring activities (Table 4-7).

Several capital and GPP costs were identified which primarily include state-of-the-art analytical equipment acquisitions for the SRL totaling approximately $3.5 million (Table 4-7).

Table 4-1. Savannah River Site Environmental Restoration Program

DEPARTMENT	ID	UNIT NAME	BUILDING NUMBER	REGULATION
RMET	W01	M-AREA SETTLING BASIN	904-51G	RCRA
RMET	W01	LOST LAKE	904-112G	RCRA
RMET	W02	A/M-AREA GROUNDWATER REMEDIATION	N/A	RCRA
SRL-ESD	W03	723-A MET LAB BASIN / CAROLINA BAY	904-110G	RCRA
POWER	W04	F-AREA ACID/CAUSTIC BASIN	904-74G	RCRA / RFI
POWER	W04	H-AREA ACID/CAUSTIC BASIN	904-75G	RCRA / RFI
POWER	W04	P-AREA ACID/CAUSTIC BASIN	904-78G	RCRA / RFI
POWER	W04	K-AREA ACID/CAUSTIC BASIN	904-80G	RCRA/ RFI
WMO	W05	MIXED WASTE MANAGEMENT FACILITY	643-29G	RCRA
CSWE	W06	C-AREA BURNING/RUBBLE PIT	131-C	RFI
CSWE	W06	716-A MOTOR SHOP SEEPAGE BASIN	904-101G	RFI
CSWE	W06	D-AREA OIL SEEPAGE BASIN	631-G	RFI
CSWE	W06	L-AREA RUBBLE PIT	131-1L	RFI
CSWE	W06	K-AREA BURNING/RUBBLE PIT	131-K	RFI
CSWE	W06	L-AREA BURNING/RUBBLE PIT	131-L	RFI
CSWE	W06	P-AREA BURNING/RUBBLE PIT	131-P	RFI
CSWE	W06	R-AREA BURNING/RUBBLE PIT	131-R	RFI
CSWE	W06	F-AREA BURNING/RUBBLE PIT	231-F	RFI
CSWE	W06	F-AREA BURNING/RUBBLE PIT	231-1F	RFI
CSWE	W06	F-AREA RUBBLE PIT	231-2F	RFI
CSWE	W06	D-AREA BURNING/RUBBLE PIT	431-D	RFI
CSWE	W06	D-AREA BURNING/RUBBLE PIT	431-1D	RFI
CSWE	W06	M-AREA WEST	631-21G	RFI
CSWE	W06	GRACE ROAD SITE	631-22G	RFI
CSWE	W06	GUNSITE 113 ACCESS ROAD SITE	631-24G	RFI

Table 4-1. Savannah River Site Environmental Restoration Program (Contd)

DEPARTMENT	ID	UNIT NAME	BUILDING NUMBER	REGULATION
CSWE	W06	A-AREA BURNING/RUBBLE PIT	731-A	RFI
CSWE	W06	A-AREA BURNING/RUBBLE PIT	731-1A	RFI
CSWE	W06	A-AREA RUBBLE PIT	731-2A	RFI
CSWE	W06	R-AREA BURNING/RUBBLE PIT	131-1R	RFI
CSWE	W06	GUNSITE 720 RUBBLE PIT	631-16G	RFI
CSWE	W06	GUNSITE 218 RUBBLE PILE	631-23G	RFI
CSWE	W06	A-AREA MISCELLANEOUS RUBBLE PILE	731-6A	RFI
CSWE	W06	K-AREA RUBBLE PILE	631-20G	RFI
CSWE	W06	G-AREA OIL SEEPAGE BASIN	NBN	RFI
POWER	W06	C-AREA COAL PILE RUNOFF BASIN	189-C	RFI
POWER	W06	F-AREA COAL PILE RUNOFF BASIN	289-F	RFI
POWER	W06	D-AREA ASH BASIN	488-4D	RFI
POWER	W06	R-AREA ACID/CAUSTIC BASIN	904-77G	RFI
POWER	W06	L-AREA ACID/CAUSTIC BASIN	904-79G	RFI
POWER	W06	K-AREA SLUDGE LAND APPLICATION SITE	761-4G	RFI
POWER	W06	PAR POND SLUDGE APPLICATION SITE	761-5G	RFI
POWER	W06	CENTRAL SHOPS SLUDGE LAGOON	080-24G	RFI
REACT	W06	L-AREA OIL & CHEMICAL BASIN	904-83G	RFI
REACT	W06	FORD BUILDING SEEPAGE BASIN	904-91G	RFI
RMET	W06	ROAD A CHEMICAL BASIN	904-111G	RFI
RMET	W06	METALS BURNING PIT	731-4A	RFI
RMET	W06	MISCELLANEOUS CHEMICAL BASIN	731-5A	RFI
SEP	W06	F-AREA SEEPAGE BASIN (OLD)	904-49G	RFI
SEP	W06	211-F & 211-H CLAY LATERALS	NBN	RFI
SREL	W06	WEST OF SREL "GEORGIA FIELDS" SITE	631-19G	RFI
SRL	W06	SRL OIL TEST SITE	080-16G	RFI
SRL-TNX	W06	TNX SEEPAGE BASIN (OLD)	904-76G	RFI

Table 4-1. Savannah River Site Environmental Restoration Program (Contd)

DEPARTMENT	ID	UNIT NAME	BUILDING NUMBER	REGULATION
WMO	W06	CMP PITS	080-17G	RFI
WMO	W06	SILVERTON ROAD WASTE SITE	731-3A	RFI
WMO	W06	CMP PITS	080-17.1G	RFI
WMO	W06	CMP PITS	080-18G	RFI
WMO	W06	CMP PITS	080-18.1G	RFI
WMO	W06	CMP PITS	080-18.2G	RFI
WMO	W06	CMP PITS	080-18.3G	RFI
WMO	W06	CMP PITS	080-19G	RFI
WMO	W06	L-AREA RUBBLE PIT	131-3L	RFI
WMO	W06	CS BURNING/RUBBLE PIT	631-1G	RFI
WMO	W06	CS RUBBLE PIT	631-3G	RFI
WMO	W06	CS BURNING/RUBBLE PIT	631-5G	RFI
WMO	W06	CS BURNING/RUBBLE PIT	631-6G	RFI
WMO	W06	HIGH LEVEL TANK 016	241-H	RFI
WMO	W06	OLD RADIOACTIVE WASTE BURIAL GROUND	643-G	RFI
WMO	W06	BURMA ROAD RUBBLE PIT	231-4F	RFI
EPS	W07	RFI PROGRAM SUPPORT	N/A	RFI
EPS	W08	ER PROGRAM SUPPORT	N/A	DOE
SRL	W09	TCE BIODEGRADATION DEMONSTRATION	NBN	RCRA
SRL	W10	SRL SEEPAGE BASIN	904-53G1	RCRA/RFI
SRL	W10	SRL SEEPAGE BASIN	904-53G2	RCRA/RFI
SRL	W10	SRL SEEPAGE BASIN	904-54G	RCRA/RFI
SRL	W10	SRL SEEPAGE BASIN	904-55G	RCRA/RFI
SRL-TNX	W11	TNX SEEPAGE BASIN (NEW)	904-102G	RCRA/RFI
WMO	W12	SOLVENT TANK DECOMMISSIONING	S01-S22	RCRA
CSWE	W13	FORD BUILDING WASTE SITE	643-11G	POTENTIAL CERCLA
CSWE	W13	HYDROFLURIC ACID SPILL	631-4G	POTENTIAL CERCLA

Table 4-1. Savannah River Site Environmental Restoration Program (Contd)

DEPARTMENT	ID	UNIT NAME	BUILDING NUMBER	REGULATION
SRL-TNX	W13	TNX BURYING GROUND	643-5G	POTENTIAL CERCLA
WMO	W13	H-AREA RETENTION BASIN	281-3H	POTENTIAL CERCLA
WMO	W13	F-AREA RETENTION BASIN	281-3F	POTENTIAL CERCLA
POWER	W15	UNDERGROUND STORAGE TANKS	108-R	RCRA
CSWE	W16	R-AREA ASBESTOS PIT	080-1R	SCSWD R61-61
CSWE	W16	GAS CYLINDER DISPOSAL FACILITY	131-2L	SCSWD R61-61
CSWE	W16	D-AREA ASBESTOS PIT	080-20G	SCSWD R61-61
CSWE	W16	SUBSTATION 051 EROSION CONTROL SITE	080-27G	SCSWD R61-61
CSWE	W16	R-AREA RUBBLE PIT	131-2R	SCSWD R61-61
CSWE	W16	D-AREA RUBBLE PIT	431-2D	SCSWD R61-61
CSWE	W16	L-AREA RUBBLE PILE	631-26G	SCSWD R61-61
CSWE	W16	R-AREA RUBBLE PILE	631-25G	SCSWD R61-61
CSWE	W16	MEYERS MILL SIDING	NBN	SCSWD R61-61
CSWE	W16	OLD ELLENTON RUBBLE PILE	NBN	SCSWD R61-61
CSWE	W16	STADIA LIGHTS WITH POLES	NBN	SCSWD R61-61
CSWE	W16	RUBBLE PILE NEAR JUNCTION US 278 & GE 103 ROAD	NBN	SCSWD R61-61
CSWE	W16	RISHER ROAD RUBBLE PILE	NBN	SCSWD R61-61
CSWE	W16	RECREATIONAL AREA #002 RUBBLE PILE	NBN	SCSWD R61-61
CSWE	W16	PILE OF TELEPHONE/LIGHT POLES	NBN	SCSWD R61-61
CSWE	W16	RUBBLE PILE NORTH OF SRL	NBN	SCSWD R61-61
CSWE	W16	ROAD 9 RUBBLE PILE	NBN	SCSWD R61-61
CSWE	W16	ROAD 9 @ GATE 23 RUBBLE PILE	NBN	SCSWD R61-61
CSWE	W16	ROBBINS STATION ROAD RUBBLE PILE	NBN	SCSWD R61-61
CSWE	W16	L-AREA SCRAP METAL AND WOOD	NBN	SCSWD R61-61
CSWE	W16	ROAD 3 FOUNDATION RUBBLE PILE	NBN	SCSWD R61-61
CSWE	W16	POND B DAM RUBBLE PILE	NBN	SCSWD R61-61
CSWE	W16	RUBBLE PILE ACROSS FROM GUNSITE 012	NBN	SCSWD R61-61

Table 4-1. Savannah River Site Environmental Restoration Program (Contd)

DEPARTMENT	ID	UNIT NAME	BUILDING NUMBER	REGULATION
CSWE	W16	TCU RUBBLE PILE	NBN	SCSWD R61-61
CSWE	W16	MISCELLANEOUS RUBBLE PILE	631-7G	SCSWD R61-61
CSWE	W16	GUNSITE 051 RUBBLE PILE	080-29G	SCSWD R61-61
CSWE	W16	GUNSITE 102 RUBBLE PILE	080-30G	SCSWD R61-61
CSWE	W16	GUNSITE 072 RUBBLE PILE	080-31G	SCSWD R61-61
CSWE	W16	GUNSITE 012 RUBBLE PILE	NBN	SCSWD R61-61
CSWE	W16	GUN EMPLACEMENT 407A & 407B RUBBLE PILE	NBN	SCSWD R61-61
CSWE	W16	RISHER ROAD OPEN METAL PIT	631-17G	SCSWD R61-61
CSWE	W16	SCRAP METAL PILE	631-18G	SCSWD R61-61
CSWE	W16	UN-NUMBERED GUN EMPLACE. RUBBLE PILE	NBN	SCSWD R61-61
POWER	W16	C-AREA ASH PILE	188-C	SCSWD R61-61
POWER	W16	EARTHEN BASIN ADJ. BLDG. 108-3R	131-1R	SCSWD R61-61
POWER	W16	L-AREA ASH BASIN	188-L	SCSWD R61-61
POWER	W16	R-AREA ASH BASIN	188-R	SCSWD R61-61
POWER	W16	C-AREA ASH PILE	188-1C	SCSWD R61-61
POWER	W16	F-AREA ASH BASIN	288-F	SCSWD R61-61
POWER	W16	F-AREA ASH BASIN	288-1F	SCSWD R61-61
POWER	W16	B-AREA SANITARY TREATMENT PLANT RUBBLE PILE	NBN	SCSWD R61-61
POWER	W16	IMHOFF TANK RUBBLE PILE	NBN	SCSWD R61-61
SAFETY	W16	FIRE DEPT HOSE TRAINING FACILITY	904-113G	SCSWD R61-61
SRFS	W16	SRFS RUBBLE PILE	631-9G	SCSWD R61-61
SRL	W16	40-ACRE HARDWOOD SITE	761-G	SCSWD R61-61
SRL	W16	SECOND PAR POND SITE	761-8G	SCSWD R61-61
SRL-TNX	W16	TNX RUBBLE PILE	NBN	SCSWD R61-61
WMO	W16	C-AREA ASBESTOS PIT	080-21G	SCSWD R61-61
WMO	W16	C-AREA ASBESTOS PIT	080-22G	SCSWD R61-61
WMO	W16	L-AREA RUBBLE PIT	131-4L	SCSWD R61-61

Table 4-1. Savannah River Site Environmental Restoration Program (Contd)

DEPARTMENT	ID	UNIT NAME	BUILDING NUMBER	REGULATION
WMO	W16	SILVERTON ROAD WASTE TANK PLUGS	NBN	SCSWD R61-61
REACT	W17	R-AREA SEEPAGE BASIN	904-57G	POTENTIAL CERCLA
REACT	W17	R-AREA SEEPAGE BASIN	904-58G	POTENTIAL CERCLA
REACT	W17	R-AREA SEEPAGE BASIN	904-59G	POTENTIAL CERCLA
REACT	W17	R-AREA SEEPAGE BASIN	904-60G	POTENTIAL CERCLA
REACT	W17	R-AREA SEEPAGE BASIN	904-103G	POTENTIAL CERCLA
REACT	W17	R-AREA SEEPAGE BASIN	904-104G	POTENTIAL CERCLA
REACT	W17	K-AREA SEEPAGE BASIN	904-65G	POTENTIAL CERCLA
REACT	W18	K-AREA BINGHAM PUMP OUT PIT	643-1G	POTENTIAL CERCLA
REACT	W18	L-AREA BINGHAM PUMP OUT PIT	643-2G	POTENTIAL CERCLA
REACT	W18	L-AREA BINGHAM PUMP OUT PIT	643-3G	POTENTIAL CERCLA
REACT	W18	P-AREA BINGHAM PUMP OUT PIT	643-4G	POTENTIAL CERCLA
REACT	W18	R-AREA BINGHAM PUMP OUT PIT	643-8G	POTENTIAL CERCLA
REACT	W18	R-AREA BINGHAM PUMP OUT PIT	643-9G	POTENTIAL CERCLA
REACT	W18	R-AREA BINGHAM PUMP OUT PIT	643-10G	POTENTIAL CERCLA
WMO	W19	F-AREA SEEPAGE BASIN	904-41G	RCRA
WMO	W19	H-AREA SEEPAGE BASIN	904-44G	RCRA
WMO	W19	F-AREA SEEPAGE BASIN	904-42G	RCRA
WMO	W19	H-AREA SEEPAGE BASIN	904-45G	RCRA
WMO	W19	H-AREA SEEPAGE BASIN (OLD)	904-46G	RCRA - LIKE / RFI
WMO	W19	H-AREA SEEPAGE BASIN	904-56G	RCRA
WMO	W19	F-AREA SEEPAGE BASIN	904-43G	RCRA
WMO	W19	F/H SEEPAGE BASINS ABANDONED PROCESS SEWER	NBN	RCRA

Table 4-2. Environmental Restoration D&D Milestones

	Activity Title	Priority	Milestones
1. SR 0329	D & D HWCTR	1	"Level" funding in FY1991 and FY 1992 would complete the D & D Plan, schedule, baseline cost estimate, and ensure that physical D & D begins in FY 1993.
2. SR 0330	D & D of old HB-Line	1	Complete work in FY 1993.
3. SR 0326	D & D - Decommission SRL SED I Facility	4	Begin decommissioning in FY 1990.
4. SR 0327	D & D - Decommission SRL SED II Facility	4	Begin decommissioning in FY92
5. SR 0328	D & D - Decommission the SRL CPF Facility	4	Begin work in FY93 and complete by FY96.
6. SR 0331	D & D R Reactor Support Facilities	4	Begin design and basic data in FY 1992.
7. SR 0345	D & D HWCTR	4	"Level" funding in FY1991 and FY 1992 would complete the D & D Plan, schedule, baseline cost estimate, and ensure that physical D & D begins in FY 1993.

Table 4-2. Environmental Restoration D&D Milestones (Contd)

	Activity Title	Priority	Milestones
8. SR 0349	D & D 284-D Powerhouse	4	Begin definition design in FY92.
9. SR 0350	D & D 412-D Heavy Water Facility	4	Begin conceptual design and basic data development in FY92 or sooner.

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Table 4-3. Environmental Restoration R&D Milestones

	Activity Title	Priority	Milestones
1. SR 0308	SRL TCE Biodegradation Demonstration	1	Pilot-scale bioreactor, December 1990. In-Situ demonstration through 1992. Groundwater unit through 1995.
2. SR 0336	SRL Reg. Hydrogeologic Support	1	Aquifer Geochemistry Report: 2/91; Calcareous Zone Report: 91; F-Canyon Draft SAR, Site Characterization Chapter (Sections 3.4-3.6): 10/89; Transuranic Waste Handling Facility Draft SAR Site Characterization Chapter (Sections 3.4-3.6): 11/89.
3. SR 0337	SRL Data Base Management Ecology	1	L-Lake data base documentation 3Q, 1989
4. SR 0192	SRL ICP/MS, Equipment	3	Ongoing support
5. SR 0195	SRL Ion Microscope Equipment	3	Ongoing support
6. SR 0333	SRL Accelerator Mass Spec Facility	3	On-going program support.
7. SR 0334	SRL Accelerator Mass Spectrometer Equipment, 735-A	3	On-going program support.
8. SR 0340	SRL Geotechnical Support	3	In-situ Air Stripping Test: performed by May 1990; Horizontal Well Report due August 1989; Environmental Transport report September 1990; In-Situ Vitrification Bench-Scale Test: April 1991.

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Table 4-3. Environmental Restoration R&D Milestones (Contd)

	Activity Title	Priority	Milestones
9. SR 341	SRL Gas Chromatograph-Mass Spectrometer Equipment	3	On-going program support.
10. SR 0175	SRL Accelerator Mass Spectrometer, 735-A	4	Purchased in FY 93.
11. SR 0326	D & D - Decommission SRL SED I Facility	4	Begin decommissioning in FY 1990.
12. SR 0327	D & D - Decommission SRL SED II Facility	4	Begin decommissioning in FY92
13. SR 0328	D & D - Decommission the SRL CPF Facility	4	Begin work in FY93 and complete by FY96.
14. SR 0347	SRL Waste Site and Facility Closure	4	Milestones are not available at this time.

Table 4.4. Environmental Restoration Total Cost Summary

Activity Area	Activity Summary ($1,000) Total Operating	Total Capital	Total GPP	Grand Total
Environmental Restoration	$347,137			$347,137
Decontamination & Decommissioning	46,620			46,620
Research & Development (Budget)	62,571	2,950	500	66,021

Table 4-5. Environmental Restoration Funding Summary

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
1. SR 0301	M-Area Settling Basin/Lost Lake Closure	1	3,700	0	0	0	0	0	0	3,700
2. SR 0302	A/M - Area Groundwater Remediation	1	800	1,525	2,500	1,000	1,000	1,000	1,000	8,825
3. SR 0305	Mixed Waste Management Facility Closure	1	10,700	25,000	7,000	0	0	0	0	42,700
4. SR 0306	RFI Program Investigations	1	2,338	9,131	14,250	3,000	0	0	0	28,719
5. SR 0307	ER Program Support	1	150	250	250	250	250	250	250	1,650
6. SR 0309	Seepage Basins Closure (Savannah River Lab.)	1	280	600	1,800	600	0	0	0	3,080
7. SR 0311	Solvent Tank Decommissioning	1	100	500	550	550	550	550	550	3,350
8. SR 0314	Underground Storage Tanks	1	50	422	400	400	800	500	500	3,072
9. SR 0315	Misc. Waste Site	1	50	350	500	800	500	200	100	2,500
10. SR 0316	F/H Seepage Basin Closure	1	0	12,000	16,000	2,000	0	0	0	30,000
11. SR 0351	F/H Seepage Basin Closure	1	8,551	0	0	0	0	0	0	8,551
	Subtotal by Priority	1	26,719	49,778	43,050	8,600	3,100	2,500	2,400	136,147
12. SR 0303	Met Lab Basin Closure	2	430	900	2,500	200	0	0	0	4,030
13. SR 0304	Acid/Caustic Basin Closure	2	2,000	800	500	400	200	80	0	3,980
14. SR 0310	New TNX Seepage Basin Closure	2	170	250	2,000	450	0	0	0	2,870
15. SR 0312	RI/FS (CERCLA) Investigation	2	250	2,750	2,500	4,000	4,500	4,750	5,000	23,750
16. SR 0317	Inactive Reactor Seepage Basins RI/FS	2	0	700	500					1,200
17. SR 0318	Singham Pump Outage Pits Investigation	2	0	490	500	0	0	0	0	990

Table 4-5. Environmental Restoration Funding Summary (Contd)

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
18. SR 0320	Bingham Pump Outage Pits Remediation	2	0	0	0	2,500	2,500	1,000	0	6,000
19. SR 0332	Inactive Reactor Seepage Basins Remediation	2	0	0	0	8,000	20,000	20,000	2,000	50,000
20. SR 0342	CERCLA Remediations	2	0	250	3,920	6,000	6,000	5,000	4,000	27,170
	Subtotal by Priority	2	2,850	6,140	12,420	23,550	33,200	30,630	11,000	119,990
21. SR 0319	RFI Program Corrective Actions	3	0	0	0	17,250	20,250	28,250	25,250	91,000
	Subtotal by Priority	3	0	0	0	17,250	20,250	28,250	25,250	91,000
	Grand Totals		29,569	55,918	55,470	49,400	56,550	61,580	38,650	347,137

Table 4-6. D&D Funding Schedule

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
1. SR 0329	D & D HWCTR	1	10	10	110	10	10	10	10	170
2. SR 0330	D & D of old HB-Line	1	3,500	2,500	2,500	2,500	400	0	0	11,400
	Subtotal by Priority	1	3,510	2,510	2,610	2,510	410	10	10	11,570
3. SR 0326	D & D - Decommission SRL SED I Facility	4		0	750					750
4. SR 0327	D & D - Decommission SRL SED II Facility	4				1,000	1,000	1,000		3,000
5. SR 0328	D & D - Decommission the SRL CPF Facility	4					1,000	1,000	1,000	3,000
6. SR 0331	D & D R Reactor Support Facilities	4				650	1,300	650	7,500	10,100
7. SR 0345	D & D HWCTR	4				2,500	3,300	3,600	3,400	12,800
8. SR 0349	D & D 284-D Powerhouse	4					1,000	2,000		3,000
9. SR 0350	D & D 412-D Heavy Water Facility	4						1,200	1,200	2,400
	Subtotal by Priority	4		0	750	4,150	7,600	9,450	13,100	35,050
	Grand Totals		3,510	2,510	3,360	6,660	8,010	9,460	13,110	46,620

Table 4-7. R&D Funding Summary

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
1. SR 0308	SRL TCE Biodegradation Demonstration	1	250	250	250	1,500	1,500	1,500	1,500	6,750
2. SR 0336	SRL Reg. Hydrogeologic Support	1	1,649	1,984	3,600	4,500	4,500	4,500	4,500	25,433
3. SR 0337	SRL Data Base Management Ecology	1	301	362	380	380	380	380	380	2,563
	Subtotal by Priority	1	2,200	2,596	4,430	6,380	6,380	6,380	6,380	34,746
4. SR 0192	SRL ICP/MS, Equipment	3		300	100	100	100	100	100	800
5. SR 0195	SRL Ion Microscope Equipment	3			900					900
6. SR 0333	SRL Accelerator Mass Spec Facility	3			25	600	50			675
7. SR 0334	SRL Accelerator Mass Spectrometer Equipment,	3			50	100	950	150	150	1,400
8. SR 0340	SRL Geotechnical Support	3			4,300	4,500	4,600	4,600	4,600	22,600
9. SR 341	SRL Gas Chromatograph-Mass Spectrometer	3		150	150	150	100	100	100	750
	Subtotal by Priority	3		450	5,525	5,450	5,800	4,950	4,950	27,125
10. SR 0175	SRL Accelerator Mass Spectrometer, 735-A	4					800			800
11. SR 0347	SRL Waste Site and Facility Closure	4	0	0	530	630	730	730	730	3,350
	Subtotal by Priority	4	0	0	530	630	1,530	730	730	4,150
	Grand Totals		2,200	3,046	10,485	12,460	13,710	12,060	12,060	66,021

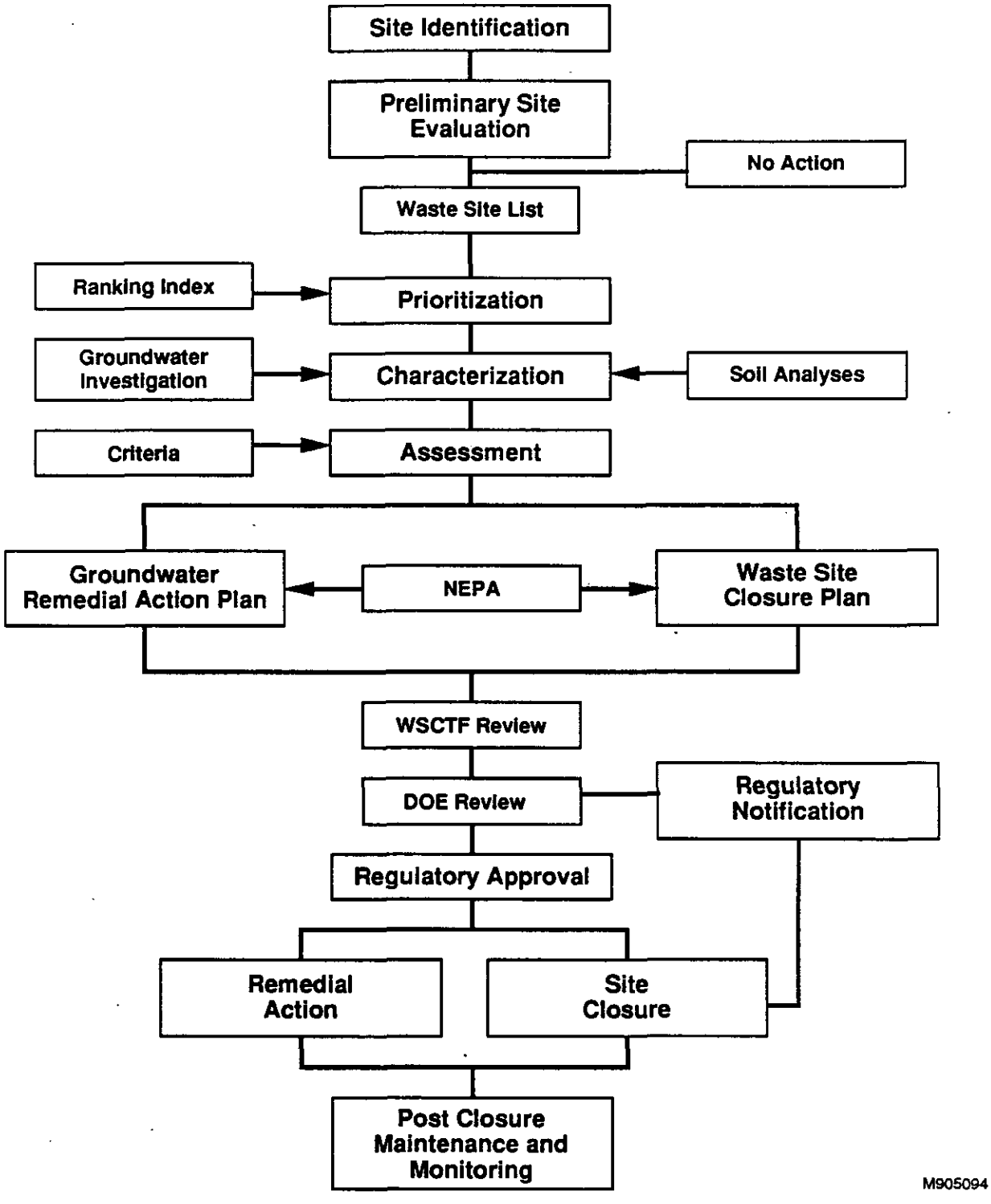

Figure 4-1. Waste Site Closure Pathway

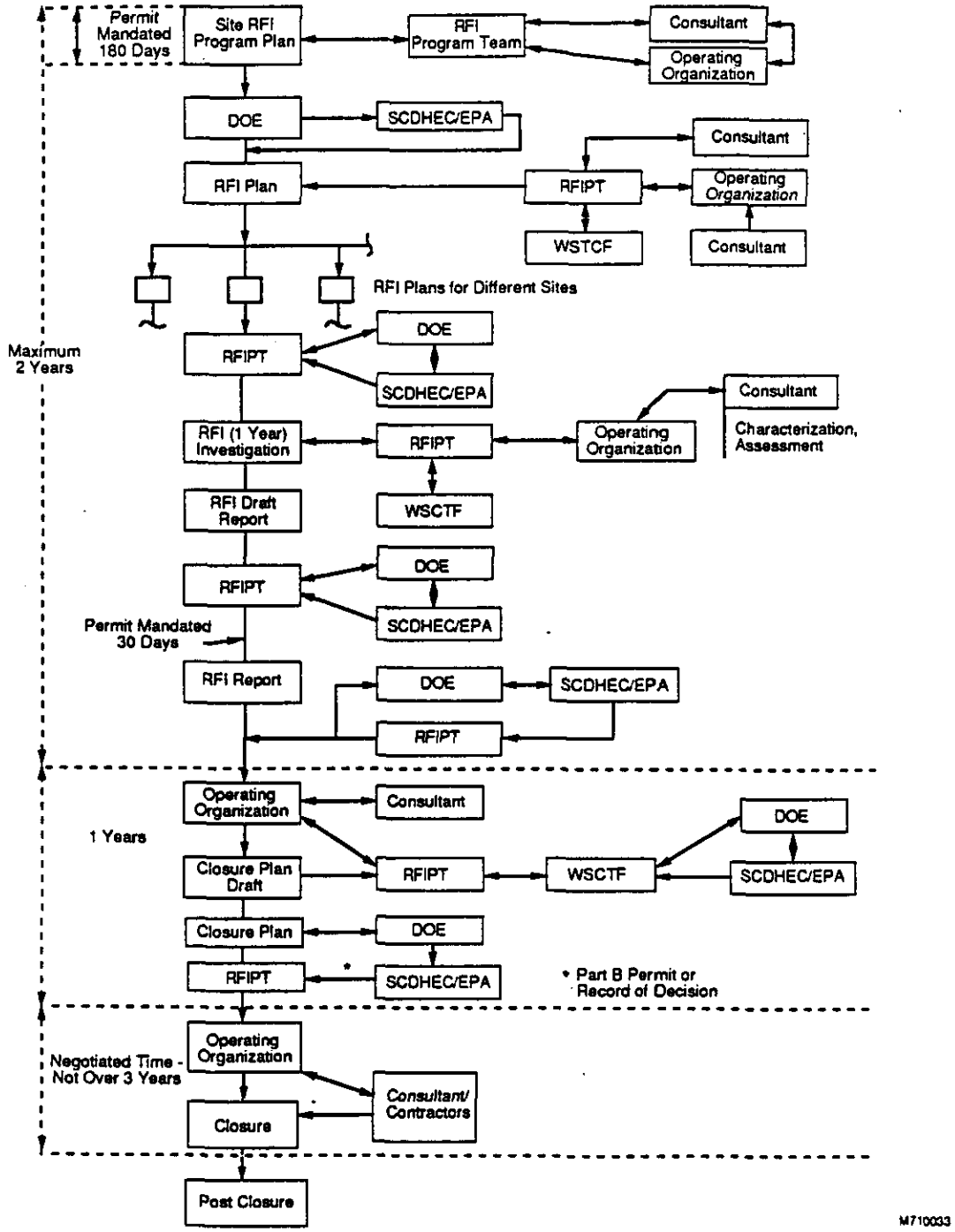

Figure 4-2. Waste Site Closures with RCRA Facility Investigations (RFI)

Inactive Waste Units

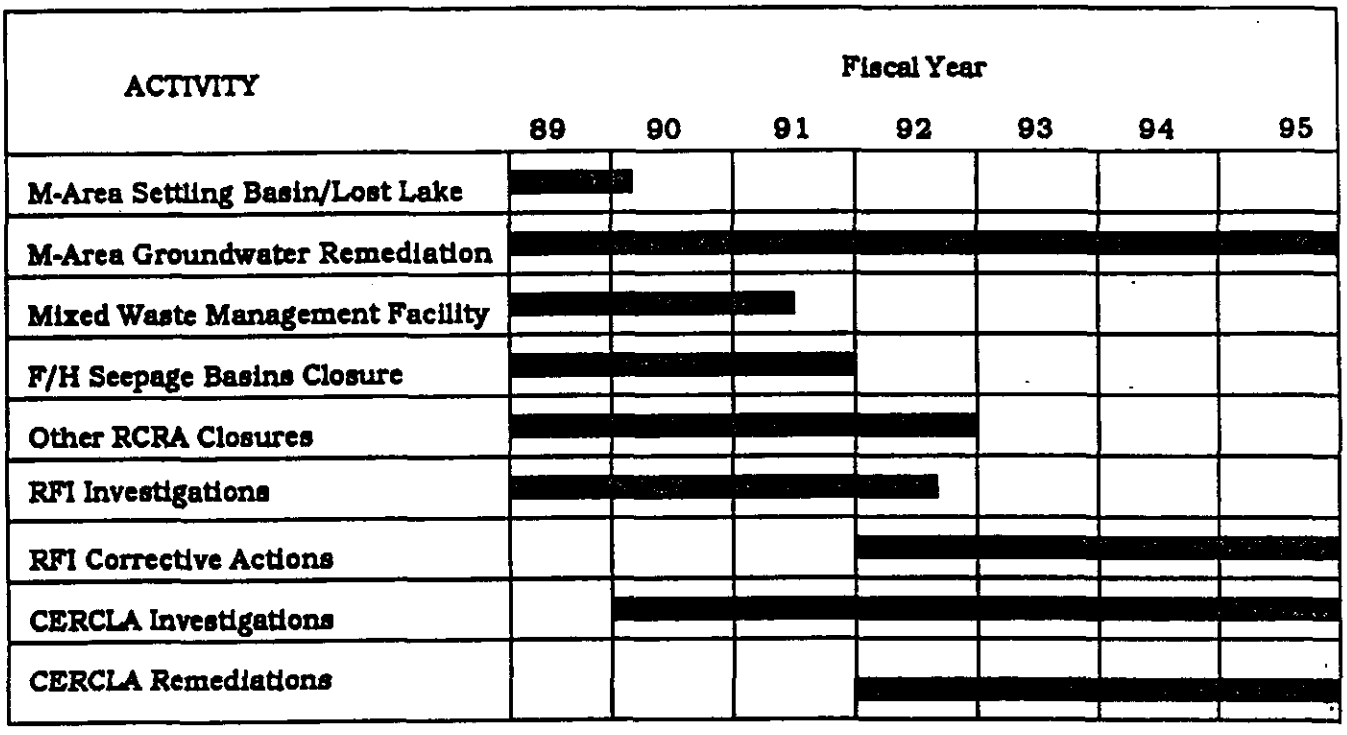

Figure 4-3. Environment Restoration Five-Year Plan

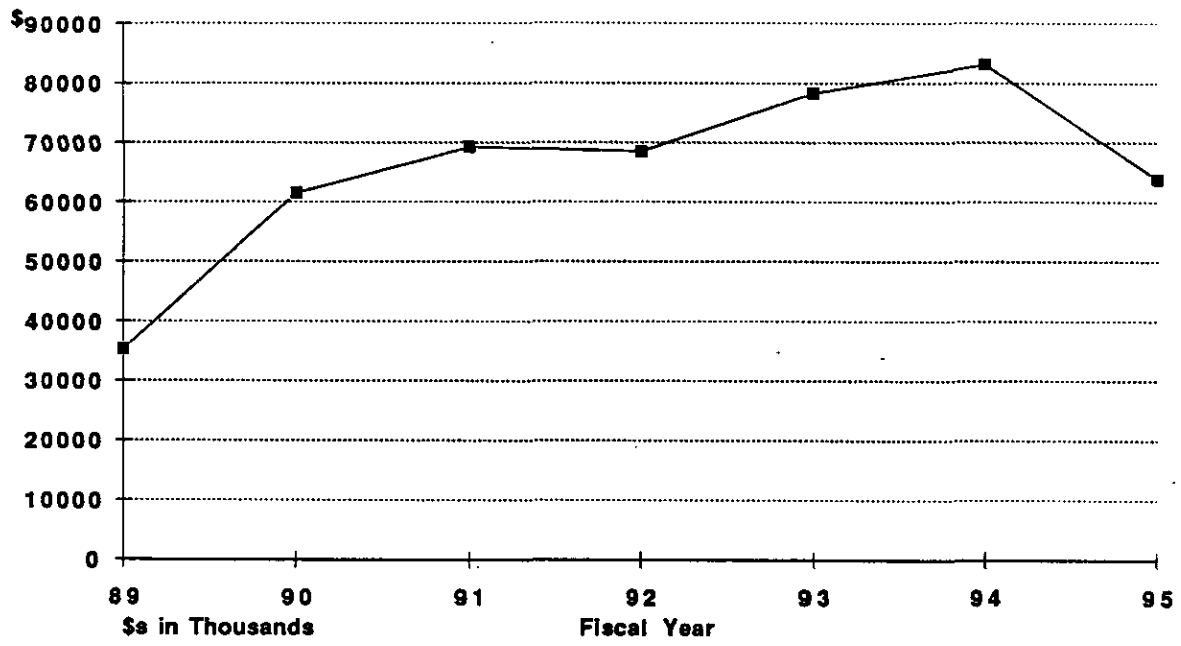

Figure 4-4. Environmental Restoration Projected Total Expenditures

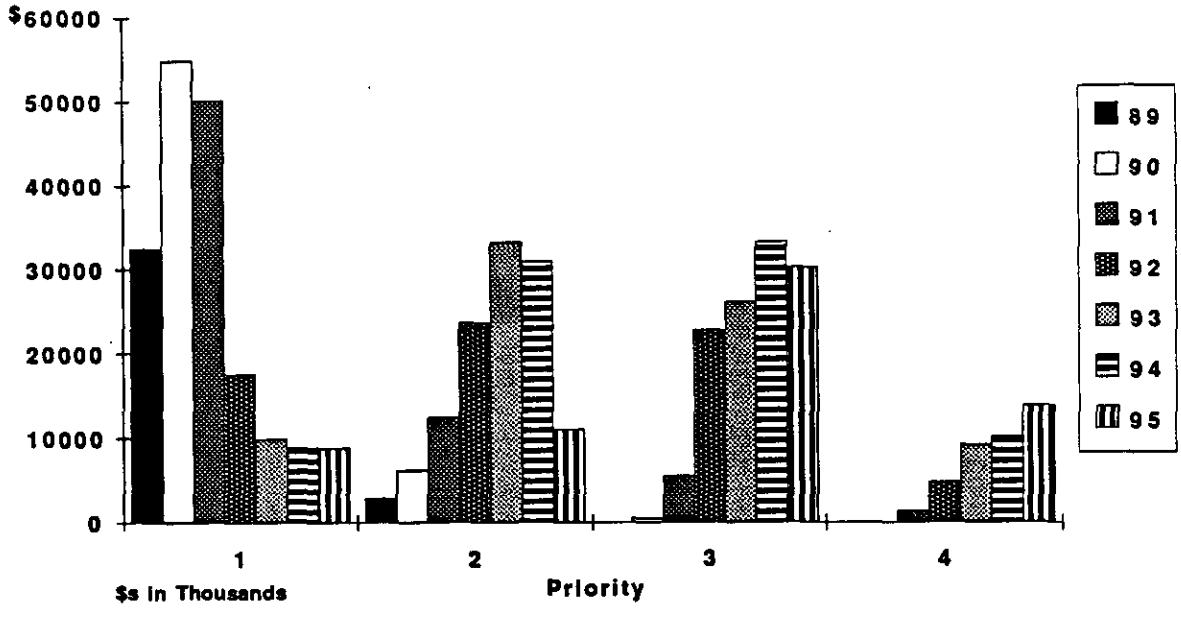

Figure 4-5. Environmental Restoration Projected Total Expenditures by Priority

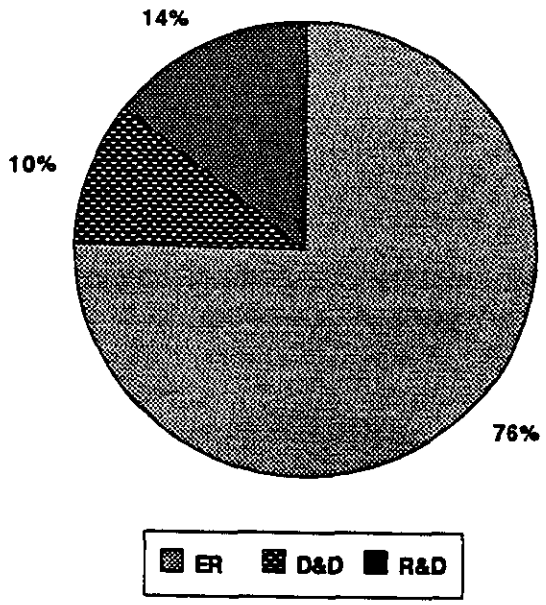

Figure 4-6. Environmental Restoration Percentage of Total Expenditures

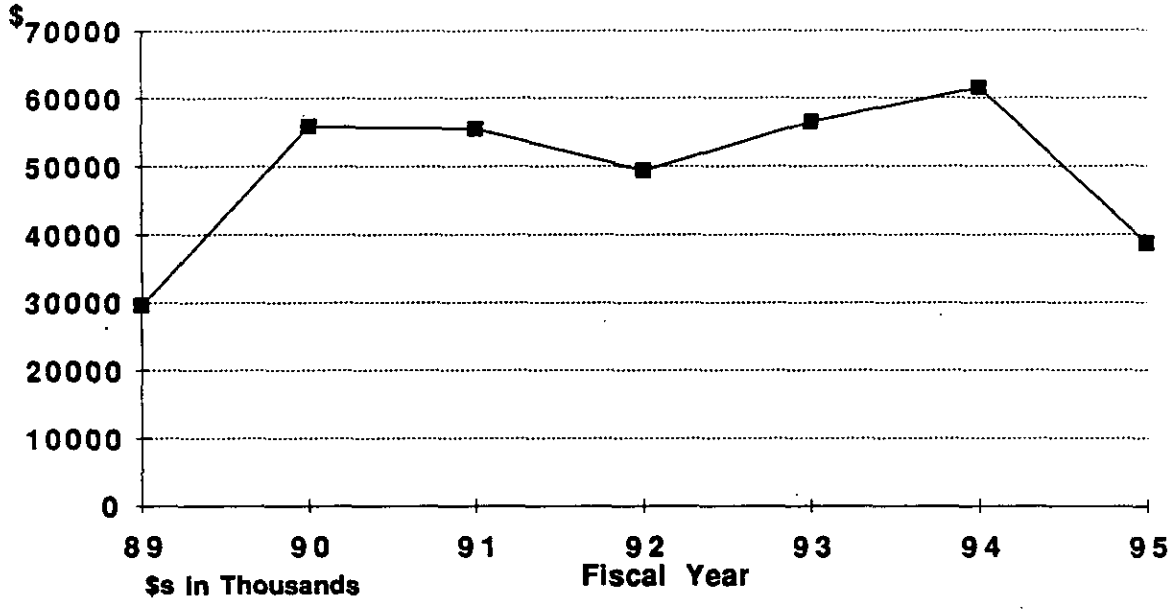

Figure 4-7. Environmental Restoration Planned Annual Expenditures

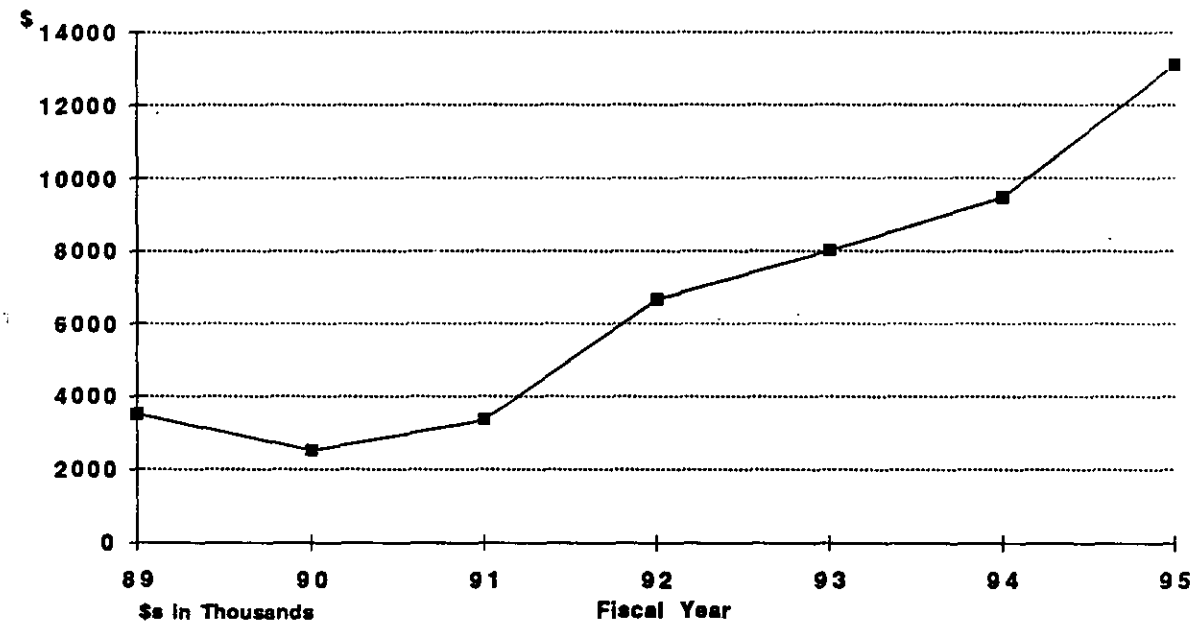

Figure 4-8. Decontamination and Decommissioning Planned Annual Expenditures

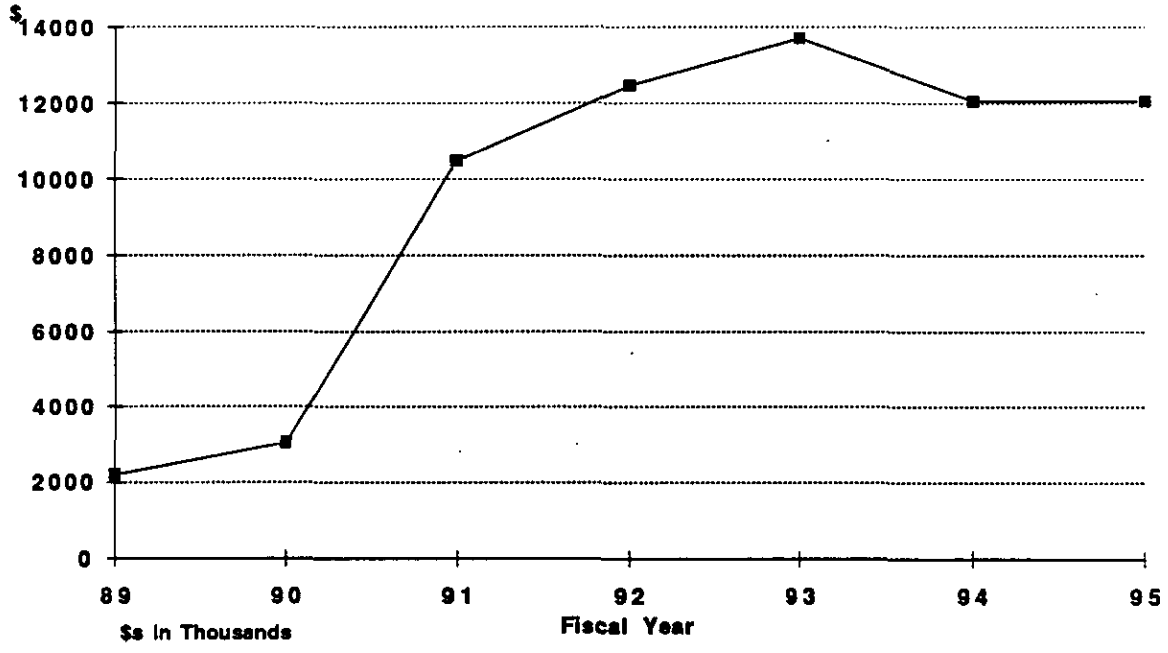

Figure 4-9. Research and Development Planned Annual Expenditures

5.0 WASTE MANAGEMENT OPERATIONS

5.1 Requirements/Strategy

5.1.1 Waste Management Operations

5.1.1.1 Site Program Overview

The *Savannah River Waste Management Operations Program Plan* (DOE 1989b) provides a strategy to comply with applicable federal and state regulations, Department of Energy (DOE) orders, and operating contractor policies related to groundwater protection, waste treatment, storage, and disposal activities. The plan covers disposal of all nonhazardous, hazardous (as defined by the Resource Conservation and Recovery Act (RCRA)), radioactive and RCRA hazardous radioactive (mixed) wastes.

The Savannah River Site (SRS) waste management plan is updated annually. Some of the needed facilities for treating, storing or disposing of the wastes are currently operating; others are in active design or construction; still others are in the conceptual planning stage.

5.1.1.2 Regulatory Requirements

SRS waste management practices are regulated by the DOE, Environmental Protection Agency (EPA), and the South Carolina Department of Health and Environmental Control (SCDHEC). The applicable regulations are described in the following paragraphs.

Resource Conservation and Recovery Act (RCRA)

The Resource Conservation and Recovery Act of 1976, also known as the Solid Waste Disposal Act, as amended, provides a comprehensive federal EPA regulatory program for hazardous waste management and a state regulatory program for nonhazardous wastes. The SCDHEC has been granted authority by the EPA to conduct the RCRA hazardous waste program in South Carolina. The basic framework for the management of hazardous waste, from its generation to its final disposal, is presented in 40 CFR 260-265.

All hazardous waste treatment, storage and disposal facilities at the SRS are either, (1) fully permitted: (2) have interim status; or (3) have entered into settlement agreements or consent orders with the SCDHEC. The SRS is in compliance with or has entered into compliance agreements related to groundwater protection, waste treatment, and waste disposal regulations. There have been several RCRA settlement agreements and consent orders signed from 1985 to February 1989.

Date	Agreement/Order	Number	Description
07/19/85	Consent Order	85-57-W,SW	Spills
11/07/85	Consent Order	85-70-SW	Groundwater Monitoring (Hazardous Waste Sites)
9/14/88	Consent Order	85-70-SW	Groundwater Monitoring (Hazardous Waste Sites), amended
10/06/86	Settlement Agreement	86-52-SW	M-Area Drums
05/01/87	Settlement Agreement	87-27-SW	Part B Deficiencies
11/12/87	Settlement Agreement	87-51-SW	EPA Multimedia Inspections Resulting in RCRA Violations
11/12/87	Settlement Agreement	87-52-SW	Mixed Waste Management Facility (MWMF) Part B Deficiencies
12/29/87	Settlement Agreement	87-60-SW,W	L Tank Hazardous Waste Storage
05/26/88	Consent Decree	N/A	Natural Resources Defense Council (NRDC) Lawsuit
11/23/88	Settlement Agreement	88-28-SW	Transuranic (TRU) Pads Interim Status Closure Plan
02/16/89	Settlement Agreement	89-06-SW	Naval Fuel Drums

Toxic Substances Control Act (TSCA)

The objective of the TSCA is to ensure that the manufacture and sale of chemical substances and mixtures do not present an unreasonable risk of injury to health or the environment. The principle applicability of the TSCA to SRS operations is in the management and disposal of polychlorinated biphenyls (PCBs). The EPA implementing regulation for the handling, storing and disposal of PCBs and PCB-containing material is found in 40 CFR Part 761. Costs associated with PCB regulation compliance are not included in this plan.

Federal Solid Waste Management Guidelines and Regulations, 40 CFR 240-257

The regulations presented in 40 CFR 240-257 describe the guidelines for the management of nonhazardous solid wastes. Specifically, 40 CFR 241, Guidelines for the Land Disposal of Solid Waste, and 40 CFR 257, Criteria for Classification of Solid Waste Disposal Facilities and Practices, are applicable to SRS operations.

SCDHEC R.61-79.124 through R.61-79.270

A major goal of RCRA is to authorize state agencies to operate hazardous waste programs based on minimum standards set by the EPA. The requirements of the hazardous waste management program administered by the state are described in the South Carolina Hazardous Waste Management Regulations (R.61-79.124 through R.61-79.270). Hazardous waste management in the Hazardous Waste Storage Buildings (except 643-29G, Mixed Waste Storage Building (MWSB)) are operated under a Part B permit issued in September 1987. Post Closure for the M-Area Hazardous Waste Management Facility is also included in the RCRA Part B permit issued September, 1987. All other hazardous waste

management activities at the SRS are currently being conducted under Interim Status Standards. As such, facilities must comply with the Interim Status Standards (R.61-79.265) and must not engage in hazardous waste activities or processes not specified in the RCRA Part A application.

DOE Order 5480.3

This order establishes the requirements for the packaging and transportation of hazardous (including radioactive) materials, substances, and wastes.

DOE Order 5820.2A

This order establishes policies and guidelines by which the DOE manages its radioactive waste, waste byproducts, and radioactively-contaminated surplus facilities. Under this order, a waste management plan for radioactive waste-management facilities must be prepared and updated annually. This plan must include a section on radioactive and nonradioactive monitoring programs, including groundwater monitoring.

See Section 2.3, Regulations and Orders, for more details.

Waste Management Objectives and Strategy

The SRS waste management objectives are to comply with applicable regulations, to minimize effects on the environment and, to the extent possible, contain waste handling, treatment, storage, and disposal within the site. Exceptions to onsite final disposal are: PCBs, which must go to EPA-approved PCB disposal facilities; high-level wastes and certified TRU wastes, for which federal repositories are to be designated; some types of nonradioactive hazardous waste, which are sent offsite for incineration and disposal until onsite facilities are available; chlorinated hydrocarbons, lead batteries and scrap metal, which are sold to commercial recyclers. Offsite PCB and nonradioactive hazardous waste disposal costs are not included in this plan.

The strategy for achieving these objectives is to:

- Ensure waste can be adequately treated and properly disposed of before it is generated.
- Reduce/minimize waste generation.
- Recycle or consume wastes in processes as much as practical to become more cost effective.
- Segregate wastes at the generating location for temporary storage in permitted facilities.
- Incinerate to destroy hazardous wastes and reduce waste volume.
- Treat wastes to minimize mobility before final disposal.
- Dispose of newly generated wastes ultimately in monitored repositories.
- Maintain integrity of existing disposal sites to assure performance objectives are met.

5.1.1.3 RCRA Permitting

RCRA permit application, modification, and implementation is an ongoing process for treatment, storage or disposal facilities. Several examples of RCRA permitting activities at the SRS are as follows:

Permitted

- Hazardous Waste Storage Buildings 709-G,-2G,-4G, and 710-U
- M Area Basin Post Closure Care

Permits Pending Regulatory Approval (Submission Date)

- Consolidated Incineration Facility (08/88)
- Benzene Storage Tank at DWPF (12/88)
- M-Area Process Interim Treatment/Storage Facility (07/88)
- Mixed Waste Management Facility (MWMF) Post Closure Care (07/88)
- Mixed Waste Storage Building 643-29G (08/86)
- Hazardous Waste/Mixed Waste Disposal Facility (11/88)
- Solid Waste Storage Pad, Building 709-G,-2G-4G (12/88)
- Metallurgical Laboratory Basin Post-Closure Care (08/89)

Interim Status (Operating Facilities)

- SRL Waste Storage Tanks
- 643-29G Mixed Waste Storage Building
- Transuranic (TRU) Pads (6-13)
- M Area Process Waste Interim Treatment/Storage Tanks
- High-Level Waste Tank Farms
- Solid Waste Storage Pad, Building 709-G,-2G,-4G

Permit Applications to be Submitted

- Transuranic Waste Facility (02/90)
- Y-Area Saltstone (11/89)
- TRU Pads 1-5 RCRA Storage Subpart X (06/90)
- TRU Pads 6-13 RCRA Storage (06/90)
- SRL Waste Storage Tanks (12/90)
- F/H Area Seepage Basin Post-closure Care (12/90)

5.1.1.4 Tank Farm Permitting

Waste Management is preparing a South Carolina Department of Health and Environmental Control (SCDHEC) wastewater permit for the tank farms. Also, a Federal Facilities Agreement (FFA) which is being developed by EPA, SCDHEC, and DOE may have requirements for secondary containment and leak detection for the tank farms. Final signing of the FFA is expected in January 1990. These requirements will be similar, but not identical to, the RCRA tanks standards specified in 40 CFR 264.

5.1.1.5 Waste Management Overview

The major categories of wastes generated at the SRS are nonradioactive nonhazardous, nonradioactive hazardous, mixed (hazardous and radioactive), low-level radioactive, high-level radioactive and

transuranic. Figure 5-1 provides an overview summary of the site waste management plan. Within each of these six categories there are a multitude of waste streams requiring numerous storage and disposal techniques. Five of the waste streams, the waste slurry from M Area Liquid Effluent Treatment Facility (LETF), the waste slurry from F/H Area ETF, waste streams requiring mixing and disposal as saltstone, tritiated wastewater, and depleted uranium, are discussed in detail in later sections.

The following descriptions provide an overview of the storage and disposal practices, both current and future, for the six waste categories and the five highlighted waste streams.

Nonradioactive Nonhazardous Waste

For nonradioactive nonhazardous solid waste, the SRS complies with RCRA Subtitle D requirements which is a South Carolina regulated program. Programs in place for managing SRS waste streams include land reclamation, sanitary landfilling, salvage/recycle, wood burning and erosion control. A detailed flow chart of the current and recommended programs for the management of the nonradioactive nonhazardous waste streams generated is shown in Figure 5-2.

Land reclamation involves disposal of land enhancing materials in ash basins and piles and areas designed for sanitary sludge disposal. The ash basins and piles have been used primarily for the disposal of coal ash from powerhouse operations located throughout the SRS. Land reclamation is also used for the disposal of sludge generated at SRS sanitary wastewater treatment plants.

A sanitary landfill is currently used at the SRS for disposal of general garbage and paper waste, rubble and construction waste, and asbestos enclosed in bags. Refuse from regulated areas that is not contaminated will be surveyed for radioactivity, certified as nonradioactive waste and sent to the sanitary landfill. A 70-acre site is being used for the sanitary landfill. Operation of this site began in 1973, and it is expected to be filled by 1991. There are plans to build a new Sanitary Landfill in FY 1993 that will meet future regulations and plans to expand the existing landfill until the new Sanitary Landfill can be built (see ADS SR 0219 and SR 0215).

Nonradioactive Hazardous Waste

Nonradioactive hazardous waste is defined by several environmental laws and managed according to requirements established by EPA and the state.

Current, planned and proposed programs for the treatment and disposal of nonradioactive hazardous waste streams are shown in Figure 5-3. Nonradioactive hazardous waste is generated sitewide, predominately from Construction, Raw Materials, Central Services Works Engineering (CSWE), and the SRL-TNX. This waste includes paint solvents, extrusion press oil, halogenated degreasing solvents, and machine coolant. Current onsite programs for the management of nonradioactive hazardous waste are storage of the waste in permitted hazardous waste storage buildings (Buildings 709-G, 709-4G, and 710-U), and the use (burning) of waste oil in SRS powerhouses for energy recovery.

Various hazardous wastes (e.g., solvents and pesticides) and contaminated soil from the Chemicals, Metals and Pesticides (CMP) pits are stored in RCRA permitted hazardous waste storage facilities. All

buildings used as hazardous waste storage facilities are operated pursuant to a RCRA Part B permit issued in September 1987.

Storage of incinerable hazardous waste or shipment for incineration offsite, except land ban solvent wastes, will continue at permitted facilities until the Consolidated Incineration Facility (CIF) begins operations. Ash from the CIF will be stabilized as ashcrete at the CIF and then disposed in a proposed Hazardous Waste/Mixed Waste Disposal Facility, except for a small fraction that may be hazardous which will be disposed of in the Y Area Waste Solidification and Disposal Facility. Currently, the nonincinerable hazardous waste, such as corrosive, heavy metals and reactive metals, are stored in RCRA permitted hazardous waste storage buildings/pads.

Mixed Waste

Mixed waste is waste that contains both hazardous and radioactive components.

Current and planned programs for the management of mixed waste are presented in Figure 5-4. Examples of mixed waste are tritiated oil, F006 sludge, mercury, lead, cadmium, silver, benzene and scintillation fluids. Most of the mixed waste is being stored until the CIF and the Hazardous Waste/Mixed Waste Disposal Facility begin operation.

Currently, tritiated oil is stored in sealed DOT 17-E drums placed inside concrete culverts in one of the Mixed Waste Storage Buildings if contamination is >50 nCi/ml. The latter approach is also used for spent scintillation fluid. Radioactive PCB-material is stored in enclosed concrete culverts in 643-29G until an offsite TSCA-approved mixed waste disposal facility becomes available.

Mixed waste is also stored at some of the generator facilities for a period up to ninety days, after which the waste must be transferred to a RCRA permitted or interim status facility. There are currently two permitted mixed-waste storage buildings: one for low activity mixed waste (Building 709-2G), and one for high activity mixed waste (Building 643-29G). The mixed waste managed by this storage method includes tritiated mercury from the tritium facilities, tritiated oil (>50 nCi/ml) from the reactor areas and Tritium facilities, solvents from various area facilities, lead, and lead-containing equipment. Mercury pumps in the tritium facilities are being replaced with nonmercury pumps, which will reduce the amount of contaminated mercury generated for storage. In addition, the SRL is currently demonstrating a mercury decontamination process for DWPF mercury.

Low-Level Solid Radioactive Waste

Figure 5-5 shows current, planned and proposed programs for the management of low-level waste. Low-level wastes (LLW) are generated sitewide and are accepted from offsite generators. These waste streams consist of contaminated operating and laboratory wastes such as small equipment, plastic sheeting, protective clothing, soil, used equipment from production facilities, and other job control waste.

LLW is defined at the SRS as waste that radiates 300 mR/hr or less at three inches from an unshielded container. It also must contain less than 100 nCi of transuranic nuclides per gram of waste. The LLW is buried in engineered low-level trenches (ELLTs) in the Radioactive Waste Burial Ground, 643-7G. A

portion of the LLW that is contaminated with beta/gamma emitting radionuclides (i.e., no alpha contamination) that can be packaged into cardboard boxes and that radiates less than 50 mrad, is compacted into 96 cubic feet burial boxes, steel B-25 boxes, prior to disposal in the ELLTs. Other LLW is packaged in 55-gallon drums for disposal. Custom packaging of various dimensions are used for oversized items such as tanks and large pumps. Refuse from regulated areas that is known to be free of radioactivity is surveyed for radioactivity, certified as clean waste, and sent to the sanitary landfill.

The initial phases of the new low-level waste disposal facilities, commonly called the Burial Ground Expansion (BGE), are scheduled to be complete in the first quarter of calendar year 1992. Design concepts for the BGE are consistent with commercial regional compacts and provide state-of-the-art waste disposal/storage exceeding the requirements of 10 CFR Part 61. SRS will use engineered, vault disposal for any significantly contaminated waste and will protect groundwater resources consistent with Federal, State and local requirements per DOE Order 5820.2A. In contrast to the 10 CFR Part 61 which provides waste form requirements, DOE Order 5820.2A provides performance objectives and requires the site to validate facility design and operating criteria with a facility specific radiological performance assessment. Evaluations of BGE disposal practices are included in DOE/EIS-0120, *Environmental Impact Statement - Waste Management Activities for Groundwater Protection Savannah River Plant* (DOE 1987c). SRS uses container radiation exposure rates to segregate waste in order to optimize handling, to reduce occupational exposure, and as an indicator of radionuclide content.

Intermediate-level waste (ILW) (an SRS definition for the higher activity portion of the LLW) radiates more than 300 mR/hr at three inches from an unshielded container or contains greater than 10 but less than 100 nCi of transuranics per gram of waste. An improved disposal technique, Greater Confinement Disposal (GCD), is used for some ILW. The objective of Greater Confinement Disposal (GCD) is to provide a near-zero release facility that will require minimum maintenance after site closure for the disposal of the higher activity fraction of low-level, solid, beta-gamma waste. The GCD technique uses engineered barriers which provide a degree of isolation greater than that of shallow land burial. Twenty 9 ft diameter boreholes are augered to a depth of 30 feet. Nineteen boreholes contain a 20 ft long, 7 ft diameter fiberglass liner with a fiberglass bottom, while the remaining borehole contains a steel liner of the same size. A steel collar lines the top 10 feet of each borehole to prevent soil from falling into the hole. The liners are grouted into place with approximately 1 feet of concrete surrounding each liner. All waste emplaced will be stabilized by placing a grout around the waste forms to fill void spaces producing a monolith. Monitoring wells, provided at the boreholes, indicate no migration of waste from these facilities has occurred. ILW waste that cannot be packaged for GCD is placed in shallow land burial trenches. The TRU contaminated LLW is being stored awaiting evaluation of disposal options.

Planned programs for the disposal of LLW and ILW include the opening of new Low-Level Waste Storage/Disposal Facilities, and treatment of both liquid and solid LLW by the Consolidated Incineration Facility (CIF). No segregation of radioactive, hazardous, and mixed wastes is planned for the CIF operations. The resulting waste ash will be considered a mixed waste. Size reduction and stabilitization processes are planned for LLW and possibly ILW going to the new Low-Level Waste Disposal Facilities. These activities will be provided by the proposed Waste Preparation Facility.

The planned new Low-Level Waste Disposal Facility will have an above-ground facility for future interim storage of wastes contaminated with long-lived radioisotope (i.e., C-14, I-129) until an appropriate disposal facility is determined.

Tritium containing waste will be placed into vaults in what could be called monitored, retrievable disposal instead of storage. After 120 years with no significant environmental releases, these waste forms will be disposed of in place and the site closed. Of the waste generated at SRS, most of this waste is tritiated waste. Enhanced storage/disposal of these waste forms is necessary to protect the groundwater. The recent EPA guidance on total dose will limit concentrations of tritium and other radionuclides in the groundwater to levels that require this design concept.

The planned and proposed facilities described here are consistent with those analyzed pursuant to the National Environmental Policy Act (NEPA) EIS process for waste management activities (DOE 1987c). These storage/disposal concepts for radioactive waste are consistent with those proposed for commercial regional compacts (reference, U. S. Congress, Office of Technology Assessment, *Partnerships Under Pressure, Managing Commercial Low-Level Radioactive Waste*, November 1989).

Transuranic Waste

The current and planned programs for the management of transuranic (TRU) waste are shown in Figure 5-6. TRU waste is material which is contaminated with alpha-emitting radionuclides of atomic numbers greater than 92 having a half-life greater than 20 years and in concentrations greater than 100 nCi/g. Since 1974, TRU waste has been retrievably stored on above-ground concrete pads in the Low-Level Waste Disposal Facility. The programs developed by the SRS include facilities to process and evaluate TRU waste for management by onsite disposal at the Waste Isolation Pilot Plant (WIPP) in New Mexico. Two facilities included in these programs are the Waste Certification Facility (WCF) and the TRU Waste Facility (TWF). The first phase of the WCF was completed in 1986 and includes facilities to assay, x-ray and weigh 55-gallon drums of suspect TRU-contaminated waste material. The second phase of this facility is under construction and will include facilities to prepare drums for shipment and to load drums into the Transuranic Package Transporter (TRUPACT) for shipment to the WIPP. The TWF will include facilities and equipment to retrieve TRU waste from retrievable storage in the Low-Level Waste Disposal Facility; vent, purge, shred and repackage drums; reduce sizes and repackage bulky waste; and solidify waste. The proposed startup for this facility is 1995.

Newly generated TRU waste will be certified prior to disposal at WIPP. For purposes of the certification program, newly generated drummed TRU waste is divided into five categories: job control waste, resin, high efficiency particulate air (HEPA) filters, sludges and miscellaneous waste. With existing facilities, only job control drummed waste can be packaged to meet the comprehensive waste packaging requirements for WIPP. Under this program, the five TRU waste generating facilities segregate and package the drummed waste as certifiable or noncertifiable. The certifiable waste is sent to the WCF for final nondestructive examination to verify that all waste packaging requirements for WIPP have been met. This waste is then placed in temporary storage to await shipment to WIPP. The noncertifiable drummed waste and waste in all other containers is placed in interim storage for eventual processing in the TWF.

After evaluation at the WCF, the waste certified <100 nCi/g is placed in interim storage for future disposal onsite in a GCD trench. The waste >100 nCi/g is placed in interim storage pending shipment to the WIPP. The WIPP facility under construction will be a development facility for demonstrating the safe disposal of TRU waste in an underground repository. Shipments to WIPP are scheduled to begin when a review by the National Academy of Sciences is complete, land withdrawal legislation is passed by Congress, and RCRA permitting is completed for WIPP.

High-Level Radioactive Waste (Mixed Waste)

High-level radioactive waste (HLW) treatment and disposal methods are shown in Figure 5-7. HLW is generated in the chemical separations facilities and at the SRL.

Currently, the HLW is in tanks designed to receive high-level radioactive process effluents. The processing of the liquid HLW begins by separating sludge and aqueous fractions. The sludge is allowed to settle in a tank. The aqueous fraction is evaporated, forming a damp salt cake. Both fractions are then aged to allow decay of short-lived radionuclides before further processing. The salt waste is treated for disposal by an In-Tank Precipitation (ITP) process to remove the radioactive components from salt wastes. In this process, over 99.9 percent of the radioactivity in the salt portion of the waste is precipitated and removed from solution by filtration. The resulting decontaminated salt solution, which represents about 90 percent of the HLW volume, will be piped to the Z-Area Saltstone Facility where it will be mixed with cement, and fly ash, to form a nonhazardous grout called saltstone. The saltstone will be placed in near-surface concrete vaults for disposal (see Saltstone Disposal discussion).

The HLW sludges, which contain about 70 percent of the radioactivity will be treated via Extended Sludge Processing (ESP) to remove soluble salts and aluminum. The resulting wasted sludge will be piped as slurries to the DWPF vitrification facilities, which are scheduled to begin operation in 1992. Before being fed to the glass melter, the sludges and precipitate will go through several treatment steps. Treatment of the precipitate results in the formation of benzene and other organics which will be collected in a RCRA permitted tank and incinerated in the CIF. The treated precipitate stream, with about 90 percent of the organic removed, is combined with the treated sludge and glass-making material and fed to the glass melter, where the waste solids actually dissolve in and become part of the glass. The glass will be poured into stainless steel canisters where it will solidify. The glass containers will be placed in temporary onsite storage until a federal repository is available. It is anticipated that additional onsite storage will be needed prior to the availability of a federal repository.

Tritiated Wastewater

The current, planned and proposed programs for the management of tritiated waste water are shown in Figure 5-8.

Tritiated water from D Area is discharged directly to Beaver Dam Creek where it flows to the Savannah River. The disassembly-basin purge-water from K, P, and L Areas is discharged to the respective area seepage and containment basins, where atmospheric exchange and radioactive decay occur prior to and during subsurface flow to onsite streams. Usage of the basins could be discontinued if a proposed engineered basin serving P, L, K, and D Areas were selected.

Currently the evaporator overheads and untreated effluents from F and H Areas are sent to the F/H Effluent Treatment Facility (F/H ETF). Effluents from the F/H ETF are discharged directly to Upper Three Runs Creek. While the discontinued use of seepage basins will eliminate the discharge of hazardous waste, it will eliminate the tritium decay mechanisms afforded by seepage basins.

Depleted Uranium

The storage and disposal scheme for Depleted Uranium is shown in Figure 5-9.

Uranyl nitrate solution is generated as a byproduct of plutonium production in the F-Canyon Purex process. The solution is processed in the FA-Line facility to produce a uranium oxide powder (yellow cake). Several methods of reprocessing and/or recovery of this material have been studied and have shown that is it not cost effective to recover the depleted uranium. The material is stored onsite awaiting possible future reprocessing. Drums of uranium oxide are stored in several areas onsite: F, R, and B Areas. Construction of three large buildings in F Area has recently been completed to consolidate storage of the uranium oxide powder drums.

Visual inspections are performed periodically for accountability and environmental purposes. Repackaging of old or corroded drums is done when required to prevent breech of containment. The drums are all in good to excellent condition. All of the drums have plastic liners inside to contain the uranium oxide powder. Even in cases where the exterior drum condition deteriorates, the interior containers have been proved to maintain their integrity.

Waste Slurry from M Area Liquid Effluent Treatment Facility (Mixed Waste)

Current and planned programs for waste management in M Area are presented in Figure 5-10. The M Area Liquid Effluent Treatment Facility (LETF) was designed and constructed to treat liquid effluents from the fuel and target fabrication facility. The LETF includes a Chemical Transfer Facility (CTF), a Dilute Effluent Treatment Facility (DETF), and the Process Waste Interim Treatment/Storage Facility (PWIT/SF).

Concentrated uranium waste, acid waste and caustic waste from M Area are blended and neutralized in the CTF. The resulting precipitate is concentrated and stored in interim status waste tanks for eventual disposal as a saltstone waste form. Because the sludge comes from an electroplating facility it is a listed waste (F006). Efforts to delist the waste are underway. If delisting is accomplished, disposal in a RCRA permitted facility would not be necessary.

The DETF provides for the neutralization and filtration of M Area dilute wastes. The filtered solids are sent to the CTF for processing. The remaining effluents (filtrate) meet NPDES discharge limits and are released to Tims Branch through NPDES outfalls M-004 and A-014.

Further processing of this waste will include sending the supernate from the stored sludge to the DETF for processing. This will reduce the volume of sludge requiring final disposal as saltstone.

Waste Slurry from the F/H Effluent Treatment Facility

The F/H Effluent Treatment Facility (F/H ETF) treats wastewater generated in the Separations Areas. The F and H Area waste streams are classified as hazardous because of corrosivity, and EP toxicity. Usage of the F/H Area seepage basins was discontinued by October 8, 1988, as required by RCRA. Operation of the F/H ETF began in 1988.

The waste treatment scheme for the F/H ETF is presented in Figure 5-11. The process consists of filtration, organic removal, reverse osmosis and ion exchange. Concentrated liquid waste streams from these processes are evaporated. The reverse osmosis permeate and condensate from the evaporator overheads are discharged in compliance with an NPDES permit. The evaporator bottoms will be sent to Tank 50 in the HLW tank farm, before being disposed of in Z Area as saltstone, unless the activity is too high, in which case, the slurry will be stored in other HLW tanks for eventual processing in the DWPF.

The F/H ETF should typically discharge less that 35,000 curies of tritium per year to surface waters. Tritium results from the materials' separations processes. Although the start up of the ETF has resulted in increased concentrations of tritium in the Savannah River, annual doses to downstream water consumers will be 0.3 to 0.4 mrem/yr compared to a drinking water standard of 4.0 mrem/yr. There are no plans to dispose of tritiated water from the ETF in seepage basins; SRS ceased the use of the F/H seepage basins in November 1988.

Saltstone Disposal

The disposal program for two planned saltstone disposal facilities is presented in Figure 5-12.

The Z Area mixing and disposal facility is designed to solidify decontaminated salt solution rendering it nonhazardous. This solution contains sodium chromate and has a high pH, both of which cause the solution to be characterized as hazardous under SCDHEC regulations. Concentrated slurry from the F/H ETF will also be processed in Z Area. The salt solution will be mixed with a slag based cement and fly ash to form a nonhazardous grout called saltstone, which is suitable for long-term disposal in above grade concrete vaults.

It is planned that the slurry from CIF off-gas treatment will be mixed with the sludge from the M Area LETF and then stabilized in a RCRA designed Saltstone Mixer. If the saltstone is determined to be nonhazardous it will be sent to Z Area for final disposal. If the resulting saltstone is determined to be hazardous it will be disposed of in Y Area, which will have been permitted as a RCRA disposal site.

5.1.1.6 Waste Generation

Table 5.1 provides the 1989 SRS waste generation forecast.

Nonradioactive hazardous waste is generated sitewide. Approximately 718 cubic feet per year is generated by all departments.

Mixed waste is generated primarily by Raw Materials, Reactors, Separations and Tritium. It is estimated that the departments collectively generate approximately 1900 cubic feet per year. Raw Materials is the largest contributor, generating approximately 900 cubic feet per year.

Low-level and intermediate-level radioactive waste is generated sitewide. Approximately 1,100,000 cubic feet of low-level waste and 54,000 cubic feet of intermediate-level waste is generated annually. The largest contributors are Separations, Reactor, Raw Materials and Waste Management.

Separations is the primary producer of transuranic waste, generating approximately 56,000 cubic feet per year.

5.1.2 Waste Minimization

Site Program Overview

The SRS Waste Minimization Program is designed to reduce the volume and toxicity of hazardous, mixed, low-level radioactive and nonhazardous waste generated at the site in order to minimize any present or future threat to human health and the environment. The program is being jointly developed by the Environmental Protection Section (EPS), Waste Management, and Savannah River Laboratory (SRL) Interim Waste Technology Section through a Waste Action Team.
The site strategy is to: (1) identify and inventory all site waste streams; (2) select candidate streams for source reduction, recycling, or treatment based on regulatory or operating contractor requirements and cost effectiveness considerations; (3) implement facility specific waste minimization programs; and (4) monitor progress on unit production basis, where appropriate. The site has already started or planned many waste reduction or recycling activities.

Regulatory Requirements/Justification

Federal Laws

- **1984 Resource Conservation and Recovery Act (RCRA) Amendments**—The Act requires the generator of hazardous waste to have a program to reduce the volume or quantity and toxicity of waste to the degree economically practicable and use treatment, storage, or disposal methods which minimize the present and future threat to human health and the environment.

DOE Orders

DOE Order 5400.1—This order establishes requirements for waste minimization plans as required by the RCRA, including the establishment of a Pollution Awareness program for the site.

Policy

- **Waste Minimization Policy**—The operating contractor shall treat, dispose of, and store radioactive and other hazardous materials in a manner that minimizes waste volumes and provides the maximum protection for the environment and human health.

Divisions will reduce or modify to the extent practicable, material, procedures, or processes which produce hazardous waste. Waste Minimization programs should consider:

- Use of alternate raw materials to reduce or eliminate waste
- Recovery, recycle or sale
- Process and operational changes to eliminate or reduce the volume, quantity and toxicity of the waste.

- **Waste Minimization**—Waste specific minimization goals are set by individual operating departments and facilities as their waste minimization programs are developed through the overall site program.

Definitions

The following definitions will be used in the SRS Waste Minimization Program.

Waste Minimization—The reduction of the amount of waste that is generated or that must be subsequently treated, stored, or disposed. It includes any source reduction or recycling activity that results in the reduction of the total volume or quantity of a waste and/or the reduction of the toxicity or the toxicity classification of a waste. The reduction must be consistent with the goal of minimizing present and future threats to human health and the environment. Methods of waste minimization include waste reduction, substitution, volume reduction, waste treatment and stabilization, delisting, and reclassification.

Waste Reduction—Any activity or treatment that reduces or eliminates the generation of a waste at the source. Waste recycling or treatment of wastes after initial generation, is not considered waste reduction. An action that concentrates the hazardous content of a waste to reduce waste volume or dilutes it to reduce the degree of hazard is not considered waste reduction. Waste reduction is measured in terms of weight per unit production.

Substitution—The use of an alternative chemical in a process which results in the production of a less toxic or nontoxic waste product.

Volume Reduction—Any treatment, storage, or disposal method which reduces the volume of waste after it is generated.

Waste Treatment and Stabilization—The processing of a waste after initial generation to produce a less toxic or inert substance for storage or disposal.

Delisting—The removal of a chemical from the RCRA hazardous chemical list by the Environmental Protection Agency (EPA). Delisting reclassifies a waste by demonstrating that the waste is nonhazardous.

Reclassification—The certification of waste generated in regulated areas as non-radioactive waste.

Strategy

The SRS waste minimization strategy is to identify and inventory all site waste streams, select candidate streams for reductions based on regulatory/operating contractor requirements and cost effectiveness considerations, implement facility specific waste minimization programs, and monitor progress on unit production basis. The strategy also includes development and tracking of cumulative cost savings for waste minimization efforts.

Conceptually, a facility specific waste minimization team will conduct an inventory to identify all waste streams generated by their operating facilities, review process flow sheets to determine the expected volumes of waste produced, and determine the methods and costs associated with disposing the waste. Once these data are obtained, waste minimization technologies are reviewed and proposed to reduce or eliminate the waste generation rate.

Waste minimization approaches which are currently being followed include:

- Process Changes—Nonhazardous (or less hazardous) materials are substituted for hazardous materials where possible. Processes are also reviewed for modifications that would eliminate or drastically reduce the waste generation rate.
- Process Optimization—Process procedures are strictly followed or modified as necessary so that the existing processes/facilities will operate more efficiently.
- Segregation—Nontoxic substances are separated out from waste mixtures when feasible.
- Waste Reuse and Recycling—After treatment, some waste is recycled either in the process that produced it, or by another onsite facility.
- Detoxification Techniques—After generation, select the most cost-effective method of reducing the waste toxicity that adequately protects human health and the environment. Methods such as biological, chemical, or physical treatment and incineration are currently being utilized.
- Delisting and Reclassification—Lower the toxicity category of a waste stream by delisting applicable hazardous waste streams and reclassifying clean waste from regulated areas to nonhazardous and nonradioactive categories, respectively.
- Awareness and Training—Independent reviews of both new and existing processes by site waste minimization committees help identify ways in which waste generation rates can be reduced. Ongoing programs educate and train employees in waste generation opportunities. Additional awareness activities are planned to support the site Waste Minimization Program.

5.2 Priorities

Priorities for the purposes of the FYP are defined as follows (DOE 1989a):

Priority 1

Priority 1 includes activities necessary to prevent near-term adverse impact to workers, the public, or the environment. Examples include containment to prevent the spread of contamination, actions to

prevent or minimize releases to the environment, and ongoing waste management activities required to maintain safe conditions. Allowing waste of any type to accumulate at treatment, storage, or disposal facilities without proper management is totally unacceptable and would constitute a health or environmental hazard. Also included as Priority 1 are ongoing activities which, if terminated, could result in significant program and/or resource impacts. Impacts could include increased risk to the environment or to workers, loss of trained staff , or increased costs.

Priority 2

Priority 2 items encompass those activities required to meet the terms of agreements (in place or in negotiation) between DOE and local, state, and federal agencies. These agreements represent legal commitments to complete activities on the schedules agreed to by DOE. A major goal of this Plan is to document DOE's commitment to comply with these agreements.

Priority 3

Priority 3 adds those activities that (1) could reduce risk; (2) promote compliance with State, Federal, or DOE requirements; (3) address public concerns; (4) are cost-effective; or (5) ensure no mission disruption. Most of the waste minimization and Applied R&D activities fall into this priority. In addition, most new construction starts, improvements to existing facilities and noncritical operations, and technical compliance actions are included.

Priority 4

Priority 4 includes activities that are not required by regulation but would be desirable to do. Examples of Priority 4 actions include complying with DOE Orders that are more stringent than external regulations, implementing good management practices, reducing personnel exposures below levels required by regulations or standards,and accelerating actions to satisfy an agreement or milestone ahead of schedule.

There are several Priority 4 projects in the FYP for SRS. Many of these are for outyears. They are:

Power Upgrade Sanitary Sludge Treatment (SR0134), a FY 1994 project for $700,000 that is necessary for a future regulation.

WM Constant Air Monitors (SR0211), a FY 1991 project that is partially funded. Waste Management Operations has a need for $2,000,000 and only $1,000,000 is funded for this project. This is required to comply with DOE orders.

RM CTF Filtration Improvements, 313-M (SR0138), a FY 1993 project for $850,000 that is needed for waste minimization.

SEP B-25 Alpha Waste Compactor, 221-FBL (SR0072), a FY 1994 project for $5,000,000 that is needed for waste minimization.

5.3 Technical Approach

Activities identified during the planning process are discussed below. The activities are presented by site organization, waste type (nonradioactive nonhazardous, nonradioactive hazardous, mixed, low-level, etc.), and method of handling (treatment, storage, disposal, etc.). The activities are organized so that the descriptions provided in Section 5.1 and Figures 5-1 through 5-12 can be referenced for additional information. The activity data sheet number and activity priority appear in parentheses following the activity title.

5.3.1 Department of Energy - Program Support

- ***DOE - Headquarters Management Initiative (SR0033) (Priority 1)***

  This is funding reserved for the use of DOE-Headquarters. The numbers in FY 1990 and FY 1991 are based on guidance received from DOE-HQ. The numbers beyond FY 1991 are estimated based on the funding initiatives in FY 1990 and FY 1991.

- ***DOE - SR Interim Waste Management/ DWPF Costs (SR0034) (Priority 1)***

  These funds provide Interim Waste Management and Defense Waste Processing Facility their portions of program support activities. These activities include the contractor award fee, Wackenhut security services, and the technical support contractor for the DOE Waste Management starting in FY 1990.

5.3.2 Power

5.3.2.1 Nonradioactive Nonhazardous Waste

Treatment

- ***Equalization Basin, 100-C, Project # 3571 (SR0109) (Priority 1)***

  This project is for the installation of an equalization basin, needed to even out low and high sewage flows which can adversely affect the performance of the sanitary wastewater treatment facility.

- ***Install Sodium Hypochlorite and Dechlorination Facility, Project # 3688 (SR0116) (Priority 3)***

  This project will install permanent disinfection and dechlorination facilities at the sanitary treatment plants. Disinfection is required at all effluents of the sanitary treatment plants in order to meet SCDHEC regulations. At the present time, there are temporary drip feeders being used to disinfect the waste stream with the addition of sodium hypochlorite. These drip feeders require frequent monitoring and manual adjustment to prevent the effluent from being out of limits. In addition, indications from SCDHEC are that new limits will be imposed on the sanitary treatment plant

effluents for residual chlorine. If imposed, these limits would require dechlorination of the effluent. The present system does not provide for any dechlorination. This project would install permanent, self-monitoring and self-controlling systems for disinfection and dechlorination.

- ***Portable Waste Treatment Plant (SR0122) (Priority 3)***

  A portable wastewater treatment plant will be used to provide sanitary treatment to areas exhibiting temporary high flows or to areas which are temporarily staffed over the capacity of existing treatment facilities.

- ***Upgrade Softener Building and Spill Control (SR0135) (Priority 3)***

  This project will provide spill containment for the cation and anion exchange (H & S) units at the Softener Buildings in P, K and H areas. H & S units at the softener buildings P, K, & H areas provide treatment for water used in the powerhouse boilers. These boilers are used to produce steam for production purposes and generate backup emergency electrical power. The H & S units are regenerated on a regular basis. During that time, they contain strongly acidic or caustic solutions and any leakage occurring then could result in a spill with potential adverse impact on the environment. Spill containment dikes would contain any such spill.

- ***Upgrade Softener and Spill Containment (SR0136) (Priority 3)***

  This project will replace piping, valves, and instrumentation in Softener building, 483-2D, and provide spill containment for the H & S tanks at the Water Treatment Plant, Building 438-D. The piping and valves at 483-2D Softener building have deteriorated from 35 years of caustic and acid service and are no longer reliable. During 1987, two H units had to be removed from service to repair leaks at valves and pipes. Water treatment is critical to continued operation of 484-D powerhouse (which produces steam for production purposes and backup emergency electricity); and to achieve reliable water treatment, upgrading at the Softener building is required. The spill containment will prevent environmental releases caused by leaks and accidental spills associated with operation of the H & S units.

- ***Upgrade Sanitary Sludge Treatment (SR0134) (Priority 4)***

  This project will provide an aerobic digester to prepare sanitary sludge for land application. The SRS is currently disposing of sludge from the sanitary plants through land application. To reduce pathogens, aerobic digestion is needed before land application.

Disposal

- ***Sewer & Domestic Water Line, 681-6G (SR0128) (Priority 3)***

  This project will install a sewer and domestic water lines for bathrooms at 681-6G. Building 681-6G is equipped with drinking fountains and bathrooms which cannot be permitted for operation until the tie-in is made to existing sanitary facilities or new sanitary facilities are constructed.

5.3.2.2 Other

Storage

- ***Install Domestic Water Tank 400-D (SR0110) (Priority 3)***

  Domestic water is supplied to 400-D Area by treating surface water with chlorine, phosphate, and caustic. SCDHEC recently audited the water treatment facility and documented the need for significant improvements to meet SC Safe Drinking Water Act requirements. Water supplied by a deepwell will eliminate the need for filtration, phosphate, and caustic addition; thereby reducing purchased chemical costs. A storage tank will be required to support the new domestic system.

5.3.3 Raw Materials

5.3.3.1 M Area Effluent Treatment Facility

Treatment

- ***CTF Evaporator Equalization Tank Modification, 313-M (SR0137) (Priority 3)***

  This project will install pH control for CTF evaporator equalization tank, enabling reduction of the volume of material to be stored in the process waste tanks. It could avert future extended outages of area production activities resulting from the delivery of high-pH materials to the equalization tank. This is a waste minimization program, encouraged by RCRA.

- ***Effluent Toxicity Reduction (SR0037) (Priority 3)***

  SCDHEC will require routine toxicity tests of Outfall A-014 this year. Scouting tests indicate that toxicity reduction for M-Area wastewater effluent may be required to reduce uranium or other pollutants in the effluent. The toxic chemicals must be identified and removal processes developed, designed and installed. Present data indicate that effluents from aluminum forming operations for lithium tube and uranium fuel tube production are not toxic, so only uranium target slug production and stored waste volume reduction are affected. This activity provides for process development and construction of the removal facility.

  Whole effluent toxicity testing will also probably be required on other outfalls which may also dictate additional wastewater treatment. SRS has been working with subcontractors to do some baseline toxicity studies and to work out difficulties with this difficult test procedure.

- ***Waste Volume Reduction and Solidification Waste and Interim Storage (SR0038) (Priority 3)***

  M-Area Wastewater Slurry Treatment Interim Fixation Facility (STIFF) will remove dilute wastewater for treatment and discharge to Tims Branch, treat the concentrated sludge for interim fixation in saltstone, and provide storage on a RCRA pad. This facility will be completed for M-Area to produce uranium target slugs or to process supernate from waste storage tanks after the May 1990 land ban.

- ***Wastewater Feed Improvements, 341-M (SR0146) (Priority 3)***

  This project will correct hydraulic deficiencies in the wastewater feed system to the dilute wastewater filter. This is the final part of modifications that will enable achievement of original design capacity to support M-Area production. This capacity is also needed to reduce the volume of hazardous waste for saltstone disposal ($12 million savings in saltstone disposal cost).

- ***CTF Filtration Improvements, 313-M (SR0138) (Priority 4)***

  This project will modify the existing CTF autoclave treatment area piping system to wastewater filters to rectify design errors and decrease hazardous waste (saltstones) for RCRA storage.

- ***Replace Process Sewer Line, 322-M (SR0144) (Priority 3)***

  This project will connect 322-M to the overhead process sewer line leading to Liquid Effluent Treatment Facility (LETF), enabling deactivation of the existing underground line which has a temporary liner.

5.3.3.2 Nonradioactive Nonhazardous Waste

Safety and Continuity

- ***Upgrade Storm Sewer (SR0145) (Priority 3)***

  The existing storm sewer is operating at maximum capacity. It will be modified to enable handling volumes of non-contact cooling water. The modification will include contamination monitors to ensure compliance with DOE orders.

5.3.3.3 Waste Minimization

- ***Improved Filtration, 341-M (SR0140) (Priority 1)***

  This project will improve dilute wastewater filtration at the Liquid Effluent Treatment Facility (LETF) as required by the Clean Water Act and agreements with state regulators. This is the first part of modifications that will enable achievement of original design capacity to support M-Area production. The capacity is also needed to reduce the volume of hazardous waste for saltstone disposal ($12 million savings in saltstone disposal).

- ***New Degreaser System (SR0141) (Priority 4)***

  Systems in buildings 321-M, 320-M and 313-M used for degreasing metal components and products will be replaced with systems compatible with more environmentally acceptable degreasing agents. The existing florochloroethane (freon) degreaser is an international environmental concern. To reduce potential environmental damage, degreasers have been eliminated in Buildings 313-M and 320-M and it is desirable, however, to reinstitute degreasing processes in 313-M and 320-M when an environmentally safe agent is developed.

5.3.4 Reactor

5.3.4.1 Low-Level Waste

Treatment

- ***Upgrade Disassembly Basin Water System (SR0152) (Priority 3)***

  The disassembly basin area water filtration and deionization systems will reach the end of their useful life around 1990. New filters and deionizers will also need a better anion/cation ratio to increase efficiency for removing radioactive nuclides from the basin water. This project provides this equipment for P, L, and K reactor areas.

Disposal

- ***Waste Handling (SR0036) (Priority 1)***

  These are the costs for boxing and shipping reactor waste, collecting and shipping wastewater and oil. It also includes cleanup and purging of Reactor disassembly basin water.

5.3.5 Separations

5.3.5.1 Nonradioactive Nonhazardous Waste

Treatment

- ***Domestic Wastewater Treatment Facility 200-H (SR0229) (Priority 3)***

  The expected increase in population of the Separations Areas could result in inadequate capacity at the wastewater treatment facility. Inadequate capacity may result in NPDES permit noncompliance. This project will provide the necessary wastewater treatment capacity.

- ***Wastewater Treatment Facility 200-F (SR0230) (Priority 3)***

  Increased population of the Separation Areas could result in inadequate capacity at wastewater treatment facility. Inadequate capacity may result in NPDES permit noncompliance. This project will provide the necessary wastewater treatment capacity.

Safety and Continuity

- ***Seg Water Automatic Count System, 221-H, Project #0125 (0165) (Priority 1)***

  This project will purchase an automatic low background Alpha/Beta/Gamma counting system. It will provide design for installation of this system in the 221-H HP counting room and piped to a source of P-10 gas in cylinder shed located outside the warm gang valve corridor door next to the truckwell. The present method and instrumentation used to determine the activity in segregated cooling water

prior to discharging it to the creek is adequate but can be improved. Purchase and installation of a more sensitive counting device will eliminate the potential for release of contaminated cooling water to NPDES outfall.

- ***Divert East Side Rainwater, 221-H, Project # 0112 (SR0158) (Priority 3)***

  This project will provide design and scope of work to install drainage system to divert rainwater draining down the east side of 221-H into the area storm system. The roof of 221-H has an area of approximately 100,000 ft. Rainwater drains off either the west or the east side of the building. The west side is equipped with drain pipes which are connected to the area storm sewer system, but since there are no drainage lines on the east side, the roof water collects on the ground; the water should go to the storm sewer. This project is necessary to meet requirements of the NPDES permit by reducing the potential for high suspended solids that can be transported to the outfall.

- ***Upgrade OF-F Drainage System, 200-F, Project # 0186 (SR0170) (Priority 3)***

  This project will re-landscape OF-F to upgrade the existing drainage system. The slopes should be corrected so as to utilize the existing storm sewers. A few new manholes may be needed. Recent construction activity and erosion over the years have disrupted the drainage system in OF-F.

5.3.5.2 Low-Level Waste

Treatment

- ***Laundry Effluent Treatment Facility - F Area (SR0227) (Priority 3)***

  Facilities are needed to provide for the new laundry facility to deal with potentially contaminated laundry wastewater.

- ***B-25 Alpha Waste Compactor, 221-FBL (SR0072) (Priority 4)***

  Provide compactor for B-25 containers containing alpha-type waste. The compactor will reduce FB Line and Canyon waste volume by 80 percent which will result in reducing B-25 usage and burial ground space requirements.

Storage

- ***Waste Handling Facility, 235-F (SR0071) (Priority 3)***

  This project will provide a facility for proper packaging and assaying of waste containers. Current facilities are in a temporary plastic hut which will not handle the volume when the facility is being restarted or operating.

- ***Improved Waste Handling, 211-F, 92-SR-094 (SR0163) (Priority 3)***

  This project will provide a new truck unloading building in the 211-F Waste Handling Facility and will be designed to completely enclose high- and low-level waste trailers during unloading operations. A ventilation system including HEPA filters and sampling and monitoring capabilities are included in the project. The project will also replace the existing ventilation system on the storage tanks.

Disposal

- ***Low-Level and Intermediate-Level Waste Handling (SR0040) (Priority 1)***

  This activity includes costs to the operating facilities in the Separations Department for handling and packaging of low-level and intermediate-level solid waste. Costs include materials for packaging (boxes, plastic, tape) and cost of manpower to handle and load the waste and to ensure proper disposal.

- ***Enlarge Southwest Loading Dock, 221-F (SR0087) (Priority 3)***

  This project will provide a containment area for waste box loading. The current area is not enclosed. It provides more control to reduce potential for radioactive releases.

- ***Upgrade Railroad Tunnel Monitoring (SR0168) (Priority 3)***

  This project will revise the existing 221-FH canyon building railroad tunnel airlock to provide a facility to allow improved handling, surveying and decontamination of transport boxes. It will use remote robotic technology where applicable.

- ***Upgrade Transport and Storage Boxes, 221-FH, Project # 0727 (SR0171) (Priority 3)***

  This project is to provide new transport and storage boxes for use with contaminated canyon equipment. A new design will provide improved contamination control and retain remoteability.

- ***Upgrade Truckwell Monitoring Equipment, Project # 0725 (SR0172) (Priority 3)***

  This project will revise an existing truckwell to provide a facility for improved handling, surveying and decontamination of transport boxes. Remote robotic technology will be used where applicable.

5.3.5.3 Transuranic Waste

Treatment

- ***Glove Box Waste Processing Facility, 221-F BL (SR0085) (Priority 3)***

  This project will install equipment in the third level of F B-line facilities to process F B-line residue to recover 70 percent of the plutonium waste and reduce TRU waste volume. The equipment will

consist of robotics sorting, incineration, freon cleaners and compaction. This is required to meet new DOE TRU waste processing requirements and to economically recover plutonium from the waste.

Storage

- ***TRU Waste Handling (SR0041) (Priority 1)***

  This activity includes costs to operating facilities in the Separations Department for handling and packaging of TRU waste. Costs include materials for packaging (drums, plastic bags, and tape) and cost of manpower for operators to handle and load the waste and to ensure proper disposal.

Safety and Continuity

- ***Upgrade TRU Waste Management, 221-HB Line (SR0084) (Priority 3)***

  This project provides a multi-isotopic assay system to screen a wide range of waste matrix and materials to determine if the waste containers contents meet level specifications.

5.3.6 Savannah River Laboratory

5.3.6.1 Nonradioactive Nonhazardous Waste

Disposal

- ***Sanitary Sewer Upgrade, T Area (SR0203) (Priority 3)***

  This activity will upgrade the lines and lift stations of the existing TNX sanitary sewer which have been in place for 35 years.

- ***Sanitary Sewer Upgrade, T Area (SR0241) (Priority 3)***

  This project will upgrade the existing lines and lift stations.

- ***Process Sewer Upgrade, SRL (SR0242) (Priority 3)***

  This activity will replace deteriorating sections of the old process sewer system at T Area, which has been in place for more than 30 years. The upgrade will be necessary to maintain compliance as the old sewer pipe ages.

Safety and Continuity

- ***Increase Capacity of Tech Area Sewage Lift (SR0193) (Priority 3)***

  This project will increase the capacity of technical area sewage lift stations and connecting pipe systems. The existing lift stations were installed in original construction (1952) and the present volume of sewage is in excess of original design. There is no alternate lift station to Bldg. 607-2A.

- ***Process Sewer Upgrade (SR0200) (Priority 3)***

  This activity will replace deteriorating sections of the old process sewer system located at TNX research facilities which have been in place for more than 30 years.

5.3.6.2 Nonradioactive Hazardous Waste

Treatment

- ***Effluent Treatment Facility (SR0184) (Priority 1)***

  As a part of routine operation, the SRL generates low-level liquid wastes that are disposed via existing SRS facilities, this task is to provide for development of a wastewater treatment facility for SRL. This activity will include characterization of SRL process effluents, demonstration of treatment steps and establish disposal system requirements. This facility will eliminate transport of low level liquid waste over site roadways and reduce the volume of waste that is eventually disposed of in Z Area. This task will be to supply process definition and characterization of waste stream.

- ***Effluent Treatment Expansion, T Area (SR0237) (Priority 3)***

  This activity will be necessary to continue to treat wastewater that will be generated by research activities as T Area continues to grow.

Research and Development

- ***Nonradioactive Hazardous Waste Analytical Support (SR0065) (Priority 1)***

  Non-radioactive hazardous waste are generated due to several operations at SRS. Methods to treat various waste streams require development/testing to ensure waste disposal criteria are fulfilled.

  This task is to provide analytical studies for RD&D non-radioactive hazardous waste (NRHW) programs. This task will provide for development of techniques for waste analysis, waste characterization, that is necessary for the evaluation of newly developed treatment technology. In addition, this will allow enhanced methods to segregate hazardous and non-hazardous waste to be pursued as a way to reduce final treatment and disposal costs. This will also provide for analysis of treated waste to demonstrate proof-of-concept for supporting waste facility permitting and improved waste disposal technology programs.

- ***Hazardous Waste Reduction (SR0090) (Priority 1)***

  This activity will provide new intiatives in the reduction, treatment or elimination of hazardous wastes generated at the SRS. This task will include the identification of methods to recycle hazardous waste as raw materials. The objective is to reduce the volume of stored waste through technology development for recycle/recovery. This is lead site funding.

Safety and Continuity

- ***Satellite Storage Area, 677-T (SR0204) (Priority 3)***

  The new satellite area will allow for accumulation of hazardous material into one 55-gallon drum located adjacent to building 677-T. Currently, material from 677-T is being accumulated in a satellite area near 674-T. The DOE-SR has requested that the satellite area be moved nearer to the point of generation.

5.3.6.3 Nonradioactive Hazardous and Mixed Waste

Research and Development

- ***Hazardous/Mixed Waste Disposal Technology Development (SR0059) (Priority 1)***

  Hazardous and mixed waste are generated at SRS as a result of operations at the site. Some materials can be treated by incineration. Other materials are treated by chemical fixation. This activity will provide development and demonstration of technologies for treatment and disposal of hazardous and mixed wastes that require treatment by stabilization. This activity will provide support for a new facility at SRS for disposal of hazardous and mixed waste. Included in this task will be the evaluation and development of treatment steps for waste prior to disposal. This will also provide support for the Y-Area disposal facility.

5.3.6.4 Nonradioactive Hazardous, Mixed and Low-Level Waste

Treatment

- ***Consolidated Incineration Support (SR0081) (Priority 1)***

  SRS plans to construct a Consolidated Incineration Facility (CIF) to incinerate combustible low-level, hazardous and mixed waste that have been generated as a result of plant operations. This activity provides technical support for the demonstration of key process area for the CIF. These areas include a test burner to evaluate the performance of rotary seals and a 1/10th scale off gas system to optimize OG system performance. In addition, SRL will provide the ash solidification equipment for this facility for the stabilization of ash residues. Included in this activity will be the development of a formulation for solidification of this waste stream and equipment support work.

- ***Replace/Upgrade 776-A Waste Handling Facility (SR0054) (Priority 3)***

  This project will provide a new facility that will replace and upgrade the 776-A radioactive liquid waste handling facility. The existing 776-A radioactive liquid waste handling facility collects and temporarily stores radioactive and nonradioactive aqueous wastes generated by research activities at the SRL Technical Area, and transports these wastes to the 200 Area for final disposal. Wastes are stored in underground storage tanks protected by reinforced concrete secondary containment structures. Wastes are transported over plant roads by tanker trucks to the 200 Area. The existing facilities and equipment are over 30 years old and are nearing the end of their useful life. Layout of

the facility makes inspections of the system components difficult. This facility does not provide waste treatment capability and does not have the flexibility to respond to rapidly changing environmental regulations.

The replacement/upgrade project will utilize and install state-of-the-art technology and equipment to treat radioactive and nonradioactive liquid waste streams resulting from research at the SRL Technical Area. The new facilities will operate within current environmental regulations, and will provide the flexibility to address anticipated environmental regulations. New facilities will treat the clear, nonradioactive liquid waste streams to meet NPDES guidelines and discharge effluent to the A-001 outfall. Radioactive liquid waste streams will be treated to reduce the activity of the effluent. This project will provide new equipment to ship treated effluent from the radioactive waste streams and solid radioactive secondary waste generated by the wastewater treatment process to the 200 Area for final disposal. This shipment of the solid waste will meet environmental and DOT regulations.

Storage

- ***Contained Pad Storage (SR0179) (Priority 3)***

  This activity will provide the necessary storage for drum waste and operating materials.

Safety and Continuity

- ***Safety & Continuity (SR0055) (Priority 1)***

  This activity provides technical oversight and safety technology support for waste management operations. Included in this activity are safety related process studies, development of technical standards, incident reviews, and Safety Analysis Reports to ensure the safety of on-going site waste management activities.

- ***Waste Management Operating Costs (SR0062) (Priority 1)***

  SRL generates LLW, hazardous and mixed waste as part of routine laboratory operations. This item covers activities connected with the collection, packaging, storage, and transport of radioactive, hazardous, and mixed waste generated as a result of ongoing operations of the SRL.

- ***Production Monitoring Support (SR0052) (Priority 3)***

  This project is continued support to Waste Management Operations to provide trace radionuclide analysis. This includes waste analysis stock and aqueous effluent analysis. Analyses are needed to ensure safe disposal of significant quantities of low-level, mixed, and hazardous waste. Research and development of analysis methods is included in the support effort.

- ***Process Containment Exhaust Systems Upgrade (SR0199) (Priority 3)***

  Project activities involve upgrading or replacing process containment supply and hood exhaust systems in the SRL Technical Area thus allowing continued use of this area to support Waste Management activities. The process containment supply and exhaust systems in the laboratory buildings maintain airflow patterns that prevent flow of chemical/radioactive/carcinogenic contamination from a laboratory to other parts of the building or the environment. These systems have been in operation since 1952. System components have deteriorated, provide marginal performance, and require frequent repairs. Failure of these systems increases the potential for an air reversal and a release of contamination outside of the primary confinement zones. This project will replace the aging system components, including fans, heating coils, cooling coils, filter frames, ductwork, controls and monitoring equipment. With new components, the potential of system failure is reduced, concurrently reducing the potential of releasing contamination.

- ***Hazardous Waste Reduction (SR0090) (Priority 1)***

  This activity will provide new intiatives in the reduction, treatment or elimination of hazardous wastes generated at the SRS. This task will include the identification of methods to recycle hazardous waste as raw materials. The objective is to reduce the volume of stored waste through technology development for recycle/recovery. This is lead site funding.

5.3.6.5 Low-Level Waste

Research and Development

- ***LLW Storage/Disposal-B.G. Operation (SR0047) (Priority 1)***

  SRS will be constructing a new LLW Facility utilizing state-of-the-art concepts for LLW disposal based principally on engineered disposal systems. This is a transition to new disposal practices and will require modification of existing handling and packaging requirements. This activity provides for development of packaging requirements and demonstration studies for the new SRS LLW disposal facility. This activity also includes groundwater studies of past LLW operations to support future planned closure activities. Included in this task is the demonstration of remote technology for handling waste and reducing worker exposure. Technical support for the outyears consists of groundwater studies and process technology support.

- ***LLW Technology (SR0089) (Priority 1)***

  This activity provides for continued investigations of radionuclide migration on the SRS Burial Ground and for laboratory and field tests of mechanisms associated with migration. The SRS Burial Ground is representative of conditions at commercial, shallow land burial (SLB) sites that are operating in a humid, coastal plain area. Experience from operating this site will provide information necessary to develop disposal facilities at other humid sites. Included in this will be field investigations of landfill stabilization by grout injections, dynamic compaction and chemical fixation.

- ***Active Lysimeters (SR0099) (Priority 3)***

  This task provides for continued investigation of radionuclide migration in the SRS Burial Ground for laboratory and field tests of mechanisms associated with migration. The SRS Burial Ground is representative of conditions at commercial shallow land burial (SLB) sites that are operating in a humid, coastal plain area. Experience from operating this site may provide information necessary to develop disposal facilities at other humid sites.

5.3.6.6 Transuranic Waste

Research and Development

- ***TRU Waste Compliance Activities (SR0060) (Priority 1)***

  TRU wastes (transuranic waste) have been stored at SRS since 1974. As part of the National TRU waste program, these wastes are to be retrieved, repackaged (as necessary) and transported to the Waste Isolation Pilot Plant (WIPP) for disposal. This program addresses technical requirements necessary to assure the safe transportation of SRS TRU wastes to the WIPP.

  This R&D task is to determine gas generation rates and determine ways to ensure the safe transportation of SRS TRU waste to WIPP. Completion of gas generation testing is essential to assure SRS waste can be certified for shipment to WIPP.

- ***TRU Waste Processing Technology (SR0061) (Priority 1)***

  TRU Wastes (transuranic waste) have been stored at SRS since 1974. In support of the National TRU programs, these wastes will be transported to the Waste Isolation Pilot Plant (WIPP) for disposal. Prior to shipment, wastes must be packaged to meet waste acceptance criteria for disposal at the WIPP. This activity provides demonstration of the TRU waste technology for improved TRU waste handling to ensure all SRS TRU waste will satisfy certificate of compliance requirements. This includes development activities conducted in support of the Transuranic Waste Facility for remote handling and packaging of TRU waste. Completion of this program is necessary to demonstrate waste retrieval and demonstrate process concepts for the TRU Waste Facility.

- ***TRU Waste - Lead Site (SR0088) (Priority 1)***

  This activity will provide technology development for the recovery of Pu-239 from the TRU waste generated in the Separations Area. This will aid in the reduction of TRU Waste volume while producing an ash that will be used to recover the Pu-239.

- ***Recovery Incineration (SR0053) (Priority 3)***

  TRU wastes are generated as the result of producing strategic nuclear materials. Waste contaminated with transuranics (TRU) are packaged and stored retrievably on-site awaiting transportation to the Waste Isolation Pilot Plant (WIPP) for disposal. To reduce future waste generation, methods of recovery are being developed. This activity supports the utilization of

existing incineration technology for recovery of fissile material from TRU waste. Process demonstration is aimed at reducing the volume of TRU waste generated while producing incinerator residues compatible with technologies for metal recovery. The goal is to reduce the ultimate volume of waste generated.

5.3.6.7 High-Level Waste

Treatment

- ***Defense Waste Processing Facility - Waste Compliance Technology (SR0043) (Priority 1)***

  This activity funds the SRL support of DWPF product acceptance technology and also confirmation of product acceptability. This is lead site funding. Specific near-term goals are gaining approval of the DWPF Waste Form Compliance Plan (WCP), preparation of a preliminary Waste Form Qualification Report (WQR), assistance in including data from Integrated Cold Run in WQR, and development and implementation of QA programs for DWPF product qualification and production.

- ***Defense Waste Processing Facility - Support (SR0044) (Priority 1)***

  This activity will provide technical support and startup assistance for DWPF, including:

  - Development and demonstration of equipment characterization plans.
  - Long-term materials corrosion tests in process environments.
  - Development and demonstration of process control strategies.
  - Development and demonstration of product characterization plans.
  - Assistance in solving processing problems during Integrated Cold Runs.

- ***HLW Evaporation Support (SR0045) (Priority 1)***

  Evaporation processes are used to reduce the volume and mobility of stored HLW at SRS. This activity provides technical support to HLW evaporation activities and is aimed toward improving overall tank farm evaporator operations by increasing utility. It will also provide support for a new replacement HLW evaporator. Primary focus of this activity is to improve evaporator system utility. This activity will provide support for programs to improve existing evaporator feed pumps and the newer above tank pump units.

- ***Waste Transfer-Old Tanks/Operations Support (SR0064) (Priority 1)***

  HLW is transferred between storage areas in the F and H Area Tank Farms and between tanks as part of waste transfer operations. To support on-going tank farm waste transfer activities, process technology support is conducted to fully understand waste handling activities including the fluid mechanics and equipment requirements. This activity will provide process technology support for HLW transfer activities. This activity includes HLW sludge characterization studies and simulated sludge transfer studies to support waste transfer activities. This program provides information necessary to establish a data base.

- ***ITP/ESP (DWPF Feed Prep.)/Operation (SR0035) (Priority 1)***

  HLW stored at SRS consist of an insoluble sludge and salt. To reduce the volume of HLW processed in the DWPF, the salt solution will be decontaminated where essentially all of the radioactivity will be removed. This is accomplished in an In-Tank Precipitation (ITP) process. The decontaminated salt will be disposed by mixing with grout and disposed of onsite as LLW. The precipitate, containing the radioactivity removed from the salt solution, will be processed in the DWPF. This activity provides for on-going process technology for In-Tank processing including the run-in of filters used for In-Tank processing programs.

- ***Decontamination Development (SR0042) (Priority 1)***

  Various components, tools, equipment, etc., became contaminated in certain service applications at the SRS. To reduce operator exposure where equipment is replaced or repaired, decontamination methods are used prior to this, as a way to reduce operator exposure. This task is to provide R&D in support of decontamination development for general site applications used in routine operations. It addresses the development/demonstration of coatings and chemical solutions to improve decontamination of equipment and reduce personnel exposure. Also this task will provide for development and demonstration of robotic systems integrated with decontamination technology for emergency response, facility maintenance and decommissioning activities. The major emphasis of this program will be: (1) Emergency Response; (2) Reduction of Personnel Exposure; (3) Technology development for decommissioning. A major demonstration will be conducted in FY 1993 where a High-Level Waste (HLW) tank top will be mocked up and remote technology utilized for decommissioning. This activity is necessary to support decommissioning of the HLW Tank Farm.

- ***HLW Storage Support (SR0046) (Priority 1)***

  HLW is stored at SRS in 51 large carbon steel tanks. Understanding the composition of the waste materials and chemistry is necessary for on-going operations. This activity supports the study of the chemistry of HLW to ensure corrosion data, corrosion mechanisms and waste chemistry data bases are maintained. This activity provides for process technology to ensure waste storage conditions are assured. This activity is necessary for the continued safe storage of HLW and control of corrosion.

- ***New Development HLW Processing and Waste Handling (SR0050) (Priority 1)***

  This program is directed at improving operations of the HLW Tank Farm by providing technology for enhancing current operations R&D. This activity will include development concepts for improving operation of the in-tank precipitation and reducing atmospheric benzene releases from resulting operation of the ITP process. In addition, this includes the demonstration of an ion exchange process as an improved method for salt decontamination. Also, this activity will address the demonstration of additional remote equipment for use in tank farm operations. Remote equipment will be utilized for task operations such as jumper change out and maintenance. Remote equipment will also be used to improve Tank Farm Operations by further reducing personnel exposure and increasing equipment repair capabilities.

- ***HLW Process Development (SR0051) (Priority 1)***

  HLW are stored in carbon steel tanks at SRS until feed preparation activities are completed that allow transfer to DWPF (HLW) or saltstone (LLW). Several programs require analytical support for evaluating process operations and conditions. This activity provides technology support for HLW storage/processing activities including analytical support for tank chemistry studies and operation of High Level caves facilities for waste handling and small scale testing. These support capabilities are needed for other HLW programs including In-Tank Precipitation, Salt Removal, Evaporation and Sludge processing.

- ***Salt Removal-New Tanks/Operations Supports (SR0056) (Priority 1)***

  HLW salt waste is stored in large carbon steel tanks at SRS prior to processing in the DWPF and disposal of decontaminated salt or saltstone onsite. This program addresses the area of salt removal from these tanks. This activity provides process support for programs to remove salt from salt storage tanks. This activity includes simulation testing to determine salt mining parameters for pump operations and determined optimum rates.

- ***Tank Farms (NWTF Operations) Support (SR0058) (Priority 1) R&D***

  This activity provides for the development of remote equipment to improve tank farm operation and reduce exposure. Includes development of remote equipment to disassemble components and reduce waste volume. This includes slurry pump testing, improved containment by new seal development and studies to improve and increase pump life. Also, the program will address improvement of waste transfer programs by conducting slurry transfer experiments.

5.3.6.8 F and H Area Effluent Treatment Facility

Treatment

- ***ETF Chemical Studies (SR0187) (Priority 1)***

  This activity provides process technology support for F/H Area Effluent Treatment Facilities. This work is necessary to provide chemical analysis for on-going studies of the ETF process. These studies are conducted as part of process technology activities needed to ensure treatment plant operation is maintained and system availability is secured.

Research and Development

- ***F/H Effluent Treatment Facility Support (SR0189) (Priority 1)***

  The F/H Effluent Treatment Facility began operations in November 1988 to treat aqueous process effluents from the 200 Area Separations and Waste Management Facilities. In support of this facility, SRL operates a pilot scale unit that is used for process technology support activities. This task provides for support for the maintenance and operation of test facilities supporting the F/H ETF. This task also will provide a demonstration of organics removal process to be used for

replacing the current activated charcoal process. This R&D program will reduce the volume of mixed and Low Level waste generated by plant operations. This task will also provide on-going support for chemical studies associated with process technology.

- ***SRL TNX Support (SR0209) (Priority 1)***

  Provide process technology support for the maintenance and operation of test facilities used is support of the F/H Area ETF. These facilities are operated to demonstrate methods for improved operation and waste minimization (organic removal) by ozonolysis.

- ***ETF Tritium Reduction (SR0206) (Priority 3)***

  Tritium is the major radionuclide released due to SRS operations. This task is to provide R&D of techniques for the reduction of tritium released to surface streams, principally by the 200 Area Effluent Treatment Facility. Operation of the ETF and discontinued use of seepage basins will result in increased off-site discharges of tritium. This task will address removal of tritium from process waste water and methods for recovery. Technology has been developed for recovery of tritium from high activity streams. This task will investigate methods and processes for application to low activity streams typical of ETF discharges.

5.3.6.9 SRL Waste Minimization

Waste Minimization

- ***Waste Minimization (SR0063) (Priority 3)***

  LLW, hazardous waste, and mixed waste are generated as a result of operations at SRS. SRS has developed an integrated plan for treatment and disposal of all SRS waste streams. To further reduce the volume of wastes that require treatment and disposal, waste minimization activities will be emphasized.

  This activity supports the R&D program for developing concepts to reduce the volume of solid and liquid waste generation by waste avoidance, substitution, recycle and treatment. This program is focused on the generation of waste and how to reduce the ultimate volume of waste disposed. The impact of this program will be to reduce the final disposal and handling costs for low level and hazardous solid waste.

5.3.6.10 Other

Research and Development

- ***Metallurgical Support (SR0048) (Priority 1)***

  Several R&D tasks are being developed to improve current waste disposal strategy, including waste recovery. The processes being developed will require component evaluation to determine equipment

lifetime. The task is to provide general metallurgical support for R&D task supporting general waste technology development. Specific areas include support for recovery incinerator studies and ETF corrosion components testing. This activity provides analysis of corrosion mechanics as a way to improve the operating life of process equipment.

- ***Modeling Studies (SR0049) (Priority 1)***

  This task provides for on-going studies of groundwater movement at potential new sites for SRS Waste Management facilities. The primary focus is to provide understanding for siting new waste disposal facilities. The goal of this program is to continue studies of the hydrogeology of the SRS site and eventually reduce requirements for physical systems such as monitoring well systems. This task will involve the calibration of this model to site specific properties and provide the basis for understanding the interaction between the various groundwater systems at SRS.

- ***Stress Analysis (SR0057) (Priority 1)***

  This task is to provide general stress analysis support studies of containers that store, process or handle hazardous, radioactive or mixed waste. On-going support is to provide analysis and chemical studies of components and devices used for waste handling and storage.

Safety and Continuity

- ***Chemical Storage Expansion, 674-T (SR0178) (Priority 3)***

  The Chemical Storage Expansion for Building 674-T will provide additional storage space for raw chemicals to be stored for research purposes. Currently, space is limited, and much of this material must be stored outdoors.

- ***600 Process Water Reservoir, T-Area (SR0238) (Priority 3)***

  This activity will replace the clear wells that were put into operation during the early 1950s. The current water reservoir fills up with sand periodically during operation. This and all new production wells will be located and constructed to minimize or eliminate the downward migration of contaminants as a result of pumping.

- ***New Water Well, T Area (SR0239) (Priority 3)***

  This activity will replace the existing wells on a needed schedule to keep up with the forecasted growth of the T Area. This and all new production wells should be located and constructed to minimize or eliminate the downward migration of contaminants as a result of pumping.

- ***Process Water Header, Westside, TNX (SR0240) (Priority 3)***

  This activity will allow for the increases in growth forecasted for T Area, and the new projects.

5.3.7 Tritium

5.3.7.1 Nonradioactive Hazardous and Mixed Waste

Disposal

- ***Waste Disposal (SR0066) (Priority 1)***

  Normal waste management in the Tritium Facilities is an on-going activity. Waste management activities include identification, handling, packaging, short-term storage, and shipment of job-control, mixed, and hazardous waste. Most waste management activities involve solid waste, but there is some liquid waste in drums that must be disposed.

5.3.8 Waste Management

5.3.8.1 Nonradioactive Nonhazardous Waste

Disposal

- ***Sanitary Landfill Expansion (SR0219) (Priority 1)***

  The present landfill at SRS will be full in FY 1991. It will take two to three years to build a new sanitary landfill and get it permitted with the state. State and federal regulations for sanitary landfills are currently being rewritten. The state has told SRS to expand the present landfill to allow time for regulations to be passed before building a new landfill.

- ***New Sanitary Landfill (SR0215) (Priority 3)***

  This is a newly identified project. Originally, the FY 1989 GPP project for the landfill was to build a new sanitary landfill.

5.3.8.2 Nonradioactive Hazardous Waste

Storage

- **Hazardous Waste Storage (SR0018) (Priority 1)**

  Hazardous waste is stored in diked, covered facilities that are permitted by the state of South Carolina. These facilities will continue to operate until the CIF and similar facilities are available to process the waste.This activity must be supported in order to meet environmental regulations and to continue to support site operations.

5.3.8.3 Mixed Waste

Storage

- ***Mixed Waste Storage/Disposal (SR0013) (Priority 1)***

  The currently operated Mixed Waste Storage Buildings are a storage facility for mixed waste permitted under RCRA interim status. The EPA "Land Ban" deadlines will prohibit the indefinite storage or disposal of mixed wastes by May 1990. To meet these environmental regulations, the mixed waste will be stored at the Mixed Waste Storage Buildings until the RCRA permitted Hazardous Waste/Mixed Waste Disposal Facility is operational.

5.3.8.4 Nonradioactive Hazardous, Mixed and Low-Level Waste

Treatment

- **Consolidated Incineration Facility - Operations (SR0019) (Priority 1)**

  This task provides funds to support facility design for FY 1989 through FY 1991, and facility startup and operation support beginning in FY 1992. This activity will provide facilities to treat and dispose of hazardous waste, low-level radioactive waste and mixed waste at SRS in accordance with state and federal regulations.

- **Nonradioactive Hazardous Waste (SR0068) (Priority 1)**

  This project will provide facilities to store, treat and dispose of hazardous waste generated at the SRS in accordance with state and federal regulations and will include the facilities to contain, recover, or neutralize chemical spills, facilities to adjust the pH of aqueous effluents, and the CIF. The CIF will provide a process facility to incinerate solid and liquid wastes generated at SRS including wastes that are considered hazardous under RCRA, low-level radioactive wastes, and mixed wastes. The resulting solid waste products from the incineration process will be solidified in a cement matrix in drums with facilities provided by this project.

Disposal

- ***Hazardous Waste/Mixed Waste Disposal Facility (SR0070) (Priority 1)***

  It will provide for the above grade disposal of hazardous and mixed waste per the South Carolina Department of Health and Environmental Control regulations, the EPA regulations and DOE orders. The purpose of this facility is to provide a RCRA permitted disposal facility for waste containing hazardous components that cannot be otherwise disposed of in existing or planned facilities at SRS. The RCRA amendments will eliminate the indefinite storage and landfilling of all untreated hazardous wastes in May of 1990. SRS intends to apply for several one-year extensions to permit continued storage of these wastes until this treatment and disposal facility is complete. This project will be integrated with planned stabilization and incineration programs to provide a final permitted, monitored, disposal location for hazardous and mixed waste.

- ***Y-Area Solidification And Disposal - Operations (SR0023) (Priority 1)***

  This activity provides funds to support design and construction of the facility in FY 1989 through FY 1992 and startup and operation of the facility in FY 1993 through FY 1995. The Y-Area Solidification and Disposal Facility provides RCRA permitted facilities for the solidification and permanent disposal of waste salt solutions from the 300-M Area Fuel Fabrication Facility and the CIF. These facilities will allow 1.2 million gallons of solution per year to be mixed with cement, blast furnace slag, and fly ash. This mix will be pumped via a pipeline into above ground RCRA permitted vaults and solidified into saltstone.

- ***Y-Area Vault Project (SR0032) (Priority 1)***

  This project provides RCRA approved vaults in Y Area for the disposal of saltstone. One vault is required each year to adequately accommodate saltstone production.

- ***Waste Solid and Disposal Plant (SR0218) (Priority 1)***

  This project provides facilities for the solidification and permanent disposal of waste salt solutions from the 300-M Area Fuel Fabrication Facility. These facilities will allow 1.2 million gallons of solution per year to be mixed with cement, admix, and fly ash. This mix will be pumped via a pipeline into above ground RCRA approved vaults and allowed to solidify into saltstone.

- **Waste Preparation Facility - Operations (SR0021) (Priority 3)**

  This line item project will provide facilities to prepare low level solid waste for disposal. This preparation consists of volume reduction of the waste via shredding and compaction and then containment of the waste in drums by filling the void spaces with cement grout. It will reduce the volume of waste packed in the burial ground vaults, thus increasing vault life and decreasing storage/disposal costs. It will also provide facilities to contain the waste creating a more stable waste form and reducing the risk to man and the environment. These funds are needed to support the design and startup of the facility.

- **Waste Preparation Facility (SR0217) (Priority 3)**

  This activity will provide RCRA permitted facilities to prepare low and intermediate level solid waste for disposal. This preparation consists of waste reduction of the waste via shredding and compaction and then containment of the waste in drums by filling the void spaces with concrete. It will reduce the volume of waste packed in the burial ground vaults and the HW/MW Disposal Facility Vaults, thus increasing vault life and decreasing storage/disposal costs. It will also provide facilities to contain the waste creating a more stable waste form and reducing the risk to man and the environment.

5.3.8.5 Low-Level Waste

Storage

- ***Low-Level Waste Processing Tanks - Operations (SR0025) (Priority 1)***

  This project will provide a facility in H Area at SRS to receive and transfer hazardous low-level liquid waste streams generated by Extended Sludge Processing, the Effluent Treatment Facility, In-Tank Precipitation and the Receiving Basin of Offsite Fuels. This facility will manage 6,000,000 gallons of hazardous low-level waste annually which will be distributed to salt and sludge removal facilities, the Tank 32 cesium removal column and In-Tank Precipitation. The purpose of this project is to provide tank space needed to manage these large volumes of hazardous low-level wastes.

  Currently this waste is being stored in 27 year old Type IV tanks which are single walled, carbon steel tanks that do not meet RCRA requirements for new tank construction. This activity provides startup and operating funds in FY 1995 and support of design in FY 1989 through FY 1994.

- ***Hazardous Low-Level Waste Processing Tanks (SR0067) (Priority 3)***

  This project will provide a facility in H Area at the SRS to receive and transfer hazardous low-level liquid waste streams generated by Extended Sludge Processing, In-Tank Precipitation, and the Receiving Basin of Offsite Fuels. This facility will manage six million gallons of hazardous low-level waste annually which will be distributed to salt and sludge removal facilities, the Tank 32 cesium removal column, and In-Tank Precipitation. The purpose of this project is to provide tank space needed to manage large volumes of hazardous low-level wastes. Currently, this waste is being stored in 27-year-old Type IV tanks which are single walled, carbon steel tanks that do not meet RCRA requirements for new tank construction.

Disposal

- ***Low-Level Waste Storage/Disposal - Burial Ground Operations (SR0016) (Priority 1)***

  This task includes all activities needed for the safe, environmentally sound operation of the Burial Ground for the disposal of low-level solid waste. Costs for this activity increase significantly in FY 1991, when SRS moves to an improved mode of operation with disposal in engineered vaults. Costs such as manpower costs and material costs will increase accordingly.

- ***Low-Level Waste Storage/Disposal - Project (SR0015) (Priority 1)***

  The current low level waste disposal facility will reach capacity by early FY 1991. This project will provide new facilities required to allow continuous site operations. The new facilities will offer significantly enhanced environmental protection over current disposal methods and the upgraded design of the new facility will be required to meet the new DOE Order 5820.2A performance requirements.

5.3.8.6 Transuranic Waste

- ***Transuranic Waste Facility - Operations (SR0020) (Priority 1)***

  The TRU Waste Facility (TWF) will be permitted under the RCRA and will consist of a new building and equipment necessary to retrieve, examine, repackage, and prepare for certification TRU waste at the SRS so that it can be safely and permanently disposed of at the Waste Isolation Pilot Plant (WIPP) in New Mexico. Approximately 15,000 cubic feet of stored waste and 6,200 feet of newly generated waste will be handled each year at the TWF. Hazardous waste contaminated with TRU waste is governed by RCRA and implementation of this act will require removal of all stored mixed waste. These operating funds will be required starting in FY 1990 to support Design, Construction, and in FY 1995 to support startup.

  SRS has anticipated the potential for breach of containment of the TRU drums. The following contingencies mitigate the consequences of container failure; (1) rainwater runoff is monitored to detect radionuclides released due to containment failure, and (2) radiological surveys will be conducted as part of the container retrieval program. Catastrophic failure of a drum is not expected based on field corrosion studies which indicate drum life should exceed 20 years. Also, the drums have a 90-mil polyethylene liner which should provide containment in the event of drum failure.

- ***TRU-Waste Facility (SR0069) (Priority 1)***

  The TRU Waste Facility (TWF) will be permitted under the Resource Conservation and Recovery Act and will consist of a new building and equipment necessary to retrieve, examine, repackage, and prepare for certification TRU waste at the SRS so that it can be safely and permanently disposed of at the Waste Isolation Pilot Plant (WIPP) in New Mexico. This project will provide equipment to retrieve the waste, vent and purge, x-ray and assay the storage containers, size reduce the large waste not suitable for shipment as is, and repackage the waste for shipment and permanent disposal offsite. Approximately 15,000 cubic feet of stored waste and 6,200 feet of newly generated waste will be handled each year at the TWF. By startup in FY 1995, a portion of the stored TRU waste will exceed the design basis 20-year storage limit. The SRS has the largest inventory of waste in the DOE complex by radioactive content because of the large amount of plutonium generated at this site.

Storage

- ***Waste Certification Facility - Operations (SR0022) (Priority 1)***

  This activity is to manage Transuranic Waste (TRU) at the SRS, including the operation of the Waste Certification Facility (WCF) and all storage and handling costs within WM facilities. The WCF will be used to certify TRU waste for shipment to the Waste Isolation Pilot Plant (WIPP).

Disposal

- ***Waste Certification Facility - Transportation to WIPP (SR0091) (Priority 1)***

  This activity is to provide transportation costs of TRU wastes to the Waste Isolation Pilot Plant (WIPP).

5.3.8.7 High-Level Waste

Treatment

- ***Evaporation (SR0002) (Priority 1)***

  This task includes both the operation of the current SRS tank farm evaporators and the design and construction of a new replacement HLW evaporator (89-D-174). The current evaporators process HLW to support the canyon (Separations) processes at the SRS. However, two of these evaporators are approaching 30 years of service and are becoming increasingly unreliable. The new evaporator will replace these two and will also provide capacity needed to process the DWPF recycle stream (an additional three million gallons/year). Also, the new evaporator will offer enhanced contamination control over the current facilities.

- ***Waste Transfer-Old Tanks/Operation (SR0003) (Priority 1)***

  This activity is to provide operating funds for current waste removal operations. High-level waste is currently stored in tanks which do not have complete secondary containment capacity. Many of these tanks have existing leaksites. This funding is needed to allow removal of the waste and transfer to full secondary containment, Type III, tanks where waste will be prepared for feed to the Defense Waste Processing Facility.

- ***Waste Transfer-Old Tanks/Cost Project (SR0004) (Priority 1)***

  Waste Transfer provides facilities for the removal of waste from twenty-three high-level waste tanks. This activity provides operating funds for current waste removal operations. High-level waste is currently stored in tanks which do not have complete secondary containment capacity. Many of these tanks have existing leaksites. Waste Removal will be accomplished by adding water to each tank and using long-shaft slurry pumps to agitate the waste. Salts will be dissolved and insoluable solids suspended in the slurry so that the waste can be transferred to a Type III tank.

- ***Salt Removal-New Tanks/Operations (SR0005) (Priority 1)***

  The high level waste storage facilities at SR are collectively approaching their maximum storage capacity. These funds provide for the removal of saltcake from Tank Farm storage tanks so that they can be re-used to receive evaporator concentrate. The removed salt solution will be processed via In-Tank Precipitation and eventually transferred to DWPF for permanent disposal.

- ***Salt Removal-New Tanks/Cost Projects (SR0006) (Priority 1)***

  Salt Removal from the newer Type III tanks is required so that these tanks can be returned to active use as evaporator concentrate receipt tanks. Without the salt removal capability, the high-level waste tank farm available space would eventually be depleted and the tank farms would not be able to sustain support of canyon (Separations) processes and operations. Salt removal facilities will eventually be needed on all thirteen salt receivers, however, the facilities are being constructed in phases under several different projects as the facilities are needed to support Tank Farm and canyon operations.

- ***Defense Waste Processing Facility (SR0007) (Priority 1)***

  This activity includes the Vitrification Facility which is part of the Defense Waste Processing Project. Located in S Area, this facility converts high level radioactive waste into a borosilicate glass. Cold runs of the vitrification process are tentatively scheduled for the fourth quarter 1990 and will be completed by third quarter 1992. Funding requested for the vitrification facility includes a projected startup second quarter 1992. This task also includes funding for the second DWPF Glass Waste Storage Facility in FY 1992. Included in the Glass Waste Storage Facility Line Item is funding for the failed Equipment Storage Facility.

- ***ITP/ESP (DWPF Feed Preparation)/ Operations (SR0009) (Priority 1)***

  Tank farms used for storing and processing high-level waste at SRS are nearing their capacities. This process, In-Tank Precipitation (ITP) will process salt solution from salt storage tanks so that they can be returned to use as evaporator concentrate receivers. The ITP products, precipitate and decontaminated salt solution will then be further processed in the DWPF and Saltstone facilities, respectively, for eventual permanent disposal. Sludge processing activities prepare the sludge fraction of SRS waste for feed to the DWPF. These processes together will allow continued canyon operations, the removal and processing of tank farm high-level waste and eventual decommissioning of the older SRS tanks.

- ***ITP/ESP (DWPF Feed Preparation)/ Cost Project (SR0010) (Priority 1)***

  The In-Tank Precipitation cost projects are nearing completion. These projects provide facilities to process dissolved salt solution from salt storage tanks so that these tanks can be returned to use as active evaporator concentrate receivers. The tank space must be recovered to allow the tank farms to continue to support canyon (Separations) operations.

- ***Agitation (SR0008) (Priority 3)***

  A layer of insoluble solids collects on the tank bottom of high-level waste tanks that are used to receive fresh canyon waste. This sludge layer generates heat by radiolytic decay. Currently, the high level waste tanks do not have a mechanism for effectively cooling this layer of sludge. This project will provide facilities to agitate the sludge layer so that it can be dispersed into the supernate layer and subsequently cooled by the tank cooling coil system. It is not anticipated that funds will be available in FY 1990 to initiate this task.

- ***High-Level Waste Removal (SR0027) (Priority 3)***

  This activity will provide agitation facilities needed to remove salt cake and sludge from HLW tanks so that they can be reused as concentrate receivers and facilities needed to dissipate hot spots in fresh high heat waste receivers so that they can continue to be used. The hot spots must be dissipated to protect the integrity of the carbon steel tank walls. The salt cake will be removed and processed via In-Tank Precipitation so that the tank farms can continue to support canyon operations. The sludge will be removed to supply feed to DWPF.

Storage

- ***Tank Farms (Non-Routine Maintenance & Upgrades) (SR0011) (Priority 1)***

  This activity includes all non-routine maintenance and upgrades in the high level waste Tank Farms. Examples of activities include replacement of failed service lines, upgrades of the public address system to meet emergency preparedness requirements, upgrades of operational systems and instrumentation, and facility upgrades to enhance contamination control. Also included in FY 1989 and FY 1990 are Line Item funding to complete Contamination Containment Buildings over key Diversion Boxes and Pump Pits in the Tank Farms.

- ***Tank Farms (NWTF Operations) (SR0012) (Priority 1)***

  This activity includes the startup and operation of four New Waste Transfer Facilities: H-DB8 (H-Area Diversion Box # 8) in the H-Area Tank Farm, the Auxiliary Pump Pit, the Low Point Pump Pit, and the Low Point Drain Tank. These facilities are required for inter-area transfers of processed high level waste to DWPF Vitrification and Saltstone facilities for final processing. HDB-8 will also provide new transfer routes within H Area and a route from the F/H Effluent Treatment Facility back to the H-Area Tank Farm.

- ***Stormwater System Upgrade (SR0026) (Priority 3)***

  This activity will provide improved management of storm water from Waste Management areas. Additional and improved monitors will be installed, new collection basins constructed and existing diversion basins will be upgraded.

- ***Interarea Line Upgrade (SR0028) (Priority 3)***

  The Interarea Line is used to transfer HLW between the F and H-Area tank farms. This activity will provide a containment building with HEPA filtered and monitored exhaust for F-Area Diversion Box 1, F-Area Pump Pit 2 and the Interarea High Point Vent. These facilities will minimize radiation exposure to workers and will significantly enhance contamination control.

- ***Restoration of Service Facilities (SR0029) (Priority 3)***

  This activity will upgrade existing service facilities in F and H-Area tank farms, particularly the plant and instrument air lines and the emergency power, substations and lighting systems. These

upgrades are required to ensure that necessary services are maintained to existing and future facilities and to maintain compliance with the DOE orders.

- ***Tank Farm Containment (SR0073) (Priority 3)***

  Funds for this project will provide permanent containment buildings for three existing Tank Farm evaporators and for four pump pits and two diversion boxes to allow for remote maintenance with appropriate containment. This work is currently done with temporary plastic containment structures. Because of the nature of the temporary structures, work cannot be performed during inclement weather. Therefore, the new structures will not only enhance radionuclide containment, but will also significantly decrease interruptions of facility operations.

Disposal

- ***Saltstone Operations (SR0014) (Priority 1)***

  The Saltstone Facility is a separate facility of the Defense Waste Processing Project. Located in Z Area, this facility provides for safe disposal of low level radioactive waste. This facility immobilizes decontaminated salt solution from the in-tank precipitation process in the tank farm by mixing it with slag and flyash.

  This task includes not only the cost of operating the facility but also the cost of constructing additional vaults. The facility is mechanically complete and ready for simulated salt solution runs during the third quarter 1989.

Safety and Continuity

- **Improve Storm Water System (SR0220) (Priority 1)**

  This project will provide improved management of storm water in Waste Management Areas. This will include providing improved monitoring capacity and decreased risk of inadvertant releases to the environment.

Safety and Continuity

- ***Constant Air Monitors (SR0211) (Priority 4)***

  Constant air monitors are to be installed at approximately 40 locations on waste storage tanks in the F and H Tank Farm Areas. Monitors will be installed on tank purge and annulus exhaust systems that presently do not have constant air monitor systems.

5.3.8.8 F and H Area Effluent Treatment Facility

Treatment

- ***F/H Area Effluent Treatment Facility (SR0017) (Priority 1)***

  The purpose of the F/H Effluent Treatment Facility (ETF) is to collect and treat routine process waste water, formerly discharged to the F and H-Area Seepage Basins. The ETF uses ultrafiltration, reverse osmosis, and evaporation to remove hazardous and some low level radioactive constituents from the influent stream. The resulting stream meets NPDES requirements for discharge to plant surface streams.

- ***Organic Oxidation Facility - Effluent Treatment Facility (SR0030) (Priority 1)***

  This facility is required to treat organic compounds which may be present in DWPF waste water streams beginning in FY 1993. The ETF Organic Oxidation Facility will utilize ozone generation equipment and ultra-violet light chemical reaction vessels to treat waste streams which are presently treated with activated carbon columns. Delay of this project could result in excessive operating costs (estimate, three million/year) and accumulation of 35,000 cubic feet annually of mixed radioactive waste. This project was included in the FYP, but has since been shown to not be cost effective.

- ***ETF RM Storage Building, 200-H, (WMO), Project #0564 (SR0159) (Priority 3)***

  This project will provide a prefabricated building at the Effluent Treatment Facility (ETF) for storage of raw materials. The building will be 2500 sq. ft. in size with a 20 ft. wall height and will include heating and ventilation.

- ***ETF Spare Parts Storage Building, 200-FH, Project Number 0566 (SR0160) (Priority 3)***

  This project will provide a prefabricated building at the ETF for storage of spare parts and instruments. The building will be 3,400 sq. ft. with a 20 ft. wall height with air conditioning.

Storage

- ***Retention Basin Liners, F (SR0222) (Priority 3)***

  This project is to install new liners in F-Area retention basins to improve integrity and reliability and minimize potential for releases to the environment.

- ***Retention Basin Liners, H (SR0223) (Priority 3)***

  This project is to install new liners in H-Area retention basins to improve integrity and reliability and minimize potential for releases to the environment.

5.3.8.9 Waste Minimization

Waste Minimization

- ***Landfill Monitoring Assay (SR0221) (Priority 1)***

  The equipment for this project will provide improvements in segregating low-level waste from clean waste and will be used as a part of the site Waste Minimization Plan set forth in DOE Order 5820.2A.

5.3.8.10 Other

Safety and Continuity

- ***Safety and Continuity (SR0001) (Priority 1)***

  This activity includes all tasks associated with maintaining the safety and continued operation of Waste Management programs. Examples of these tasks include surveillance and maintenance of waste management facilities, monitoring, facility upgrading to meet DOE requirements, waste management planning and coordination activities for production, and site-wide efforts such as waste minimization. Funds for this task also provide for training programs for facility operating personnel as well as Quality Assurance activities.

- ***Permitting (SR0216) (Priority 1)***

  Waste Management has prepared the RCRA Part B submittals for the Hazardous/Mixed Waste Disposal Facility, the Consolidated Incinerator Facility, and is preparing the RCRA Part B submittal for Y Area, Transuranic Waste Facility, and TRU pads. A RCRA Closure Plan was submitted for the F and H Seepage Basins after the operating permit was denied. Revisions for the Mixed Waste Management Facility submittals are made as needed. A wastewater permit will be submitted to SCDHEC. Separate permit applications may be needed for two new facilities: the New Waste Evaporator and the Hazardous Low-Level Waste Processing Tanks. SRS is preparing, at DHEC's request, a wastewater permit package for the high level tanks; the new Waste Evaporator and Low Level Waste Processing Tanks will be permitted in a similar fashion as permitted modifications to a wastewater facility. The costs for this activity include estimates for rewriting the permit application to respond to regulator's comments, revisions to the application to reflect new facilities, and groundwater monitoring for RCRA contaminants.

- ***Waste Management Safety and Continuity (SR1000) (Priority 1)***

  This activity includes all tasks necessary to upgrade Waste Management Operations to Standards in commercial nuclear practices similar to the upgrades necessary in SRS Reactor operations.

- **Drilling and Sampling (SR0212) (Priority 3)**

  Monitoring wells are required at a number of waste management facilities. The construction of the new Hazardous/Mixed Waste Repository will require monitoring wells to demonstrate compliance with

groundwater quality standards. A request for waiver has been submitted to South Carolina Department of Health and Environmental Control. If a detection monitoring system is required, the system will consist of at least one upgradient well and three downgradient wells at the point of compliance. The construction of new facilities in Y Area to dispose of waste generated in M-Area will require monitoring wells in order to demonstrate compliance with groundwater quality standards. Twelve wells have been installed in Y Area by the SRL to determine background water quality. The Mixed Waste Management Facility, seven F and H Area Seepage Basins, and the Old Radioactive Burial Ground will be closed to comply with RCRA, SCHWMR, and DOE orders. Closure under SCHWMR requires groundwater monitoring for at least 30 years. A waste solidification and disposal facility is planned for construction at Y Area. The groundwater characterization program is planned which will include the installation of 18 RCRA monitoring wells. New RCRA monitoring wells are planned for installation around the Burial Ground Expansion site and F and H Area Tank Farms. This is priority 3 based on DOE-HQ guidance.

The proposed performance evaluation and tracking system are discussed in Section 1.1.

5.4 Schedule, Milestones, and Costs

The SRS annually reviews its waste management needs and prepares forecasts and schedules for ensuring that continuous, safe operations are maintained. These forecasts and schedules become the basis for milestones and budget requests. This section presents a few of the key schedules, all key FY 1990 milestones, outyear milestones for the primary projects, and summaries of the estimated costs that will be incurred to meet the milestones and schedules.

Schedules

Waste Management schedules start with a forecast of site needs for waste storage, treatment, or disposal. Based on these needs, projects are proposed and schedules are developed to guide the project to a timely completion. These schedules and milestones may change depending on final program guidance from DOE-HQ. Key FY 1990 schedules are provided in Figures 5-13 through 5-16. For example, forecasts of future solid Low-Level Waste generation indicate that current burial ground space will be fully utilized in second quarter Fiscal Year 1992. Figure 5-14 shows the schedule for providing a new LLW vault, ready for operation by that time. Similarly, the Defense Waste Processing Facility will begin operations in second quarter FY 1992. By that time the Consolidated Incineration Facility must be operational to manage the benzene waste stream from the DWPF. Figure 5-13 shows the CIF schedule for making that commitment.

The costs and milestones given in the next two sections are all based on schedules similar to the ones described above.

Milestones

Milestones for the outyears, FY 1991 through FY 1995, are presented in Tables 5.2 and 5.3. Twenty projects have been or will be initiated during FY 1989 through FY 1991. The project milestones are given in Table 5.11. Twenty other projects which will require permits before milestones can be specified are listed in Table 5.3. Milestones for FY 1990 are covered in more detail in the sections below. These sections cover the main areas of the FYP: Treatment, Storage, Disposal, Waste Minimization, and Safety and Continuity.

Treatment

Treatment is by far the most active area at SRS throughout the planning period. Title I design is scheduled to begin for the TRU Waste Facility. The RCRA Part B permit is also scheduled to be submitted this year.

There are also many milestones associated with the High-Level Waste program. Construction is scheduled to begin on the new Replacement HLW evaporator. Operations that will prepare feed for DWPF, In-Tank Precipitation (ITP) and Extended Sludge Processing (ESP), are scheduled to begin operations. (ESP will actually be resuming operations. That operation has been down for modifications to its main equipment, the long shaft slurry pumps. This same type pump will also be used by ITP.) The DWPF itself is also scheduled to initiate cold runs during this fiscal year.

Storage

While several different waste types are stored at the SRS, most activities are directed towards treatment and eventual disposal. Therefore there are only a few milestones specifically directed at storage facilities for FY 1990. The most significant milestone is to place a New Waste Transfer Facility in service for the HLW tank farm. This facility will provide new transfer routes to the DWPF and ETF and will provide alternatives to several old routes within the tank farm.

Disposal

Construction will begin in FY 1990 for a new facility that is essential to the SRS plan for managing low-level wastes, the New LLW Disposal Facility. Title II design will begin on the Hazardous Waste/Mixed Waste Disposal Facility, a facility that is essential to our future management of those waste types.

Waste Minimization

Waste Minimization has been an active program at the SRS for several years now, with specific programs aimed at reducing the amount of LLW and hazardous waste that is generated. However, for FY 1990, the SRS is committed to completing and issuing a formal Waste Minimization Plan. In the meantime, SRS will continue its efforts to reduce waste and has a milestone to reduce the amount of LLW generated by 5 percent over FY 1989.

Safety and Continuity

The SRS will place a great deal of emphasis on enhancing safety and continuity programs in the coming year. Training programs will be enhanced to include a new "Conduct of Operations" course for all operators and their first-line supervisors. "In-Field" trainers will be assigned to provide experienced on the job training for new operators. A Maintenance Improvement Program will be implemented as will a program for ensuring the proper calibration and labeling of all Measuring and Test Equipment.

Costs

Waste Management Operations projected expenditures (based on 1989 Activity Data Sheet submittal) over the planning period will total over $3.6 billion with annual total costs increasing from approximately $370 million in FY 1989 to $600 million in FY 1989 (Figure 5-17). The increase in cost is associated the installation and operation of major new waste management facilities at the SRS. Most activities for waste management are rated as Priority 1 for operation of existing, and construction and operation of new waste management facilities at the site (Figures 5-18 and 5-19).

Activity Area	Total Cost ($s in Thousands)
Treatment	$1,984,773
Storage	356,471
Disposal	381,104
Waste Minimization	13,180
Research and Development	92,998
Safety and Continuity	600,471
Program Support	195,313
Total	$3,624,310

Additional information concerning Waste Management Operations and Research Development planned expenditures are provided in the following sections. Activity specific descriptions were provided in Section 5.3.

5.4.1 Treatment

Treatment costs for the planning period total approximately $2.0 billion (Table 5.4) and constitute 55 percent of the Waste Management Operations estimated costs (Figure 5-20). Forty-eight activities were identified for the planning period. Annual costs are approximately $300 million per year (Figure 5-21). Operating costs include activities such as: support for the Consolidated Incineration Facility (CIF), Defense Waste Processing Facility (DWPF), HLW tank farm operations; and operating expenditures for the HLW tank farm, DWPF, CIF, TRU facility, Effluent Treatment Facilities (ETF), and ETF chemical studies.

A number of major line item projects are proposed for construction initiation or completion, and operation during the planning period including the DWPF, CIF, Waste Handling Facility, Waste Preparation Facility,

several effluent treatment facilities, waste stream toxicity reduction, waste processing, and HLW removal. Line Item expenditures are projected to total over $512 million. The remaining treatment activities are associated with several capital and GPP projects associated with the HLW tank farms, DWPF, CIF, and ETFs.

5.4.2 Storage

Storage costs for the planning period total approximately $356 million (Table 5.4) and constitute 10 percent of the Waste Management Operations estimated costs (Figure 5-20). Annual costs increase from approximately $24 million in FY 1989 to $75 million in FY 1995 (Figure 5-22). Nineteen activities were identified for the planning period. Operating costs which include activities such as TRU waste handling, hazardous waste handling, HLW tank farm support and operations, low-level and mixed waste operations, and Waste Certification Facility operations.

A number of major line item projects are proposed for construction initiation or completion, and operation during the planning period including HLW tank farm improvements, improved waste handling, LLW processing tanks, and stormwater upgrades. Line Item expenditures are projected to total over $155 million (Table 5.4). The remaining storage activities are associated with several capital and GPP projects including HLW tank farm improvements and basin liners.

5.4.3 Disposal

Disposal costs for the planning period total approximately $381 million (Table 5.4) and constitute 10 percent of the Waste Management Operations estimated costs (Figure 5-20). Annual costs increase from approximately $20 million in FY 1989 to $70 million in FY 1995 (Figure 5-23). Twenty-three activities were identified for the planning period. Operating costs total approximately $293 million, which include activities such as: low- and intermediate level waste handling; LLW, TRU, hazardous, and mixed waste disposal; new sanitary landfill; and saltstone vault operation.

A number of major line item projects are proposed for construction initiation or completion, and operation during the planning period including Hazardous Waste/Mixed Waste Facility, LLW Disposal project, Waste Solidification and Disposal Plant, and new sanitary landfill. Line Item expenditures are projected to total over $70 million. The remaining disposal activities are associated with several capital and GPP projects including sanitary sewer upgrades, storage boxes, monitoring equipment, and existing sanitary landfill expansion.

5.4.4 Waste Minimization

Waste Minimization costs for the planning period total approximately $13 million (Table 5.4) and constitute less than one percent of the Waste Management Operations estimated costs (Figure 5-20). Annual costs are approximately $2 million per year (Figure 5-24). Four activities were identified for the planning period. Operating costs total approximately $12 million, which is primarily for the SRL waste minimization activities.

The remaining waste minimization activities are associated with several capital projects including monitoring, a new degreaser system, and improved filtration.

5.4.5 Research and Development (R&D)

R&D costs are examined two ways. One is based on R&D budget cost codes (Budget and Reporting Codes) which identify separate budget R&D activities. The second is based on projects that are: (1) identified as separate activities; (2) are included as a subpart of another project. These estimated costs are non-additive.

R&D (budget code) costs for the planning period total approximately $93 million (Table 5.4) and constitute 3 percent of the Waste Management Operations estimated costs (Figure 5-20). Annual costs are approximately $14 million per year (Figure 5-25). Eighteen separate activities were identified for the planning period. Operating costs include SRL decontamination development, ETF support, waste reduction, hazardous waste/mixed waste technology development, disposal technology development, LLW and HLW development, modeling studies, tritium reduction, TRU processing technology, incineration, and analytical support activities.

The remaining R&D activities are associated with capital and GPP projects including decontamination development, hazardous waste/mixed waste technology development, HLW storage support, HLW processing and waste handling, and TRU processing technology.

Additional R&D (non additive) activities are identified in Table 5.10. The non-additive total estimated planning cost is $321 million (Table 5.4). Annual costs are approximately $50 million per year (Figure 5-26). Thirty-one separate activities were identified for the planning period. Operating costs include: SRL CIF , DWPF, ETF, LLW, and HLW tank farm technology and support; decontamination development; waste reduction; hazardous waste/mixed waste technology development; disposal technology development; LLW and HLW development; modeling studies; tritium reduction; TRU processing technology; incineration; toxicity reduction; waste minimization; and analytical support activities.

The remaining R&D activities are associated with capital and GPP projects including CIF and DWPF support, decontamination development, hazardous waste/mixed waste technology development, HLW storage support, HLW processing and waste handling, LLW storage and disposal, and TRU processing technology.

5.4.6 Safety and Continuity

Safety and Continuity costs for the planning period total approximately $600 million (Table 5.4) and constitute 17 percent of the Waste Management Operations estimated costs (Figure 5-20). Annual costs increase from approximately $45 million in FY 1989 to $100 million in FY 1995 (Figure 5-27). Twenty-two separate activities were identified for the planning period. Operating costs include activities required to continue the safe operation of the various waste management facilities, and develop, upgrade and maintain safety procedures and training.

The remaining safety and continuity activities are associated with capital and GPP projects.

5.4.7 Program Support

Program support costs for the planning period total approximately $195 million (Table 5.4) and constitute 5 percent of the Waste Management Operations estimated costs (Figure 5-20). Annual costs increase from approximately $6 million in FY 1989 to $33 million in FY 1995 (Figure 5-28). Two separate DOE activities were identified for the planning period. These activities include DOE-HQ management initiatives and DOE-SR management costs (Table 5.12).

Table 5.1. 1989 Waste Generation Forecast (Volumes in Cubic Feet)

	Waste Type				
Organization	Low-Level	Intermediate-Level	TRU	Mixed	Nonradioactive Hazardous
Laboratories	86,100	270	838	28	0
Naval Fuel	127,500	0	0	14	7
Raw Materials	82,400	0	0	900	420
Reactors	157,000	9420	0	300	0
Separations	421,000	8450	55,617	400	0
Site Services	5,000	0	0	0	0
SRL	37,600	300	992	12	250
Tritium	54,000	6,000	0	270	10
Waste Mgmt.	101,800	29,400	0	25	16
Other	4,000	0	0	0	0
Totals	1,076,400	53,840	57,447	1934	718

Table 5.2. WMO Milestones

1. SR 0002 Priority: 1 WM Evaporation	Construction start 3/90; Physical completion 3/93.
2. SR 0006 Priority: 1 WM Salt Removal-New Tanks/Cost Projects	Phase I Construction complete 4QFY91. Phase II Construction complete 2QFY94.
3. SR 0010 Priority: 1 WM ITP/ESP (DWPF Feed Prep.)/ Cost Project	Complete construction by 1QFY90. Begin operation 2QFY90
4. SR 0011 Priority: 1 WM Tank Farms (Non-Routine Maint.& Upgrades)	Complete construction of Diversion Box and Pump Pit Containment , 1Q91.
5. SR 0015 Priority: 1 WM Low-Level Waste Storage/Disposal - Project	Initiate construction of the Intermediate-level Vault , 2Q90. Initiate construction of the Low-level Vault, 4Q90.
6. SR 0043 Priority: 1 SRL Defense Waste Processing Facility - Waste ComplianceTechnology	Issue WCP 3/89, issue preliminary WQR 9/89, issue revised WQR 9/91, issue cold runs report 6/92, submit WQR addenda 3/93, submit final WQR 6/93.
7. SR 0047 Priority: 1 SRL LLW Storage/Disposal-B.G. Operation	FY 90 Complete integrated monitoring report on LLW operations.
8. SR 0060 Priority: 1 SRL TRU Waste Compliance Activities	On-going program. FY 90 Complete small scale gas generation studies.
9. SR 0061 Priority: 1 SRL TRU Waste Processing Technology	FY 90 Complete trial campaign of processing simulated feeds through the Transuranic Waste Test Facility.
10. SR 0068 Priority: 1 WM Nonradioactive Hazardous Waste	3Q83 Design Complete; 4Q84 Physical Construction started; 3Q92 Construction ends
11. SR 0070 Priority: 1 WM Hazardous Waste/Mixed Waste Disposal Facility	1Q89 final design; 2Q91 physical construction starts; 2Q93 construction ends

Table 5.2. WMO Milestones (Contd)

12. **SR 0081** Priority: 1 **SRL Consolidated Incinerator Support**	FY 91 Complete off gas testing. Begin rotary seal testing; FY 93 Provide start-up assistance.
13. **SR 0109** Priority: 1 **POWER Equalization Basin, 100-C, Project # 3571**	Conceptual design 5/89; construction to start three months after permit receipt and construction will end eight months after permit receipt.
14. **SR 0218** Priority: 1 **WM Waste Solid and Disposal Plant**	1Q91 design completed; 2Q91 physical construction starts; 2Q93 construction completed
15. **SR 0038** Priority: 3 **RM Waste Volume Reduction & Solidification Waste and Interim Storage**	May 1990 Land Ban - Construction FY90 & 91
16. **SR 0053** Priority: 3 **SRL Recovery Incineration**	FY 91 Complete cold operation of demonstration facility
17. **SR 0067** Priority: 3 **WM Hazardous Low-Level Waste Processing Tanks**	2Q91 Authorization; 2Q92 Physical Constuction starts; 3Q95 Construction ends.
18. **SR 0178** Priority: 3 **SRL Chemical Storage Expansion, 674-T**	Basic Data: Fy 1991; Basin Data Routing: FY 1991; Project Authorization: FY 1991.
19. **SR 0206** Priority: 3 **SRL ETF Tritium Reduction**	FY 91-Complete construction of test; FY 92-Operate Test Facility
20. **SR 0240** Priority: 3 **SRL Process Water Header, Westside, TNX**	Project Authorization in FY 1990.

Table 5.3. WMO Contingent on Permit Receipt

1. **SR 0165** Priority: 1 **SEP Seg Water Auto Count System, 221-H, Project #0125**	Begin construction 6 months after authorization
2. **SR 0071** Priority: 3 **SEP Waste Handling Facility, 235 F**	Start construction 6 months after authorization.
3. **SR 0084** Priority: 3 **SEP Upgrade TRU Waste Management, 221-HB Line**	Begin construction 6 months after authorization.
4. **SR 0087** Priority: 3 **SEP Enlarge Southwest Loading Dock, 221-F**	Begin construction 18 months after authorization.
5. **SR 0158** Priority: 3 **SEP Divert East Side Rainwater, 221-H, Project # 0112**	Begin construction 6 months after authorization
6. **SR 0159** Priority: 3 **SEP ETF RM Storage Building, 200-H, (WMO), Project #0564**	Start construction 6 months after authorization.
7. **SR 0160** Priority: 3 **SEP ETF Spare Parts Storage Building, 200-FH, Project # 0566**	Start construction 6 months after authorization.
8. **SR 0163** Priority: 3 **SEP Improved Waste Handling, 211-F, 92-SR-094**	Construction to begin 12 months after authorization
9. **SR 0168** Priority: 3 **SEP Upgrade Railroad Tunnel Monitoring**	Begin design 2 months after authorization and start construction 12 months after authorization.
10. **SR 0170** Priority: 3 **SEP Upgrade OF-F Drainage System, 200-F, Project # 0186**	Begin construction 3 months after authorization
11. **SR 0171** Priority: 3 **SEP Upgrade Transport & Storage Boxes, 221-FH, Project # 0727**	Start construction 6 months after authorization.

Table 5.3. WMO Contingent on Permit Receipt (Contd)

12. **SR 0172** Priority: 3 **SEP Upgrade Truckwell Monitoring Equipment, Project # 0725**		Construction begins 6 months after authorization.
13. **SR 0229** Priority: 3 **SEP Domestic Wastewater Treatment Facility 200-H**		Construction to begin 6 months after authorization.
14. **SR 0230** Priority: 3 **SEP Wastewater Treatment Facility 200-F**		Construction to begin 6 months after authorization.
15. **SR 0072** Priority: 4 **SEP B-25 Alpha Waste Compactor, 221-FBL**		Construction will begin 18 months after authorization.

Table 5.4. Waste Management Operations Total Cost Summary

	Activity Summary ($1000)				
Activity Area	Total Operating	Total Capital	Total GPP	Total Line Item	Grand Total
Treatment	$1,326,647	$129,219	$16,903	$512,004	$1,984,773
Storage	148,430	31,390	20,990	155,661	356,471
Disposal	293,992	8,170	8,424	70,518	381,104
Waste Minimization	12,030	1,150	0	0	13,180
Research and Development (Budget)	88,082	4,500	416	0	92,998
Research and Development (Non-additive)	294,707	15,484	1,443	9,500	321,134
Safety and Continuity	570,703	16,051	13,017	700	600,471
Program Support	195,313	0	0	0	195,313

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Table 5.5. WMO Treatment Funding Summary

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
1. SR 0002	WM Evaporation	1	12,118	18,354	20,711	29,231	17,381	11,881	12,081	121,757
2. SR 0003	WM Waste Transfer-Old Tanks/Operation	1	1,215	2,841	1,600	1,800	1,900	1,900	2,010	13,266
3. SR 0004	WM Waste Transfer-OldTanks/Cost Project	1	0	1,507	11,126	5,000				17,633
4. SR 0005	WM Salt Removal-New Tanks/Operations	1	2,188	4,113	4,600	4,600	4,600	4,600	4,600	29,301
5. SR 0006	WM Salt Removal-New Tanks/Cost Projects	1	5,000	7,709	21,400	13,800	7,400			55,309
6. SR 0007	WM Defense Waste Processing Facility	1	166,765	85,092	99,894	136,425	140,679	124,035	145,775	900,685
7. SR 0009	WM ITP/ESP (DWPF Feed Prep.)/ Operations	1	7,735	16,142	18,522	22,240	20,052	22,958	21,840	131,489
8. SR 0010	WM ITP/ESP (DWPF Feed Prep.)/ Cost Project	1	15,000	1,000	0					16,000
9. SR 0017	WM F/H Area Effluent Treatment Facility	1	8,500	8,790	9,170	9,170	9,170	9,170	9,170	63,140
10. SR 0019	WM Consolidated Incineration Facility - Operations	1	0	0	4,470	8,300	9,400	9,400	9,400	40,970

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Table 5.5. WMO Treatment Funding Summary (Contd)

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
11. SR 0020	WM Transuranic Waste Facility - Operations	1	0	1,000	1,043	1,100	1,500	1,500	2,730	8,873
12. SR 0030	WM Organic Oxidation Facility - Effluent Treatment Facility	1	780	450	275	5,560	11,320	1,822		20,187
13. SR 0038	SRL ITP/ESP (DWPF Feed Prep.)/Operation	1	2,500	2,500	2,500	900	900	900	1,600	11,800
14. SR 0043	SRL Defense Waste Processing Facility - Waste CompliancsTechnology	1	6,000	6,454	5,700	5,040	5,000	5,000	5,000	38,194
15. SR 0044	SRL Defense Waste Processing Facility - Support	1	19,444	19,395	18,061	17,236	18,600	18,000	18,200	128,936
16. SR 0045	SRL HLW Evaporation Support	1		928	600	400	300	300	300	2,828
17. SR 0056	SRL Salt Removal-New Tanks/Operations Supports	1		800	600	600	600	600	600	3,800
18. SR 0064	SRL Waste Transfer-Old Tanks/Operations Support	1	100	400	400	400	400	400	400	2,500
19. SR 0068	WM Nonradioactive Hazardous Waste	1	13,000	14,140	5,000	4,500				36,640
20. SR 0069	WM TRU-Waste Facility	1		3,100	15,300	14,200	17,400	18,900	6,100	73,000
21. SR 0081	SRL Consolidated Incinerator Support	1	1,250	1,594	1,790	1,800	1,100	900	900	9,334

Table 5.5. WMO Treatment Funding Summary (Contd)

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
22. SR 0109	POWER Equalization Basin, 100-C, Project # 3571	1	275							275
23. SR 0184	SRL Effluent Treatment Facility	1	300	600	800	300	300	200	200	2,700
24. SR 0187	SRL ETF Chemical Studies	1	400	400	650	250	250	250	500	2,700
	Subtotal by Priority	1	262,570	199,309	244,212	284,852	268,252	230,718	241,408	1,731,317
25. SR 0008	WM Agitation	3	0	124	13,129					13,253
26. SR 0021	WM Waste Preparation Facility - Operations	3	0	0	1,500	882	882	882	882	5,028
27. SR 0027	WM High-Level Waste Removal	3			100	9,000	15,750	24,750	20,250	69,850
28. SR 0037	RM Effluent Toxicity Reduction	3			1,000	4,550	4,550	50		10,150
29. SR 0038	RM Waste Volume Reduction & Solidification Waste and Interim Storage	3			3,500					3,500
30. SR 0064	SRL Replace/ Upgrade 776-A Waste Handling Facility	3					7,675	10,500	15,750	34,125
31. SR 0085	SEP Glove Box Waste Processing Facility, 221-F BL	3			4,000	10,000	10,000	6,000		30,000

Table 5.5. WMO Treatment Funding Summary (Contd)

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
32. SR 0116	POWER Install Sodium Hypoch & Dechlor Facility, Project # 3688	3			3,750	5,000	1,875			10,625
33. SR 0122	POWER Portable Waste Treatment Plant	3			150					150
34. SR 0135	POWER Upgrade Softener Building and Spill Control	3			600					600
35. SR 0136	POWER Upgrade Softener & Spill Containment	3				440				440
36. SR 0137	RM CTF Evaporator Equalization Tank Modification, 313-M	3							150	150
37. SR 0146	RM Wastewater Feed Improvements, 341-M	3			600					600
38. SR 0152	RX Upgrade Disassembly Basin Water System	3						675	900	1,575
39. SR 0159	SEP ETF RM Storage Building, 200-H, (WMO), Project #0564	3			180					180
40. SR 0160	SEP ETF Spare Parts Storage Building, 200-FH, Project # 0566	3			180					180
41. SR 0217	WM Waste Preparation Facility	3			0	0	6,000	18,000	32,000	56,000
42. SR 0227	SEP Laundry Effluent Treatment Facility - F Area	3			2,000	4,000	4,000			10,000

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Table 5.5. WMO Treatment Funding Summary (Contd)

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
43. SR 0229	SEP Domestic Wastewater Treatment Facility 200-H	3								
44. SR 0230	SEP Wastewater Treatment Facility 200-F	3								
45. SR 0237	SRL Effluent Treatment Expansion, T-Area	3							500	500
	Subtotal by Priority	3	0	124	30,689	33,872	50,932	60,857	70,432	246,906
46. SR 0072	SEP B-25 Alpha Waste Compactor, 221-FBL	4						5,000		5,000
47. SR 0134	POWER Upgrade Sanitary Sludge Treatment	4						700		700
48. SR 0138	RM CTF Filtration Improvements, 313-M	4					850			850
	Subtotal by Priority	4					850	5,700		6,550
	Grand Total		262,570	189,433	274,901	318,724	320,034	297,273	311,838	1,984,773

Table 5.6. WMO Storage Funding Summary

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
1. SR 0011	WM Tank Farms (Non-Routine Maint.& Upgrades)	1	17,401	16,269	23,698	22,328	23,274	24,248	25,251	152,469
2. SR 0012	WM Tank Farms (NWTF Operations)	1	1,150	1,700	4,700	1,000	1,000	1,000	1,000	11,550
3. SR 0013	WM Mixed Waste Storage/Disposal	1	631	660	688	688	688	688	688	4,731
4. SR 0018	WM Hazardous Waste Storage	1	1,600	600	600	300				3,100
5. SR 0022	WM Waste Certification Facility - Operations	1	2,524	3,040	3,544	3,554	3,554	3,554	3,554	23,324
6. SR 0025	WM Low- Level Waste Processing Tanks - Operations	1	0	0	200	200	200	200	1,000	1,800
7. SR 0041	SEP TRU Waste Handling	1	963	1,059	1,165	1,165	1,165	1,165	1,165	7,847
8. SR 0058	SRL Tank Farms (NWTF Operations) Support	1		200	200	200	200	200	200	1,200
	Subtotal by Priority	1	24,269	23,528	34,795	29,435	30,081	31,055	32,858	206,021
9. SR 0026	WM Stormwater System Upgrade	3			200	100	5,000	8,750	8,750	22,800
10. SR 0028	WM Interarea Line Upgrade	3			200	5,000	8,750	8,750	2,500	25,200
11. SR 0029	WM Restoration OF Service Facilities	3			300	100	6,000	10,500	10,500	27,400

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Table 5.6. WMO Storage Funding Summary (Contd)

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
12. SR 0067	WM Hazardous Low-Level Waste Processing Tanks	3			5,600	10,100	12,300	14,600	6,500	49,500
13. SR 0071	SEP Waste Handling Facility, 235 F	3								
14. SR 0073	WM Tank Farm Containment	3						3,000	10,000	13,000
15. SR 0110	POWER Install Domestic Water Tank 400-D	3			500					500
16. SR 0163	SEP Improved Waste Handling, 211-F, 92-SR-094	3				1,500	2,000	3,000	3,000	9,500
17. SR 0179	SRL Contained Pad Storage	3			150					150
18. SR 0222	WM Retention Basin Liners, F	3				1,200				1,200
19. SR 0223	WM Retention Basin Liners, H	3			1,200					1,200
	Subtotal by Priority	3			7,350	12,800	14,300	17,600	19,500	75,350
	Grand Total		24,269	23,529	43,145	47,435	64,131	79,855	74,108	356,471

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Table 5.7. WMO Disposal Funding Summary

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
1. SR 0014	WM Saltstone Operations	1	0	10,800	22,156	22,806	22,806	22,806	22,806	124,180
2. SR 0015	WM Low-Level Waste Storage/Disposal - Project	1	2,166	0	13,600	15,700	17,000	16,200	17,000	81,666
3. SR 0016	WM Low-Level Waste Storage/Disposal - Burial Ground Operations	1	2,989	2,970	7,318	600	625	650	680	15,832
4. SR 0023	WM Y-Area Solidification And Disposal - Operations	1	1,335	1,120	2,175	1,550	5,100	6,200	6,200	23,680
5. SR 0032	WM Y-Area Vault Project	1	0	0	0	0	2,000	2,000	2,000	6,000
6. SR 0035	RX Waste Handling	1	855	894	932	932	932	932	932	6,409
7. SR 0040	SEP Low-Level and Intermediate-Level Waste Handling	1	4,171	4,586	5,047	5,047	5,047	5,047	5,047	33,994
8. SR 0047	SRL LLW Storage/Disposal-B.G. Operation	1	200	1,094	1,100	1,100	1,400	1,400	1,400	7,694
9. SR 0066	TRI Waste Disposal	1	240	251	262	262	262	262	262	1,801
10. SR 0070	WM Hazardous Waste/Mixed Waste Disposal Facility	1	3,500	7,068	9,255	2,992	1,032	1,032	1,032	25,911
11. SR 0091	WM Waste Certification Facility - Transportation to WIPP	1			10					10
12. SR 0218	WM Waste Solid and Disposal Plant	1	3,600	7,600	7,500	1,200	2,600			22,700
13. SR 0219	WM Sanitary Landfill Expansion	1	1,090							1,090

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Table 5.7. WMO Disposal Funding Summary (Contd)

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
	Subtotal by Priority	1	20,148	36,585	69,355	52,189	58,804	56,529	57,359	350,969
14. SR 0087	SEP Enlarge Southwest Loading Dock, 221-F	3					2,000	4,000	4,000	10,000
15. SR 0128	POWER Sewer & Domestic Water Line, 681-6Q	3			85					85
16. SR 0144	RM Replace Process Sewer Line, 322-M	3			400					400
17. SR 0168	SEP Upgrade Railroad Tunnel Monitoring	3			600					600
18. SR 0171	SEP Upgrade Transport & Storage Boxes, 221-FH, Project # 0727	3			100					100
19. SR 0172	SEP Upgrade Truckwell Monitoring Equipment, Project # 0728	3			300					300
20. SR 0203	SRL Sanitary Sewer Upgrade T-Area	3			300					300
21. SR 0215	WM New Sanitary Landfill	3			750	750	3,750	5,000	7,500	17,750
22. SR 0241	SRL Sanitary Sewer Upgrade, T-Area	3							300	300
23. SR 0242	SRL Process Sewer Upgrade, SRL	3					300			300
	Subtotal by Priority	3			2,535	750	6,050	9,000	11,800	30,135
	Grand Total		20,148	36,585	71,890	52,939	64,854	65,529	69,159	381,104

Table 5.8. WMO Waste Minimization Funding Summary

			Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
1. SR 0140	RM Improved Filtration, 341-M		1	600							600
2. SR 0221	WM Landfill Monitoring Assay		1	150							150
		Subtotal by Priority	1	750							750
3. SR 0063	SRL Waste Minimization		3	730	1,500	1,900	1,900	2,000	2,000	2,000	12,030
		Subtotal by Priority	3	730	1,500	1,900	1,900	2,000	2,000	2,000	12,030
4. SR 0141	RM New Degreaser System		4			400					400
		Subtotal by Priority	4			400					400
		Grand Total		1,480	1,500	2,300	1,900	2,000	2,000	2,000	13,180

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Table 5.9. WMO R&D Funding Summary

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
1. SR 0042	SRL Decontamination Development	1	250	400	600	600	1,100	900	1,000	4,850
2. SR 0046	SRL HLW Storage Support	1	1,200	995	1,000	1,000	1,200	1,200	1,200	7,795
3. SR 0048	SRL Metallurgical Support	1	75	100	125	125	125	125	125	800
4. SR 0049	SRL Modeling Studies	1	75	100	125	150	175	175	175	975
5. SR 0050	SRL New Development HLW Processing and Waste Handling	1	1,723	1,745	2,440	2,500	2,600	2,600	2,600	16,208
6. SR 0051	SRL HLW Process Development	1	100	1,400	1,400	1,500	1,500	1,500	1,500	8,900
7. SR 0057	SRL Stress Analysis	1	50	50	50	50	50	50	50	350
8. SR 0058	SRL Hazardous/Mixed Waste Disposal Technology Development	1	800	994	1,200	1,100	1,300	950	950	7,294
9. SR 0060	SRL TRU Waste Compliance Activities	1	800	800	500	500	300	300	300	3,500
10. SR 0061	SRL TRU Waste Processing Technology	1	1,926	2,270	2,730	3,791	3,450	3,600	3,700	21,467
11. SR 0065	SRL/NRHW Analytical Support	1	800	800	700	700	800	800	800	5,000
12. SR 0066	SRL TRU Waste - Lead Site	1	-93	240	200	300	250	250	250	1,397
13. SR 0069	SRL LLW Technology	1	83	384	335	355	300			1,437

Table 5.9. WMO R&D Funding Summary (Contd)

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
14. SR 0090	SRL Hazardous Waste Reduction	1	135	240	400	400	200	200	200	1,775
15. SR 0189	SRL F/H Effluent Treatment Facility Support	1	1,200	1,000	600	400	300	300	300	4,100
16. SR 0209	SRL TNX Support	1	425	450	500	400	350	200	200	2,525
	Subtotal by Priority	1	9,329	11,768	12,905	13,871	14,000	13,150	13,350	88,373
17. SR 0053	SRL Recovery Incineration	3	375	700	400	200	0	0	0	1,675
18. SR 0099	SRL Active Lysimeters	3		50						50
19. SR 0206	SRL ETF Tritium Reduction	3	250	350	600	800	500	200	200	2,900
	Subtotal by Priority	3	625	1,100	1,000	1,000	500	200	200	4,625
	Grand Total		9,954	12,868	13,905	14,871	14,500	13,350	13,550	92,998

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Table 5.10. WMO R&D (nonadditive) Funding Summary

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
1. SR 0035	SRL ITP/ESP (DWPF Feed Prep.)/Operation	1	1,800	1,800	1,700	100	100	100	600	6,200
2. SR 0042	SRL Decontamination Development	1	250	400	600	600	1,100	900	1,000	4,850
3. SR 0043	SRL Defense Waste Processing Facility - Waste ComplianceTechnology	1	6,000	6,200	5,700	3,890	3,200	3,200	3,200	31,390
4. SR 0044	SRL Defense Waste Processing Facility - Support	1	17,994	17,623	14,171	9,156	6,130	6,170	6,370	79,614
5. SR 0045	SRL HLW Evaporation Support	1		100	100					200
6. SR 0046	SRL HLW Storage Support	1	1,200	995	1,000	1,000	1,200	1,200	1,200	7,795
7. SR 0047	SRL LLW Storage/Disposal-S.G. Operation	1	57	494	500	400	600	500	500	3,051
8. SR 0048	SRL Metallurgical Support	1	75	100	125	125	125	125	125	800
9. SR 0049	SRL Modeling Studies	1	75	100	125	150	175	175	175	975
10. SR 0050	SRL New Development HLW Processing and Waste Handling	1	1,723	1,745	2,440	2,500	2,600	2,600	2,600	16,208
11. SR 0051	SRL HLW Process Development	1	100	200	200	200	200	200	200	1,300
12. SR 0055	SRL Salt Removal-New Tanks/Operations Supports	1		100	100	100	100	100	100	600
13. SR 0057	SRL Stress Analysis	1	50	50	50	50	50	50	50	350

Table 5.10. WMO R&D (nonadditive) Funding Summary (Contd)

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
14. SR 0058	SRL Tank Farms (NWTF Operations) Support	1		200	200	200	200	200	200	1,200
15. SR 0059	SRL Hazardous/Mixed Waste Disposal Technology Development	1	750	894	1,100	800	800	450	450	5,244
16. SR 0060	SRL TRU Waste Compliance Activities	1	700	600	400	300	100	100	100	2,300
17. SR 0061	SRL TRU Waste Processing Technology	1	1,826	2,070	2,700	3,441	2,950	2,800	2,900	18,687
18. SR 0064	SRL Waste Transfer-Old Tanks/Operations Support	1	100	100	100	100	100	100	100	700
19. SR 0065	SRL/NRHW Analytical Support	1	800	800	700	700	800	800	800	5,000
20. SR 0081	SRL Consolidated Incinerator Support	1	1,250	1,594	1,790	209	263	200	250	5,556
21. SR 0088	SRL TRU Waste - Lead Site	1	0	240	200	300	250	250	250	1,490
22. SR 0089	SRL LLW Technology	1	63	384	78	95				618
23. SR 0090	SRL Hazardous Waste Reduction	1		240	400	400	200	200	200	1,640
24. SR 0184	SRL Effluent Treatment Facility	1	300	600	800	300	300	200	200	2,700
25. SR 0187	SRL ETF Chemical Studies	1			250					250
	Subtotal by Priority	1	34,913	37,429	35,527	25,116	23,543	20,620	21,570	198,718
26. SR 0037	RM Effluent Toxicity Reduction	3			500	50	50	50		650

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Table 5.10. WMO R&D (nonadditive) Funding Summary (Contd)

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
27. SR 0052	SRL Production Monitoring Support	3	50	50	50	25	25	25	25	250
28. SR 0053	SRL Recovery Incineration	3	375	700	400	200	0	0	0	1,675
29. SR 0063	SRL Waste Minimization	3	730	1,500	1,900	1,900	2,000	2,000	2,000	12,030
30. SR 0069	SRL Active Lysimeters	3		50						50
31. SR 0206	SRL ETF Tritium Reduction	3	250	350	600	800	500	200	200	2,900
	Subtotal by Priority	3	1,405	2,650	3,450	2,975	2,575	2,275	2,225	17,555
	Grand Total		36,318	40,079	38,977	28,091	26,118	22,895	23,795	216,273

Table 5.11. WMO Safety and Continuity Funding Summary

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
1. SR 0001	WM Safety and Continuity	1	41,414	45,005	52,304	55,324	55,424	51,624	51,624	353,119
2. SR 0065	SRL Safety & Continuity	1	934	1,111	2,000	1,900	1,800	1,800	1,800	11,345
3. SR 0082	SRL Waste Management Operating Costs	1	500	500	500	500	500	500	500	3,500
4. SR 0165	SEP Seg Water Auto Count System, 221-H, Project #0125	1		100						100
5. SR 0216	WM Permitting	1	1,145	1,198	1,250	309	323	264	276	4,765
6. SR 0220	WM Improve Storm Water System	1		1,000						1,000
7. SR 1000	WM Waste Management Safety and Continuity	1			40,000	40,000	40,000	40,000	40,000	200,000
	Subtotal by Priority	1	43,993	48,914	96,054	98,033	98,047	94,388	94,400	573,829
8. SR 0052	SRL Production Monitoring Support	3	201	199	95	100	100	100	100	895
9. SR 0084	SEP Upgrade THU Waste Management, 221-HB Line	3			500					500
10. SR 0145	RM Upgrade Storm Sewer	3						300	400	700
11. SR 0155	SEP Divert East Side Rainwater, 221-H, Project # 0112	3				100				100
12. SR 0170	SEP Upgrade OF-F Drainage System, 200-F, Project # 0186	3				150				150

Table 5.11. WMO Safety and Continuity Funding Summary (Contd)

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
13. SR 0178	SRL Chemical Storage Expansion, 674-T	3			250					250
14. SR 0193	SRL Increase Capacity of Tech Area Sewage Lift	3				500				500
15. SR 0199	SRL Process Containment Exhaust Systems Upgrade	3			1,400	1,800	2,200	1,000	1,000	7,200
16. SR 0200	SRL Process Sewer Upgrade	3				300				300
17. SR 0204	SRL Satellite Storage Area, 677-T	3			100					100
18. SR 0212	WM Drilling and Sampling	3		2,477	1,254	1,254	1,254	1,254	1,254	8,747
19. SR 0238	SRL 600 Process Water Reservoir, T-Area	3						600		600
20. SR 0239	SRL New Water Well, T-Area	3					200			200
21. SR 0240	SRL Process Water Header, Westside, TNX	3		400						400
	Subtotal by Priority	3	201	3,076	3,599	4,004	3,754	3,254	2,754	20,642
22. SR 0211	WM Constant Air Monitors	4	1,000		2,000	1,000	2,000			6,000
	Subtotal by Priority	4	1,000		2,000	1,000	2,000			6,000
	Grand Total		45,194	51,990	101,653	103,037	103,801	97,642	97,154	600,471

Table 5.12. WMO Program Support Funding Summary

		Priority	FY 1989	FY 1990	FY 1991	FY 1992	FY1993	FY1994	FY 1995	FY89-FY95 Total
1. SR 0033	DOE - Headquarters Management Initiative	1		13,000	22,000	22,000	22,000	22,000	22,000	123,000
2. SR 0034	DOE - SR Interim Waste Management/ DWPF costs	1	6,491	10,737	11,017	11,017	11,017	11,017	11,017	72,313
Subtotal by Priority		1	6,491	23,737	33,017	33,017	33,017	33,017	33,017	195,313
Grand Total			6,491	23,737	33,017	33,017	33,017	33,017	33,017	195,313

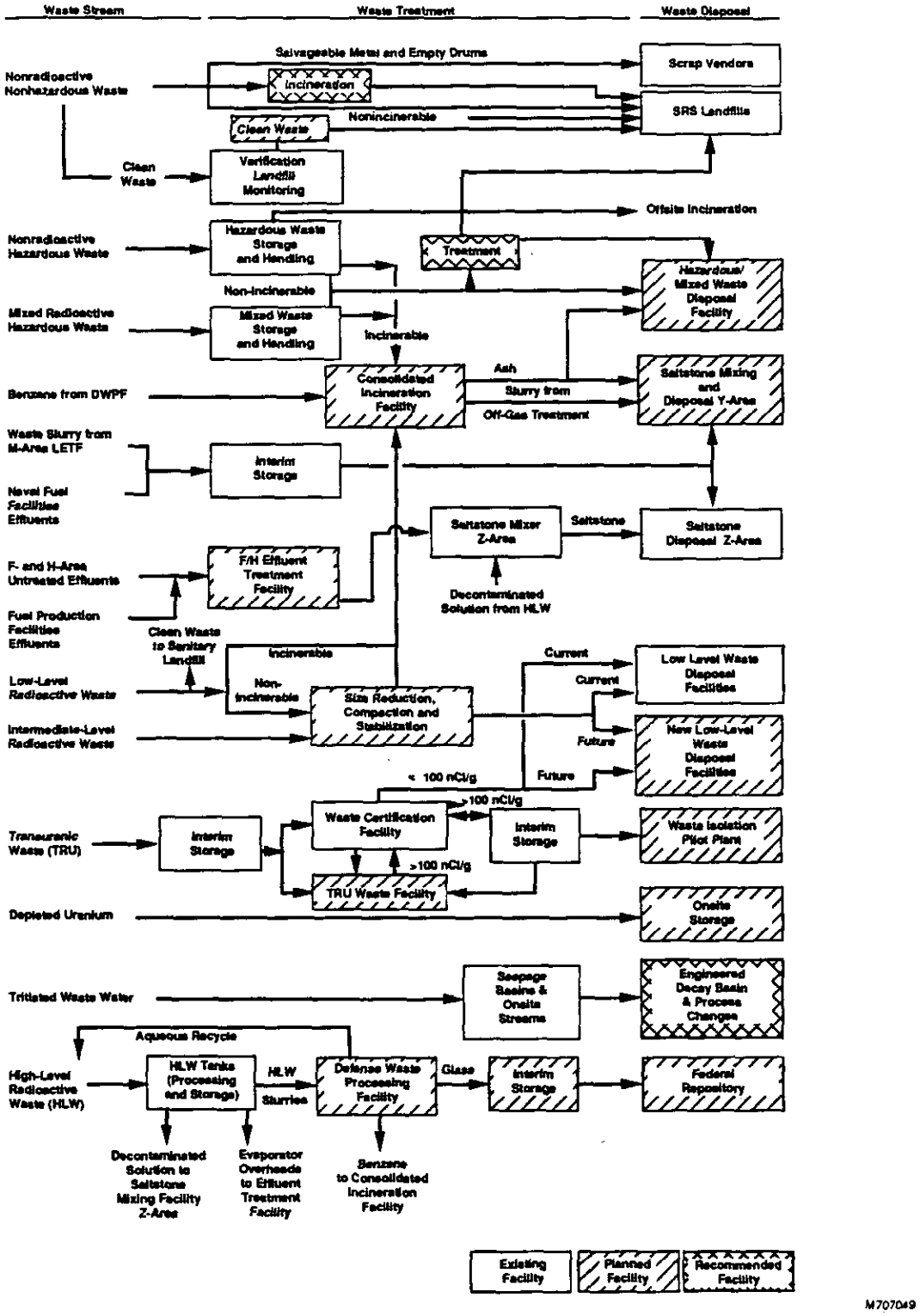


Figure 5-1. Savannah River Site Management (Overview)

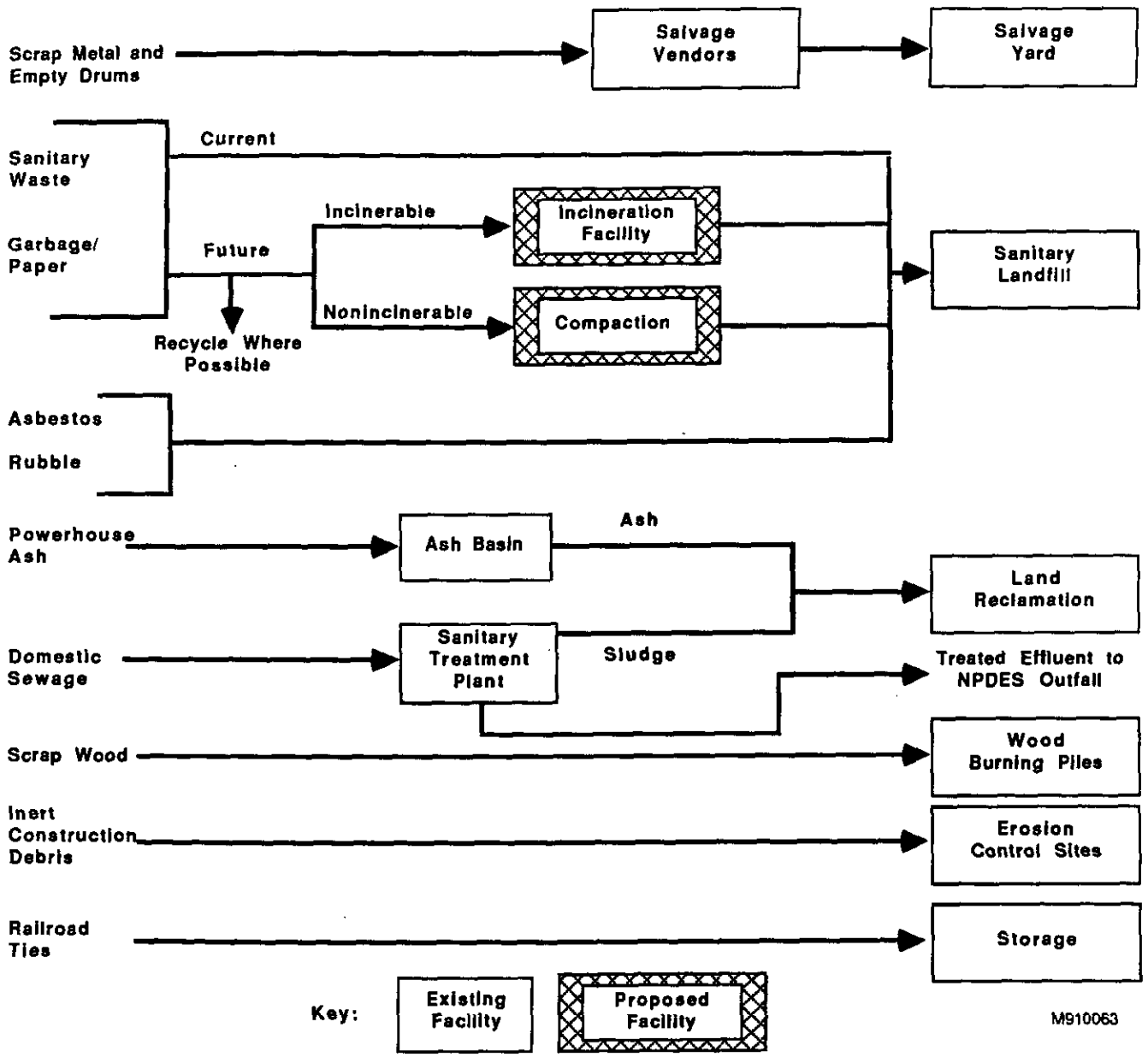
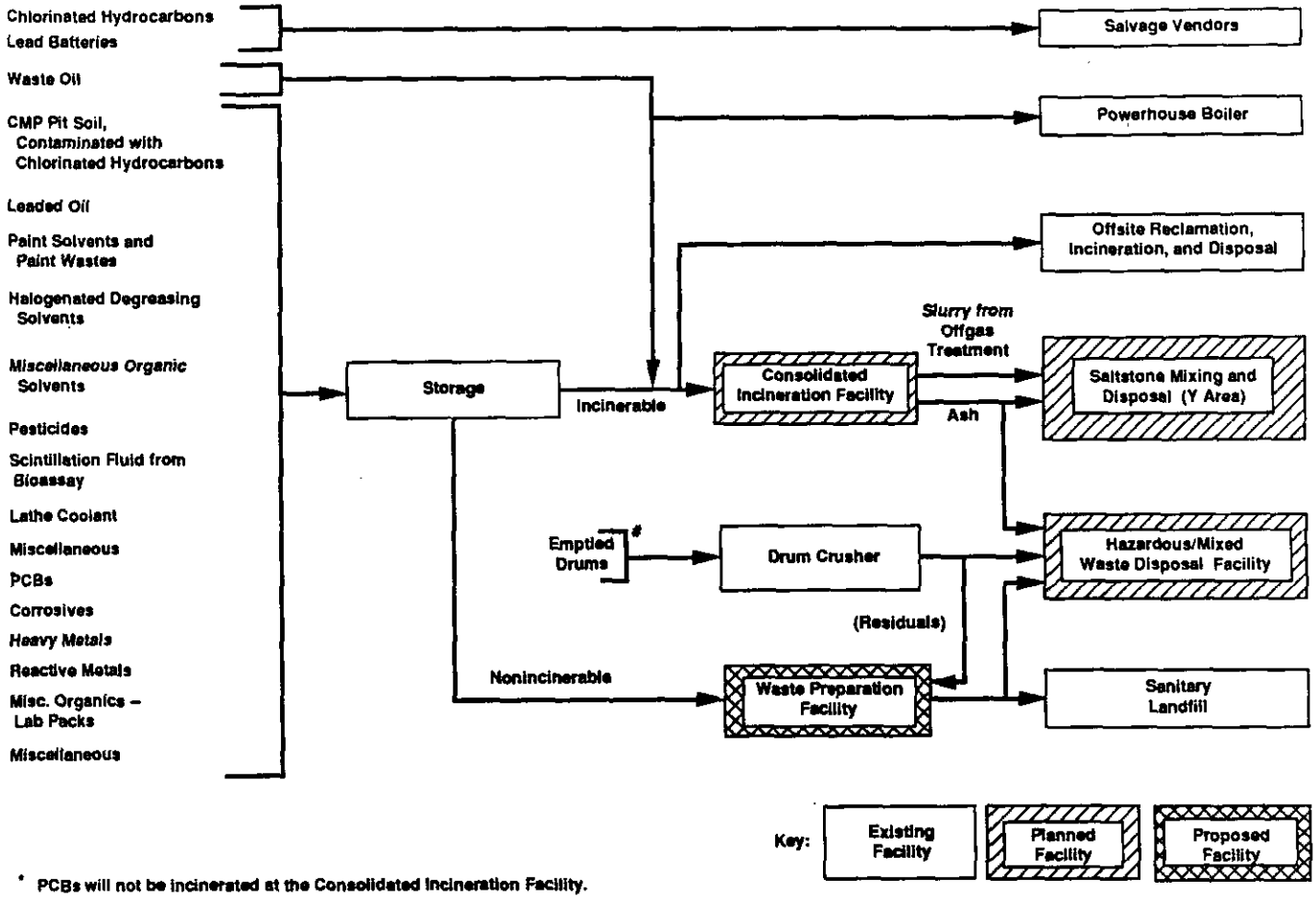


Figure 5-2. Nonradioactive Nonhazardous Waste Management Plan



* PCBs will not be incinerated at the Consolidated Incineration Facility.

\# These drums formerly contained hazardous wastes.

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Figure 5-3. Nonradioactive Hazardous Waste Management Plan

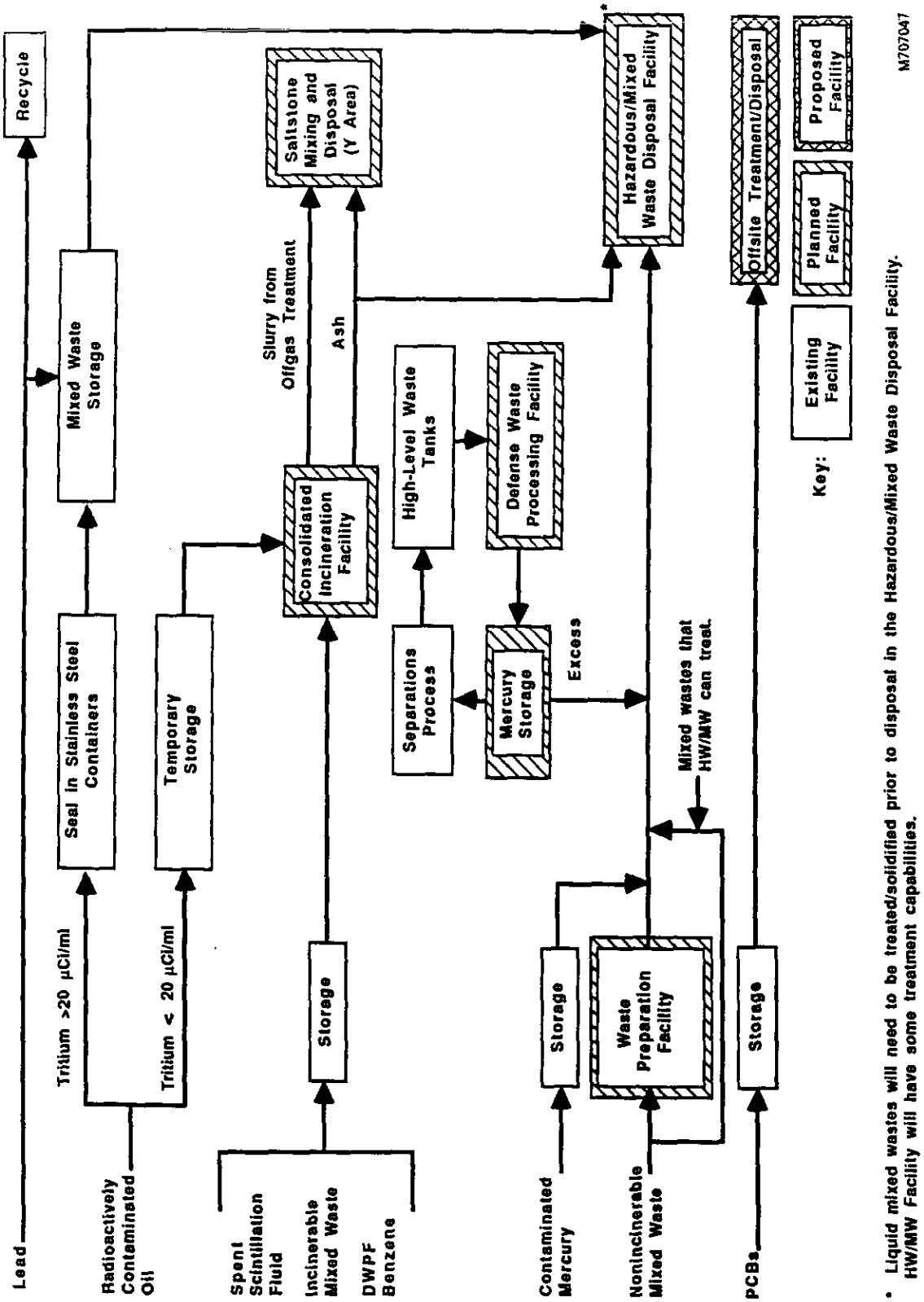

Figure 5-4. Mixed Waste Management Plan

- Liquid mixed wastes will need to be treated/solidified prior to disposal in the Hazardous/Mixed Waste Disposal Facility. HW/MW Facility will have some treatment capabilities.

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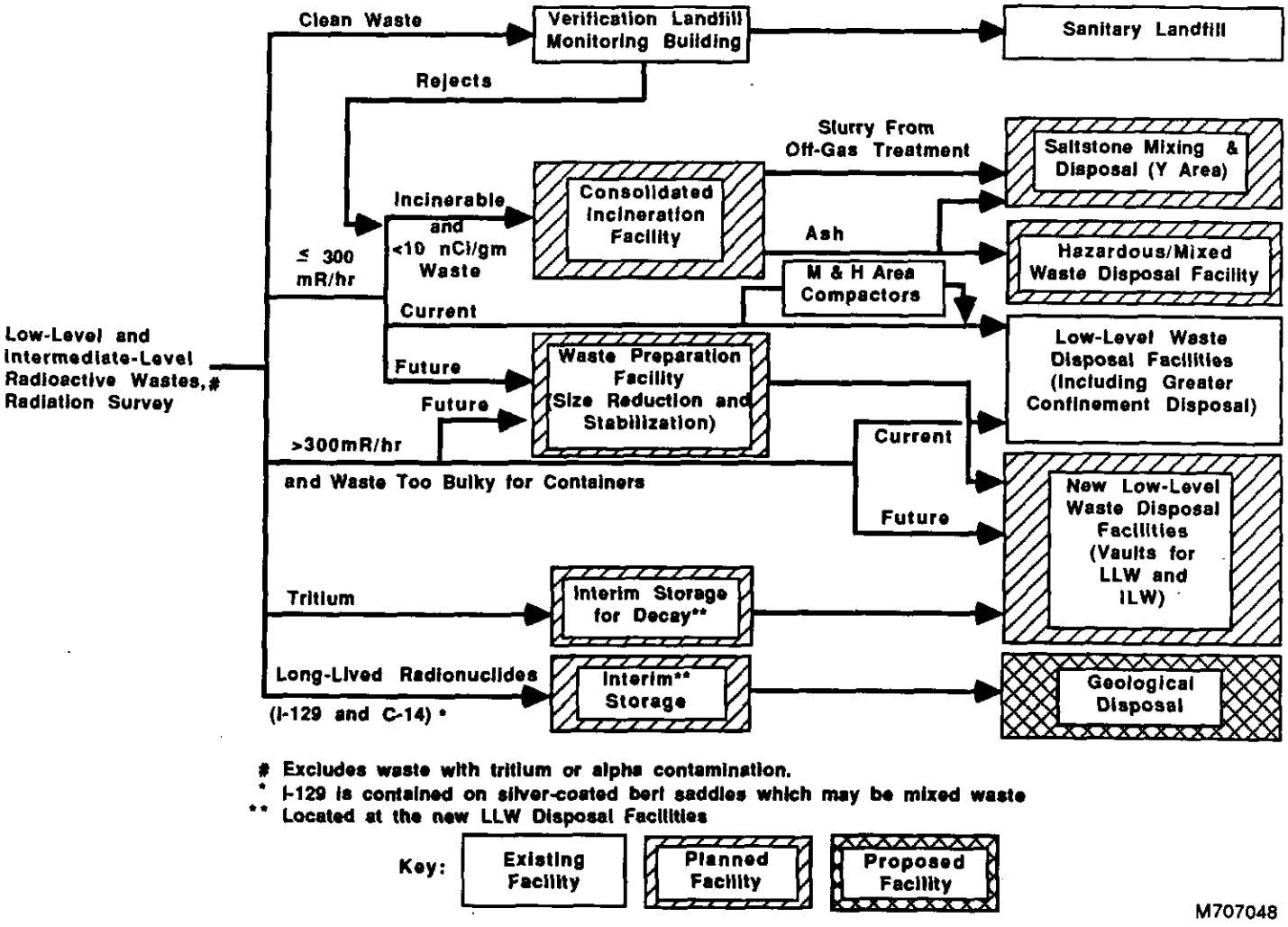

Figure 5-5. Low-Level and Intermediate-Level Waste Management Plan

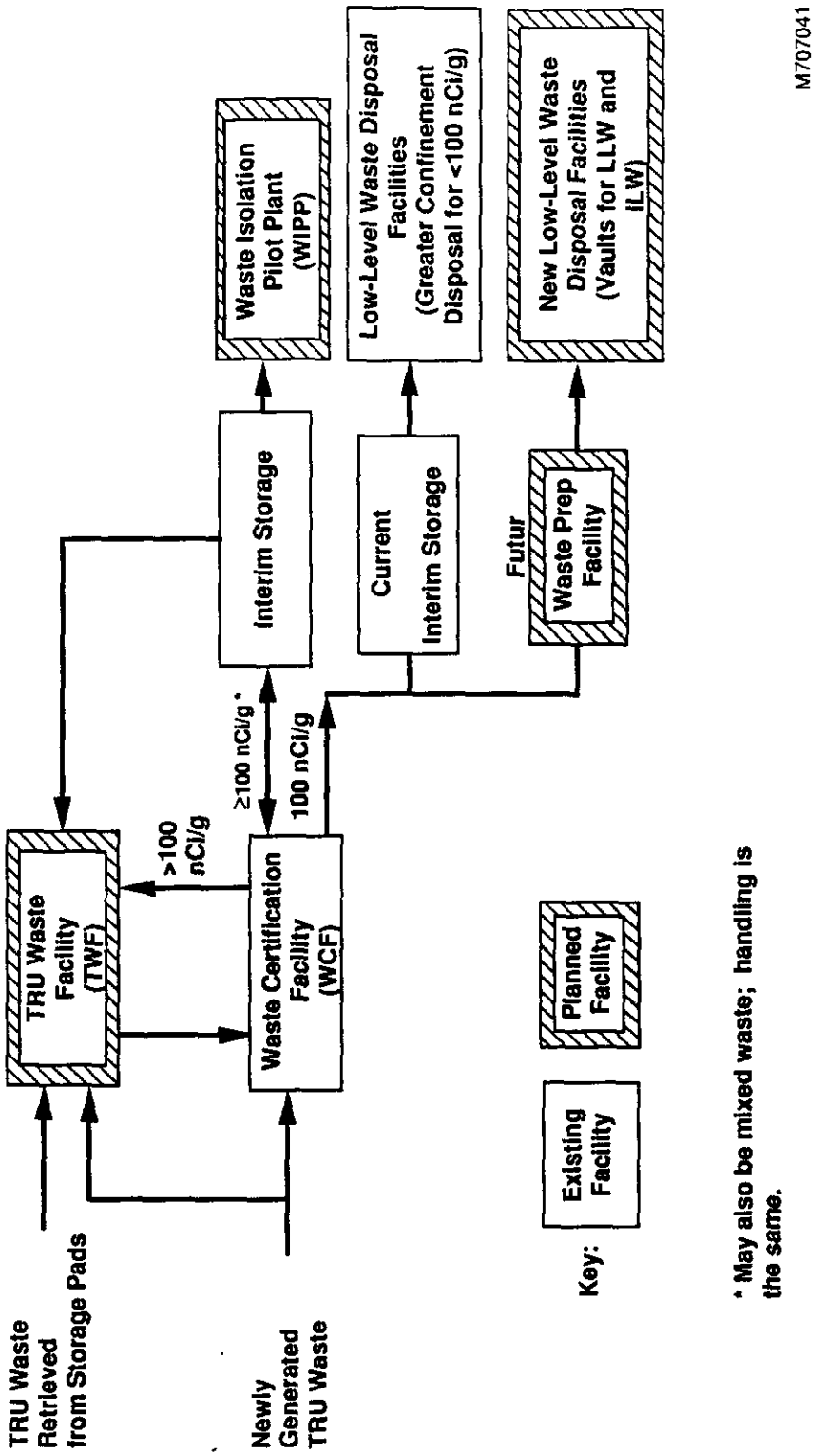

Figure 5-6. Transuranic Waste Management Plan

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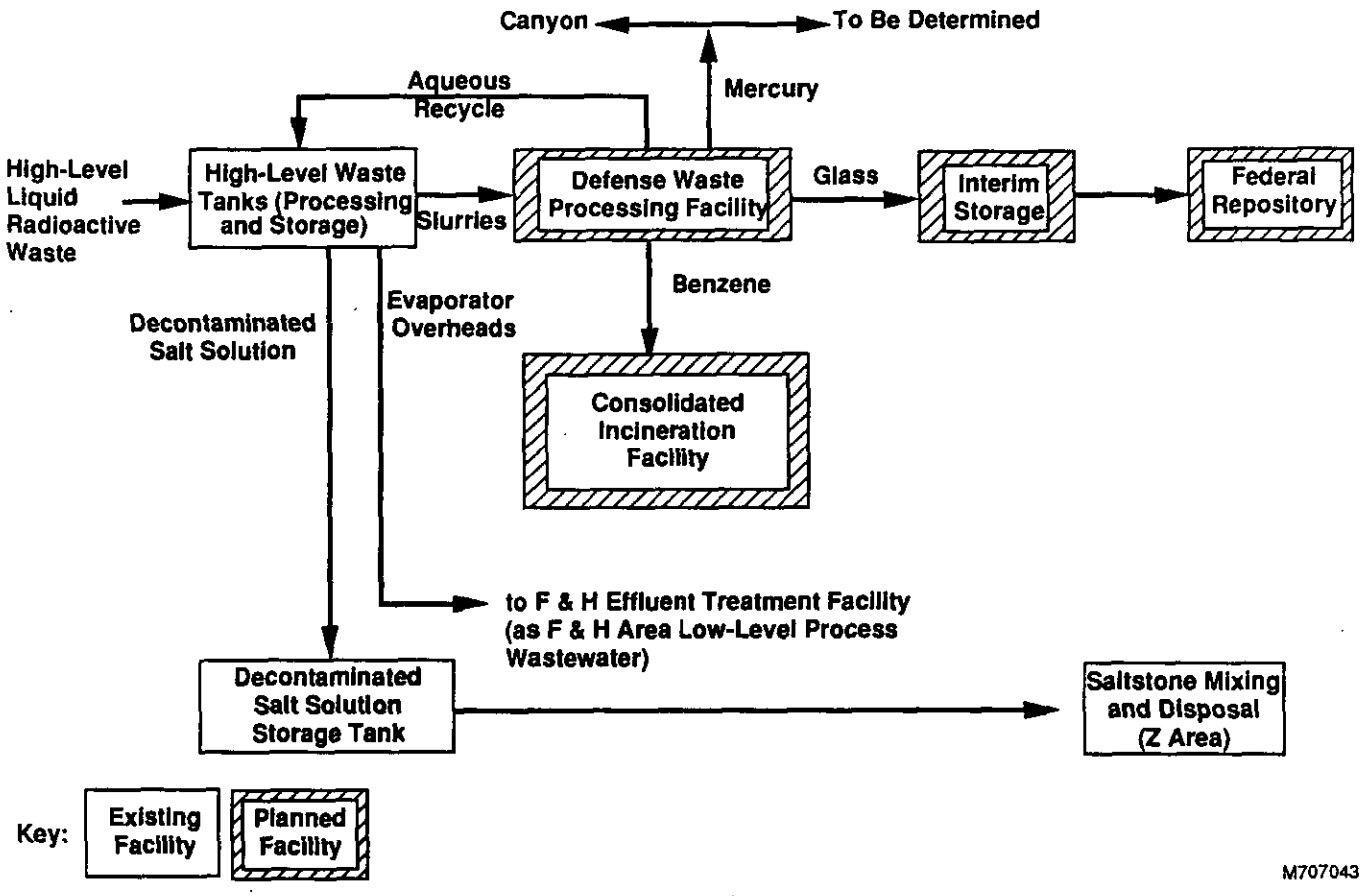


Figure 5-7. High-Level Radioactive Waste Management Plan

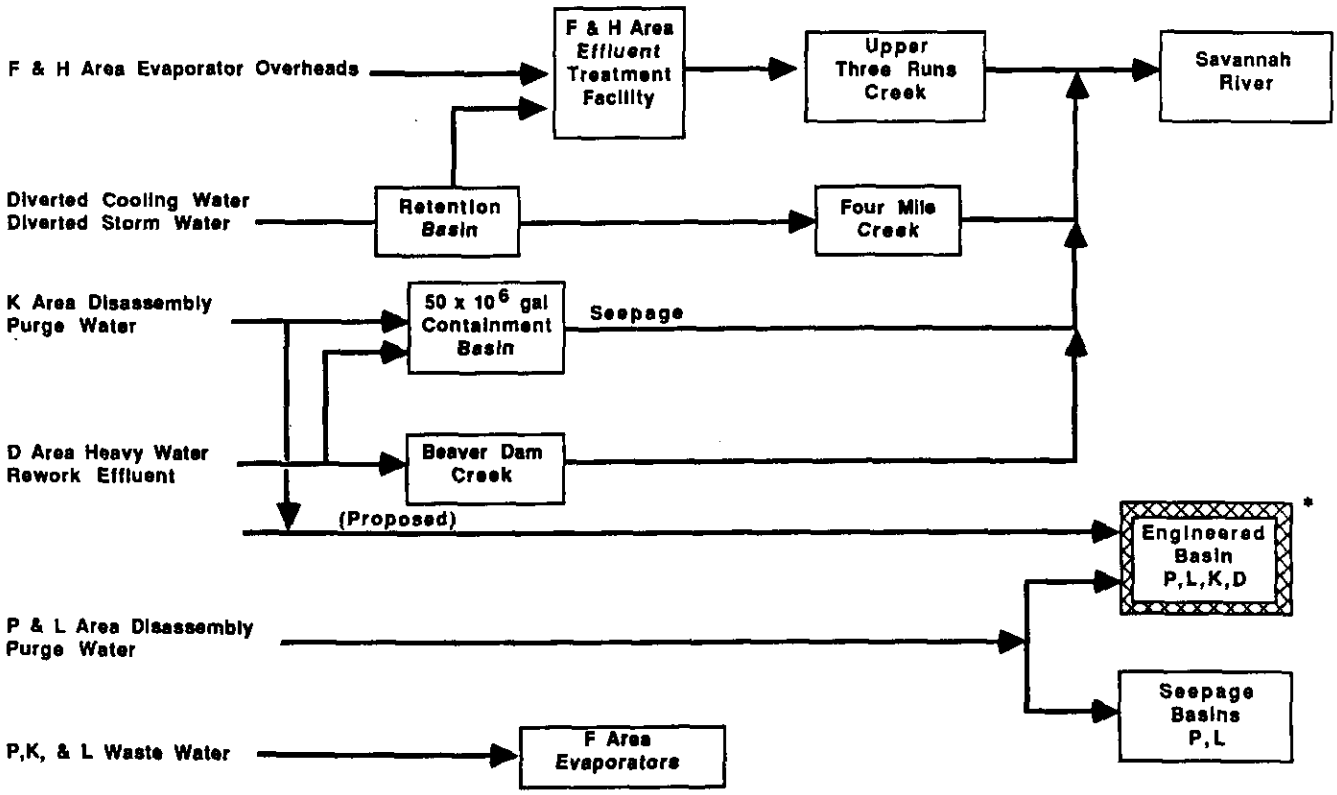
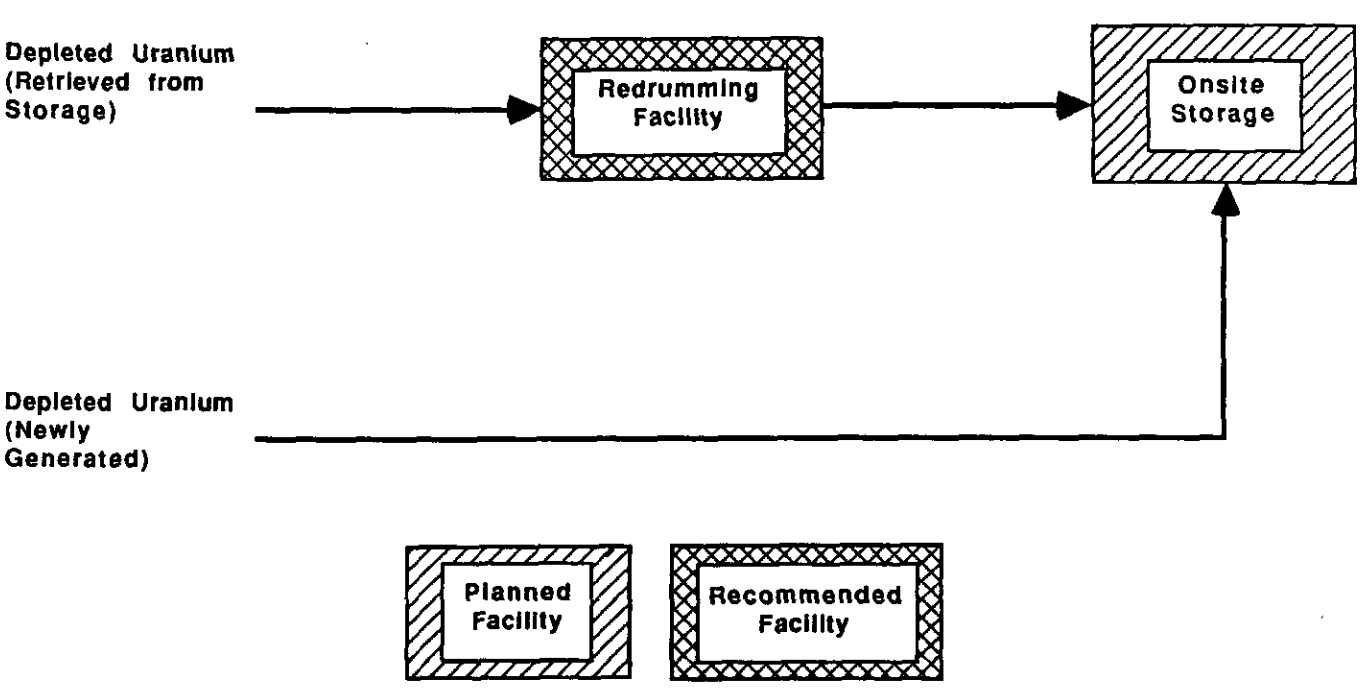


Figure 5-8. Tritiated Wastewater Management Plan



* One of the three storage buildings is complete and in use for storage of newly generated depleted uranium.

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Figure 5-9. Depleted Uranium Waste Management Plan

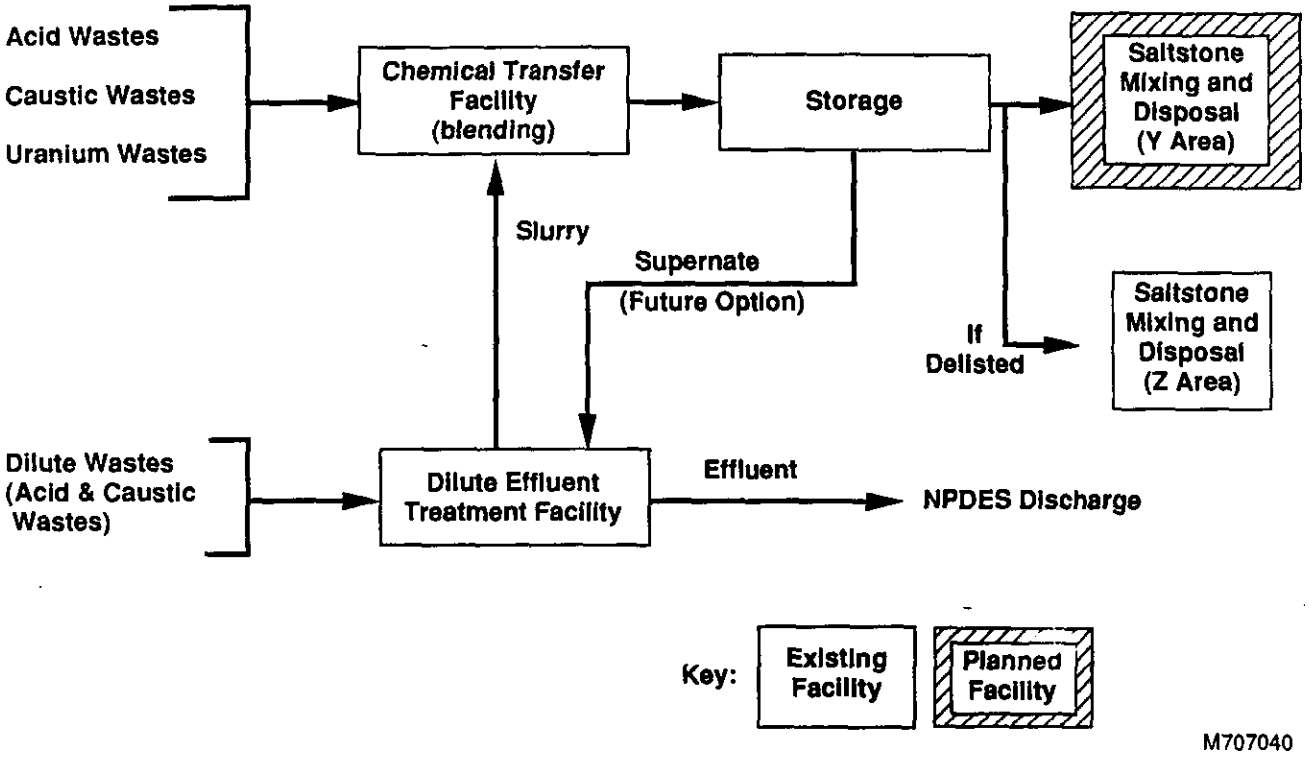

Figure 5-10. M Area Liquid Effluent Treatment Facility Waste Management Plan

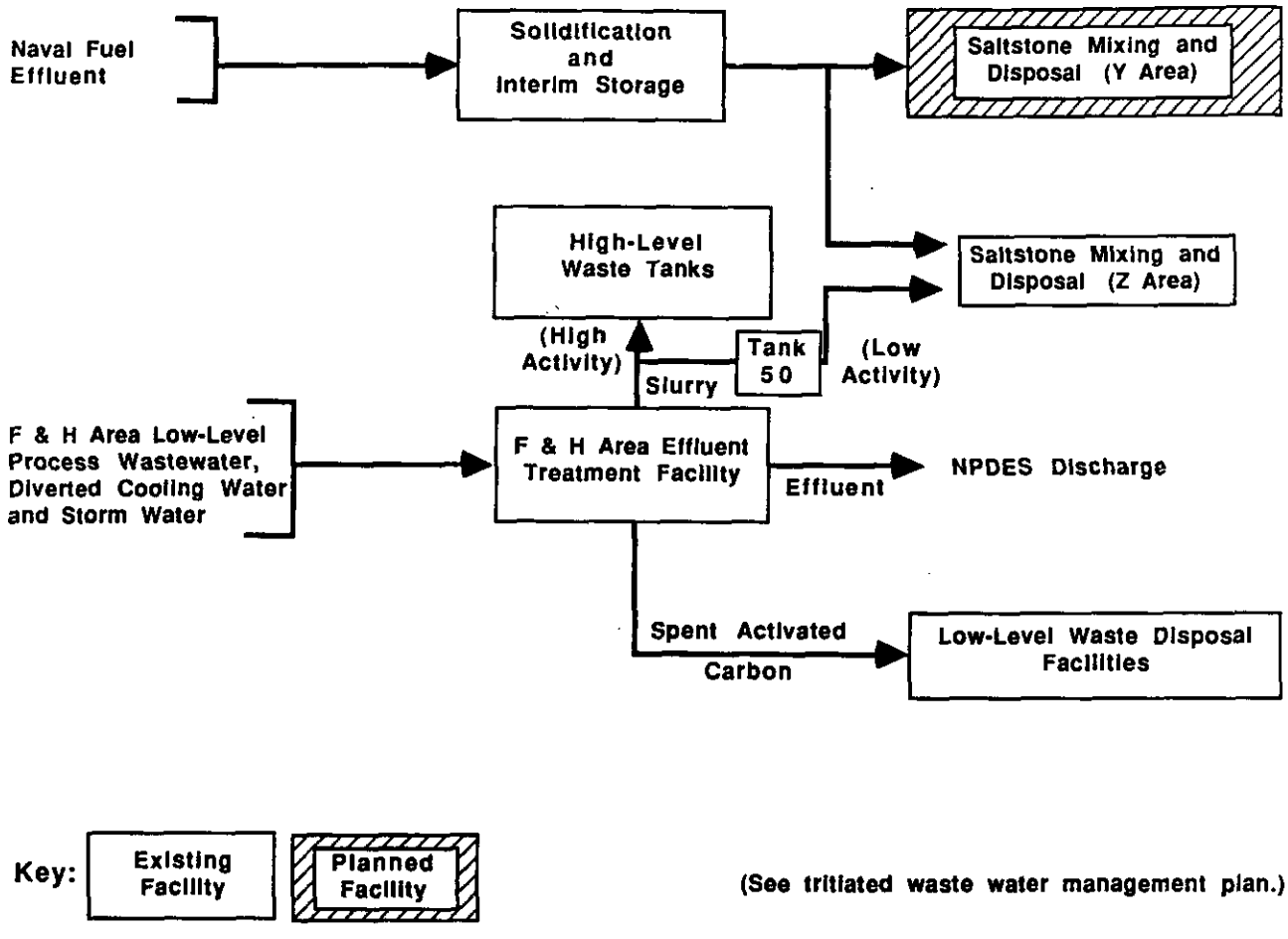

Figure 5-11. F and H Area Effluent Treatment Facility Waste Management Plan

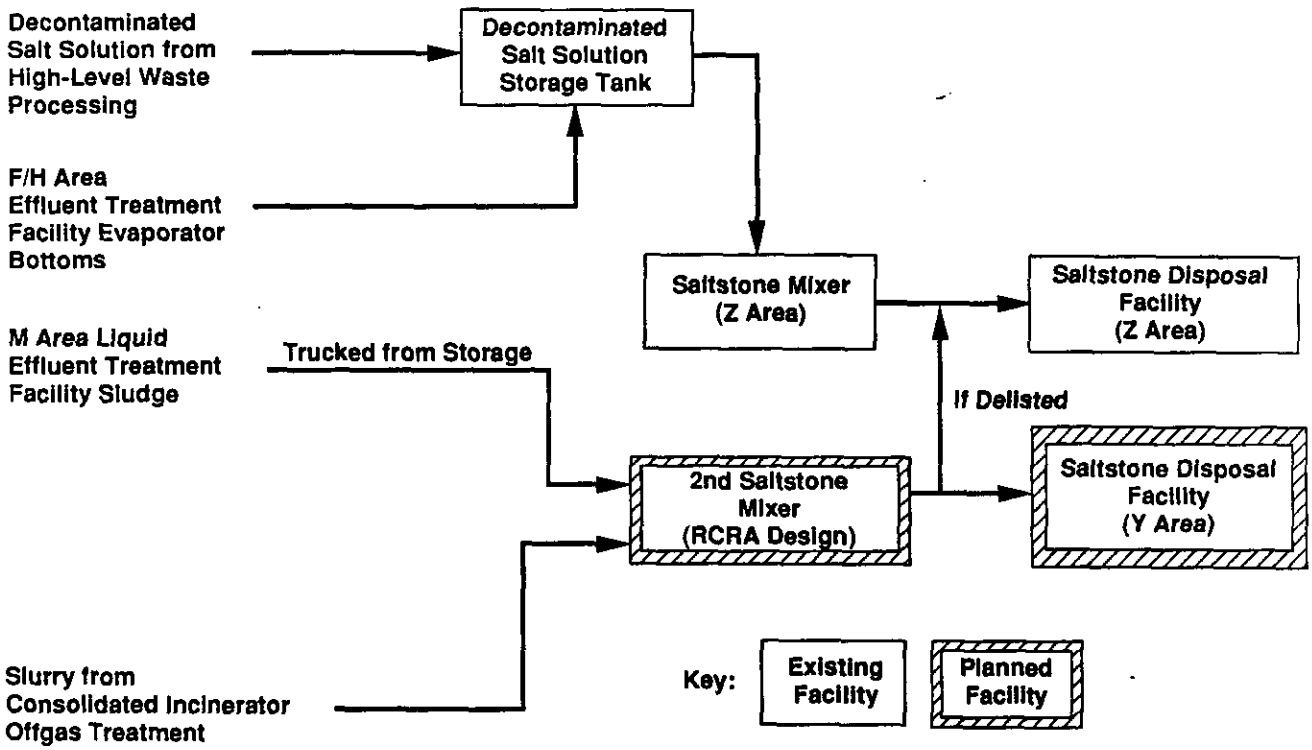

Figure 5-12. SRS Saltstone Disposal Plan

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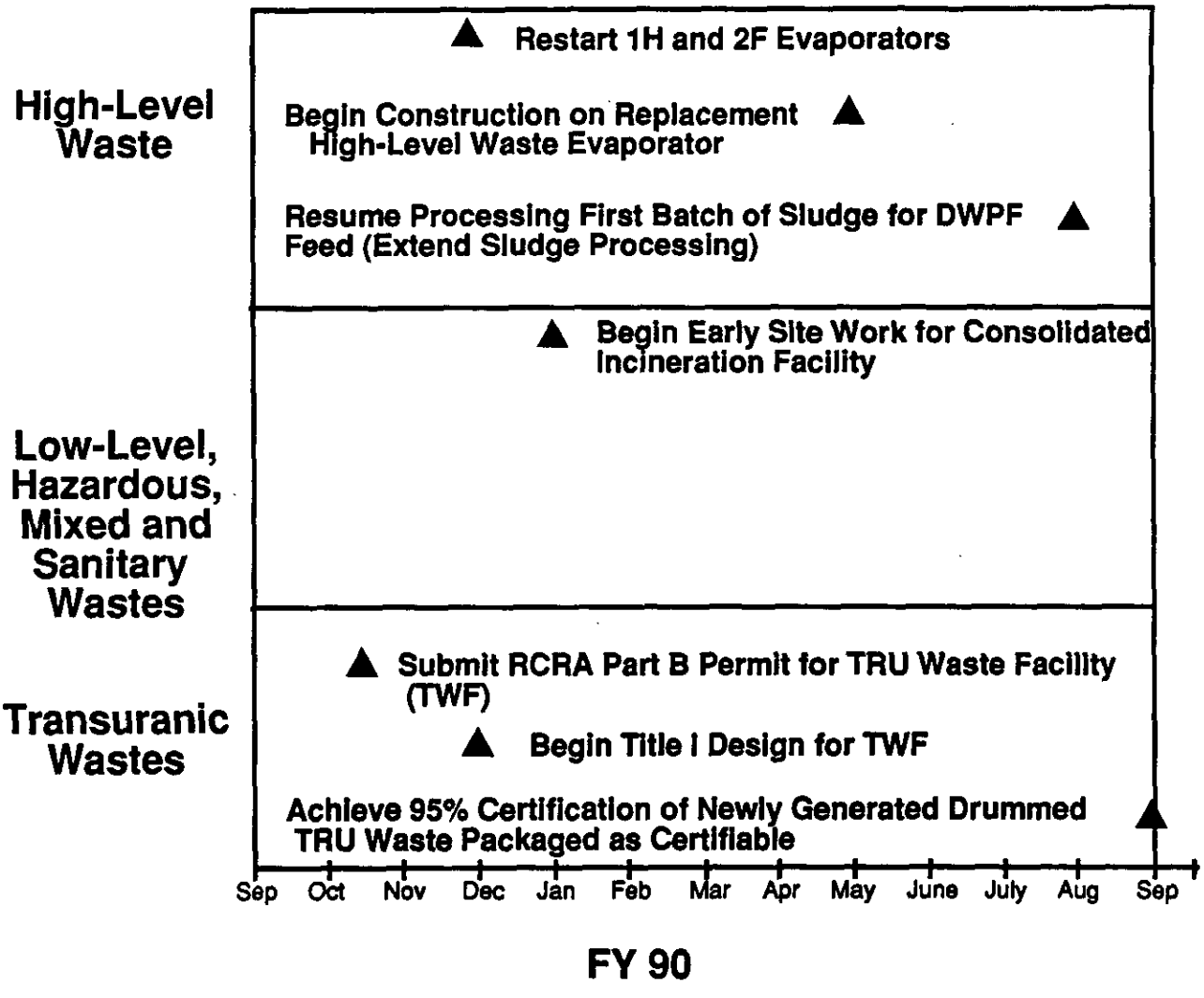

Figure 5-13. Waste Management Treatment Milestones

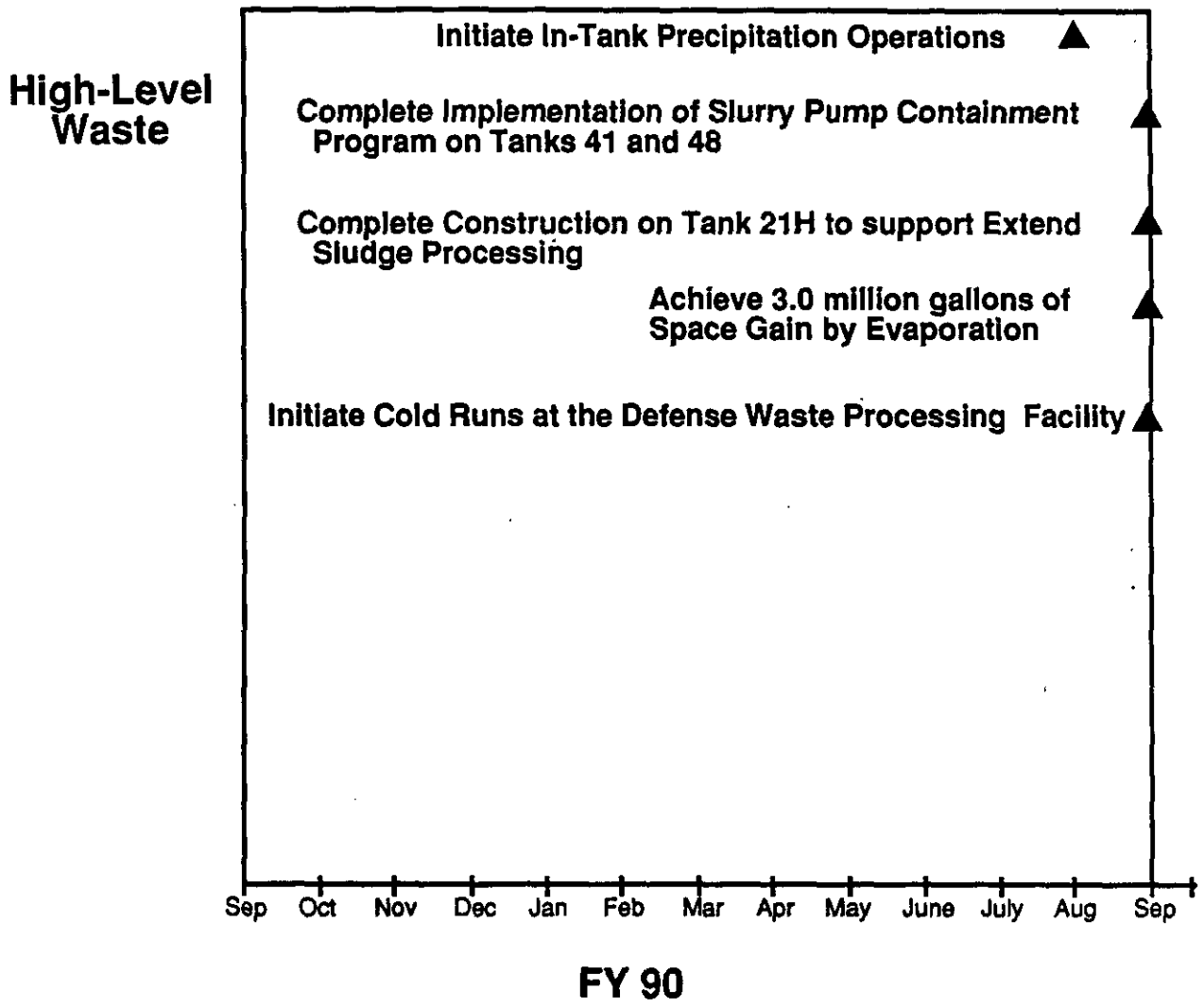

Figure 5-13. Waste Management Treatment Milestones (Contd)

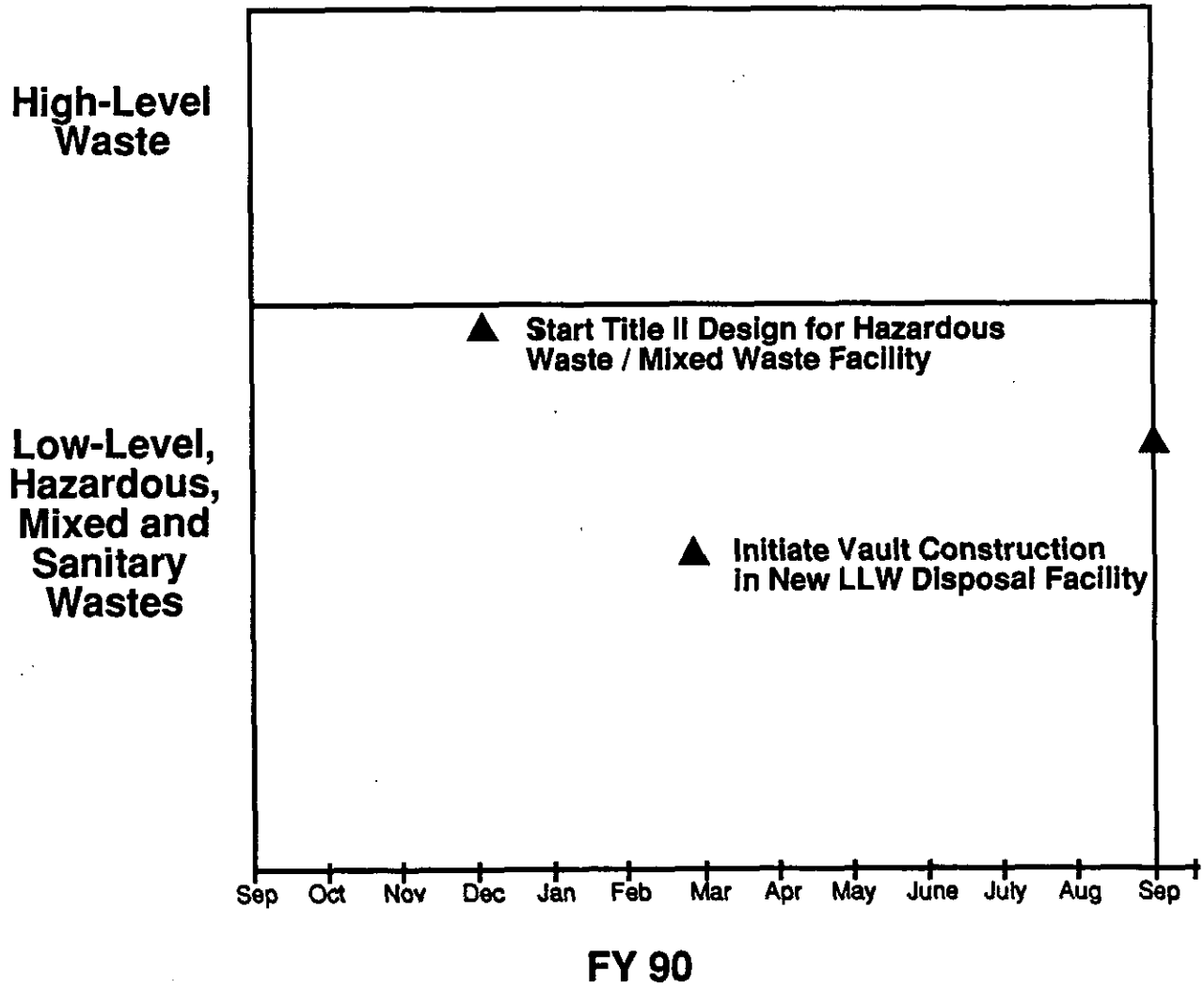

Figure 5-14. Waste Management Disposal Milestones

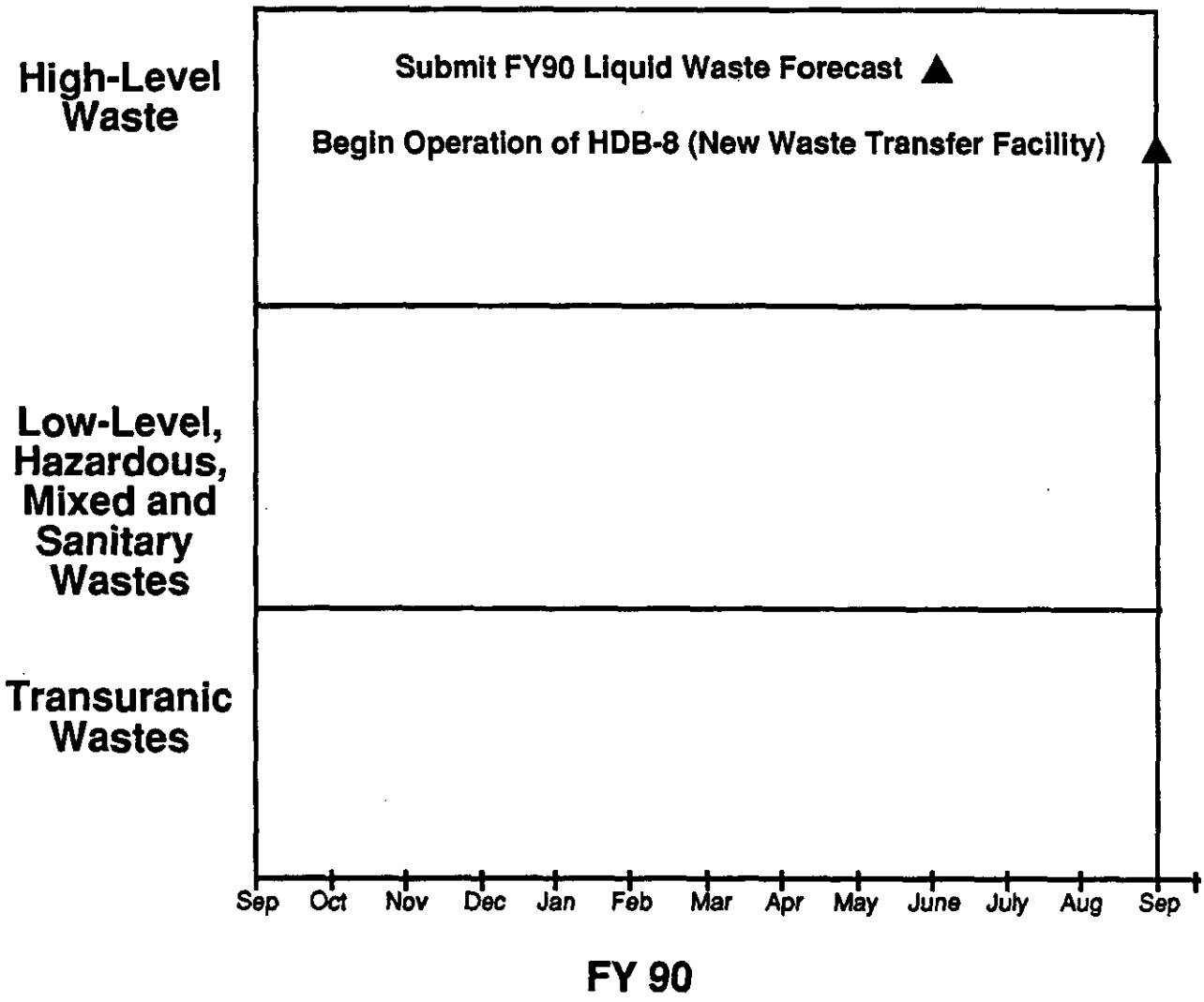

Figure 5-14. Waste Management Disposal Milestones (Contd)

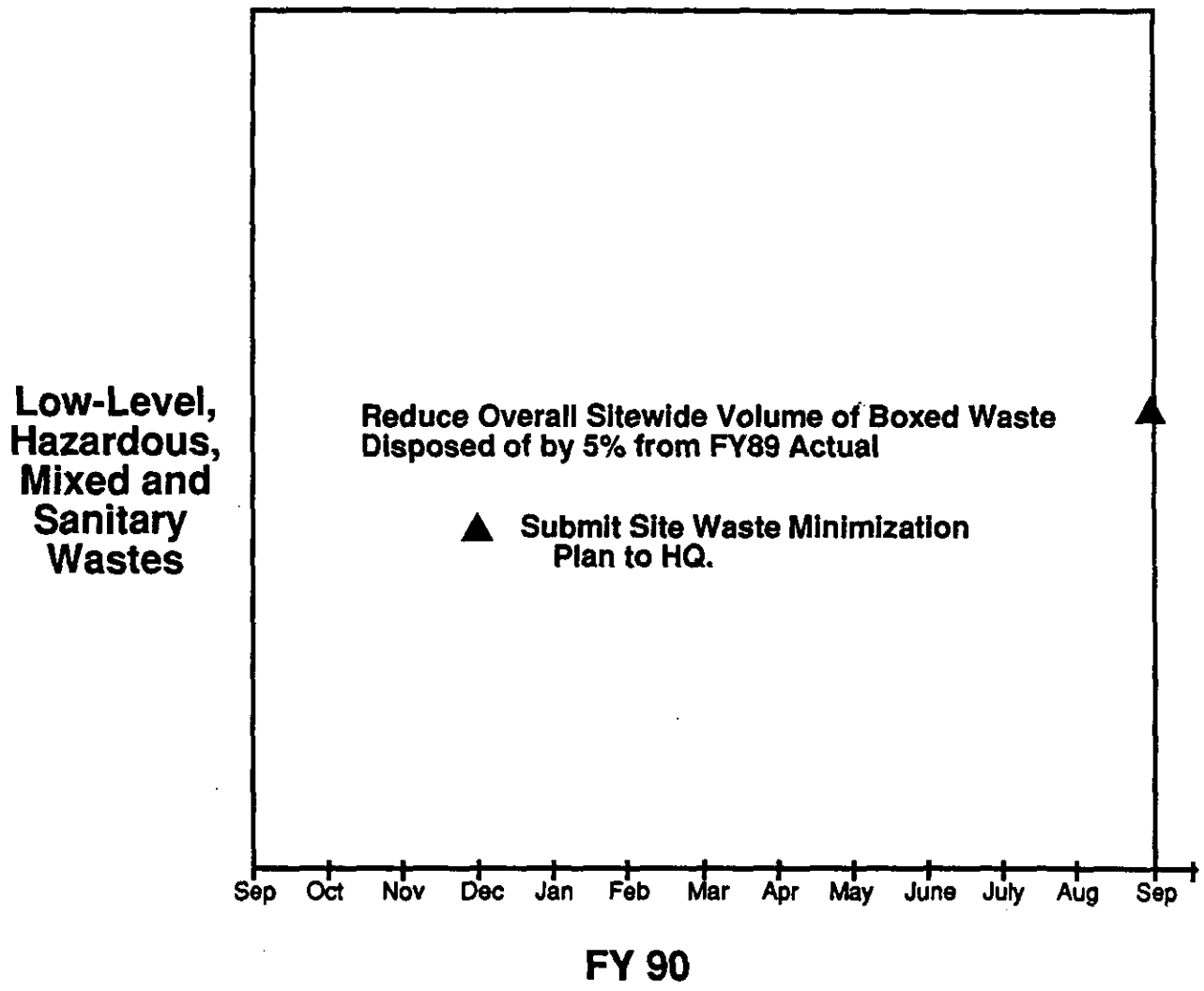

Figure 5-15. Waste Management Waste Minimization Milestones

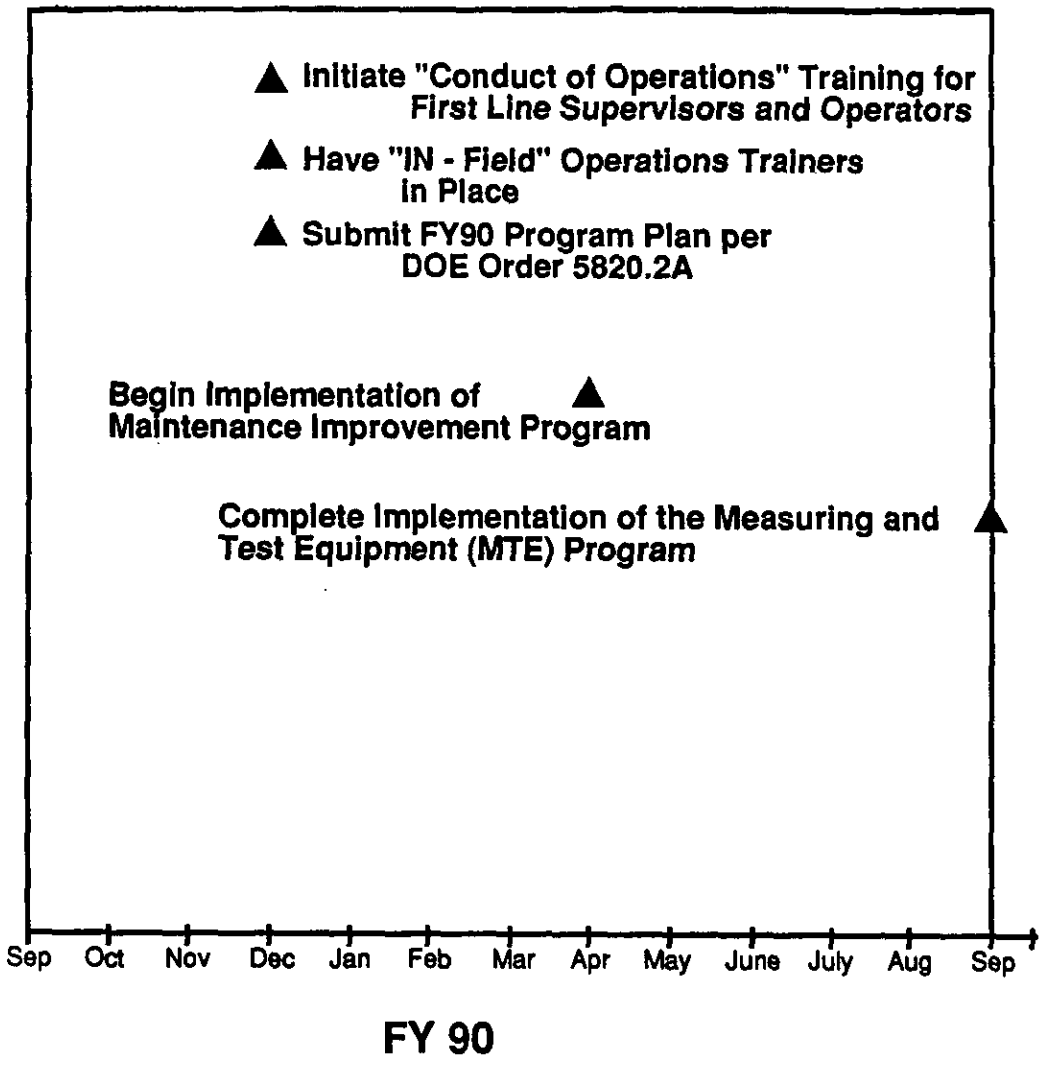

Figure 5-16. Waste Management Safety and Continuity Milestones

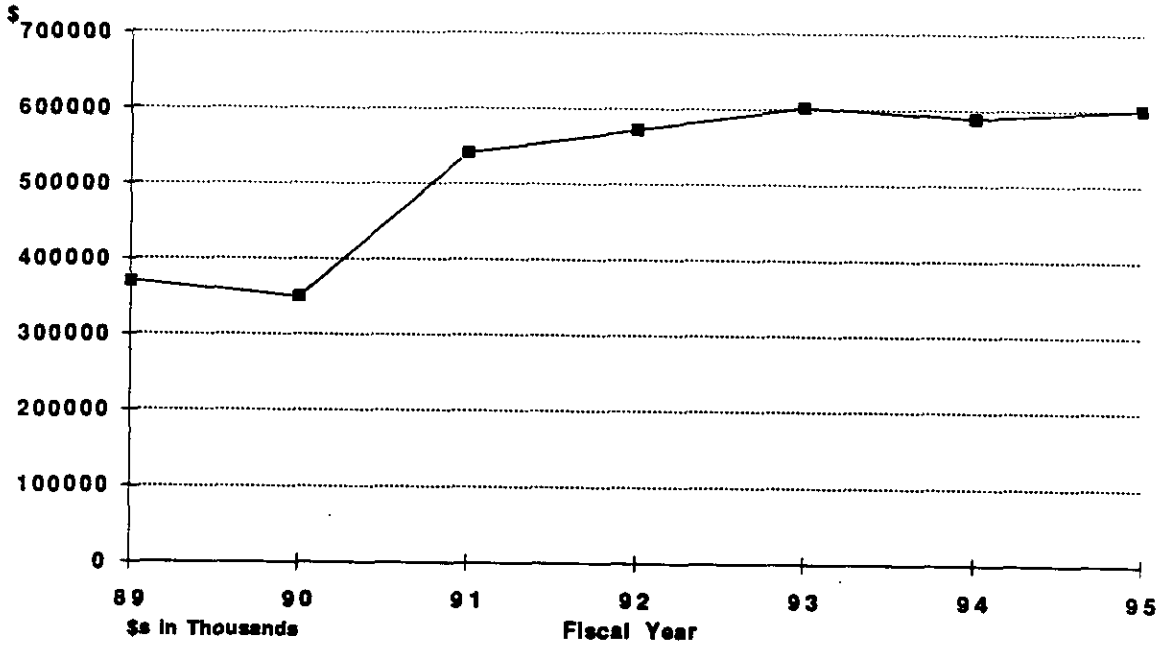

Figure 5-17. Waste Management Operations Total Projected Expenditures

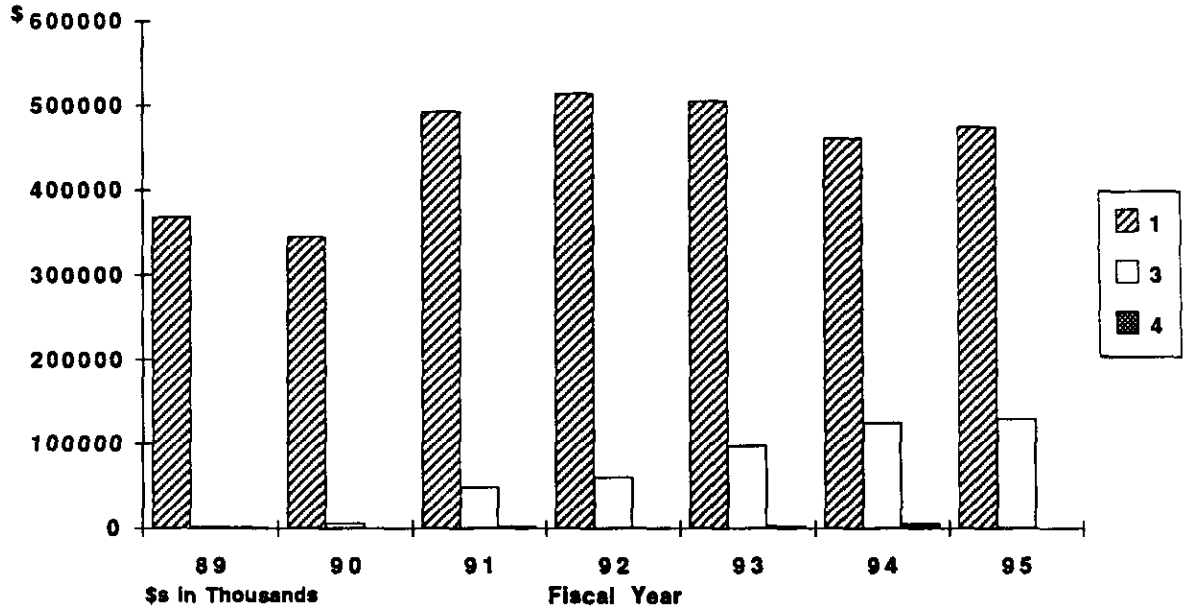

Figure 5-18. Waste Management Operations Total Projected Expenditures by Priority

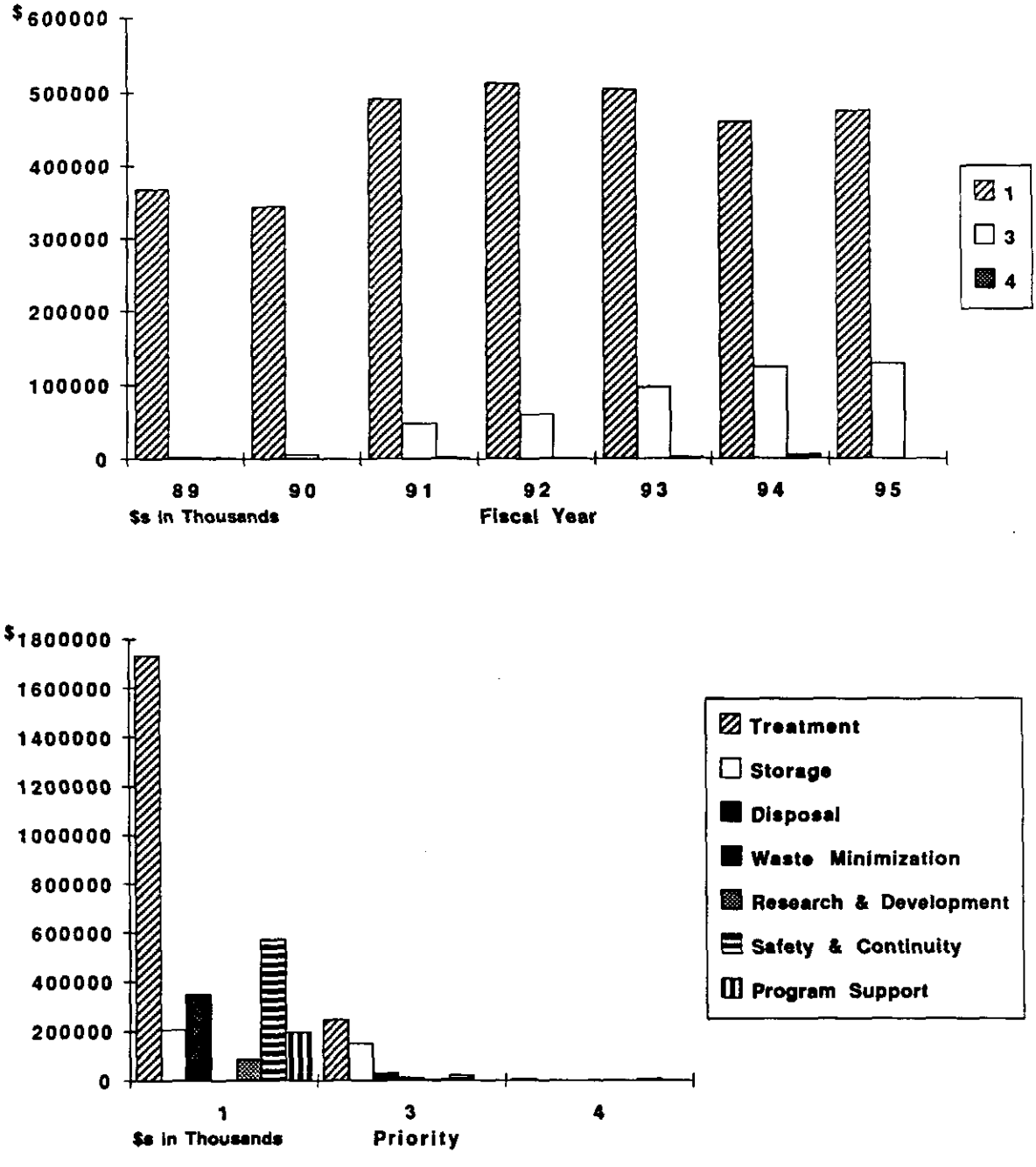

Figure 5-19. Waste Management Operations Percentage of Total Expenditures

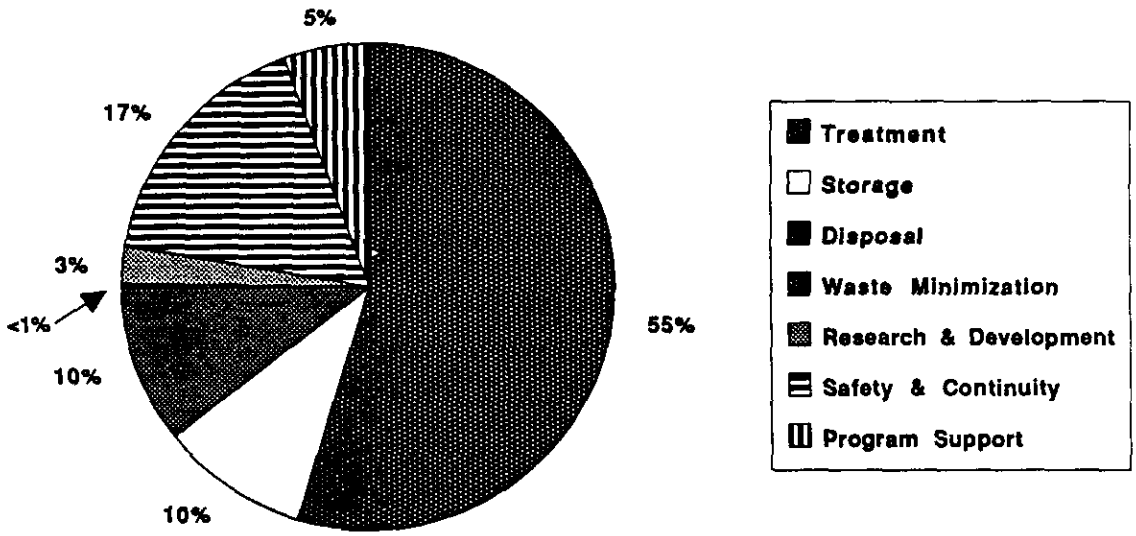

Figure 5-20. Waste Management Operations Percentage of Total Expenditures

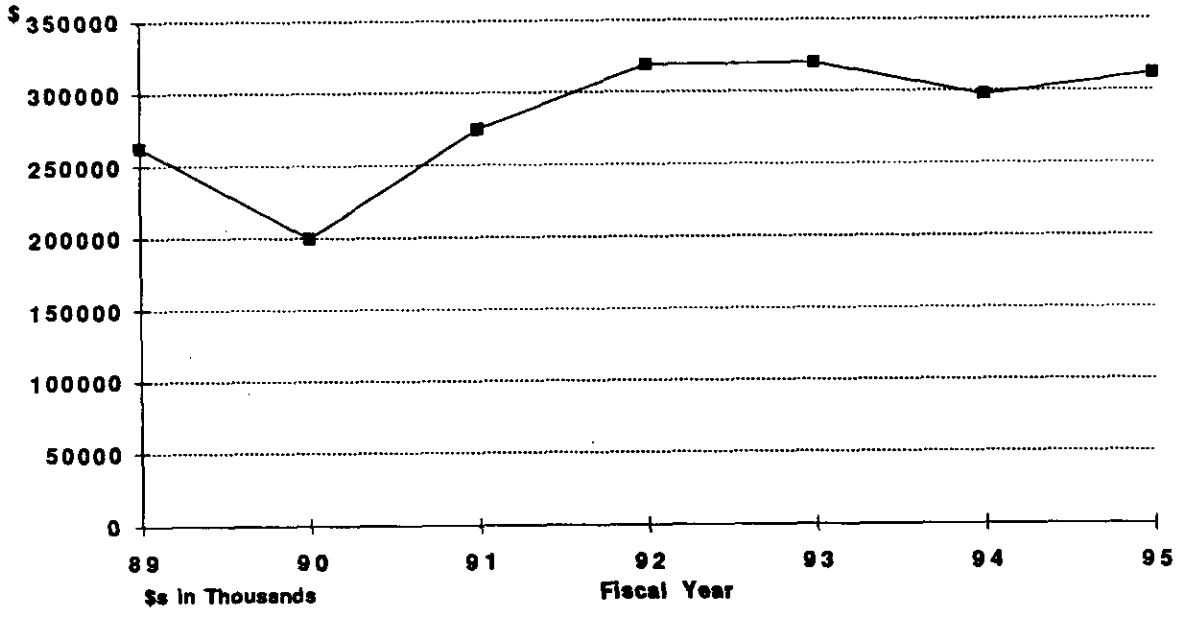

Figure 5-21. Waste Management Operations Estimated Annual Treatment Expenditures

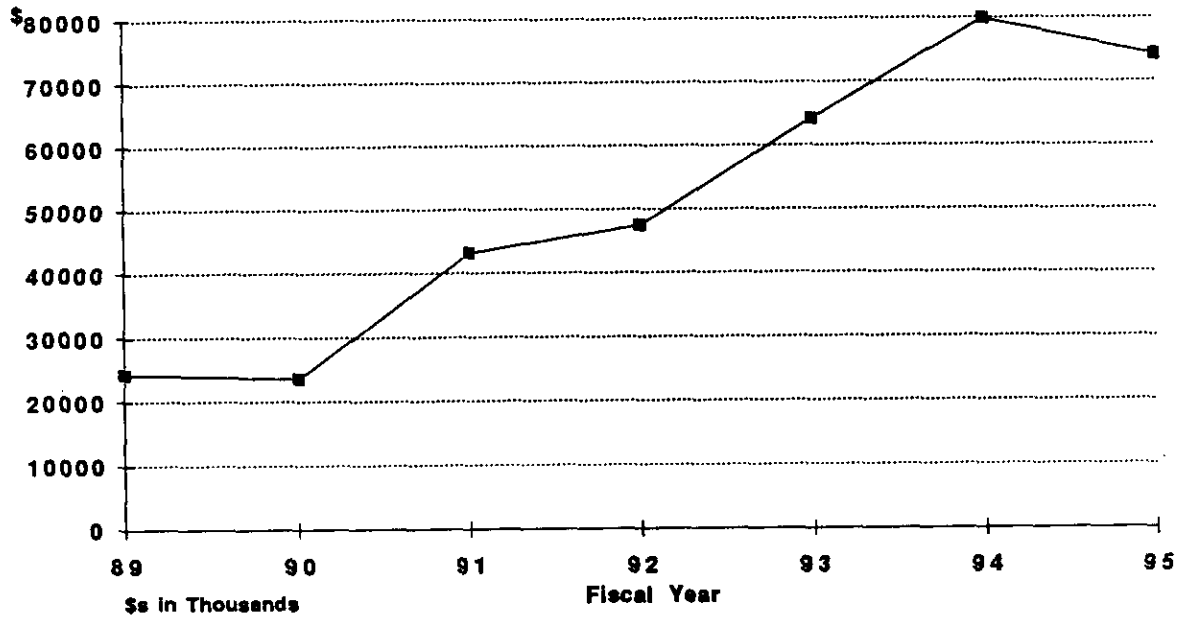

Figure 5-22. Waste Management Operations Estimated Annual Storage Expenditures

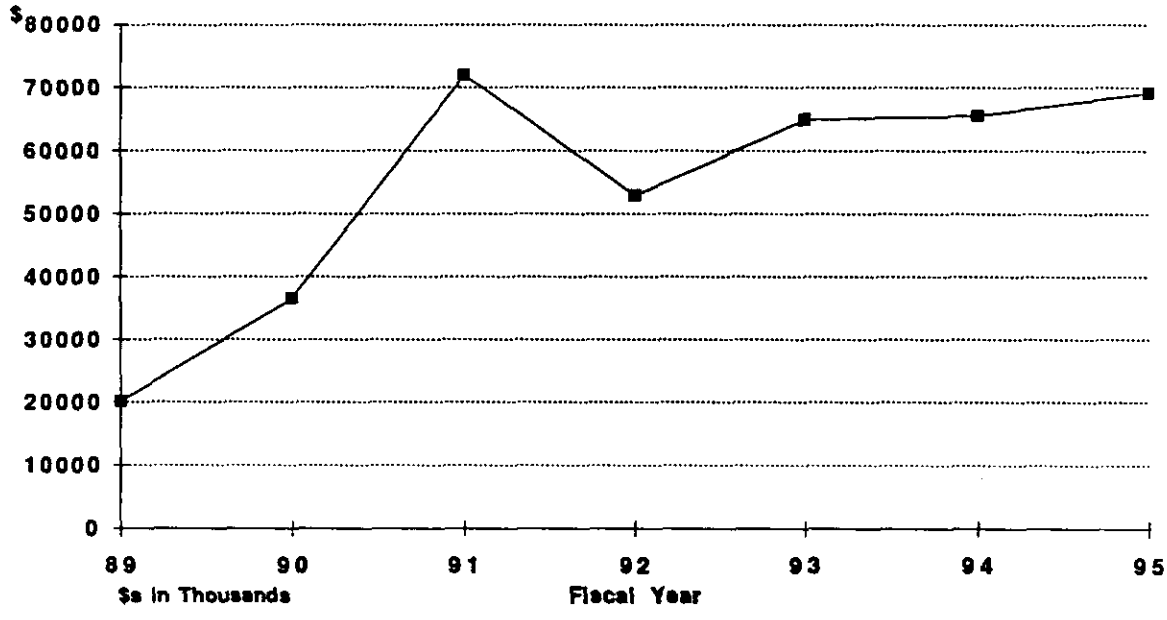

Figure 5-23. Waste Management Operations Estimated Annual Disposal Expenditures

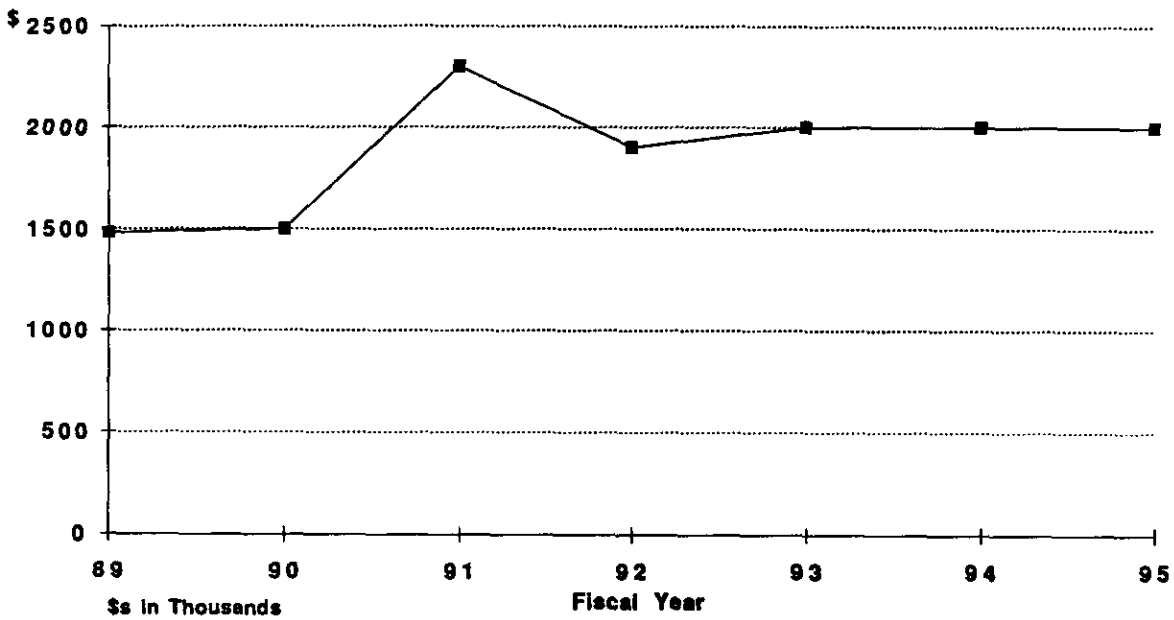

Figure 5-24. Waste Management Operations Estimated Annual Waste Minimization Expenditures

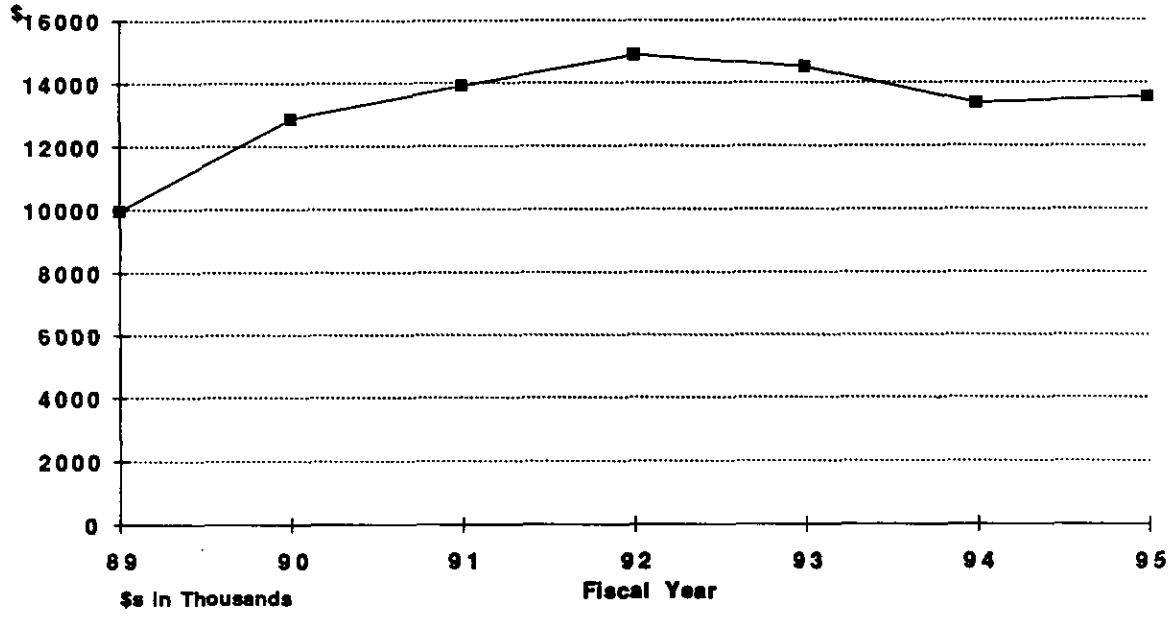

Figure 5-25. Waste Management Operations Estimated Annual Research and Development (Budget Expenditures)

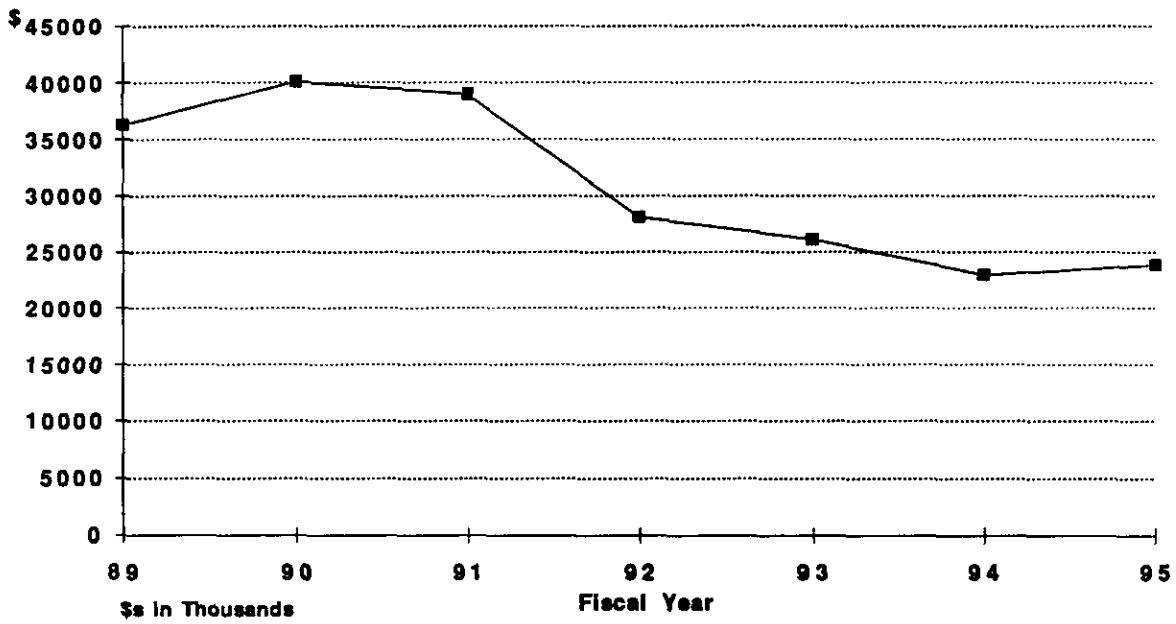

Figure 5-26. Waste Management Operations Total Projected Expenditures

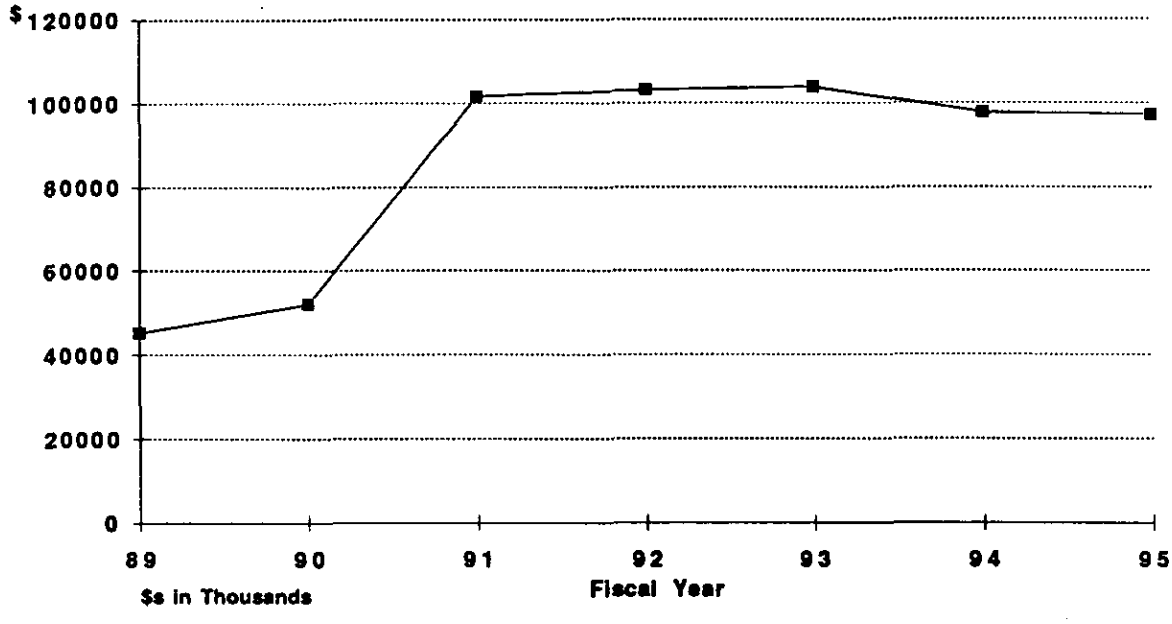

Figure 5-27. Waste Management Operations Estimated Annual Safety and Continuity Expenditures

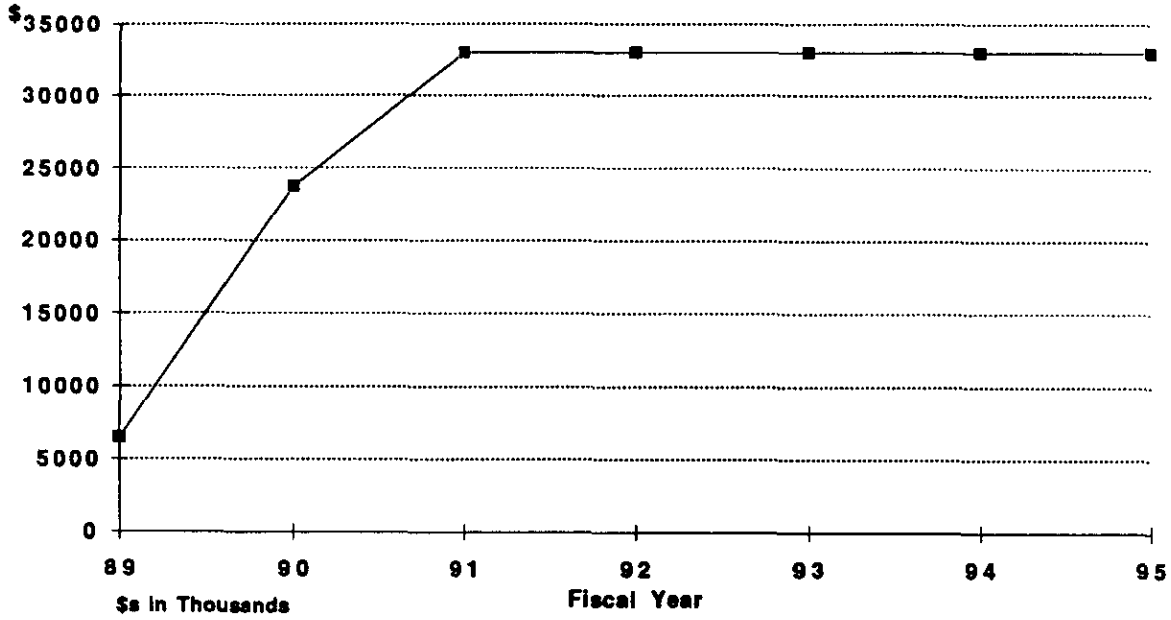

Figure 5-28. Waste Management Operations Estimated Annual Program Support Expenditures

6.0 COMPLIANCE WITH NEPA

6.1 Overview

6.1.1 Site Program Overview and Summary

The Savannah River Site (SRS) NEPA Program was initiated in August 1982 at the request of the Department of Energy Savannah River (DOE-SR) to ensure that the requirements of the NEPA were met. This program is administered and coordinated for the SRS by the NEPA Activities Group within the Environmental Protection Section (EPS) of the Environmental and Health Protection Department. The program reflects the Council on Environmental Quality (CEQ) regulations and DOE guidelines which require consideration of environmental factors during the planning process for all major federal activities that significantly affect the quality of the environment.

The NEPA Activities Group works with various SRS organizations in gathering the information and preparing the documentation necessary for NEPA compliance. The Group also has an active NEPA training program to inform employees of their obligations under the Act.

Regulatory Requirements

Federal Law

•**National Environmental Policy Act (42 U.S.C.A. 4321-4347)**—The purpose of the NEPA is to establish a national policy to protect the environment and to promote a better understanding of the ecological systems and natural resources important to the nation. NEPA and CEQ regulations implementing the NEPA (40 CFR 1500-1508) contain action-forcing provisions to ensure that federal agencies consider environmental information prior to making decisions on proposed actions. The NEPA process includes decision points at which the significance of environmental effects is considered, project alternatives are evaluated, and public input is obtained as necessary and a Record of Decision prepared publicly stating the alternative selected.

DOE Orders/Regulations

•**Implementation of the National Environmental Policy Act (DOE Order 5440.1C)**—This order established a DOE policy of complying fully with the NEPA and describes the roles of various DOE offices in implementing the Act.

•**DOE Regulations, Compliance with the National Environmental Policy Act, as amended (45 FR 20664, 45 FR 20694, 47 FR 7976)**—These guidelines provide procedures which the DOE will apply to implement the CEQ regulations for compliance with the NEPA. The SRS is required to integrate the NEPA process with other planning at the earliest possible time to ensure that planning and decisions reflect environmental values.

Organizational Responsibilities

The NEPA Activities Group within the Environmental Protection Section has the responsibility to prepare and coordinate all appropriate NEPA documentation for transmittal to the DOE. The primary responsibility of the group is to coordinate all activities of SRS organizations related to NEPA documentation for proposed projects. DOE-SR determines the appropriate level of NEPA documentation for proposed activities at SRS.

The Savannah River Laboratory (SRL), acting in an oversight capacity, reviews NEPA documentation prepared for the DOE to ensure technical accuracy and approves all formal transmittal of NEPA documentation to DOE-SR.

6.1.2 Program Activities

Environmental Protection Section (EPS)

The NEPA Activities Group administers an active program involving receipt of approximately 20-25 Environmental Evaluation Checklists for projects and Test Authorizations per month. Approximately 10 percent of these require additional environmental documentation such as a Memorandum-To-File (MTF), Environmental Assessment (EA), or Environmental Impact Statement (EIS). Two EISs have recently been completed: *Waste Management Activities for the Protection of Groundwater* (DOE 1987c) and *Alternative Cooling Water Systems* (DOE 1987a). The DOE-SR and its environmental contractors prepared the EISs for which the operating contractor provided technical information. The EA for Management Activities for Retrieved and Newly Generated Transuranic Waste was approved and issued August 1988. An analyses is underway to evaluate the environmental impacts of the DWPF, as modified since the DWPF EIS was completed. Under DOE-HQ and DOE-SR review are the Consolidated Incineration Facility (EA) and the Hazardous Waste/Mixed Waste Disposal Facility (potential supplement to groundwater EIS). An Environmental Assessment usually takes six months to one year to prepare and an Environmental Impact Statement usually takes two years to prepare.

6.2 RCRA and CERCLA Actions Under DOE Orders

Most of the RCRA and CERCLA projects covered in the Environmental Restoration and Waste Management Site Specific Plan (SSP) already are covered by *Waste Management Activities for the Protection of Groundwater*, an EIS prepared in 1987 for the site. These include: M-Area Settling Basin/Lost Lake Closure, A/M Area Groundwater Remediation, Metallurgical Laboratory Closure, Acid/Caustic Basin Closure, Mixed Waste Management Facility Closure, SRL Seepage Basin Closure, New TNX Seepage Basin Closure, F/H Seepage Basin Closure, Bingham Pump Outage Pits Remediation, and Inactive Reactor Seepage Basins Closure (Table 6.1). Other projects in the Environmental Restoration Section of the SSP are in the investigation stage. A decision will have to be made after the investigations are complete as to what will be necessary for NEPA documentation. At this time, SRS does not anticipate any EISs for RCRA and CERCLA actions.

For a newly discovered waste site, SRS will first try to discover if the general characteristics were within the current Groundwater EIS. If this was so, then after the characterization/assessment of the waste site and after regulatory review of the closure plan, a Memo to File would be filed tiered back to the Groundwater EIS. This procedure will be effective through September 30, 1990. If the waste site did not have the general characteristics that were within the current Groundwater EIS, then at a minimum an Environmental Assessment would have to be done. If the newly discovered waste site was nonradioactive, nonhazardous and just required general maintenance, then a Categorical Exclusion would be filed.

After September 1990 and the implementation of Secretary of Energy Notice (SEN) 15, the Categorical Exclusion may be expanded. If the newly discovered waste site was not routine maintenance, then NEPA documentation must be done, with an Environmental Assessment, at a minimum. If during the NEPA review, a major issue was discovered, the combination of RCRA, CERCLA, and NEPA documentation would be considered.

6.3 Other Actions Relative to NEPA

Most of the Waste Management projects included in the SSP are covered by an EIS, Waste Management Activities for the Protection of Groundwater. The SRL Effluent Treatment Facility Decontamination and Decommissioning activities for the site may require additional environmental analyses and documentation to cover the proposed activities at Savannah River. Also, under consideration, is the preparation of an EIS for all support facilities at SRS, equivalent to the EIS prepared for the Rector Operations.

Table 6.1. Activities Covered by 1987 Groundwater EIS

Activity Data Sheet Number	Activity
SR0301	M-Area Settling Basin/Lost Lake Closure
SR0302	A/M Area Groundwater Remediation
SR0303	Metallurgical Laboratory Closure
SR0304	Acid/Caustic Basin Closure
SR0305	Mixed Waste Management Facility Closure
SR0309	SRL Seepage Basin Closure
SR0310	New TNX Seepage Basin Closure
SR0316	F/H Seepage Basin Closure
SR0320	Bingham Pump Outage Pits Closure
SR0332	Inactive Reactor Seepage Basin Closure
SR0351	F/H Seepage Basin Closure

7.0 REPORTING AND DATA MANAGEMENT

7.1 Required Reports

Table 7.1 presents a listing of the numerous routine environmental and waste management reports submitted to regulatory agencies and the Department of Energy (DOE) which are prepared by Westinghouse Savannah River Company (WSRC). For Waste Management (WM), there are reports for the activities and operations in WM and reports that monitor progress in waste minimization. Environmental reports include: air emission inventory, site emission and discharge reports, budget requests, and environmental studies. For Environmental Restoration (ER), there are reports on ER program status, an annual summary, and current year planned work. These reports are prepared for the DOE, Environmental Protection Agency Region IV (EPA-IV), and South Carolina Department of Health and Environmental Control (SCDHEC).

7.2 Maintenance of Records

The control of documents for the Savannah River Site (SRS) is governed by the *Savannah River Plant Quality Assurance (QA) Manual* (Du Pont 1988b). Due to the change in operating contractors at the SRS from E. I. du Pont de Nemours and Company to the Westinghouse Savannah River Company, this document is under revision and the reference number will change.

Each SRS organization is responsible for establishing a documented administrative control system that complies with the QA Manual for documents generated or processed within their organization. The Environmental Protection Section is governed by the *Environmental and Energy Department Procedures Manual* (Du Pont 1988a). This document is currently being revised and is expected to be completed by September 1990. The Waste Management Operations Division is governed by *Waste Management Operations Programs Plan* (DOE 1989b). This is also currently being revised and it is expected that all sections will be completed and approved by June 1990. In addition, each operating department has its own quality assurance document, but all departments must follow the procedures outlined in the QA Manual.

Using the guidelines in the QA Manual, each organization is responsible for developing, documenting, and implementing an administrative control system for documents generated or processed within the organization. Each organization is also responsible for designating an individual(s) who will control the functions in the organization's document control system (Du Pont 1988b).

Each organization generating records is responsible for the control, authentication, and distribution of its own records, including:

- Limiting record designation to documents that provide evidence attesting to the quality of an item, activity, or the qualifications of an individual.
- Identifying documents designated as records by code/keywords for traceability and computerized information retrieval.

- Authenticating to ensure documents designated as records are legible, complete, and microform quality.
- Transmitting a reproducible copy, preferably the original, to the designated storage location.
- Receiving, indexed filing, access controlling, protecting, retrieving and disposition of records in interim storage.
- Documenting record control procedure(s), record retention schedule, and interim storage procedure(s).

The Records group of the Information Resource Management (IRM) Department is responsible for managing, including storage and retrieval, records received and for assisting individual organizations in the preparation of record retention schedules. The Publications group (IRM), is responsible for managing record copies of documents received for issue/distribution (Du Pont 1988b).

Most of the records and reports that are routinely submitted by the SRS to regulatory agencies and reports required by the DOE management are permanent records. Permanent records, according to the QA manual, are for the life of a particular item, process, system, or structure while the item is installed or stored for future use. Records are required to be stored in facilities constructed and maintained in a manner which minimizes risk of damage or destruction from:

- Natural disasters such as winds, floods, or fire
- Environmental conditions such as high and low temperatures, humidity, and light
- Infestations of insects, mold, or rodents.

Administrative procedures and/or physical barriers are required to preclude entry of unauthorized personnel into permanent record storage facilities. A dated and approved list of personnel authorized to enter permanent record storage facilities must be posted adjacent to all entrances. Unauthorized personnel may enter the facility only when escorted by authorized personnel (Du Pont 1988b).

Table 7.1. SRS Reports Submitted to Regulatory Agencies

Report Title and Benefits	Frequency/ Due Date/ Report Period	Distribution
Category: Waste Management (WM)		
SR WM Program Plan Summarize WM activities as required by DOE Order 5820.2A	Annually	DOE-HQ
Low-Level Waste (LLW) Generation Report Documents LLW minimization progress	Monthly	DOE
WM Milestones Documents progress in WM Operations by reporting the status of WSRC's milestones	Monthly	DOE
WM Operations Plan (part of Site Plan) Establishes WM Operations milestones and budget allocation plan	Annually	DOE
WSRC Consolidated Monthly Report Summarizes key information by WSRC related to Management and Operations of the site	Monthly	DOE
Waste Management Technology Monthly Report Provides status of WM Operations	Monthly	DOE-SR
WM Monthly Data Record Provides status of WM Operations	Monthly	DOE-SR
Waste Management Units - Annual Report Provides overview of information pertaining to SRS Waste Management units	Annually	EPA-IV and SCDHEC
SR Waste Management Operations Program Plan Provides an annual report regarding waste management operations and the waste management plans for the upcoming year.	Annually	DOE-HQ
WM Waste Minimization Report Provides the status and progress of SRS Waste Minimizatin Program	Quarterly	DOE-SR

Table 7.1. SRS Reports Submitted to Regulatory Agencies (Contd)

Report Title and Benefits	Frequency/ Due Date/ Report Period	Distribution
Category: Air		
Air Emissions Inventory *Provides data on atmospheric emissions from all permitted nonradioactive sources*	Once every 2 calendar years	SCDHEC
Annual Radiological Doses from SRS Emissions *Provides assessment of doses to the public from all atmospheric radiological sources*	Annually June 1 Calendar Year	EPA-HQ and DOE-HQ
Boiler Stack Test Reports (13 separate reports) *Provides particulate emission results of all boilers*	Once every 2 years (from last test)	SCDHEC
Minor Asbestos Removal Projects Report *Reports all small asbestos removal projects conducted at SRS each quarter (Projects consisting of less than 260 linear feet or 160 square feet)*	Quarterly (30 days after end of quarter)	SCDHEC
Monitoring Report for Airborne Radionuclides for DWPF *Provides results of stack monitoring for radionuclides at DWPF*	Quarterly	EPA-IV and DOE-HQ
Monitoring Report for Airborne Radionuclides for ETF *Provides results of stack monitoring for radionuclides at F/H Area ETF*	Quarterly (30 days after end of quarter)	EPA-IV and DOE-HQ
Oil Analyses for D-Area Boilers (Building 484-D) *Characterizes oil burned for energy recovery in D-Area Powerhouse boilers*	Quarterly (30 days after end of quarter)	SCDHEC
Opacity Report for D-Area Boilers (Building 484-D) *Provides results of continuous opacity monitoring of D-Area Powerhouse emissions*	Quarterly (30 days after end of quarter)	SCDHEC

Table 7.1. SRS Reports Submitted to Regulatory Agencies (Contd)

Report Title and Benefits	Frequency/ Due Date/ Report Period	Distribution
Category: Budget and Planning		
Environmental Implementation Plan (WSRC) Provides goals, objectives, and strategies to implement environmental requirements and obligations. Serves to justify for site manpower and funding requests.	Annually	DOE-HQ
Environmental Restoration (ER) and WM Five-Year Plan Provides a basis for SRS manpower and funding requests for environmental and Waste Management projects and programs	Annually	DOE-HQ
Site Specific Plan for ER and WM Five-Year Plan Provides site specific information about the Five-Year Plan	Annually	DOE-HQ
Office of Management and Budget-Circular A-106 Pollution Abatement Plan Provides information for environmental corrective action/pollution abatement projects at SRS	Biannually (December 31 and June 30)	OMB, EPA-HQ and DOE-HQ
Category: Environmental Monitoring		
Savannah River Site Environmental Report Provides descriptions of SRS environmental protection programs and the results of environmental monitoring	Annually (June 1 for previous calendar year)	DOE-HQ, US Congress Federal Agencies, State Governors (GA and SC), State Legislators (GA and SC), and the Public.

Table 7.1. SRS Reports Submitted to Regulatory Agencies (Contd)

Report Title and Benefits	Frequency/ Due Date/ Report Period	Distribution
Category: Environmental Restoration		
Annual Field Office Status Report *Provides an overview summary of the status of each restoration task*	Annually (October 30)	DOE-HQ
Current Year Work Plan *Provides documentation for the basis for planning and implementing the current year's work*	Annually (October 30)	DOE-HQ
Field Office Long-Range Management Plan Provides a summary of requirements for the current year and outyears	Annually (January 30)	DOE-HQ
Field Office Program Management Plan Defines the management procedures necessary to comply with the requirements	As required	DOE-HQ
Monthly Field Office Status Report Provides a status of each restoration task on a monthly basis	Monthly	DOE-HQ
Category: Groundwater		
Acid/Caustic Basins Groundwater Quality Assessment (GWQA) Report provides a quarterly summary of groundwater data for the SRS acid/ caustic basins	Quarterly	SCDHEC
A and M Corrective Action Quarterly Progress Reports Provides a summary of groundwater corrective action status for A and M Areas	Quarterly (Due 60 days after end of quarter)	SCDHEC

Table 7.1. SRS Reports Submitted to Regulatory Agencies (Contd)

Report Title and Benefits	Frequency/ Due Date/ Report Period	Distribution
A and M Corrective Action Annual Progress Report Provides an annual summary of groundwater corrective actions status for A and M Areas	Annually (Due March 1 for the previous calendar year)	SCDHEC
F and H Basins Quarterly GWQA Report Provides a quarterly summary of the F and H Areas Seepage Basins groundwater monitoring data	Quarterly (Due 90 days after end of quarter)	SCDHEC
F and H Annual GWQA Report Provides an annual summary of the F and H Areas Seepage Basins groundwater monitoring data	Annually (April 1 for previous year)	SCDHEC
MWMF GWQA Report Provides summary of the groundwater monitoring data for the Mixed Waste Management Facility (burial grounds)	Quarterly and Annually	SCDHEC
Sanitary Landfill Monitoring Well Report Provides a summary of the groundwater monitoring data for the SRS Sanitary Landfill	Biannually	SCDHEC
Sewage Sludge (Experimental Land Application Sites) GW Monitoring Report Provides an annual summary of the groundwater monitoring results for the 7 experimental sanitary sewage sludge application sites	Annually (January 15)	SCDHEC
Sewage Sludge Land Application (F and H Areas) GW Monitoring Report Provides a quarterly summary of groundwater monitoring data for the SRS sanitary sludge application sites	Quarterly	SCDHEC

Table 7.1. SRS Reports Submitted to Regulatory Agencies (Contd)

Report Title and Benefits	Frequency/ Due Date/ Report Period	Distribution
Technical Summary of Groundwater Protection at SRS Provides summary of groundwater monitoring data for SRS facilities	Every 2 years (June 1 for previous years)	SCDHEC
Water Use Report Provides quarterly summary of use of surface water and groundwater use at SRS	Quarterly	Water Resources Commission of South Carolina
Z-Area Groundwater Monitoring Report Provides a summary of groundwater monitoring data for the Z-Area saltstone disposal vaults	Quarterly	SCDHEC
Sewage Sludge Land Application (K and P Areas) GW Monitoring Reports Provides a summary of groundwater monitoring data for the application sites used for disposal of sanitary sludge from closure of CS-Area lagoon	Quarterly	SCDHEC
Met Lab GWQA Report Provides a summary of the groundwater monitoring data for the 723-A Metallurgical Lab Seepage Basin	Quarterly and Annually	SCDHEC
Category: Overall		
Environmental Permit Report (Required by DOE Order 5400.2A) Provides a list and status of SRS environmental permits	Annually (October 31)	DOE-HQ
Environmental Protection Implementation Plan per DOE 5400.1 Defines responsibilities of SRS contractors and environmental program requirements	Annually (Fiscal year)	DOE-HQ November 9

Table 7.1. SRS Reports Submitted to Regulatory Agencies (Contd)

Report Title and Benefits	Frequency/ Due Date/ Report Period	Distribution
Category: Radiological		
Effluent Information System and Onsite Discharge Information System Provides information for EG&G to generate a summary of releases from all DOE sites	Annually	EG&G, Idaho
Z-Area Saltstone Radionuclide Analyses Provides a summary of radionuclide analyses of the saltstone disposed in the Z-Area disposal Vaults	Biannually	SCDHEC
Category: SARA		
Emissions Inventory (Section 313) Title III Provides a summary of the Toxic Chemicals released into the environment at SRS	Annually (July 1 for the previous calendar year)	EPA-HQ, SCDHEC and GA DNR
MSDS Update Report (Section 311) Provides a summary of the Material Safety Data Sheets to the state and local communities for chemicals used at SRS	As Required	SCDHEC, LEPC (Aiken, Allendale, and Barnwell Counties, SC), and GA DNR
Annual SARA Tier II Inventory (Section 312) Provides an inventory, location, and physical/health hazards of the hazardous chemically and extremely hazardous substances used at SRS	Annually (March 1 for previous year)	SCDHEC, LEPC, and GA DNR
Category: Surface Water		
NSDWA Self-Monitoring Report Provides SRS drinking water quality compliance status	Monthly	SCDHEC

Table 7.1. SRS Reports Submitted to Regulatory Agencies (Contd)

Report Title and Benefits	Frequency/ Due Date/ Report Period	Distribution
NPDES Wastewater Discharge Monitoring Report (DMR) Provides data from monitoring wastewater discharges	Monthly (Due 30 days after end of month)	SCDHEC and EPAIV
Thermal Effects Report (Appended to DMR) Provides temperature data used to determine compliance status with Consent Order 84-4-W	Monthly	SCDHEC and EPA-IV
Radioactivity Monitoring Report, Water Treatment Facilities utilizing Savannah River Water Provides quarterly summary of radionuclide levels in Savannah River water	Quarterly	North Augusta, SC, and Port Wentworth, GA; and Beaufort/ Jaspar, SC Water Treatment Plant
L-Lake and Steel Creek Section 316(a) Study Provides a status of the progression towards a balanced biological community in L-Lake and Steel Creek per L-Reactor NPDES permit	Annually	SCDHEC and EPA-IV
Reactor 186 Basin Cleaning Report Provides a summary of the total solids released during the cleaning of the basins used to hold cooling water for the SRS reactors.	Annually or as required	SCDHEC and EPA-IV
Category: Surveys		
Action Plan for the Resolution of the DOE-HQ Environmental Survey Findings Provides progress of SRS corrective actions taken on the HQ survey findings	Biannually	DOE-HQ

Table 7.1. SRS Reports Submitted to Regulatory Agencies (Contd)

Report Title and Benefits	Frequency/ Due Date/ Report Period	Distribution
Category: Waste Disposal		
Hazardous Waste Minimization Report Provides summary status of the minimization results by operation and waste type	Annually (January 31 Calendar year)	SCDHEC
Hazardous Waste Report Provides summary of hazardous waste in storage and shipped offsite for disposal	Quarterly (Within 30 days of end of quarter)	SCDHEC
PCB Inventory Provides summary status of site PCB inventory	Annually (July 1 Calendar year)	DOE-HQ

8.0 QUALITY ASSURANCE

8.1 Department of Energy Quality Assurance and Data Verification

The Department of Energy (DOE) Order 5400.1 requires that a Quality Assurance (QA) Program consistent with DOE Order 5700.6B be established covering each element of environmental monitoring and surveillance programs, commensurate with its nature and complexity. This section will discuss the implementation of this requirement by the U.S. Department of Energy-Savannah River Operations Office (DOE-SR) and Savannah River Site (SRS) contractors.

The DOE QA Program is defined in DOE Order 5700.6B. Its purpose is to present DOE policy; set requirements; and assign responsibilities for establishing, implementing, and maintaining plans and actions to ensure quality achievement in DOE programs.

The DOE Under Secretary has overall responsibility and authority for DOE programs and may take necessary management actions to ensure safety, including directing the curtailment and suspension of operations when such operation would result in undue risk. The Assistant Secretary for Defense Programs has the overall responsibility and authority of the QA policy. The Assistant Secretary for Environment, Safety, and Health is responsible for establishment, coordination, and overview of the DOE QA policy. This authority is delegated to DOE-SR for programs at the SRS.

At the SRS, the Manager has the final responsibility for implementation of quality. The policy for DOE-SR QA is established in DOE-SR Order 5700.6C, which invokes the use of the national consensus quality standard ANSI/ASME NQA-1. The Director of the Quality and Materials Assurance Division (QMAD), reporting to the Assistant Manager for Health, Safety and Environment (AMHS&E), is responsible for ensuring preparation of a DOE-SR QA program. He is also responsible for auditing the QA programs established by DOE-SR and DOE-SR contractors to verify their adequacy and effectiveness in complying with the DOE-SR order. In addition to the other responsibilities outlined in DOE-SR Order 5700.6C, the Director of the QMAD is responsible for the preparation and control of the DOE-SR QA Manual (DOE 1987b). All DOE-SR Assistant Managers ensure that their Division Directors and Office Heads require their respective Divisions and Offices to include formal QA provisions in tasks, programs, and projects for which they are responsible. This includes those projects conducted by outside organizations and contractors.

The DOE-SR QA Manual is presently under revision. The new manual will include Quality Assurance Procedures for all 18 criteria of ANSI/ASME NQA-1. All DOE-SR Divisions are required to review and approved the manual and to implement its provisions in tasks, programs, and projects for which they are responsible.

They are also responsible for ensuring that, for their areas of responsibility, their contractors maintain a QA program that complies with DOE-SR Order 5700.6C.

The WSRC Quality Assurance Program both supplements and implements the requirements of the DOE-SR QA Manual. The program contains the quality control procedures to assure appropriate controls are utilized in the work performed and measurements recorded.

The Environmental Division (ED) of DOE-SR, in fulfilling its mission to provide the technical input needed to effectively manage the environmental effects of operating the SRS in compliance with environmental requirements, and to interface with environmental regulatory agencies, ensures the quality of the environmental monitoring and surveillance programs in two ways:

- Overseeing the SRS environmental protection activities
- Formally evaluating contractor performance

The Westinghouse Savannah River Company (WSRC) QA Program ensures the quality of environmental monitoring data; the WSRC Environmental, Safety and Health, and Quality Assurance Division (ESH&QA) is responsible for the WSRC Quality Assurance Program. The program consists of the *SRS QA Program Policy* (WSRC-1-01, MP 4.2 Quality Assurance), the *SRS Quality Assurance Plan* (WSRC 1989c), SRP QA Manual (Du Pont 1988b), and individual implementing procedures, such as the Health Protection Procedures Manual. SRS participates in the Environmental Laboratory QA Program, the Environmental Protection Agency (EPA) QA Assessment Program, and the EPA Ambient Air Program. The programs are under the direction of the Environmental Monitoring Laboratory and analyzed by the Environmental Monitoring Section. Analyses are returned to DOE for comparison with "true" analyses, which are used to determine EMS laboratory analytical accuracy.

The SRS QA Plan and the SRP QA Manual describe the procedures for developing and implementing the control of processes. The SRP QA Manual defines the responsibility and basic requirements for the qualification of equipment and procedures used to perform special processes and the training, qualification, and, when required, certification of personnel who perform or control special processes. It defines the responsibilities, procedures, records that are required.

The SRS QA Plan and the SRP QA Manual also contain sections for the control of Measuring and Test Equipment used to support SRS activities. This procedure ensures that the tools, gauges, instruments, and other measuring and testing devices are properly identified, controlled and calibrated at specified periods.

Laboratory Certification Program

DOE Order 5400.1 requires that DOE and DOE contractor laboratories confirm the need and apply for and certification requirements with appropriate federal, state, or local agencies. Where DOE operations secure the support of outside contractor laboratories, then these laboratories should be appropriately certified.

The need for certification is determined by regulatory authority and is listed in permit requirements. Certified laboratories are utilized when required by permit. A copy of the certification for the subcontractor laboratory is kept onsite and performance audits are run. The WSRC Health Protection Department environmental monitoring role is to gain certification for in-house laboratories, or to require

subcontractor laboratories to document their certification prior to issuing a contract. The 320-M and 484-D laboratories are certified to perform a limited number of analyses. All analyses required to be completed by certified laboratories are completed by certified laboratories.

Independent Data verification

DOE Order 5400.1 states that the Assistant Secretary for Environment, Safety and Health, in consultation with the Assistant Secretary of Defense Programs and the Manager, SR, will develop an independent data verification program as part of environmental monitoring programs at DOE facilities, including the SRS. This program is to be in place no later than November 9, 1989. This program will result in additional onsite monitoring activities by state regulatory agencies or other independent organization such as the South Carolina Consortium of Universities.

The lead organizations within DOE-SR which will have the responsibility to participate in the development of an independent data verification program are the Office of Chief Counsel, ED, and Waste management Branch of the Processing Division.

This program, when established, will be integrated into the ongoing environmental monitoring program being conducted by the SRS contractors.

8.2 WSRC Quality Assurance Program

The SRS Quality Assurance (QA) programs of all participating contractors are consistent with the requirements of DOE Order 5700.6B, *Quality Assurance*. The quality assurance manuals are based on the eighteen elements for a QA Program outlined in ANSI/ASME NQA-1. The responsibility for assuring the implementation of the defined WSRC contractor quality assurance programs is assigned to the DOE-SR Quality Assurance Department (responsibility Director Quality and Materials Assurance Division).

Contained elements of the program assuring consistency with DOE Order 5400.1 include the following:

(1) Organization and responsibilities
(2) Program design
(3) Procedures
(4) Field quality control
(5) Laboratory quality control
(6) Human factors
(7) Recordkeeping
(8) Chain-of-custody procedures
(9) Audits
(10) Performance reporting
(11) Independent data verification.

The following paragraphs identify where responsibility lies within each field organization for implementing the various programmatic and planning requirements established by the DOE Order 5400.1.

The WSRC *Quality Assurance Program Manual (QA)* (Du Pont 1988b), satisfies the requirements of DOE Order 5700.6B, thereby implementing ANSI/ASME NQA-1 in all WSRC operations. WSRC is responsible to DOE-SR for environmental operations and controlling and monitoring releases to the environment. This responsibility is implemented through its ESH&QA Division. This plan has been developed to implement DOE Order 5400.1.

The Quality Assurance Manual has been prepared as a formal and comprehensive matrix of quality requirements that must be implemented for activities that affect quality and that are performed by the ESH&QA Division as part of the Savannah River Environmental Management Program and other contractual obligations. The contents of the plan have been developed to reflect consideration of additional quality requirements from other regulatory agencies, such as the EPA, that are considered applicable to the ESH&QA Division's scope of responsibilities.

The Quality Assurance Program Plan Matrix for the Environmental Division within the plan has been developed in accordance with applicable quality and environmental assurance practices that will ensure that Environmental Division products and services satisfy data quality objectives by meeting the highest technical and professional standards. The matrix delineates the quality requirements and functional procedures necessary to ensure (1) the validity, (2) the integrity, (3) the preservation, and (4) the retrievability of ESH&QA activities and data supporting the SRS environmental protection program.

8.3 Documenting and Approving Technical Procedures

The SRS QA Manual describes the procedure for documenting and approving technical procedures. Each department superintendent shall assign and document the responsibility for coordinating the preparation, tracking, review, approval, cancellation, and/or revision of instructions/procedures by appointing a procedure coordinator (or group) or identifying individuals who are responsible for specifically defined procedures.

Procedures are prepared for each activity to the level of detail required to ensure that the activity can be performed as required. Procedures must include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed activities have been completed as specified.

Each department is responsible for designating and documenting the organization level(s) or position(s) authorized to approve instructions/procedures and subsequent changes. Prior to issuance and use, all procedures and instructions must be approved. All approvals must be documented. Distribution, issuance, and control will be done as described in Section 7.0.

8.4 Documenting and Approving Test Results and Designs

The Design Control Planning Guidelines (DCPG) Matrix is used as the systematic guidance for the application of design control for liaison, design, and construction activities commensurate with the significance of an item or facility (see Figure 8-1). There are three design categories: General Services (GS), Non-nuclear Process (NNP), and Nuclear Process (NP).

The controls required by the Design Control Planning Guidelines are minimums and do not preclude the specification of additional controls by the customer in the Basic Data. The design agency or customer may also specify in the Quality Assessment Planning Report (QAPR) that additional controls be included.

8.5 Audits and Surveillances

The Comprehensive Environmental Protection Evaluation Program (CECEP) establishes the DOE Environmental Division (ED) procedures and methodologies for performing environmental appraisal, audits, and surveillances. The Environmental Compliance Branch Chief is responsible for the maintenance of the CECEP, which includes an environmental appraisal schedule for each fiscal year in accordance with DOE 5458.1. The schedule for FY 1990 appraisals is as follows:

Finalize three functional appraisals begun in FY 1989:

Environmental Radiological Program: 100-Area Release Monitoring
Waste Management: Hazardous Waste Storage
Spill Prevention and Control

Initiate twelve functional appraisals during FY 1990:

October	Regulated Substances: Asbestos
December	Waste Management: Underground Storage Tanks
January	Environmental Radiological Programs: Sample analysis
February	Water Supply and Distribution: Potable Water Permitting and Operations
March	National Environmental Policy Act Implementation
April	Regulated Substances: Pesticides
May	Groundwater Protection: Program Management, Administration and Staffing
July	Environmental Radiological Programs: Separations and Laboratories Release Monitoring
August	Water Pollution Control: Wastewater Permitting and Operations
September	Waste Management: Restoration

In addition to the audits by ED, the *Savannah River Operations Office Quality Assurance Manual* (DOE 1987b) also describes the audits and surveillances to be performed by the QA Department. Quality Assurance audits are used to verify compliance with all aspects of the SR Quality Assurance Program and to determine the effectiveness of the SR Quality Assurance Program. The purpose of a surveillance is the early detection and correction of deficiencies and the consequent improvement of overall operations. Additionally, surveillance provides standardized documentary evidence of the Savannah River Operations Office overview of and interaction with the SR contractor(s).

8.6 Addressing Nonconformances Identified in Audits

The section that addresses the Nonconformances identified in audits is in the process of being written. It is expected that this procedure will be written and approved by January, 1990.

8.7 Implementing Reviews of Procedures, Plans, Designs, and Reports

The SRP QA Manual describes a systematic approach to design control for project activity and provides guidance for the control of liaison , design, and construction activities commensurate with the significance of the item or facility. It also addresses any revisions. Use of design control programs other than is used in the SRP QA Manual must be preapproved by the Site Quality Department prior to implementation to ensure that they contain all of the control elements specified within this procedure.

The SRP QA Manual also establishes the responsibilities and defines the requirements for the development, review, approval, and use of instructions/procedures that support activities at SRS. Each operating department is responsible for the establishing, reviewing and approving instructions/procedures as appropriate fro activities within their areas of responsibility. All personnel are then required to utilize these instructions and procedures and to initiate a revision when a need is recognized.

SRS has an administrative system that controls documents has been established in the SRP QA Manual. This system provides a means of ensuring that those documents important to the operation of the SRS are controlled consistently and are available to meet prescribed requirements. The procedure in the SRP QA Manual defines the responsibilities and established requirements for the preparation, review, approval, distribution, revision and protection of documents.

8.8 Other

A procedure of making controlled changes to this plan has yet to be developed. The Waste Management and Environmental Restoration Five-Year Plan and the SRS Site Specific Plan are new documents and a procedure for making changes is not yet in the planning stage.

The control of records is discussed in Section 7.

PROJECT ELEMENTS / (2)	DESIGN CATEGORIES		
	NUCLEAR PROCESS (NP)	NON-NUC PROCESS (NNP)	GENERAL SERVICES (GS)
PROJECT BASED DETERMINATION			
PROJECT OBJECTIVES LETTER			
DESIGN AGENCY ACCEPTANCE	X	X	X
CONTROLLED DISTRIBUTION	X		
CONTROLLED IDENTIFICATION		X	X
BASIC DATA AND REVISIONS			
CUSTOMER QUALITY DEPT. APPROVAL	X		
INFORMATION COPY TO CUSTOMER QUALITY DEPT.	X	X	
DESIGN AGENCY ACCEPTANCE	X	X	X
CONTROLLED DISTRIBUTION	X		
CONTROLLED IDENTIFICATION		X	X
SCOPE OF WORK			
CUSTOMER ACCEPTANCE	X	X	X
CONTROLLED DISTRIBUTION	X		
CONTROLLED IDENTIFICATION		X	X
QUALITY ASSESSMENT PLANNING REPORT			
QAPR REQUIRED	X	X	X
CUSTOMER QUALITY DEPT. APPROVAL	X		
CUSTOMER APPROVAL	X	X	X
INFORMATION COPY TO CUSTOMER & DESIGN QUALITY DEPT.	X	X	
CONTROLLED DISTRIBUTION	X		
CONTROLLED IDENTIFICATION		X	X
ITEM BASED DETERMINATION (1)	(SEE NOTE 1 FOR PROCESS HAZARD ITEMS)		
CALCULATIONS			
DOCUMENTED	X	X	X
TECHNICAL VERIFICATION REQ'D BY DESIGN AGENCY	X		
TECHNICAL VERIFICATION REQ'D UNLESS WAIVED BY DESIGN AGENCY		X	
TECHNICAL VERIFICATION ONLY AS SPECIFIED IN B/D & QAPR			X
DESIGN OUTPUTS + CHANGES (i.e., drawings, specifications)			
INPUT/OUTPUT VERIFICATION AND APPROVAL BY CUSTOMER	X	X	X
TECHNICAL VERIFICATION REQ'D BY DESIGN AGENCY	X		
TECHNICAL VERIFICATION REQ'D UNLESS WAIVED BY DESIGN AGENCY		X	
TECHNICAL VERIFICATION ONLY AS SPECIFIED IN B/D & QAPR			X
CONTROLLED DISTRIBUTION	X		
CONTROLLED IDENTIFICATION		X	X
TEST AND INSPECTION PLAN			
CUSTOMER QUALITY DEPT. APPROVAL	X		
CUSTOMER APPROVAL	X	X	X
INFORMATION COPY TO CUSTOMER & DESIGN QUALITY DEPT.	X	X	
CONTROLLED DISTRIBUTION	X		
CONTROLLED IDENTIFICATION		X	X
REQUIRED AS-BUILT DRAWINGS			
PRIOR TO SEGMENT TURNOVER TO CUSTOMER	X		
PRIOR TO PROJECT CLOSING		X	X
QUALITY DEPARTMENTS' SURVEILLANCES			
AS SPECIFIED IN B/D or QAPR	X	X	X

(1) Design of facilities or equipment assessed by the SRP Process Hazards Review Program to have the potential to exceed established criteria shall be controlled on an item basis in accordance with the "Nuclear Process" design category.

(2) The design controls required by this matrix shall be considered to be minimums and do not preclude the specification of additional controls in the Basic Data or QAPR.

Figure 8-1. Design Control Planning Guidelines Matrix

9.0 REFERENCES

- DOE, 1987a. *Final Environmental Impact Statement Alternative Cooling Water System,* DOE/EIS-0121, United States Department of Energy, Savannah River Operations Office, Aiken, SC.
- DOE, 1987b. *Quality Assurance Manual,* United States Department of Energy, Savannah River Operations Office, Aiken, SC.
- DOE, 1987c. *Final Environmental Impact Statement, Waste Management Activities for Groundwater Protection,* United States Department of Energy, DOE/EIS-0120, Savannah River Operations Office, Aiken, SC.
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- DOE, 1989b. *Savannah River Waste Management Operations Program Plan,* DOE/SR-WM- 89-1, United States Department of Energy, Savannah River Operations Office, Aiken, SC.
- Du Pont, 1988a. *Environment and Energy Department Procedures Manual,* DPSPM-GEN-41, E. I. du Pont de Nemours and Company, Savannah River Plant, Aiken, SC.
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- Du Pont, 1988c. *Waste Site Closure Manual,* DPSPM-GEN-59, E. I. du Pont de Nemours and Company, Savannah River Plant, Aiken, SC.
- WSRC, 1989a. *Environmental Implementation Plan,* WSRC-RP-89-453, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC.
- WSRC, 1989b. *Savannah River Site Environmental Report for 1988,* Westinghouse Savannah River Company, Savannah River Site, Aiken, SC.
- WSRC, 1989c. *Westinghouse Savannah River Company Quality Assurance Plan,* WSRC-1-05, Westinghouse Savannah River Company, Savannah River Site, Aiken, SC.
- U. S. Congress, Office of Technology Assessment, 1989 *Partnerships Under Pressure, Managing Commercial Low-Level Radioactive Waste,* U. S. Congress, Office of Technology Assessment, Washington, DC