WSRC-RP-93-1448-Rev. 4

Savannah River Site
FY 1995

Solid Waste Management Plan (U)

Revision 4

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Nuclear Information

ADC &
Reviewing
Official: Brent A. Daugherty
Date: 9/25/95

Westinghouse Savannah River Company
Savannah River Site
Aiken, SC 29808

Prepared for the U. S. Department of Energy under contract no. DE-AC09-89SR18035

DISCLAIMER

WSRC-RP-93-1448

Solid Waste Management Plan (U)

Revision 4

April 26, 1995

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1.0 Executive Summary

1.1 Introduction

The Savannah River Site (SRS) generates and manages several types of waste. With a few exceptions, waste types are divided into two broad groups: high-level waste and solid waste. Solid Waste may contain solid, liquid, or gaseous material and is further defined in Section 2.0. High-level waste consists primarily of liquid radioactive waste which is addressed in a separate plan, the *High-Level Waste System Plan* (WMER-DPM-93-0076) and, therefore, is not discussed further in this document.

The waste types discussed in this Solid Waste Management Plan (SWMP) are Municipal Solid Waste, Hazardous Waste, Low-Level Mixed Waste, Low-Level Radioactive Waste, and Transuranic Waste.

The Solid Waste Management Plan describes, for each type of solid waste, the existing waste management facilities, the issues, and the assumptions used to develop the current management plan. The SWMP is consistent with the Proposed Site Treatment Plan (PSTP), the Waste Management Environmental Impact Statement (WM EIS), currently under development, and the Out Year Budget (OYB) formally called the SRS Five Year Plan (FYP). The OYB details the operational plans and budgets for all SRS programs. The SWMP lists the process by which it was developed, issues and assumptions common to several waste types, and an integrated solid waste management plan. Appendices provide information on forecasts of waste generation, regulatory requirements, acronyms and definitions, and a bibliography.

The SWMP communicates the Solid Waste Management Program at SRS for achieving comprehensive treatment, storage and disposal (TSD) capability. The SWMP also lists the actions required during the next five years to realize this goal. The SWMP will be revised semi-annually using a systematic process to incorporate changes such as new regulations, resolution of technical or regulatory issues, advances in technology, and funding impacts. During the review cycle prior to issuance of a revision of the SWMP, SRS stakeholders will have the opportunity to provide input. The SWMP will be integrated with the overall SRS mission.

1.2 Solid Waste Process Flow

The Solid Waste Processing Flow Diagram, Figure 1.1 shows the SWMP integrated approach to handling all of the waste types currently managed by Solid Waste Management. It outlines a cradle-to-grave approach for each waste type identifying the generators, the forecasted waste generation rates, the recommended approach to treatment and storage, if known, and finally the proposed disposal approach. There are a number of areas where treatment and disposal are unknown. These areas may be impacted by the final versions of the Site Treatment Plan under the FFCAct, and the Waste Management Environmental Impact Statement (WM EIS). These documents, in conjunction with DOE National Program directives and public involvement initiatives, will provide additional guidance and direction for treatment and disposal for the wastes discussed in this document. As these directions become clear, they will be included in future revisions of this plan.

Brief descriptions of each waste type and key elements of the current plan follow.

Municipal Solid Waste

Municipal Solid Waste (MSW) is solid waste that is neither radioactive, nor hazardous as defined by the Resource Conservation and Recovery Act (RCRA). It consists of materials that would be received by a municipal sanitary landfill and salvageable material such as scrap metal.

As indicated on Figure 1.1, the current disposal method for Savannah River Site (SRS) municipal solid waste is at a commercial municipal landfill. The waste will first be screened on site, then transferred by commercial haulers to a landfill.

Other activities include recycling of aluminum cans and white paper, salvage yard recycling of usable materials, scrap wood chipping and burning, construction material recycling, offsite sale of paint and paint products, incineration of railroad ties, and land reclamation for ash and domestic sewage.

Previous plans included the design and construction of a new sanitary landfill on site. Currently, plans to develop a new sanitary landfill on site have been discontinued. DOE and the Lower Savannah Council of Governments are working toward the development of a regional disposal facility on the Savannah River Site.

Hazardous Waste

Hazardous Waste (HW) is non-radioactive waste regulated by the South Carolina Department of Health and Environmental Control (SCDHEC) and by the US Environmental Protection Agency (EPA) under the RCRA regulations. It consists of a variety of hazardous materials such as solvents, toxic metals, etc.

The current plan for treatment and disposal of HW is shipment offsite to commercial vendors. Once the Consolidated Incineration Facility (CIF) is operational, processing HW through CIF has the potential to significantly reduce shipping and radioactive screening costs. Treatment of wastes (non-incinerables) where incineration is not the "specified technology", would continue to be accomplished commercially. Other activities include burning of non-hazardous used oil in a site powerhouse. Paint solvents and degreasers will continue to be recycled on site. Materials without an identified offsite market such as heavy metals, reactive metals, and other miscellaneous materials would continue to be stored until treatment options are identified.

Low-Level Mixed Waste

Low-Level Mixed Waste (MW) is low-level radioactive waste that also contains hazardous materials regulated by RCRA. It consists of radioactively contaminated materials such as solvents, toxic metals, and miscellaneous job control waste.

SRS will continue to store MW until treatment and disposal options are available. The treatment options are being developed in accordance with the latest information provided in the Proposed Site Treatment Plan. This plan, along with DOE National Program direction and public involvement, will provide the basis for future direction. (NOTE: The analysis and discussion with generators and stakeholders inherent with the development of the Site Treatment Plan could result in significant changes to this mixed waste management strategy. The process is expected to be completed by October 1995). In addition, the WM EIS currently in the approval process may impact treatment and disposal options.

Consideration of the very large volumes of MW from D&D and ER activities projected by the WM EIS suggests that provision should be made for additional storage capacity to accommodate the five year future generation of MW. However, discussions with both D&D and ER personnel indicate that program cutbacks will reduce the volumes of waste forecasted to be generated. The amount of additional storage space that may be needed requires further evaluation based on these modified estimates of D&D and ER waste generation over the next five years as a result of funding and programmatic uncertainties. Effort will continue on implementation of interim storage capacity actions which include potential use of excessed facilities to reduce overall costs.

Low-Level Waste

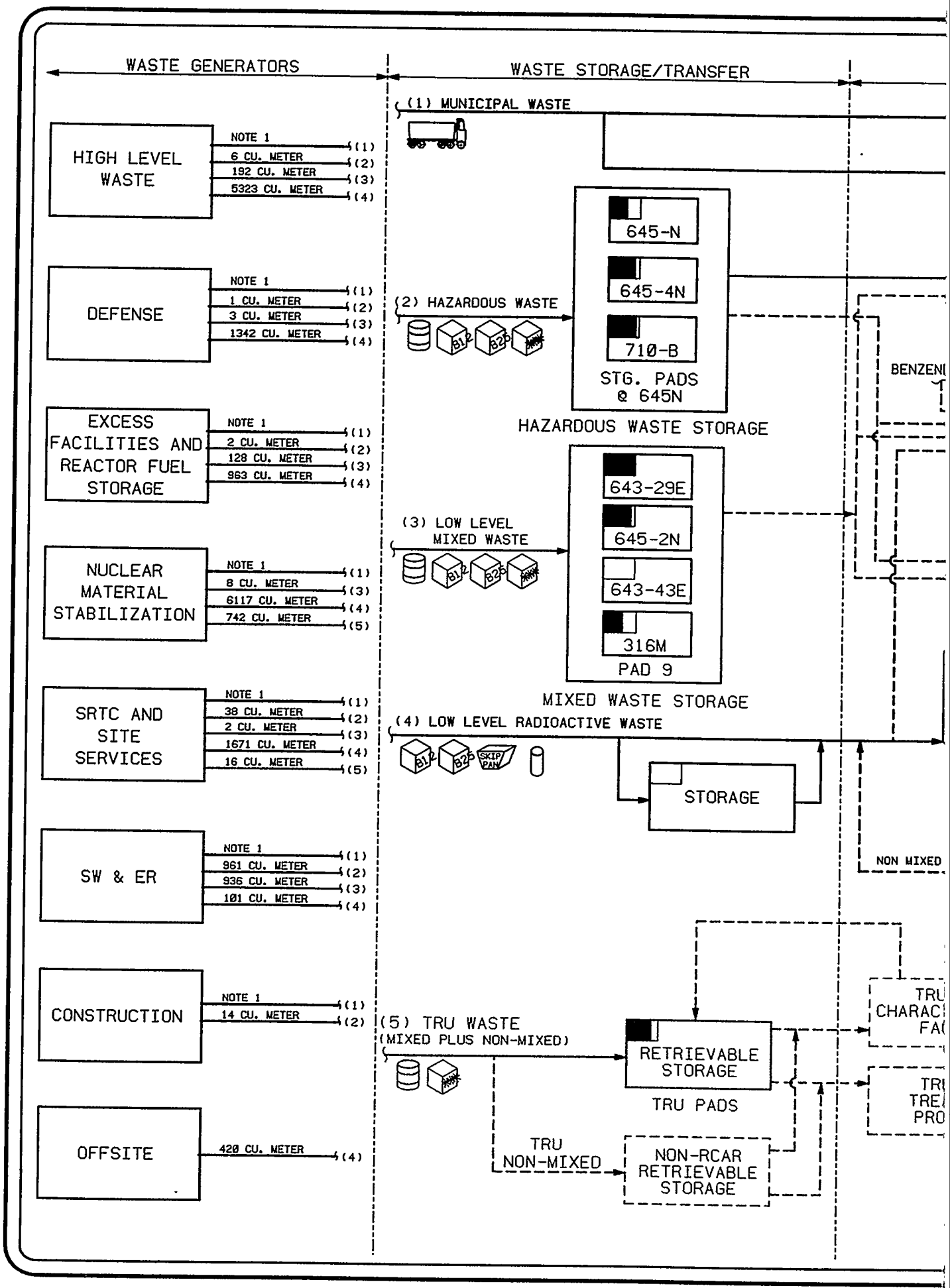
Low-Level Waste (LLW) is radioactive waste that is not high-level waste, transuranic waste, or spent fuel and does not contain RCRA-regulated materials. It consists of radioactively contaminated materials such as miscellaneous job control waste, equipment, and soil.

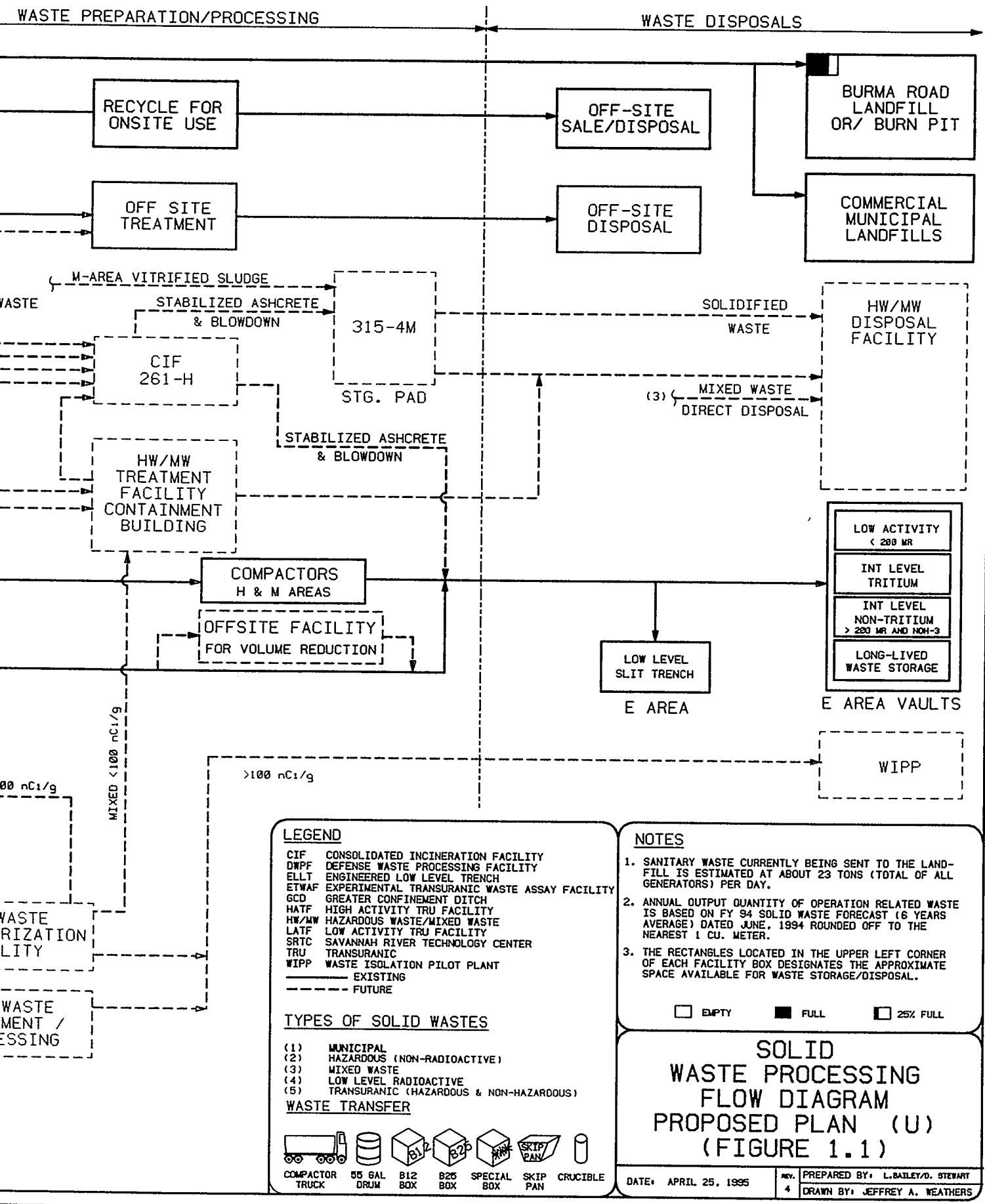
The current plan includes: operation of the E-Area Vaults; operation of CIF for incineration of low activity waste (pending outcome of the WM EIS); screening and disposal of suspect soils in shallow land disposal trenches, evaluation of alternative disposal programs including alternative disposal facility options, shallow land disposal for naval core barrels and other suitable waste forms, pursuing recycling low-level contaminated stainless steel, implementing improved waste minimization and volume reduction activities, and other initiatives such as offsite volume reduction.

Transuranic Waste

Transuranic (TRU) waste is radioactive waste that is contaminated with alpha-emitting radionuclides with an atomic number greater than 92 (e.g., plutonium-239) with half lives greater than 20 years in concentrations greater than 100 nanocuries per gram. TRU waste may also contain RCRA-regulated materials. It is comprised of a wide variety of TRU contaminated materials such as job control waste and equipment.

The plan focuses priority on retrieval of TRU waste drums that have reached or exceeded their expected service life. Additional efforts will be directed at characterization and assay capability specific to SRS needs, the re-evaluation of characterization and inspection facilities, and finally treatment facilities with emphasis on stable waste-forms allowing safe shipment to the DOE-approved geologic repository for TRU waste at the Waste Isolation Pilot Plant (WIPP) in New Mexico, or potential long term storage at SRS. The TRU waste program planning effort will also remain cognizant of the plans and developments at other facilities outside SRS including other DOE sites, commercial facilities, and international locations.


WASTE GENERATORS
WASTE STORAGE/TRANSFER
(1) MUNICIPAL WASTE
HIGH LEVEL WASTE
NOTE 1 (1)
6 CU. METER (2)
192 CU. METER (3)
5323 CU. METER (4)
DEFENSE
NOTE 1 (1)
1 CU. METER (2)
3 CU. METER (3)
1342 CU. METER (4)
(2) HAZARDOUS WASTE
645-N
645-4N
710-B
STG. PADS @ 645N
HAZARDOUS WASTE STORAGE
BENZENE
EXCESS FACILITIES AND REACTOR FUEL STORAGE
NOTE 1 (1)
2 CU. METER (2)
128 CU. METER (3)
963 CU. METER (4)
(3) LOW LEVEL MIXED WASTE
643-29E
645-2N
643-43E
316M
PAD 9
MIXED WASTE STORAGE
NUCLEAR MATERIAL STABILIZATION
NOTE 1 (1)
8 CU. METER (3)
6117 CU. METER (4)
742 CU. METER (5)
SRTC AND SITE SERVICES
NOTE 1 (1)
38 CU. METER (2)
2 CU. METER (3)
1671 CU. METER (4)
16 CU. METER (5)
(4) LOW LEVEL RADIOACTIVE WASTE
SKID PAN
STORAGE
NON MIXED
SW & ER
NOTE 1 (1)
961 CU. METER (2)
936 CU. METER (3)
101 CU. METER (4)
CONSTRUCTION
NOTE 1 (1)
14 CU. METER (2)
(5) TRU WASTE
(MIXED PLUS NON-MIXED)
RETRIEVABLE STORAGE
TRU PADS
TRU CHARAC FA
TRU TRE PRO
TRU NON-MIXED
NON-RCAR RETRIEVABLE STORAGE
OFFSITE
420 CU. METER (4)


WASTE PREPARATION/PROCESSING
WASTE DISPOSALS
RECYCLE FOR ONSITE USE
OFF-SITE SALE/DISPOSAL
BURMA ROAD LANDFILL OR/ BURN PIT
OFF SITE TREATMENT
OFF-SITE DISPOSAL
COMMERCIAL MUNICIPAL LANDFILLS
M-AREA VITRIFIED SLUDGE
STABILIZED ASHCRETE & BLOWDOWN
315-4M
STG. PAD
SOLIDIFIED WASTE
HW/MW DISPOSAL FACILITY
CIF 261-H
(3) MIXED WASTE DIRECT DISPOSAL
STABILIZED ASHCRETE & BLOWDOWN
HW/MW TREATMENT FACILITY CONTAINMENT BUILDING
COMPACTORS H & M AREAS
OFFSITE FACILITY FOR VOLUME REDUCTION
LOW ACTIVITY < 200 MR
INT LEVEL TRITIUM
INT LEVEL NON-TRITIUM > 200 MR AND NOH-3
LONG-LIVED WASTE STORAGE
LOW LEVEL SLIT TRENCH
E AREA
E AREA VAULTS
MIXED <100 nCi/g
>100 nCi/g
WIPP
LEGEND
CIF CONSOLIDATED INCINERATION FACILITY
DWPF DEFENSE WASTE PROCESSING FACILITY
ELLT ENGINEERED LOW LEVEL TRENCH
ETWAF EXPERIMENTAL TRANSURANIC WASTE ASSAY FACILITY
GCD GREATER CONFINEMENT DITCH
HATF HIGH ACTIVITY TRU FACILITY
HW/WW HAZARDOUS WASTE/MIXED WASTE
LATF LOW ACTIVITY TRU FACILITY
SRTC SAVANNAH RIVER TECHNOLOGY CENTER
TRU TRANSURANIC
WIPP WASTE ISOLATION PILOT PLANT
EXISTING
FUTURE
TYPES OF SOLID WASTES
(1) MUNICIPAL
(2) HAZARDOUS (NON-RADIOACTIVE)
(3) MIXED WASTE
(4) LOW LEVEL RADIOACTIVE
(5) TRANSURANIC (HAZARDOUS & NON-HAZARDOUS)
WASTE TRANSFER
COMPACTOR TRUCK
55 GAL DRUM
B12 BOX
B25 BOX
SPECIAL BOX
SKIP PAN
CRUCIBLE
NOTES
1. SANITARY WASTE CURRENTLY BEING SENT TO THE LAND-FILL IS ESTIMATED AT ABOUT 23 TONS (TOTAL OF ALL GENERATORS) PER DAY.
2. ANNUAL OUTPUT QUANTITY OF OPERATION RELATED WASTE IS BASED ON FY 94 SOLID WASTE FORECAST (6 YEARS AVERAGE) DATED JUNE, 1994 ROUNDED OFF TO THE NEAREST 1 CU. METER.
3. THE RECTANGLES LOCATED IN THE UPPER LEFT CORNER OF EACH FACILITY BOX DESIGNATES THE APPROXIMATE SPACE AVAILABLE FOR WASTE STORAGE/DISPOSAL.
EMPTY
FULL
25% FULL
SOLID WASTE PROCESSING FLOW DIAGRAM PROPOSED PLAN (U) (FIGURE 1.1)
DATE: APRIL 25, 1995
REV. 4
PREPARED BY: L.BAILEY/D. STEWART
DRAWN BY: JEFFREY A. WEATHERS
SKP0003.DGN

2.0 Solid Waste Management

The Solid Waste Management (SWM) program addresses the handling and disposition of solid waste at the Savannah River Site (SRS). In a regulatory sense, the term "solid waste" is defined as any garbage, refuse, sludge (from a waste treatment plant, water supply treatment plant, or air pollution control facility), and other discarded material including solid, liquid, semi-solid, or contained gaseous materials resulting from industrial, commercial, mining, agricultural activities, and community activities. Solid waste does not include solid or dissolved material in domestic sewage, solid or dissolved materials in irrigation return flows, or industrial discharges which are point sources subject to permits under the Federal Water Pollution Control Act; or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954. The SWM Program is responsible for solid waste management at SRS, which includes municipal solid waste, hazardous, low-level mixed, low-level radioactive, and transuranic waste.

2.1 Mission Statement

The Solid Waste Management program addresses the safe, efficient, and environmentally sound handling, storage, treatment, and disposal of solid waste resulting from past, ongoing, and future SRS operations. The mission of Solid Waste Management is to:

- Ensure that risks to the environment and to human health and safety posed by the current and future treatment, storage, and disposal (TSD) facilities are either eliminated or reduced to prescribed acceptable levels.
- Provide for the safe and acceptable handling, treatment, storage, transportation, and disposal of existing and future Department of Energy (DOE) solid waste.
- Establish policies which emphasize activities and programs to prevent and/or minimize the generation of solid waste.
- Comply with all applicable local, state, federal laws and regulations and DOE orders.

The SWM mission will be carried out using the most technically effective and cost-efficient means reasonably achievable including involving stakeholders in the key decision making steps.

2.2 Solid Waste Management Activities

Solid Waste Management activities are driven by regulations and are carried out in accordance with applicable rules, regulations, and DOE Orders. The main activities within Solid Waste Management for the handling and disposition of municipal, hazardous, low-level mixed, low-level radioactive, and transuranic waste are as follows:

2.2.1 Waste Minimization and Pollution Prevention

SRS has a comprehensive Waste Minimization Program to avoid waste generation, promote recycling and reduce volume and toxicity of all waste types. The Waste Minimization Program strategy is to implement specific waste reduction techniques and technologies based upon current and projected information on waste generation, waste characterization, and ultimate waste disposal costs. Pollution prevention, which has traditionally been driven by best management practices and economics, is now mandated by statutes, regulations, and agency directives such as the Pollution Prevention Act of 1990, the Resource Conservation and Recovery Act (RCRA), the Hazardous and Solid Waste Amendments of 1984, and numerous DOE Orders including 5820.2A and 5400.1. The DOE-SRS 1995 Waste Minimization and Pollution Prevention Awareness Plan (WSRC-RP-95-36) provides a complete description of ongoing and new Pollution Prevention (P2) Programs.

Waste Minimization is a key strategy to extend the life of existing storage and disposal facilities. Solid Waste Management takes a systematic approach to reduce waste. Waste streams are prioritized based on factors such as volume, toxicity, and disposal cost. Potential minimization opportunities are identified through execution of formal opportunity assessments. Improvements are implemented based on financial return on investment. Following are some examples of specific strategies and program initiatives:

- The Radioactive Materials Management Facility in the 105-C reactor building will reduce volumes of radioactive waste through segregation of non-contaminated items and decontamination of equipment and materials for reuse or recycle. Decon operations include the use of abrasives, CO_2 blasting, and chemical treatment methods. This facility will improve SRS's ability to decontaminate and release radiologically contaminated materials, including lead, for unrestricted use.

- Secondary waste resulting from contamination control enclosures will be substantially reduced through the use of prefabricated radiological containment structures, huts and glovebags.
- The SRS Chemical Commodity Management Center will reduce Hazardous and Mixed Waste by minimizing the amount and toxicity of chemicals entering the site through improved procurement controls and by minimizing the amount of chemicals declared a waste at the Site by marketing excess chemicals both on site and off site.
- A proven effective program strategy to encourage waste generators to reduce waste is allocation of disposal space. Divisions are provided with an annual allotment of space that they must manage against.
- Plans are in progress to institute Generator Set-aside Fees to fund implementation of waste minimization improvements and volume reduction services.

2.2.2 Waste Certification

DOE Order 5820.2A requires accurate waste identification to ensure regulatory compliance and to allow proper waste minimization, segregation, treatment, storage, and disposal. Waste certification ensures that the waste has been properly identified, characterized, segregated, and packaged to meet the receiving facility's waste acceptance criteria (WAC).

The Savannah River Site (SRS) and WSRC committed to the completion of formal Waste Certification for all SRS low-level radioactive and mixed waste generators as identified in the compliance schedule approval request (CSA) SRS-DOE-5820.2A-CSA-93-068.

WSRC-1S, SRS Waste Acceptance Criteria Manual, provides documentation of the requirements (i.e., waste acceptance criteria) applicable to the transfer and receipt of wastes for solid waste management, solid and hazardous waste operations.

The waste certification is a four step process, as follows:

- **The SRS Waste Characterization Board** -- reviews and approves the Waste Characterization Plan (WCP), related baseline documentation that details the process knowledge to baseline the physical, chemical, and radiochemical characterization, and any sampling and analysis plans needed. A formal oral presentation of the WCP and methodology is provided to obtain Board approval.

- **Certification Plan Approval (Organization & Procedures)** -- The facility completes the certification plan and related documentation (white papers, organization, procedures, training programs, etc.). The Waste Certification Assessment (WCA) Team conducts the formal assessment that includes facility tour and orientation, and interviews with key personnel from various organizational elements (HP, QA, etc.) of the facility.

- **Assessment of Facility Implementation** -- Following approval of the Certification Plan and related procedures, the facility personnel complete any required training. The WCA Team performs review of training records, record generation and retention process and interviews key facility personnel. A final WCA report is provided to identify observations and corrective actions.

- **Waste Characterization Form Preparation/Approval for Specific Waste Product** -- The Waste Characterization Form (WCF) for each waste stream or product allows generators to automatically manifest the radionuclide curie distribution into the Waste Information Tracking System (WITS) prior to shipment to the TSD facilities. The approval of the WCFs are controlled by procedure, SW-HW-9003 S, "Low-Level Waste Stream Characterization Form Review and Approval Checklist."

The remaining efforts that relate to Waste Certification are:

1) Complete formal assessment of new additional generators of low-level and low-level mixed waste:

- Defense Waste Processing Facility (DWPF) with forecast certification of November 1995,
- Tritium 232-F with forecast certification of August 1995.

2) Low-level waste (LLW) and low-level mixed waste (MW) first shipment assessment and walkdown of SRS generators facilities is required and scheduled to verify the packaging, labeling, marking, and training, to ensure implementation per approved certification plans, characterization plan, and related procedures. The verification is specific to

Waste Certification Reports for closure of action items.

3) Re-assessments of onsite LLW and MW generators began in March 1995.

4) Waste Certification of Consolidated Incineration Facility (CIF) program with a forecast finish of January 1996.

5) Participation in offsite generator information exchange to develop waste certification program (i.e., Pinellas, Bettis, Knolls Atomic Power Laboratory, Newport News, Norfolk-US Navy, and Portsmouth) started in January 1995 and is forecasted to finish in August 1995.

6) Implementation by October 1995 of a new Waste Verification Program to perform generator re-assessments

2.2.3 Waste Storage

Waste storage includes receipt and segregation of wastes, temporary storage of the waste prior to treatment, and final disposition. >long-term storage is included where final disposition is uncertain.

2.2.4 Waste Treatment

Waste treatment includes all associated treatment activities required to reduce the volume, toxicity and/or mobility of wastes prior to storage or disposal. The treatment of hazardous and mixed wastes will be in accordance with applicable RCRA regulations, the Site Treatment Plan, and the WM EIS.

2.2.5 Waste Disposal

Waste disposal includes the final and permanent disposition of the wastes. Disposal includes isolating the waste using engineered and natural features to protect human health and the environment, and maintain the integrity of existing disposal sites to achieve mandated performance objectives.

2.2.6 National Disposal Program

DOE is involved in the development of a process for evaluating issues related to the disposal of residues from the treatment of MW subject to the Federal Facilities Compliance Act (FFCAct). Although the FFCAct requires only that DOE develop a plan for the treatment of mixed waste, DOE has developed a strategy for evaluating the potential options for the disposal of mixed waste.

Mixed waste subject to the FFCAct consists of High-Level Waste (HLW), mixed TRU waste, and LLMW. The disposal site evaluation process has focused on identifying, from among the sites currently storing or expected to generate mixed waste, sites that are suitable for further evaluation regarding their disposal capability.

The evaluation includes:

- Site grouping to determine which sites could be grouped as single sites based on their geographic proximity
- Initial site screening where potential sites are analyzed versus flood, earthquake, and buffer zone criteria
- Further site evaluation based on site potential for disposal activity

For the sites not eliminated from further evaluation, further site evaluation activities will include the following steps for each potential disposal site:

- Performance evaluation that entails collection of site-specific data related to disposal capabilities
- Configuration analysis for evaluation of potential cost, risks, transportation, and environmental impacts
- Site limitation analysis to develop estimates of the quantities and types of waste that can be disposed
- Final DOE Office of Environmental Restoration and Waste Management Programmatic Environmental Impact Statement (EM PEIS) analyses for waste treatment and disposal activities

Site evaluation activities will also include:

- Post-Compliance Order activities that will identify preferred sites to be recommended for further development as disposal facilities
- Post-Record of Decision activities in which DOE will initiate site-specific Environmental Impact Statements (EISs) on the proposed disposal facilities, initiate performance assessment processes in accordance with radioactive waste management regulations, and initiate the processes for permitting of disposal facilities

SRS is one of the 16 sites undergoing the final evaluation activities out of the initial group of 49, reported to Congress by DOE in the Mixed Waste Inventory Report (MWIR) in April 1993.

The Solid Waste Organization is actively involved in supporting the evaluation process and provides representation on the National Disposal Committee.

3.0 Purpose and Process

3.1 Purpose

The purpose of the Solid Waste Management Plan (SWMP) is to communicate the Solid Waste Management Program for achieving comprehensive treatment, storage and disposal of the five major solid waste types at SRS; Municipal Solid Waste, Hazardous Waste, Low-Level Mixed Waste, Low-Level Radioactive Waste, and Transuranic Waste. The plan will be reviewed, finalized, implemented, and maintained in close cooperation with regulatory agencies and the public stakeholders. In addition to identifying the approximate funding requirements, the plan identifies numerous issues and assumptions that must be addressed during implementation.

The SWMP was developed with a set of overriding objectives and values so that alternatives may be compared and decisions made on a consistent basis. It is essential that regulators and the public agree that these objectives and values are valid.

The objectives and values are consistent with the Site Treatment Plan and National Disposal Plan process that DOE is conducting throughout the DOE Complex and the Waste Management Environmental Impact Statement being developed for the Savannah River Site. They include:

- Cost-effectiveness
- Use of existing capabilities, if possible
- Use of risk assessments in evaluating options, as applicable
- Appropriate use of commercial vendors and facilities
- Use of engineering judgment
- Use of common sense
- Implementation that is manageable by DOE and the states
- Focus on near-term site compliance, not on long-range technology development
- High degree of public involvement and acceptance.

3.2 Process Used to Develop the Solid Waste Management Plan

A systems engineering approach was used to develop this SWMP. The basic process is summarized in Attachment III to DOE Order 4700.1, Change 1. The process is continuous with iterative and optimization modifications being evaluated as they are identified from changes in regulations, evolving technologies, studies, the design process, implementation activities, operating experience, stakeholder input, DOE guidance, and funding. For this reason, the SWMP will require periodic revision. Revisions will occur semi-annually following the Five-Year Plan (FYP) and Annual Operating Plan (AOP) submittals.

The SRS mission consists of three distinct but overlapping areas:

- National defense
- Environmental Restoration and Waste Management
- Related technologies.

The strategic objectives for each of these areas are contained in the *Savannah River Site Draft Strategic Plan* (October 1992).

The area of Environmental Restoration and Waste Management is depicted in Figure 3.2.1 and the strategic objectives for this area are contained in the *Waste Management and Environmental Restoration Strategic Plan* (April 12, 1993). The Environmental Restoration and Waste Management area is divided into three sub-areas:

- Environmental Restoration
- Solid Waste Management
- High-level Waste Management.

This SWMP addresses the portion under Solid Waste Management in Figure 3.2.1.

The functional hierarchy associated with Solid Waste Management is depicted in Figure 3.2.2

The main functional areas are

- Waste receipt—includes the functions of waste certification, retrieval from temporary storage, and receipt from the waste generators.
- Treatment—includes all associated activities required to reduce the volume, toxicity or mobility of wastes prior to storage, and/or disposal.

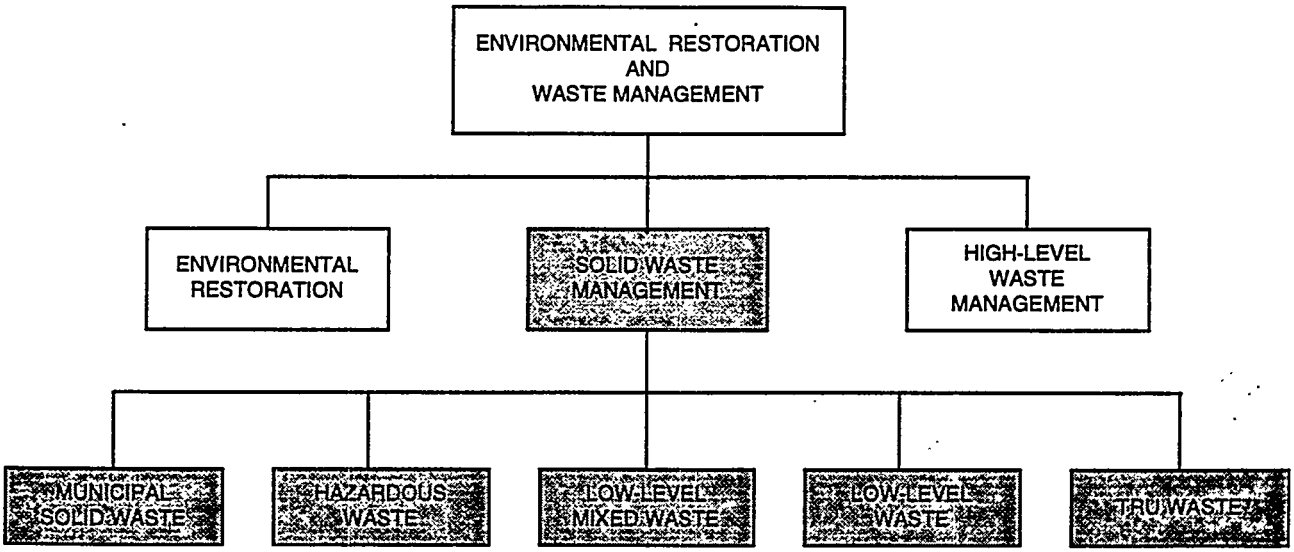


Figure 3.2.1

- Storage—includes temporary storage of the waste prior to final disposition and long-term storage where final disposition is uncertain.
- Disposal —includes the final and permanent disposition of the waste.

The basic requirements that direct the execution of these functions are defined by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), the Federal Facility Compliance Act of 1992 (FFCAct), the National Environmental Policy Act (NEPA) [descriptions of these acts are found in Appendix D], SCDHEC regulations, and DOE orders. .The requirements are further shaped by the needs of

- Public/worker health and safety
- Environmental impact
- Demonstrated technology
- Cost and schedule

Once the mission and functional breakdown were established, the evaluation of each waste type, its issues, and its management plan was documented as a separate section in the SWMP. The format is as follows:

- The waste type is described as to its characteristics and regulatory drivers. Examples are provided.
- The existing facilities for handling the waste are identified.
- Issues affecting the waste type are identified and the assumptions relative to the issues are summarized.
- The options for managing the waste type are identified and discussed.
- The current plan based on the issues, assumptions, and options already discussed is presented along with a flow diagram depicting the plan. The Solid Waste Processing Flow Diagram (Figure 1.1) also shows the generation rates of the organizations onsite for the five basic waste streams based on FY94 information.
- The near term actions (those items to be started or completed within the next 24 months) required to implement the plan are shown.

3.3 Public Involvement Process

The Assistant Secretary, Environmental Restoration and Waste Management (EM), adopted a public involvement policy that commits DOE to providing the public with opportunities to participate in the decision-making process for EM program planning, design, and implementation, however, DOE retains the final decision-making responsibility and accountability. The policy is rooted in the conviction that an effective public involvement program will:

- Enable the public to participate in policy decisions about matters that affect them.

- Assist DOE to make better decisions incorporating legal, technical, economic, environmental, and social factors, and address public values and concerns.
- Provide a means for DOE to build consensus among the various interests involved in addressing major issues and problems.
- Assist DOE in building credibility with the public by demonstrating openness, responsiveness, and accountability.
- Encompass activities necessary to comply with applicable laws, regulations, negotiated agreements, and DOE policy.

The EM goal is to create an open and accessible decision-making process that results in decisions that are health and safety conscious, environmentally sound, technically and economically feasible, that address public values and concerns, and can be implemented.

Likewise, it is the DOE-SR and WSRC goal to improve the decision-making process by soliciting and considering public input. The Program Management and Public Involvement Organization of WSRC has developed a Public Participation plan which identifies the program for enlisting public input and support for site programs. It involves the Citizen Advisory Board who is tasked to provide informed and timely recommendations to the United States Department of Energy, United States Environmental Protection Agency and the South Carolina Department of Health and Environmental Control concerning decisions to be made for SRS in the areas of Environmental Restoration, Waste Management, and other related activities at SRS.

The Solid Waste Management Plan, has been developed to meet current and anticipated solid waste needs at SRS. The SWMP provides a strategic plan for the treatment, storage, and disposal of SRS waste streams. Because the SWMP includes waste stream treatment, storage, and disposal options, public input in the option selection process, specifically, is essential.

WASTE LIFE CYCLE

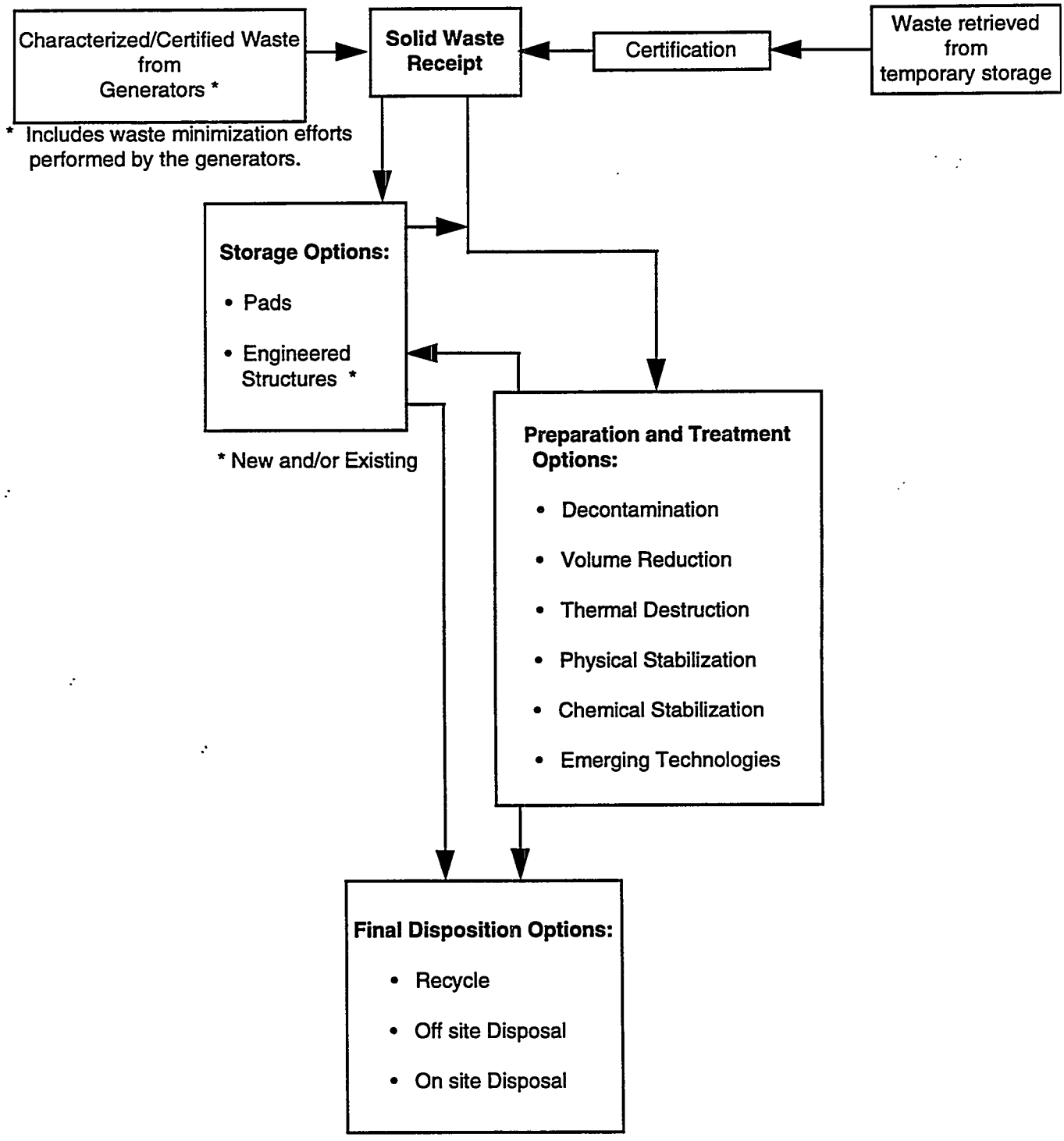


Figure 3.2.2

4.0 Cross Cutting Issues

Several issues have potential major impact on more than one waste type. These issues are termed "Cross Cutting Issues" and are discussed in this section. They are:

- Regulatory Dynamics
- DOE Commercial Sector Initiatives
- Threshold Values
- Waste Management Environmental Impact Statement
- Proposed Site Treatment Plan
- Transition, D&D and ER Waste
- Land Use
- Waste Storage
- Waste Forecasting
- Funding

In each case, the issue is stated, the assumption used is stated, and the issue is briefly discussed.

4.1 Regulatory Dynamics

Issue

Evolving regulations and compliance agreements add uncertainty to the SWMP.

Assumption

SWM will work closely with regulatory and permitting agencies to gain insight into pending changes and interpretation. This will assure timely identification and incorporation of changes into the SWMP.

Discussion

SWM activities are regulated to a large degree and, therefore, changing regulations have the potential to significantly affect the SWMP. An example is mixed waste activities which are regulated under a specific compliance agreement with the Environmental Protection Agency (EPA). This agreement, the Land Disposal Restriction (LDR) Federal Facility Compliance Agreement (FFCA), was entered into in March 1991 as a result of the solvent and California list LDR prohibitions promulgated in 1986 and 1987. This agreement was amended in April of 1992 to include "thirds" wastes and a revised treatment method for M-Area wastes. This agreement allowed SRS to continue to generate and store mixed wastes after the LDR was enacted in May of 1990 and the two-year National Capacity Variance ended in May 1992. The LDR FFCA allows continued generation and storage of mixed wastes while treatment technologies and facilities are designed and constructed. The agreement was amended in June 1994 to revise facility plans and milestones.

The LDR FFCA will remain in effect until October of 1995 when a new compliance order is expected to be signed. This new compliance order is in support of the Federal Facility Compliance Act (FFCAct) of 1992, which provides a mechanism for public and regulator input to waste treatment decisions and requires the Department of Energy (DOE) to provide site-specific plans for developing treatment capacities and technologies to treat all mixed wastes to the LDR treatment standards. This process is underway, but it will not be complete until October 1995 Therefore, the assumptions noted in this SWMP have been made in order to proceed with planning: however, decisions and/or changes resulting from Site Treatment Plan development will be incorporated into this document.

The LDR FFCA and other evolving regulations point out the need for SRS to understand these issues, understand the regulators' positions, make comparisons between the different regulatory positions, and effectively communicate any concerns back to the appropriate parties. Maintaining a dialogue with the regulators on issues of concern will facilitate timely identification and incorporation of appropriate changes into the SWMP.

4.2 DOE Commercial Sector Initiatives

Issue

A DOE initiated effort to enhance participation by the commercial sector in DOE waste management activities is underway. This program will provide the capability to potentially treat and/or dispose of wastes. These activities are being incorporated into the SWMP as the commercial sector proposal reviews are completed and decisions are made as to proposal awards.

Assumption

Although the DOE Commercial Sector Initiatives program is well underway, it is too early to predict the total impact this process will have on the SWMP.

Discussion

The Solid Waste Organization is actively pursuing several Commercial Sector Initiatives, some examples are:

- The Vendor Forum
- The Beneficial Reuse Program
- Low-Level Waste Volume Reduction (offsite)
- Treatment and/or Disposal of Low-Level Mixed Waste at Envirocare

Vendor Forum

SRS's first activity under the DOE Commercial Sector Initiatives was a vendor forum held in Augusta, Georgia in August 1993. This forum provided an opportunity for the treatment and disposal problems at SRS to be shared with the commercial sector. The goal was to identify viable technology solutions to those problems. Over 800 private sector participants attended the forum. From this forum, about 1000 proposals were received. Nearly 500 of them were specifically related to solid waste management activities. These proposals have been reviewed for further consideration. A number of innovative solutions to waste problems have been identified. Ten contracts were awarded between January 31, 1994 and September 27, 1994. The contracts are in the areas of low-level waste volume reduction, hazardous waste/mixed waste treatment, TRU waste characterization, and TRU waste retrieval.

The incorporation of specific vendor forum activities will be discussed in each waste stream section.

The Beneficial Reuse Program

Currently, SRS has accumulated over 7,000 tons of slightly contaminated excessed equipment. The vast majority of this inventory is in the form of 68 out-of-service heat exchangers. D&D activities will potentially generate over 10,000 additional tons. This material has a scrap value of $10 million. Burial costs would exceed $13 million. The potential to recycle this material not only negates these costs, but reduces expenditures for purchase of storage and disposal containers needed for other waste-forms. The steel will be used to make storage containers for radioactive waste. This program is called the Beneficial Reuse Program. 60 tons of stainless steel Radioactive Scrap Metal (RSM) will be processed and fabricated into 55-gal drums, 85-gal overpacks, and 100 ft^3 boxes in the 4QCY95. These activities are being performed under a pilot demonstration using commercial vendors. The vendors will provide proposals to privatize RSM industry at SRS in May 1995.

Low-Level Waste Volume Reduction

Solid Waste has developed a plan and schedule to utilize waste minimization and offsite commercial volume reduction services in order to significantly reduce the volume of waste requiring disposal. The reduction in waste volume will also extend the life of the E-Area vaults. Offsite volume reduction is expected to start in early FY96.

Treatment and/or Disposal of Low-Level Mixed Waste at Envirocare

Solid Waste has recently completed an economic analysis performed for onsite versus commercial disposal of Savannah River Site mixed waste.

The economic analysis results indicate that one untreated mixed waste stream (LLW Lead) has been identified for possible treatment and disposal at Envirocare. Also nine treated mixed waste streams have been identified for potential disposal at the Envirocare facility. Although the economic analysis results obtained suggest the use of the Envirocare facility as a more economical disposal alternative for some mixed waste than at SRS, the current analysis is being considered preliminary since; (1) the processes described in the PSTP have not been finalized to date and (2) some of the waste streams may require added pre-shipment costs and other processing costs to make them acceptable to Envirocare in terms of dimensions and configuration requirements.

It also must be noted that at the present time there is no funding identified for treatment and disposal of wastes at an offsite facility.

4.3 Threshold Values

Issue

A national policy on threshold values for regulation of radioactive and hazardous materials has not been established.

Assumption

A national policy on threshold values is not anticipated to be established in the near future. Solid Waste Management will monitor efforts by the Environmental Protection Agency and the Department of Energy to establish threshold values. SWM will implement threshold values when they are developed.

Discussion

Threshold values are quantities of radioactive or hazardous materials below which the materials are exempt from regulation as radioactive or hazardous waste. Establishing a national consensus on threshold values would facilitate more cost-effective management of solid waste. For example, threshold values could significantly reallocate the types of solid waste generated during Decontamination and Decommissioning (D&D) or Environmental Restoration (ER) activities. Additionally, accepted threshold values would enable a significant volume of low-level radioactive waste to be safely managed in a more cost effective manner.

Presently, the EPA is evaluating threshold values for RCRA "listed" hazardous waste and DOE is considering threshold values for radioactivity. However, obtaining public stakeholder input on threshold values will be a protracted process. Establishing threshold values in combination with a future land use policy (see Section 4.7), has the potential for considerable savings for the tax payers.

In the interim, WSRC has developed a release program for hazardous and Toxic Substance Control Act (TSCA) regulated wastes potentially contaminated with DOE added radioactivity. This program (WSRC-TR-94-0388) was approved by DOE-HQ and identifies the circumstances which result in a waste being managed as radioactive. It addresses wastes administratively determined to be non-radioactive, as well as those wastes known to have been contaminated with radionuclides. Therefore, objective guidance is available to determine when hazardous and TSCA-regulated wastes are radioactive or non-radioactive.

WSRC has also developed the SRS Radiological Soil and Rubble Management Program & Waste Acceptance Criteria, 1S Manual, WAC 3.15, effective 3/31/95. This soil management program provides a regulatory basis for the uncontrolled and controlled soil release criteria based on the following:

- Nuclear Regulatory Commission (NRC) proposed new subpart E to 10 CFR 20, entitled "Radiological Criteria for Decommissioning"
- Environmental Protection Agency (EPA) proposed draft regulation 40 CFR 195 entitled "Radiation Site Clean Regulations"
- Department of Energy (DOE) proposed regulation 10 CFR 834 entitled "Radiation Protection of the Public and the Environment"

4.4 Waste Management Environmental Impact Statement

Issue

The plans and options discussed in the SWMP concerning treatment, storage, and disposal of wastes will potentially be impacted by the Waste Management Environmental Impact Statement (WM EIS) effort currently in the development stage.

Assumption

The SWMP is a planning document that identifies near-term actions, studies, and facilities that provide potential solutions for solid waste management. Since the formal evaluation and approval process has not been completed, the SWMP assumes that the WM EIS will support the recommendations identified. If the WM EIS identifies recommendations different than the SWMP, the SWMP will be changed to agree with the WM EIS.

Discussion

The Assistant Secretary, Environmental Restoration and Waste Management (EM), US. Department of Energy (DOE) has directed that a Waste Management Environmental Impact Statement (WM EIS) be developed for the generation, management, and minimization of low-level waste, liquid high-level waste, non-radioactive hazardous waste, mixed waste, and transuranic (TRU) waste at SRS. The SWMP has been reasonably aligned with the WM EIS although, revisions may be required based on final outcome of the EIS approval process and budget constraints. The Consolidated Incineration Facility startup will be dependent on the completion of the WM EIS and the incineration of low-level waste will be decided by the WM EIS.

The development of the WM EIS will require coordination with the Site Treatment Plan (STP) and the National Disposal Plan, being developed under the Federal Facilities Compliance Act for mixed wastes at each DOE site. The WM EIS will also require coordination with the national EM PEIS and Reconfiguration PEIS being developed DOE Complex-wide. These documents will identify the options that will be used to treat, store, and dispose of the various wastes and are the formal approval mechanisms for the options chosen. The EM PEIS is scheduled to be completed in 3QCY95. Multiple Records of Decision (RODs) will be issued starting in July of 1995 for the Waste Management Environmental Impact Statement (WM EIS), for waste streams not included in the Site Treatment Plan.

Mixed waste RODs will be delayed until issuance of the Site Treatment Plan Consent Agreement from the state.

4.5 Proposed Site Treatment Plan

Issue

The Federal Facility Compliance Act requires DOE facilities that generate and store mixed wastes to develop Site Treatment Plans for treating currently stored and future generated mixed waste.

To ensure safe disposal and minimal environmental impact, mixed waste must be treated to meet regulatory land disposal restrictions. Some treatments destroy hazardous components, while others immobilize the constituents of concern.

Assumption

The treatment processes will be designed to minimize exposure of workers, the environment, and the public to radiation and hazardous materials. The treated waste itself will meet stringent regulatory requirements. Treating the waste will essentially eliminate adverse environmental impacts from storage and disposal.

Discussion

Savannah River Site's Proposed Site Treatment Plan identifies preferred options for treating its mixed wastes. The plan also lists waste from other DOE facilities slated for treatment at Savannah River Site. It also identifies Savannah River Site mixed wastes proposed for treatment in other DOE facilities.

The Proposed Site Treatment Plan examined available, or potentially available, treatment options to process Savannah River Site mixed waste streams. Treatment options that met the technical requirements were subjected to in-depth options analyses, which included an engineering assessment that resulted in selection of a preferred treatment option for each waste stream.

The Proposed Site Treatment Plan recommends treatment for all SRS mixed waste.

- Eighty-eight percent of SRS waste (the mixed high-level waste) would be treated by vitrification (capturing radioactive and hazardous waste materials in a glass-like solid that permanently immobilizes them) and stabilization onsite. This waste is not discussed further in this plan.
- Five percent (the mixed transuranic waste and mixed low-level waste managed as mixed transuranic waste) would continue to be stored onsite, awaiting preparation for shipment to the Waste Isolation Pilot Plant in New Mexico.
- Seven percent (the mixed low-level waste) would be treated by incineration, encapsulation, vitrification, or stabilization.

The selected treatment options in the Proposed Site Treatment Plan call for more than ninety-nine percent of the mixed low-level waste to be treated onsite and less than one percent offsite.

4.6 Transition, D&D, and ER Waste

Issue

The changing SRS mission (less production and more D&D and ER activities) will result in significant change in volumetric waste generation rates and physical characteristics compared to historical data that have been the planning baseline. Integrated planning by waste generating organizations and Solid Waste Management prior to waste generation is essential to ensure that appropriate treatment, storage, and disposal options are available when waste is generated.

Assumption

Integrated plans will be developed for forecasted waste to ensure that appropriate treatment, storage, and/or disposal capability is available for the waste that will be generated. If appropriate capability cannot be provided, waste generation will be deferred unless safety and health concerns dictate immediate resolution.

Discussion

The change in mission at SRS has prompted the transfer of the Savannah River Site from Defense Programs (DP) to Environmental Management (EM - 60). This transfer was completed in January 1995.

Because of the change in mission, waste generated by D&D and ER activities will represent a larger fraction of the solid waste managed than indicated by the historical database. Although large-scale D&D activities have not yet begun, transition activities are underway.

Transition activities include the following steps:

- Identification of surplus SRS facilities

- Preliminary characterization/assessment
- Transition planning
- Facility turnover
- Deactivation
- Surveillance and maintenance (S&M)
- Delivery for D&D

The facilities transition processes that include Surplus Facility Identification and Assessment (SFIA), have been completed. The number of SRS facilities and their SFIA grouping by WSRC division are provided in Table B5 of Appendix B. The total number of surplus assets, grouped in Groups I through III, is equal to 234. Complete estimates for waste types (such as hazardous, low-level mixed, low-level, and TRU waste), volumes, characterization, and configuration associated with the surplus facilities need to be developed. The development of these estimates by the Transition Team is in process. In addition, the total number of surplus assets is expected to be revised due to dismantlement efforts, possible reuse identification, and owner assessment of facility needs versus future authorized missions.

A sitewide Transition Deactivation Planning Group has been proposed to develop facility deactivation programs.

The forecast solid waste volumes generated by D&D for the fiscal years 1995 through 2000 are provided for each waste type in Table B2 of Appendix B. The years 1995 and 1996, correspond to years of funded D&D activities, whereas the period 1997-2000 provide waste volume generated during planned D&D activities. The total percent volume for each waste type, and the percent volume of all waste types for each year are also indicated. The forecast volumes show that LLW is the dominant waste generated, although substantial solid waste volumes include mixed waste and hazardous waste. TRU waste volumes are very small. Also, although small solid waste volumes will be generated in 1995 and 1996, most of the total solid waste is expected to be generated in the year 2000.

The forecast solid waste volumes generated by ER for the fiscal years 1995 through 2000 are provided for each waste type in Table B3 of Appendix B. The total percent volume for each waste type, and the percent volume of all waste types for each year are also shown. The forecast volumes show that solid waste generated by ER is mostly hazardous waste, and includes only a small amount of mixed waste. In addition, most of the ER waste is expected to be generated in 1998 and 1999.

Table B4 of Appendix B shows the forecast cumulative solid waste volumes generated by D&D and ER for the period 1995-2000. The forecast volumes show that:

- 100% of the LLW and 100% of the TRU waste will be generated by D&D
- 62% of the MW is expected to be generated by D&D, whereas 38% of the MW will be generated by ER
- 95% of the HW is expected to be generated by ER, whereas only 5% of the HW will be generated by D&D
- 14% of the total solid waste is expected to be generated by D&D
- 86% of the total solid waste is expected to be generated by ER

Figure B1 of Appendix B shows the variations in D&D and ER waste forecast during the 30 - year period considered. The variations in forecasted waste are due to the various assumptions made about D&D and ER waste activities. The forecast ER waste volumes have four major peaks that can be attributed to a few SRS units generating significant volumes of waste. These units include: Silverton Road in 1998, the Metal Burning Rubble Pit in 1999, the D-Area Ash Basin and K-Area Sludge Land Application in 2001, and the Par Pond Sludge Application and Par Pond Groundwater Operable Unit in 2003.

The estimates for Transition and D&D activities assume that funding for future work will become available. Currently, only minimal funding has been provided to support two D&D activities - the D&D of the 232-F Tritium Facility and the Heavy Water Components Test Reactor (HWCTR). Detailed characterization and decommissioning plans will be developed and implemented for these facilities. As more information and funding becomes available, these waste forecasts will be revised accordingly.

The uncertainties in the current solid waste forecast outline the need for additional funding to obtain characterization data for improved waste forecasts, and to implement proposed Transition, D&D and ER activities. Systems are being developed in Transition, D&D, and ER to track waste forecasts, and planned and actual activity funding to provide for closer coordination between Solid Waste Management and other organizations responsible for Transition, D&D and ER activity planning. Integrated site wide planning , including provisions for funding, is essential to ensure that appropriate treatments, storage and

disposal are planned and made available to accommodate generated waste.

4.7 Land Use

Issue

A DOE policy for long term land use has not been developed.

Assumption

A land use policy will be developed and the policy will be implemented at SRS to designate, at a minimum, the central portion of the Site for restricted (e.g., long-term government or heavy industrial) use.

Discussion

Future land use is a key consideration in Solid Waste Management as well as D&D and ER activities. Assumed future land use will greatly influence the volume of waste generated from D&D and ER activities. A land use policy that designates, at a minimum, the central portion of the Site as restricted (e.g., long-term government or heavy industrial) use rather than unrestricted use will significantly reduce the generation of solid waste by these activities. The central portion of the Site encompasses the two Separations Areas and their former seepage basins, the low-level radioactive waste disposal facilities, the Defense Waste Processing Facility, and the Saltstone Facility. It represents about 5% of the Site area.

Solid waste disposal facilities are also heavily impacted by land use scenarios. In the absence of a land use policy, the performance assessments for solid waste disposal facilities will assume unrestricted land use, which in turn may limit disposal of some waste streams and/or drive costly waste treatment strategies. Establishing a land use policy that restricts the future use of the central portion of the Site will allow greater utilization of the E-Area Vault Facility and the Hazardous Waste/Mixed Waste Disposal facility due to a less restrictive WAC.

4.8 SWM Technology Needs

Issue

Some of the SRS generated waste streams are presently stored because of lack of viable treatment processes. For example, TRU managed wastes are stored due to lack of characterization/treatment technology to segregate the low level waste managed as TRU from the TRU waste, and treatment of the TRU waste to meet the TRUPACT II requirements. SRS needs to pursue technology needs to develop viable treatment processes.

Assumption

The WM EIS and the PSTP have identified preferred technologies to treat the MW, HW, TRU waste, and LLW. These technologies were selected based on in depth options analyses of current commercially viable technologies. Even though the preferred technologies are the better ones of the current commercially viable technologies, new emerging technologies were not considered even though they may have shown more promise, less cost, a better final waste form or other positive attributes. Emerging technologies will be pursued for waste streams where there is lower confidence in the success of the treatment.

Discussion

The Solid Waste Management Department is in the process of performing a systematic evaluation of the WM EIS and the PSTP preferred technologies. The evaluation will identify waste streams with the low confidence level technologies. The waste streams with the low confidence technologies will be prioritized and emerging technologies identified for development. Development of these technologies will be dependent on approval of funding. Office of Technology Development (OTD) funding will be sought from the Mixed Waste Focus Area and the Landfill Stabilization Focus Area. Results of this process will have no short term impacts on the SWMP.

4.9 Waste Storage

Issue

In the environment of decreasing budgets, changing missions, regulatory uncertainty, and the need for smart container management, waste storage capability and capacity represents a major challenge to successful management of waste at SRS. Numerous waste streams such as Low-Level Mixed, TRU, TRU mixed, and Hazardous wastes compete for permits, space, and funding resources to assure compliant capacity until treatment and disposal options are developed and implemented.

Assumption

Plans will be developed to provide adequate space, appropriate permits and efficient container management to assure adequate storage capability is available for storage for these wastes until treatment and disposal capability is provided.

Discussion

This activity has already begun with interim permit revisions requested from SCDHEC in May of 1994, for additional permitted space for TRU wastes and CIF ash and blowdown storage. Activities will continue with the development of project activities to provide additional storage space for non-permitted wastes thus freeing up valuable permitted capacity. Additional efforts are underway to assure that adequate space is available for wastes as they are generated. The details of these activities are defined in more detail in the individual waste sections of this document.

4.10 Waste Forecasting

Issue

The accuracy and reliability of current waste generation forecasts, do not effectively support planning for cost effective management of Savannah River Site (SRS) solid waste.

Assumption

SRS solid waste generators will support waste forecasting initiatives developed by Solid Waste Management. The forecasting program will be in compliance with, and support those initiatives described in the Defense Nuclear Facility Safety Board 94-2 Implementation Plan.

Discussion

In the past waste forecasting has been based on "Best Guess Estimates" by the various waste generators on site using past years operating experience as a guide to develop their estimates. These forecasts have proven to be very unreliable. Therefore Solid Waste Management is developing a regulated program for forecasting future Treatment, Storage, and Disposal (TSD) needs relative to existing capacity, taking into account the projected programs for D&D and ER activities as well as current operation units. This program will be developed using a configuration control approach. The following actions are planned to start improving waste forecast reliability:

- Increase generator accountability for forecast accuracy by imposing financial penalties for forecast inaccuracies. A pilot program will be initiated 5/95 with implementation of program supporting actual funds transfer for FYF96.
- Tracking actual to forecast waste generation beginning 5/95. Generators will be responsible for explaining "variances" from forecast.
- Special project waste, such as waste generated from one-time projects, including D&D and ER projects, will be tracked separately and tied to project plans.

4.11 Funding

Issue

The availability of funding dictates the extent to which the solid waste management activities can be accomplished.

Assumption

Waste forecasts contained in the WM EIS are based on accomplishment of a significant amount of D&D and ER work. Funding is not projected for support of the extent of D&D and ER work forecasted. Therefore, the amounts of waste generated by D&D and ER activities are over stated.

Discussion

The waste forecasted in the WM EIS for D&D and ER activities are very large volumes. These volumes cannot be accommodated in existing storage facilities. These volumes represent much larger figures than recent input from programs that have started or are planned. Funding limitations will preclude performing much of the D&D and ER work projected by the WM EIS in the time frames indicated by the forecasts. Accordingly, more realistic future generation volumes must be adopted for the SWMP in order to provide a plan that is viable and realistic.

5.0 Municipal Solid Waste

5.1 Description of Waste Type

The term Municipal Solid Waste (MSW) refers to waste that is neither radioactive nor RCRA hazardous waste. It was previously referred to as 'sanitary' waste. It consists of the following types of material:

- Waste paper
- Discarded office material
- Glass
- Construction debris
- Cafeteria garbage
- Scrap cloth products
- Scrap plastic
- Asbestos material
- Scrap wood
- Salvageable material (e.g. reusable scrap metal and used tires)

Municipal solid waste does not include material from a Radioactive Materials Management Area (RMMA) or any potentially hazardous waste as defined by RCRA.

The *South Carolina Solid Waste Policy and Management Act of 1991* established the policy for the disposal of municipal solid waste in the State of South Carolina. The South Carolina Department of Health and Environmental Control (SCDHEC) *Code of State Regulations, Chapter 61*, establishes the specific regulations that must be followed in managing municipal solid waste.

5.2 Existing Facilities

Until 4QFY94, municipal solid waste was sent to an onsite landfill, the Interim Sanitary Landfill (ISL). This landfill began operation in 1993. This facility was constructed to be an "interim" facility until a 'Subtitle D' facility was completed under the New Sanitary Landfill (NSL) Project 93-D-188. The Subtitle D facility was to be designed and constructed to meet the new Federal requirements that were to become effective, October 1993. These new regulations required the addition of flexible membrane liners, leachate collection and storage features, as well as new siting criteria. These additional requirements raised the cost of construction to over $35 million. Evaluation of constructing onsite facilities, indicated that it was not cost effective to develop landfill facilities that will receive less than 300 tons of waste per day; SRS generates ~20 tons per day. This information along with an alternative study provided the basis for cancellation of the NSL Project. New paths forward are being exercised and will be discussed later in this plan.

Compactible waste, which consists of routine trash and cafeteria wastes, was collected by the site Transportation Department in 8 cubic yard compactor pans. It was then transported to and deposited in the onsite MSW facility. Also some subcontractors collected and hauled their own waste to either a proximal container or to the on site facility. These wastes are currently being transported offsite for disposal.

SRS operates a cellulosic and construction landfill facility (Burma Road Landfill) that is permitted to accept uncontaminated soil, rock (stone), concrete rubble, inert construction wastes, etc. This material is typically generated during site preparation and demolition activities.

Non-compactible MSW, consisting mainly of construction debris, is collected in 6 cubic yard load lugger pans. Collection and disposal options for this type of waste varies. The Transportation Department collects and hauls a portion of this waste through contractual arrangements with individual subcontractors. Some subcontractors collect and haul their own waste using pickup trucks.. Large volume loads of non compactible wastes such as from large construction sites are normally transported by the subcontractor using their own dump trucks. Specialized containers (12 cubic yard load luggers w/locks) are used for non routine/special waste such as asbestos.

The design capacity of the ISL is based on a 40 tons per day flow rate. The expected life span at this rate is 5 years. The life span is now limited by regulation because the ISL does not meet the new state and federal regulatory requirements. The latest closure dates for non-compliant facilities is October 1996. Closure activities for the ISL will be performed by the Environmental Restoration Department.

5.3 Issues and Assumptions

The following is an issue affecting MSW management at SRS along with the assumptions used as the planning basis:

Issue:

Strict MSW regulatory requirements have created a lack of disposal capacity for the Lower Savannah Region of South Carolina.

Assumption:

DOE and the Lower Savannah Council of Governments (LSCOG) will work toward the development of a regional disposal facility on the Savannah River Site or some other appropriate location. SRS waste will be disposed of in this facility once it is operational. A Solid Waste Technology Center is also being considered as part of this facility. Sanitary waste technology demonstrations would be conducted and the findings would be transferred to SRS and to other MSW facilities. This development will include the material recovery and recycling components that will address the needs of SRS.

Proposed Action:

WSRC should participate in this effort and provide support for this activity and ensure a smooth integration of SRS solid waste disposal and recycling initiatives with this new facility.

Issue:

South Carolina regulations require closure of landfill facilities that no longer receive wastes within 30 days of cessation of operations. WSRC needs to place the ISL in an 'interim closure status' to provide a fail-safe mechanism in the event of unforeseen circumstances with the current disposal arrangements.

Assumptions:

DOE and SCDHEC will concur with using the ISL as backup capacity.

Proposed Action:

SCDHEC was notified of the ISL status. An additional extension will be requested once the facility has not received waste for one year.

5.4 Current Plan

Beginning in FY95, SRS initiated offsite disposal of its routine MSW. A subcontract was awarded to a commercial hauling firm [Charleston Disposal Systems (CDS)] to collect and haul SRS-generated MSW to an offsite disposal facility. The waste is being disposed of at the Hickory Hill Landfill and Recycling Center located in Jasper County, South Carolina. This was done in order to take advantage of a commercial hauler's efficiency and the economy of scale of using a large landfill.

Subcontracting the collection/transportation segment of our system allows for CDS to improve our operations by implementing a true Front Loader system. In this system, all waste streams will be segregated based on the waste itself and collected in containers that can be handled with a front end loader truck. All non front end loader handling equipment is to be phased out. This equipment includes: skip pans, load lugger trucks, flat bed trucks, and pickup trucks. This new system will increase overall efficiency through standardization.

Operations at the Burma Road Landfill for cellulosic and construction rubble will continue. Collection and transportation of waste destined for this facility will continue to be handled by onsite forces and the subcontractors themselves.

As seen in the flow diagram in Figure 5.4.1, the waste composition varies widely. In meeting the waste minimization objectives, alternate paths have been initiated for disposition of certain waste streams. The goal of future plans are to continually reduce that amount of waste requiring land disposal and increasing the reuse/recycle of as much material as is practical. Current activities include:

- Salvaging of scrap metal, tires and other items as indicated on the flow diagram
- Recycling white paper, aluminum cans, and cardboard
- Reusing onsite construction materials, wood pallets, etc.

There are also some unique waste streams (powerhouse ash, scrap wood, and domestic sewage) that are not appropriate for a landfill and are handled as indicated on the flow diagram. Inert material such as construction debris is used on site for erosion control and back-fill where possible or sent to the Burma Road landfill.

Also, municipal solid waste generated at the offsite, leased office facilities is handled by the services provided by the local municipal government and not sent to the Hickory Hill landfill.

MSW is generated from clean area operations and does not contain any radiologically contaminated or hazardous waste. A waste control process has been put into practice to assure that the waste does not include material from a Radioactive Materials Management Area (RMMA) or hazardous waste as defined by RCRA. Waste control is administered through the use of container access control, employee training and heightened awareness, and monitoring.

A waste screening program has been initiated to provide feedback on the effectiveness of our waste control activities. In this process, waste containers are randomly chosen for screening. One percent of the waste will be selected each week for screening. The screening volume is based on recommendations of the Solid Waste Association of North America. The waste is removed and inspected for the inclusion of improper materials. Reports of improper materials are submitted to the management staff for that particular facility.

FLOW DIAGRAM: Municipal Solid Waste SRS

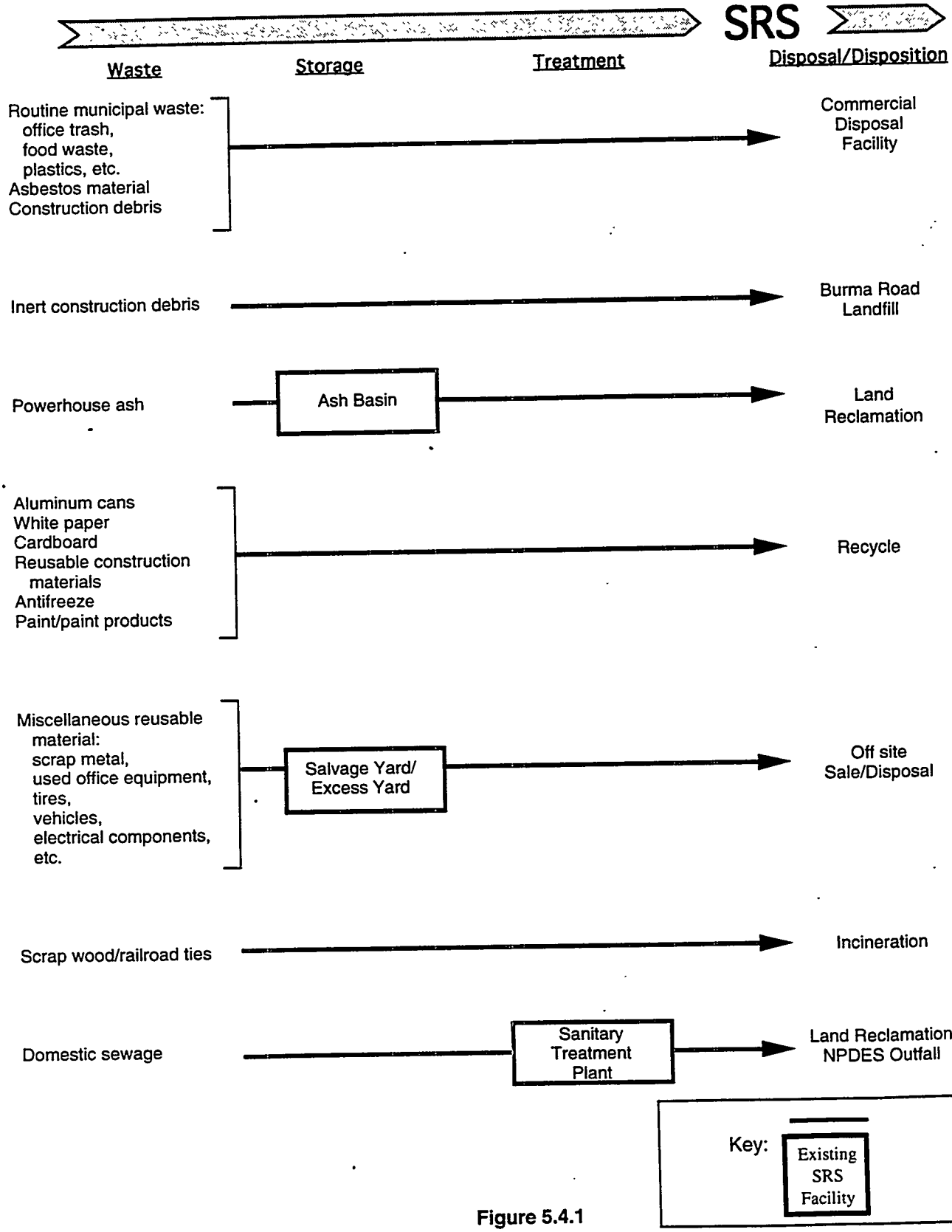


Figure 5.4.1

4/25/95

6.0 Hazardous Waste

6.1 Description of Waste Type

Hazardous waste (HW) is regulated by the Resource Conservation and Recovery Act (Public Law 94-580) of 1976. Several Environmental Protection Agency (EPA) regulations (40 CFR 260 - 268 and others) implement RCRA. The South Carolina Department of Health and Environmental Control (SCDHEC) is authorized by EPA to administer RCRA, with the exception of the Land Disposal Restrictions (LDR), via the South Carolina Hazardous Waste Management Regulations (SCHWMR).

Hazardous wastes are either "characteristic" or "listed". Waste that is hazardous by characteristic is either ignitable, corrosive, reactive, or toxic. Listed wastes are identified in 40 CFR 261.

The aggregate current inventory of hazardous waste (HW) in storage at SRS is about 437,790 gallons (1,657 m^3). The forecasted HW generation rate from continuing operations, exclusive of ER and D&D related wastes, will decrease from approximately 88 m^3/yr. in FY95 to 57 m^3/yr. in FY97 and continue at that level through the year 2000. The forecast rates were derived from the Thirty Year Solid Waste Forecast (1994), and is shown in Table B.1 of Appendix B. HW generation has recently declined as a result of waste minimization activities and some facilities no longer generate HW or the generation rate has been reduced. Future generation is also seen to be lower for similar reasons.

In 1991 DOE issued a moratorium on offsite shipment of HW that was potentially contaminated with DOE-added radioactivity. The moratorium pertained only to HW generated inside a Radioactive Materials Management Area (RMMA), and its primary intent was to ensure that offsite shipments of HW meet applicable licensing and permitting requirements. Accordingly the moratorium was lifted April 20, 1995 to allow shipments of RMMA hazardous waste to offsite facilities for treatment and disposal.

The WM EIS was used for waste generation forecasts for D&D and ER activities over the period of 1995 through 2000. The amount forecasted is about 22,380,910 gallons (84,712 m^3) as shown in Table B4 of Appendix B. The generation of this amount of D&D and ER waste is very large in light of the inability to accomplish planned work due to reduced funding.

Based on current inventories, continuing annual generation, and including the large amounts of D&D and ER waste from the WM EIS, existing storage space could potentially be exhausted by approximately 1QCY99, as shown in Chart B1, which includes 89% of the waste being sent offsite and 4% incinerated in the CIF. It can be seen from the lower curve in this Chart, however, that if only waste generation from continuing operations is considered (i.e., future waste forecasts are excluded), storage space will be available beyond the year 2000. This shows that there is some amount of D&D and ER waste generation which would not exhaust storage space before 2000. This is not an unreasonable scenario considering that D&D of 232 F and the Heavy Water Component Test Reactor (HWCTR), are the only D&D projects that will likely be funded and produce HW during the next 5 years. Estimates of HW from these sources indicate that roughly 11,360 gallons (43 m^3) of HW will be generated. Similarly small quantities of HW are anticipated from ER work although no estimates are available other than what appears in the WM EIS. Therefore, it is not believed that storage space will be depleted by 2000.

6.2 Existing Facilities

Hazardous wastes generated at various site facilities are stored at buildings 645-N, 645-4N, 710-B, and the solid waste storage pads (SWSP) located adjacent to Building 645-N. These facilities are permitted for storage of HW and are collectively referred to as the Hazardous Waste Storage Facilities (HWSF). These facilities store wastes until acceptable treatment and disposal methods can be implemented.

Currently, permitted storage capacity for hazardous waste is 1,321,720 gallons (5003 m^3). The distribution of currently permitted storage capacity is shown in the following Table.

Each facility has a "usable storage capacity". In some facilities non-standard container sizes, aisle spacing, and stacking limitations prevent full storage space utilization, resulting in a storage capability less than the permitted capacity. The usable storage capacity of these facilities is approximately 1,405,740 gallons (5,320.7 m^3) for solids and 287,320 gallons (1,087.5 m^3) for liquids. In 645-N, the "usable capacity" for solids exceeds the permitted capacity based on triple stacking of drums. **The volume in storage, however, cannot exceed the permitted capacity.** The distribution of usable capacity and associated stored inventory is shown in the following Table.

The permitted storage capacity for HW will change after approval of the Hazardous Waste Storage Facilities (HWSF) renewal application for a RCRA part B Permit; this is expected sometime in 3QFY95.

The revised distribution of storage capacity will be as shown in the Table below.

Free liquids can be combined with non-free liquids in any of the storage areas listed. However, free liquids can be combined with non-free liquids only up to the maximum free liquid volume in the Tables. The storage capability is limited by the usable storage capacity.

HAZARDOUS WASTE - CURRENT PERMITTED CAPACITY AND INVENTORY

Building	Currently Permitted Volume Gallons (m^3)	Usable Capacity Solids Gallons (m^3)	Usable Capacity Liquids Gallons (m^3)	Current Stored Inventory Gallons (m^3)
645-N	~106,920 (405)	157,540 (596.3)	68,640 (259.8)	34,670 (131.6)
645-4N	~414,000 (1,567)	339,317 (1,284.3)	170,720 (646.2)	63,000 (238.4)
710-B	~60,280 (228)	171,005 (647.2)	47,960 (181.5)	10,130 (38.3)
SWSP	~740,520 (2,803)	737,879 (2,792.9)	N/A	329,900 (1,248.7)
TOTAL	~1,321,720 (5,003)	1,405,741(5,320.7)	287,320 (1,087.5)	437,790 (1,657)

HAZARDOUS WASTE - PERMITTED CAPACITY AFTER PART B RENEWAL APPROVAL

Building	Storage Distribution After Part B Renewal Liquids Gallons (m^3)	Storage Distribution After Part B Renewal Non-Free Liquids Gallons (m^3)
645-N	102,960 (390)	157,540 (596.3)
645-4N	256,080 (969)	339,317 (1.284.3)
710-B	112,860 (427)	171,005 (647.2)
SWSP	N/A	737,879 (2,792.9)
TOTAL	471,900 (1,786)	1,405,741 (5,320.7)

6.3 Issues and Assumptions

The following are the major issues affecting Hazardous Waste management at SRS along with the assumptions used as the planning basis:

Issue

The capability of the usable permitted storage space is adequate without considering ER and D&D generated waste. Storage capability with ER and D&D wastes is uncertain due to unavailability of realistic waste generation forecasts.

Assumption

Additional storage space in line with forecasted continuing operations waste generation will be available as needed (i.e., funding will be available and permits will be obtained when needed). SCDHEC approval of a Part B renewal application for the HWSF currently under review is expected in 3Q FY95. Chart B1 of Appendix B shows the hazardous waste storage facilities to be depleted by 1QCY99 due to forecasted ER and D&D wastes. However, since the projected ER and D&D forecasted waste volumes are believed to be conservatively high, due to funding limitations, required storage provisions for ER and D&D generated wastes are expected to be modest through the year 2000, and can be accommodated in existing facilities.

Issue

Treatment and/or disposal of hazardous waste from an (RMMA) by offsite vendors is restricted until the WSRC release program is approved. Radiation screening procedures are part of the WSRC release program document.

Assumption

The WSRC release program for RMMA-generated hazardous waste will be approved in 3Q FY95. The screening procedure for liquid and homogeneous solids has been approved, and sampling of these wastes has been started preparatory to release program approval. Inventories will begin to decline as shipments of these wastes offsite occur. The reduced inventories will contribute to improve storage capability for newly generated wastes.

Issue

Offsite treatment and/or disposal of RMMA HW with inaccessible surfaces or highly heterogeneous waste streams will be delayed until representative sampling procedures are available. Development of analytical techniques for determining the level of Tritium contamination in solids is also required.

Assumption

It is presently not known when appropriate sampling procedures will be available for radiological screening of heterogeneous solids. The guidance for sampling may be contingent on development efforts by the EPA. The analytical technique for radiological screening of solid material for Tritium is currently being developed by analytical laboratories both onsite (SRTC), and offsite under the direction of the EPA.

Issue

A Waste Management Environmental Impact Statement (WM EIS) for waste management at SRS will be required prior to CIF operation.

Assumption

The WM EIS will be completed on schedule; therefore, operation of the CIF will not be delayed.

Issue

Regulations have been issued by SCDHEC which may preclude siting of the HW/MW Vaults at SRS. The regulations require a 10 ft. naturally-occurring, low permeability layer of clay to be in contact with the bottom liner of a hazardous waste landfill. SRS does not have a location meeting the requirement.

Assumption

SCDHEC will approve the groundwater waiver, that has been requested by SRS, for the HW/MW vaults. If the waiver is not approved, SRS will enter into negotiations with the regulators. SRS believes that the SWMP should stay consistent with the National Disposal efforts being conducted in conjunction with the STP process. Alternative disposal options should be discussed, such as disposal at Envirocare.

6.4 Current Plan

The plan for hazardous waste is shown by flow diagram, Figure 6.4.1.

Management of hazardous waste is governed by the requirements contained in the currently approved RCRA Part B permit and in the 1992 RCRA Part B Renewal Application (WSRC-IM-91-53). Pending SCDHEC approval, the following processes will be allowed under the Renewal Application:

- Compacting of solid wastes
- Cutting solid waste
- Segregating different waste types into different containers
- Absorbing liquids

- Repackaging/re-drumming wastes

Commercial treatment and disposal is currently the only option for HW management. When the moratorium on offsite shipments of RMMA generated HW potentially contaminated with DOE-added radioactivity is terminated, offsite shipments of RMMA HW will be made in accordance with the WSRC Release Program. This program establishes the foundation for determining whether a HW is radioactive or non-radioactive. It is expected that offsite shipments of liquid and homogeneous solid RMMA HW that meet the Release Program requirements will begin by 4Q FY95. Radioactive screening procedures for heterogeneous wastes, and wastes not having completely accessible surfaces (e.g., soils, enclosed equipment, etc.) are currently being developed, however, development of sampling and analytical techniques for Tritium contamination are still required.

About 1,100 55-gallon drums of non-RMMA HW have been shipped offsite starting in May 1994 through March 1995. Offsite shipments of RMMA HW meeting the Release Program will reduce the current inventory of HW being stored by SWM by approximately an additional 15%. The remainder of the HW inventory will be stored until resolution of the radioactive screening, sampling and analytical methodology allow this waste to be categorized in accordance with the WSRC release program. LDR requirements mandate that wastes be stored only for the purposes of accumulating such quantities of waste as necessary to facilitate recovery, treatment or disposal. When the screening procedures and sampling and analysis methodologies discussed above are approved, funding will be needed to process the backlog of HW in a timely manner.

Hazardous waste is stored on site in RCRA regulated storage facilities until it can be sent offsite for treatment and/or disposal. Selected hazardous wastes that fall within the CIF permit restrictions and meet the waste acceptance criteria will be incinerated in the CIF. CIF will start up in 2Q FY96 and will be available to process these selected wastes. Activities have been initiated for packaging of hazardous wastes for incineration in the CIF.

The Solid Waste Management Plan for hazardous waste is a combination of the options discussed above. Offsite treatment and disposal will continue. As onsite treatment capacity becomes available, it will be used where it is cost effective. Where offsite treatment is employed, offsite disposal will be pursued first with the option of onsite disposal when facilities are available.

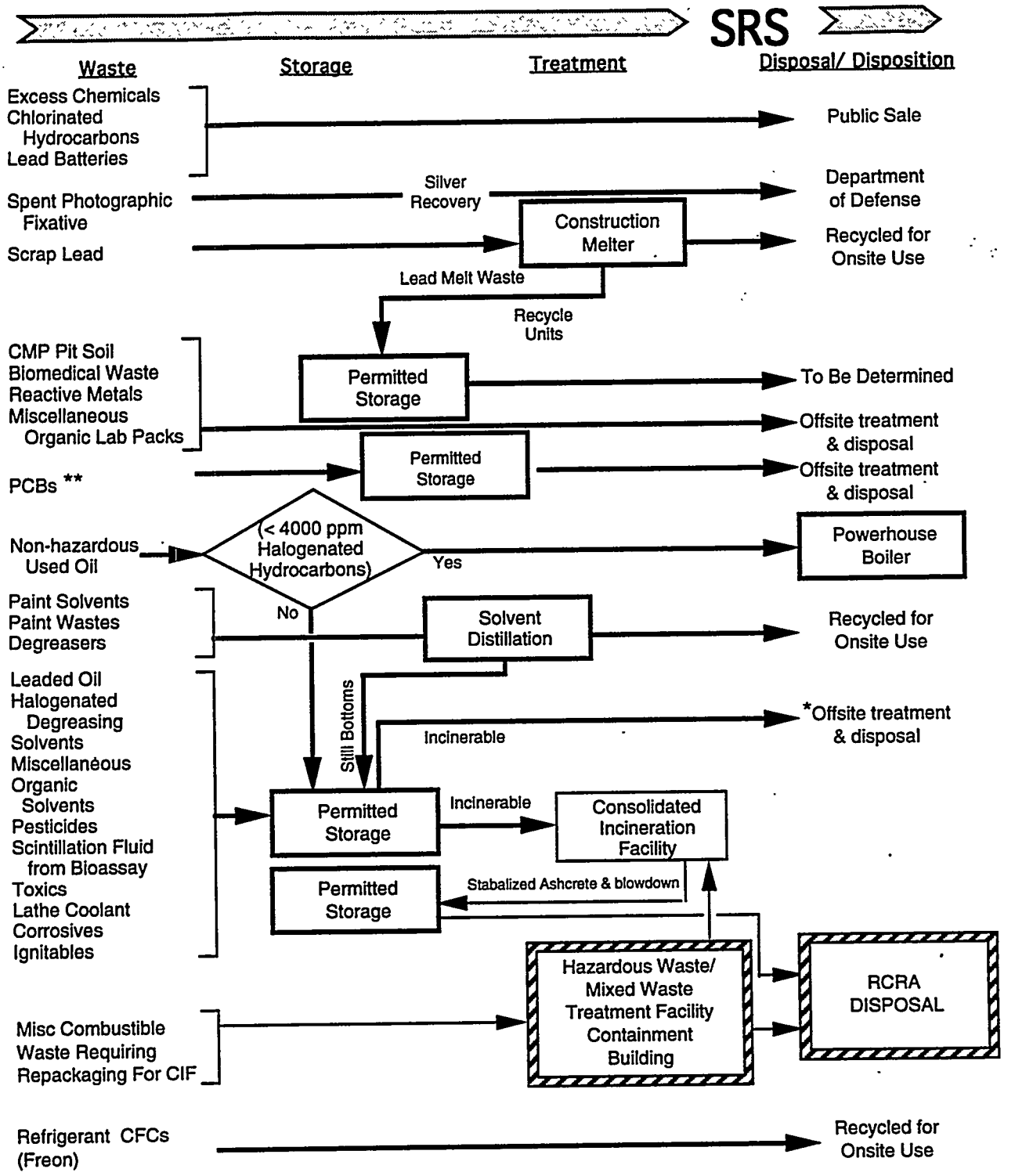
The Hazardous Waste/Mixed Waste Treatment Facility concept and the Hazardous Waste/Mixed Waste Disposal Vault will be re-evaluated. Pending the results of the re-evaluation, the HW/MW Disposal Vaults may be used for disposal of hazardous waste meeting LDR requirements. Re-evaluation of the HW/MW Treatment Facility may include utilization of offsite vendors to provide onsite treatment (see discussion in Sections 4.2 and 7.0). It is not possible at this time to anticipate the result of the re-assessment.

Near-term actions include:

- Develop radioactive screening procedure for heterogeneous solids
- For heterogeneous solids, develop representative sampling and analytical techniques for determining the Tritium contamination level
- Re-evaluate HW/MW treatment and disposal vault facilities. The WM EIS and the National Disposal plan are evaluating optional disposal methods
- Continue operation of 3 HW storage buildings (645-N, 645-4N and 710-B) and 3 HW storage pads
- Prepare incinerable hazardous waste for shipment to CIF
- Continue shipment of hazardous wastes offsite for treatment and disposal
- Begin shipment of homogeneous and liquid wastes offsite for treatment and disposal after the moratorium is terminated
- Develop and conduct emergency preparedness program including training and drill for Hazardous Waste Facility
- Begin operation of PCB facility

FLOW DIAGRAM: Hazardous Waste

(Non Radioactive)



* - Most of these wastes will be processed by CIF when it comes on line.

** - Will not be processed by the Consolidated Incineration Facility.

Figure 6.4.1

4/25/95

7.0 Low-Level Mixed Waste

7.1 Description of Waste Type

Mixed wastes (MW) are defined as radioactive wastes that contain materials listed as hazardous in Subpart D of 40 CFR 261 or that exhibit waste characteristics identified in Subpart C of 40 CFR 261. In addition, the Land Disposal Restrictions (LDR) (40 CFR 268) which were enacted in 1986, place additional constraints on the treatment and disposal of hazardous and mixed wastes (see Section 4.1 for more detail on Land Disposal Restriction (LDR) requirements). These regulations are collectively referred to as the Resource Conservation and Recovery Act and provide the basis for determining treatment and disposal.

Significant quantities of MW have been generated at SRS. The current inventory of containers of MW in storage is about 2,325,000 gallons (8,800 m^3). The largest fraction of this inventory is mixed Transuranic (TRU) waste, with a container volume of about 1,311,500 gallons (4,964 m^3).

NOTE: The waste volume and the volume of the container in which the waste is placed may not be the same. The container volume in most cases is larger than the actual volume of the waste due to void volumes in the containers. The container volumes are those for which storage provisions are required.

Mixed TRU waste is discussed in Section 9.0 of this document. Due to the higher concentration of radioactive constituents, it is not considered low-level mixed waste. Mixed TRU waste will be mentioned here only when the added volume affects the path forward. The balance of the containerized MW inventory is considered low level, and has a volume of approximately 1,012,400 gallons (3,832 m^3).

Mixed wastes are discussed in Chapter 3 of Volume II of the Proposed Site Treatment Plan (PSTP). There are 61 different MW streams listed and they are categorized in groups by the specified treatment method.

Forecasted generation of MW of 498,800 gallons (1,888 m^3) from continuing operations shown in Table B.1 of Appendix B, was derived from the Thirty Year Solid Waste Forecast (1994) for the period of 1995 through 2000. The 30 year forecast was used as the reference because it provided detailed waste estimates from individual sources for 1995-1997 which enabled inappropriate entries in the continuing operations forecasts to be eliminated. The WM EIS was used for waste generation forecasts for D & D and ER activities over the period of 1995 through 2000. The amount forecasted is about 1,718,620 gallons (6,505 m^3) as shown in Table B4 of Appendix B. The generation of this amount of D&D and ER waste is extremely large in light of the inability to accomplish planned work due to reduced funding.

Based on current inventories, waste generation from continuing operations, the addition of CIF blowdown and ash, and M-Area stabilized waste, and including the large amounts of D & D and ER waste from the WM EIS, existing storage space will be adequate through the year 2000. As shown in Chart B2, D&D of 232-F and the Heavy Water Components Test Reactor (HWCTR) are the only D&D projects that are funded and will generate MW during the next 2 years. The waste estimate from these two projects, adjusted for container storage, is roughly 93,000 gallons (350 m^3). D&D of the Beta-Gamma Incinerator (BGI) has been considered but the availability of funding is doubtful. The amount of mixed waste from BGI is very small and has not been included. Similarly, small quantities of MW is anticipated for ER work although no estimates are available other than what appears in the WM EIS.

The strategy to provide storage capacity until disposal option implementation, is discussed in more detail in the following sections.

7.2 Existing Facilities

The current MW program at Savannah River Site (SRS) is to treat the wastes in accordance with a compliance order, which SCDHEC is scheduled to issue in mid-1996. The compliance order will be baselined on the approved or revised Site Treatment Plan. The currently permitted MW storage units are Buildings 645-2N, 643-29E, 643-43E, 316-M and solvent tanks S23 through S30. TRU pads 6-17 are also permitted for MW storage. They are designated primarily for mixed TRU wastes, but contain some MW. (Pads 1-5

store primarily mixed TRU waste and are covered with earth).

Currently, the total MW permitted storage capacity, including tank storage and mixed TRU waste, is 7,754,745 gals. (29,352 m^3). Non-standard container sizes, aisle spacing and stack limitations, however, prevent full utilization of this capacity so that there is not a direct correlation between the volume of the containerized inventory and permitted volume. The distribution of permitted storage is as follows based on the actual volumes documented in the permits:

TRU Pads		MW Storage Buildings		Solvent Tanks		TOTAL
Pad No.	Gallons (m^3)	Building	Gallons (m^3)	Tank	Gallons (m^3)	
1-5	1,111,000 (4,205)	645-2N	153,780 (582)	S23-S30	200,000 (757)	
6-13	2,035,000 (7,702)	643-29E	31,750 (120)	PWIT/SF	2,195,730 (8,311)	
14 -17	1,485,000 (5,621)	643-43E	309,375 (1,171)	DWPF Waste Stor. Tanks	150,000 (568)	
		316-M	30,800 (117)	SRL MW Tanks	52,310 (198)	
TOTAL	4,631,000 (17,528)		525,705 (1,990)		2,598,040 (9,834)	**7,754,745 (29,352)**

Notes: TRU pads (1-17) are designated for mixed TRU storage, although there is currently a known small amount of MW stored on pads 7-13. The storage capacity/capability of pads 1-17 is not included with the MW storage facilities.

After the Part B for the MWSB is approved the capacity of 645-2N will be changed to 284,111 gallons (1,075 m^3).

MW buildings in general have a "usable capacity" which is greater than the permitted capacity, except for the liquid capacity of 643-43E, which is less. **The volume of waste stored, however, cannot exceed the permitted capacity.** The usable capacity for these facilities and the stored inventories are as shown in the following table.

Facility	Usable Capacity - Gallons (m^3)		Stored Inventory - Gallons (m^3)
	Liquids	Solids	
645-2N	177,320 (671)	284,111 (1,075)	148,005 (560)
643-29E	53,000 (201)*	65,000 (246)*	24,088 (91)
643-43E	187,000 (708)*	309,375 (1,171)*	0
316-M	30,800 (117)	30,800 (117)	13,562 (91)
TOTAL	448,120 (1,697)	689,286 (2,609)	185,655 (702)

* Preliminary estimate (after the usable capacity is finalized a Part A revision will be submitted to SCDHEC)

Recently an interim solid waste storage strategy was developed to provide additional needed storage space as a result of SCDHEC required aisle spacing. This strategy identified the need for additional MW storage space for stabilized M-Area sludge and CIF ashcrete and blowdown. These two wastes were future generation wastes but required a near term commitment for storage space and steps were taken to provide for storage of these wastes.

A storage pad in M area (315-4M) was available and was designated for storage of M-area sludge and CIF waste. It is expected that the storage of the M-area sludge and stabilized CIF waste will begin in approximately mid-1996. A revision to the Part A permit was submitted to SCDHEC in May of 1994 providing for 600,000 gallons (2,271m^3) of interim storage capacity for the M-area pad in conjunction with requesting interim status for pads 18 and 19 for mixed TRU storage. This capacity for the M-area pad was allocated from the available capacity of TRU pads 6-17. Pads 18 and 19 were included in the 6-17 pad group storage capacity. The revised Part A is currently under review by SCDHEC with approval anticipated about the end of October 1995.

The M-area sludge will occupy about 1/3 (200,000 gallons) of the 315-4M pad with the remaining portion of the pad reserved for storage of stabilized CIF ashcrete and blowdown. The 315-4M pad, however, will not accommodate storage of CIF ashcrete and blowdown through 2000. The CIF waste will fill the reserved portion of the 315-4M pad in approximately the second half of 1998 at the currently estimated generation rate of 2,100 drums/year. Additional storage space is required for storage of stabilized CIF ashcrete and blowdown after that date. Pads 20-22 have been identified for storage of CIF stabilized ashcrete and blowdown after 1998. Information is currently being prepared regarding waste characteristics of the CIF waste to be stored on the 315-4M pad for inclusion in a subsequent Part A revision to be submitted to SCDHEC.

Earlier (9/25/90) SCDHEC was requested to consider a permit revision to permit pads 20-22 under the TC rule for 1,446,130 gallons (~5,474 m^3) of storage capacity. This request was denied by SCDHEC in a letter dated 2/16/94. When the Part B for the Mixed Waste Storage Buildings, currently under review by SCDHEC, is approved (expected by the end of 1996), it will provide 1,446,130 gallons (~5,474 m^3) of MW storage capacity for pads 20-22. Permitting of these pads will enable storage of the CIF stabilized ashcrete and blowdown (equivalent to about 2 pads) on pads 20-22 in the time frame necessary plus storage space (~1 pad) for other MW.

Construction of building 643-43E has been completed and operation is expected in 3Q FY95. The permitted storage capacity for MW provided by these several facilities is expected to be adequate to support continued and new generation through 2000. The forecasted amounts of D&D and ER wastes in the WM EIS are included in Table B.4 in Appendix B.

Solid Waste Management has a total of approximately 31,600 gallons (~120 m^3) of Purex solvent stored in two single-walled underground storage tanks S29 and S30. These two tanks have a total storage capacity of 46,350 gallons (175.4 m^3). Tanks S23-S28 are required to be removed from service immediately in accordance with South Carolina Waste Management Regulation (SCHWMR) R.61-79.265.196. The waste from tanks S23-S28 has been transferred to tanks S29 and S30. The remaining two tanks (S29 and S30) are required to pass integrity testing annually to remain in service up to a maximum of 15 years. The required integrity testing for FY94 was completed in 4QFY94. The next annual integrity testing will be due some time in 4QFY95. The 15-year service life for S29 and S30 ends October 1996. These two tanks will remain in service and continue to accept Purex solvent until four new Solvent Tanks (S33-S36) are constructed and placed in service. Tanks S33-S36 will be installed and operational by October 1996. The four new tanks will replace tanks S23-S30 and will have a capacity of 120,000 gallons (454 m^3). These new tanks will be located near the CIF to facilitate incineration of this material. Tanks S23-S28 are out of service and are in the interim closure process.

7.3 Issues and Assumptions

The following are the major issues affecting management of MW at SRS along with the assumptions used as the planning basis:

Issue MW-1: Permitted storage space may be depleted before the year 2000 by future solid MW generation.

Assumption: With approximately 46% of future generation of MW incinerated in the CIF as specified by the PSTP, indications are that storage space will be adequate through the year 2000 on the basis of the volumes of D&D and ER waste forecasted in the WM EIS.

An overall strategy has been developed to provide for MW storage over the next 5 years, however, it was based only on waste generation from continuing operations and did not consider D&D and ER generated wastes. This strategy did, however, show that there would be unoccupied areas on the TRU pads for a limited period of time until aisle spacing of mixed TRU waste containers occurs. Currently, pads 1-13 are under a variance from aisle spacing and the pads will have some available storage area that can accommodate MW storage as long as the variance is in effect.

The large volumes of ER wastes projected by the WM EIS are believed to be conservatively high based on current funding limitations through the year 2000. Discussions with ER personnel have indicated that the estimates are bounding values and the volumes will likely be much smaller, especially in the near term, since funding limitations will prevent accomplishing much of the ER work that has been planned. As with ER, the amount of MW from the D & D waste generation estimates will not be realized due to funding limitations. Waste generation will be much reduced from the WM EIS estimates and will consist essentially of only that from 232-F and HWCTR.

These factors indicate that storage space requirements for D & D and ER wastes will be significantly reduced. It is likely that there will be sufficient storage space for MW through the year 2000.

The storage strategy program also deals with storage needs by considering the possible conversion of excessed facilities with project development of new facilities. This is noted in Section 7.4.1.

Issue MW-2: The FFCAct of 1992, which requires that a Site Treatment Plan be developed, and the DOE national program initiative for regionalization, have added uncertainty about local program development at this time. These initiatives, driven by both SCDHEC and DOE, support the further evaluation and planning of treatment technology and complex wide disposition of waste. This may result in a more efficient approach to the establishment of treatment and disposal facilities at each DOE site and ensure equity for the states involved.

Assumption: The proposed Site Treatment Plan (PSTP) development focuses on proven technologies that are cost effective and are suitable for the majority of mixed wastes. The PSTP was submitted to SCDHEC on 30 March, 1995.

The FFCAct requires that the regulators subsequently approve, approve with modification, or disapprove each plan within six months.

The integration of capability between SRS and other DOE site organizations is an essential ingredient in the SWMP.

7.4 Current plan

The plan for Low Level Mixed Waste is shown in the flow diagram, Figure 7.4.1.

7.4.1 Storage

A Strategy Proposal for Interim Storage of Hazardous, Mixed and Non-Mixed TRU and Low Level Mixed Waste (WSRC-94-767) and an Interim Solid Waste Storage Plan (WSRC-95-233), developed for various solid waste streams, including mixed wastes, indicated that the capability of the currently permitted storage facilities is adequate through the year 2000 until permanent disposal solutions are developed. Because of the uncertainty of D&D and ER programs at the time, the scope of the storage strategy and plan was developed, it did not consider D&D and ER waste generation.

Effort has been initiated to permit other existing areas for MW storage in conjunction with implementation of aisle spacing on TRU pads 14-17 by the end of 1998. The evaluation presented in the Strategy Proposal for Interim Storage of Solid Waste was issued to DOE on

September 1, 1994. The strategy was approved by DOE and included the following actions:

- Permit existing storage pad 315-4M for storage of M-Area vitrified sludge and CIF stabilized ashcrete and blowdown.
- Permit pads 18 and 19 for mixed waste storage.

An Interim Expansion to the RCRA Part A was submitted to SCDHEC May 23, 1994 to accomplish these two items.

The distribution of the revised storage capacity will be as follows:

Facility	Storage Capacity
Pads 6-19	2,920,000 gallons (~11,052 m^3)
315-4M pad	600,000 gallons (~ 2,271 m^3)

Note: The interim status capacity of pads 6-17 includes pads 18 and 19 in the RCRA part A permit modification noted above. The Part B permit application, previously submitted to SCDHEC, will increase the capacity of pads 20-22 to 1,446,130 gallons (~5,473 m^3), when approved.

The strategy provides adequate storage space for storage of M-Area vitrified sludge and approximately 2 1/2 years production of CIF ashcrete and blowdown on the 315-4M pad and storage capability for pads 20-22.

Factoring the forecasted D & D and ER waste generation from the WM EIS into the storage strategy scenario creates uncertainty as to the future adequacy of the storage facilities. Waste generation over and above continuing operations sources were considered during development of the PSTP. Several significant quantities of MW that would require storage space were identified in Section 7 of Volume II of the PSTP. They are as follows with known or estimated containerized volumes:

- Cadmium control rods, 13.2 m^3
- ITP filters - 32.6 m^3 over '95-'99 period
- Tank farm debris - boxes and drums, estimated at 1,600 m^3 over '95-'99 period
- Job control wastes contaminated with TC constituents and radioactivity, general site-estimated at 1,065 m^3 over '95-'99 period
- D&D of 232-F, boxes and drums-estimated at 253 m^3, mid-'96 and '97

D&D of 232-F is the one known specific activity that is funded and will produce an estimated 350 m^3 MW (revised from the estimated 253 m^3 in the PSTP to account for the containerized volume). D & D of HWCTR could also generate a small amount of MW. Subcontractor activity has begun on 232-F and a better estimate will be provided as waste characterization proceeds. This D&D waste from 232-F and the other wastes listed above are given in the PSTP as acknowledged future generation wastes. These wastes plus the aggregate of various smaller waste volumes in the PSTP have a total estimated volume of approximately ~3,300 m^3. It was recommended in the PSTP that acquisition of additional LLMW storage space should be pursued as this amount of additional volume would exceed available storage space.

Also, an ER investigation derived waste (IDW) stream that is currently being generated has been identified and consists of well purge water. This was not known during development of the PSTP. A processing system is being constructed for processing this purge water with scheduled completion in 4QFY96. It is currently planned that this purge water in 55 gallon drums will be stored temporarily in the MW facilities until that time, when it will be returned to ER for processing. It is currently conservatively estimated that the amount of this waste to be stored is ~600 55-gallon drums (125 m^3) through October 1996. In parallel other alternatives are being evaluated for treatment of this purge water including incineration in the CIF.

The additional volume of the purge water (125 m^3) brings the total to ~3,425 m^3 for which storage provisions are needed. This further emphasizes the need to pursue acquisition of additional MW storage space.

A new storage scenario presented in Section 9, Transuranic Waste, provides for 4 new storage pads in the EAV area for storage of retrieved mixed TRU drums from pads 2-6. This in turn allows for drum storage of future generation on a portion of pad 17 and pad 18. These pads would

also store approximately 500 drums of water from dewatering operations and drums of TRU waste to retain them in covered storage. The culverts and boxes of newly identified large volumes of waste would be stored on pad 19 and on available space on pads 7-13. Additional storage space could be made available with reorganization of containers on pads 2-6 after retrieval for more efficient storage arrays.

It may be possible that storage of these containerized waste volumes could be accommodated through the year 2000. The following assumptions apply to this storage scenario:

- The Consolidated Incineration Facility (CIF) begins operation in 1996 for treatment for mixed wastes requiring storage of stabilized wastes in approximately mid-1996.
- Four new storage pads are funded and constructed in the EAV area for retrieved drums.
- The rate of generation of stabilized CIF ashcrete and blowdown to be stored would be approximately 2,100 drums/year.
- The Part A and Part B permit revisions under review by SCDHEC are approved.
- Implementation of aisle spacing would not be required on pads 1-13 in the foreseeable future thereby allowing storage of some or all of the anticipated wastes identified above on unoccupied areas of these pads.
- Waste generated from D&D and ER activities is much less than forecasted in the WM EIS due to reduced funding; storage space required for these wastes is therefore significantly less.
- Non-Mixed TRU waste on pads 18 and 19 will be relocated to a non-RCRA storage area in the vault area of the Solid Waste Disposal Facility (SWDF).
- The 600 drums of IDW well purge water, if stored, will require storage for approximately one and a half years.

Solvent tanks S29 and S30 will reach the end of their allowable service life in October 1996. Replacement tanks are required to extend storage capability until CIF becomes operational and also to provide excess blending capacity required to process the Purex solvent through the CIF.

Project S-4790 is currently funded but is on a tight regulatory mandated schedule. This schedule will have four new tanks operational by October 1996, which coincides with S29 and S30 reaching 15 years of age.

The remaining tanks S23-S28, have already reached the end of their allowable service life and are undergoing interim closure per Resource Conservation and Recovery Act (RCRA) guidelines by Solid Waste Management (SWM). Solvent tanks S23-S28 are undergoing closure. Tanks S29 and S30 will provide the storage capability until new tanks S33-S36 are available to replace them after which they will also undergo closure. A revision to the RCRA Part A has been submitted requesting Liquid Waste Solvent Tanks S33-S36 to be added to the RCRA Part A. During the closure of tanks S29 and S30, waste will be transferred to tanks S33-S36, and the total volume of waste in Liquid Waste Solvent Tanks S23-S36 shall not exceed the current RCRA Part A capacity of 200,000 gallons (757 m^3). After certification of the closure of tanks S23-S30 a revision to the Part A will be submitted to SCDHEC changing the capacity of tanks S23-S30 to zero and tanks S33-S36 to 120,000 gallons (454 m^3).

Approximately 52,840 gallons (200 m^3) of mixed waste from the Naval Fuels Facility is stored on Pad 9. This waste stream contains approximately 41 kg of enriched U^{235}. Since this waste is believed to have been conservatively classified as a mixed waste a position paper will be researched, developed and presented to WSRC EPD stating that at least a portion, if not all of this waste stream should be reclassified. If this argument is accepted Solid Waste will make efforts to have a portion of this waste stream reprocessed for recovery of the U^{235}. The low activity portion of this waste stream will most likely be disposed of, either at CIF or the EAV, depending on its radionuclide characterization. Solid Waste is currently developing a detailed schedule for dealing with this waste stream.

7.4.2 Treatment

7.4.2.1 Consolidated Incineration Facility

Project No. 83-D-148 provides for construction of the CIF which will treat and reduce the volume of hazardous and mixed wastes for which incineration and/or stabilization meets the LDR

treatment requirements. This project also stabilizes the ash and blowdown from the incineration process. Construction was initiated January 5, 1993, and is currently on a 39-month schedule. Trial burn is scheduled for 4QFY95 with operation scheduled to begin by February 1996.

The technology for blowdown stabilization has been determined (see item 3 below). Currently it is planned that the stabilized ash and blowdown will be sent to the Hazardous Waste/Mixed Waste (HW/MW) disposal facility vaults. However, the HW/MW vaults have been delayed significantly due to permitting review and funding deferral. This will necessitate interim storage of this waste until disposal facilities are available. The proposed interim storage location for stabilized ash and blowdown is a combination of the 315-4M storage pad through approximately 1998 and pads 20-22 thereafter.

Approximately 46% of the current and expected MW streams (excluding soil) can be treated by incineration. The *Mission Need And Design Capacity Review for the Consolidated Incineration Facility (CIF)* (WER-CIF-93-0012) provides a detailed evaluation of CIF options and concludes that continuation of the project is warranted. The blowdown stabilization phase of the CIF project has been re-evaluated. The detailed evaluation is provided in the report, *Final Study on Alternatives for Treatment of the CIF Blowdown* (SWE-CIF-930043). Only the conclusions will be presented here along with any recommendations from the SWMP. Four main areas were considered to reduce CIF stabilized waste volume, storage, and disposal costs:

1. Replacement of polyvinyl chloride (PVC) products with other forms of non-chlorinated plastic such as polyethylene, coupled with lower waste generation forecasts, would reduce CIF blowdown by 86% or from an estimated 370,000 to 50,000 gallons per year. The added cost of polyethylene would be approximately $1 million per year but the saving would be approximately $18.3 million assuming cement stabilization.

   This alternative is being pursued and planned for implementation prior to CIF startup.

2. "Campaign" the waste feed to increase disposal options—CIF operation would be campaigned so that characteristic hazardous and listed hazardous wastes could be processed separately. This would increase the disposal options for ash and blowdown reducing interim storage requirements and disposal cost.

   Campaigning of wastes is anticipated subject to further detailed planning.

3. Implement evaporation of blowdown to reduce the water content thereby reducing the stabilized volume of the blowdown waste.

   Schedule constraints have necessitated eliminating the blowdown evaporation system from the CIF design. Operation will be based on stabilizing the blowdown in the ashcreting system.

4. Integration of stabilization capability for a number of waste streams into one centralized facility to saving substantial costs by centralizing rather than constructing stand-alone facilities was considered

   The concept of a centralized stabilization facility has been abandoned in deference to stabilizing CIF ash and blowdown into ashcrete at the CIF facility.

The SWMP action plan is to continue with CIF construction, startup and operation. The plan includes implementation of the use of PVC alternatives on the site to reduce blowdown volume and treatment/disposal costs.

7.4.2.2 Hazardous Waste/Mixed Waste Treatment Facility

A Hazardous Waste/Mixed Waste Treatment Facility (HW/MWTF) is not currently the preferred treatment option. The PSTP specifies treatment options as lead choices in preference to adoption of a HW/MW Treatment Facility for hazardous and mixed wastes that cannot be treated by the CIF and/or require preparation prior to incineration at the CIF.

7.4.2.3 Treatment Facilities

The HW/MW treatment project is being re-evaluated to include only low-hazard material processing with the following capabilities:

- Repackaging to meet the CIF waste acceptance criteria
- Macroencapsulation of lead
- Amalgamation of mercury
- Decontamination
- Soil Sorting

The grouping of some treatment processes with similar support requirements in a single structure may be beneficial and cost effective. The use of an excessed facility with existing support capability (e.g., ventilation control, etc.) could greatly reduce cost. The use of a modular concept for the treatment processes would facilitate vendor options.

7.4.2.4 Vendor Forum

There are many DOE commercial sector initiatives under way at this time, one of which is commonly referred to as the vendor forum. The vendor forum resulted in contracts being awarded for research and development or innovative demonstration of existing technologies to help solve SRS's treatment and disposal problems.

There were three contracts awarded between January 31, 1994 and October 1, 1994 in the Mixed Waste technical area.

1. Treatment of low level waste lead by decontamination.

   The vendor will demonstrate an effective volume reduction and decontamination technology for radioactivity contaminated lead items. Items include; tiles, bricks, sheets, collars, weights, housings, and associated shielding materials contaminated with alpha, beta-gamma or tritium low level materials. Based on these efforts, an appropriate volume reduction/reuse preparation technology will be recommended for the final product and any associated waste streams will be characterized.

2. Stabilization/encapsulation of surrogate waste with vinyl ester styrene to meet LDR treatment standards.

   The vendor will demonstrate by vinyl ester styrene stabilization or encapsulation to meet Land Disposal Restrictions (LDR) treatment standards for three waste streams:

   - Silver coated berl saddles
   - Aqueous mercury
   - Aqueous lead

3. Shredding of filter paper take-up rolls to enable them to be treated.

   This contract provides complete services for the design, fabrication, installation, and operation of a system for the shredding and of filter paper roll waste. This includes pelletizing after shredding such that there is no volume increase. The waste contains both radioactive and hazardous constituents. The pelletized material will be bagged and placed into steel boxes to await later repackaging into 21"x21"x21" boxes for incineration in the CIF.

7.4.3 Disposal

7.4.3.1 HW/MW Vaults

Project No. 89-D-175 provides for construction of two HW/MW vaults for the disposal of CIF stabilized waste. It will also provide for preparation of the site for an additional eight vaults to be built in the out-years on separate projects. The cost of the first two vaults is estimated at about $20 million. The first two vaults are low-hazard design and are scoped to only accept CIF stabilized ashcrete and blowdown. A RCRA Part B Permit Application was submitted to SCDHEC in 1990. The first set of Notices of Deficiency (NODs) were received in January 1993. Design is complete on these vaults and awaiting approval of the Part B Permit from SCDHEC to begin the procurement and construction efforts. The WM EIS currently forecasts that the vaults will be operational in approximately FY 2002. The elimination of M-Area Waste Disposal (Y-Area) has prompted redirecting stabilized CIF ashcrete, blowdown and stabilized M-Area sludge to the HW/MW vaults and will require interim storage from startup of these two programs until vault operation begins. The WMEIS and National Disposal Plan however, are evaluating optional disposal methods to vault disposal.

7.4.4 Proposals and Near Term Actions

7.4.4.1 Proposals

SRS will have to continue to store MW until treatment and disposal options are available. Consideration of the very large volumes of MW for D&D and ER activities projected by the WM EIS suggests that provision should be made for additional storage capacity to accommodate the five year future generation of Mixed Waste. These volumes are very large in view of budget constraints. Discussions with both D & D and ER personnel indicate that the volumes of these wastes to be generated will be much less than projected in the WM EIS. The amount of additional storage space that may be needed requires further evaluation based on more representative estimates for D & D and ER waste generation over the next five years as a result of funding and programmatic uncertainties. Effort should continue on implementation of interim storage capacity actions. Continue with evaluation of strategy actions which include potential use of excessed facilities to reduce overall costs.

The replacement of solvent storage tanks with new ones (Project No. 94-D-416) must be completed on schedule to prevent a regulatory violation in accordance with SCHWMR R.61-79.265.196. Funding and the project schedule are acceptable, but there is no margin for slippage. The closure of solvent tanks S23-S28 is expected to be completed per regulatory requirements.

CIF should continue on schedule. Eliminating PVC plastics will be the baseline for treatment alternatives.

The scope of the HW/MW treatment facility should be re-evaluated to consider a low-hazard facility with repackaging/size reduction, amalgamation, soil screening, and macroencapsulation capabilities.

The HW/MW disposal vaults project will be evaluated based on decisions made in conjunction with the National Disposal plan. The decision to continue the current vault project will be delayed until the Consent Order with the state has been signed and alternative disposal options both onsite and offsite have been evaluated. Commercial mixed waste disposal should be expeditiously evaluated, completed, and the results incorporated into the next revision of the SWMP.

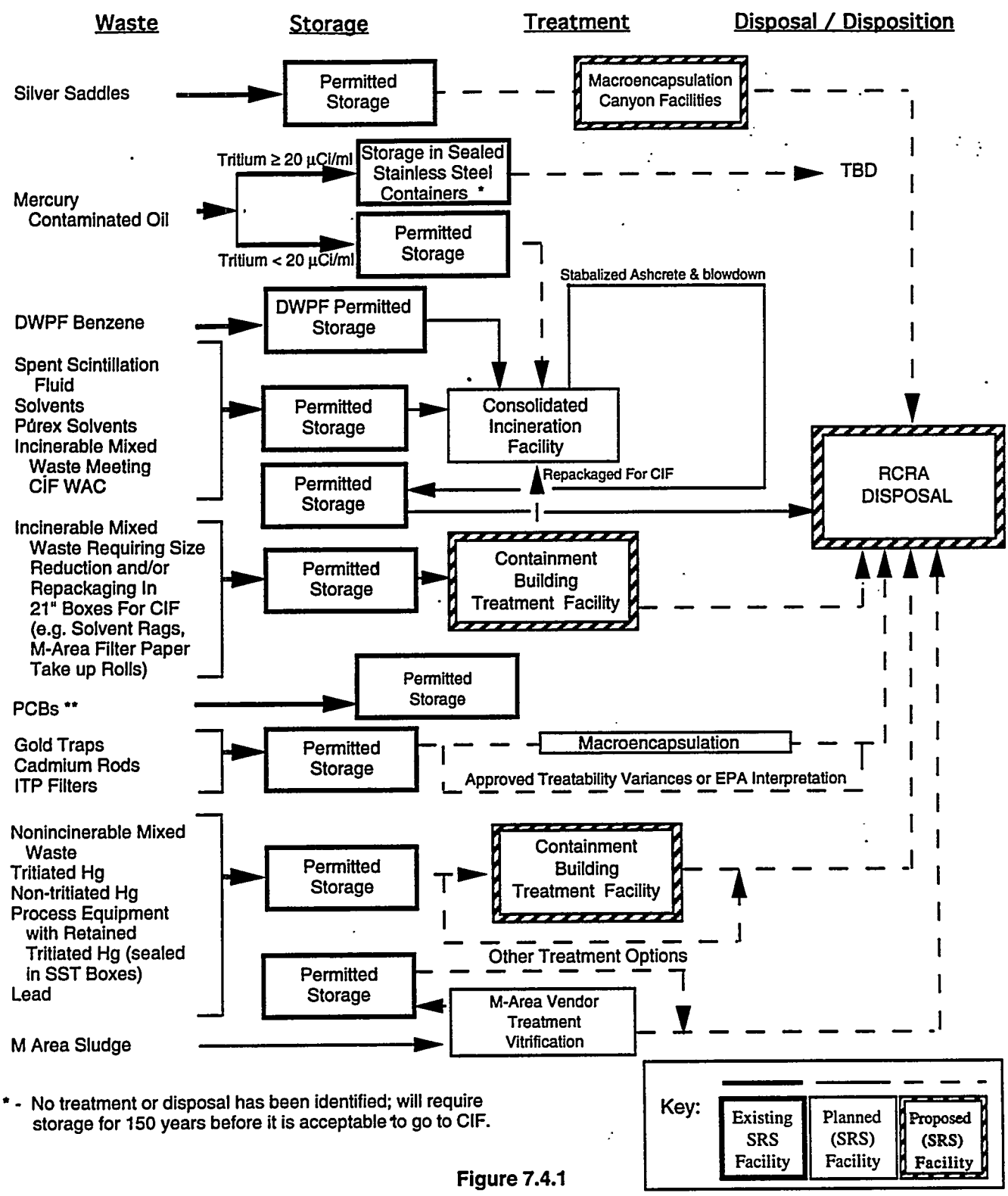
7.4.4.2 Near Term Actions

- Implement use of PVC alternative plastic to reduce CIF blowdown generation.
- Campaign characteristic hazardous and listed hazardous waste streams in the CIF to enable stabilized ashcrete and blowdown from these waste streams to be sent to the E-Area vaults.
- Commence radioactive operations of CIF.
- Continue operation of MW storage facilities.
- Continue subcontract for Solvent Tank Closure after receipt of Closure Plan approval.
- Continue overpacking of Naval Fuels Waste.
- Complete construction of replacement solvent tanks (S33-S36) and transfer of solvent inventory.
- Re-evaluate vault concept for HW/MW disposal to determine if it is the best option prior to constructing next generation of disposal vaults.
- Re-evaluate current vault design.
- Submit Short Form Data Sheet for FY98 new start for Vault Expansion to provide additional vault capacity to support disposal of treated mixed wastes identified in the PSTP schedule.
- Re-activate vault project activities.
- Revise the scope, Safety Analysis Report (SAR), and Part B permit application for HW/MW Vault No. 1 and No. 2 to accept stabilized CIF ashcrete and blowdown.
- Evaluate the technical and economic feasibility of commercial disposal of SRS mixed waste. This evaluation will be performed for mixed waste in a before treatment state and in an after treatment state.
- Support the STP.
- Develop more representative estimates of D & D and ER waste forecasts consistent with reduced funding.

- Re-evaluate MW storage needs and initiate planning for additional storage space.

FLOW DIAGRAM: Low Level Mixed Waste

SRS



* - No treatment or disposal has been identified; will require storage for 150 years before it is acceptable to go to CIF.

Figure 7.4.1

4/25/95

8.0 Low-Level Waste

8.1 Description of Waste Type

Low-level waste (LLW) is defined as waste that contains radioactivity and is not classified as high-level waste, transuranic waste, or as spent nuclear fuel and does not contain materials designated as hazardous by the Resource Conservation and Recovery Act (RCRA). In terms of physical characterization, the waste may consist of any non-hazardous material. Examples would include job control waste (shoe covers, overalls, plastic), small and large equipment, plastic sheeting, gloves, soil, and suspect contaminated materials that were used within a Radioactive Materials Management Area (RMMA) and cannot be proven to be non-radioactively contaminated.

At SRS, low-level waste is segregated into several categories to facilitate proper treatment, storage, and disposal. These categories are

- Low-Activity Waste (LAW)—contact handled solid waste that radiates <200 mrem/hr at 5 cm from the unshielded container. SRS receives small quantities of LAW waste from off-site DOE and DOD facilities including the Naval Reactors program.
- Intermediate-Level Wastes (ILW)—remote handled solid waste radiating >200 mrem/hr at 5 cm. ILW waste is typically contaminated equipment from Separations, Reactors, or Waste Management facilities and includes items such as pipe and irradiated reactor hardware that does not contain spent fuel.
- Intermediate-Level Tritium Waste (ILTW)—waste contaminated with > 10 Curies of tritium per container. ILTW waste would include tritium operations equipment such as spent lithium-aluminum targets.
- Long-Lived Waste—waste contaminated with long-lived isotopes exceeding waste acceptance criteria for disposal. Long-lived wastes may include resins contaminated with carbon-14 from reactor operations.
- Suspect Soil—excavated soil from RMMAs that has not been demonstrated to be uncontaminated.

Low level wastes are being disposed of as they are generated with the exception of the long-lived wastes, which are being stored. Current generation of these wastes is as follows:

- Low-Activity Waste - approximately 11100 m^3 in FY 95 and this number will increase in FY 96 to about 11800 m^3. The Waste Forecast does not include decontamination and decommissioning (D&D) generation. Generation rates are discussed in detail in Appendix B.
- Intermediate Level and Intermediate Level Tritium Waste - total generation in FY 95 is expected to be about 595 m^3 of which 3 m^3 is tritiated waste. Generation in FY96 and 97 is expected to be approximately 644 m^3 total with tritiated waste accounting for about 3 m^3.
- Long-Lived Waste—there are currently only two identified waste-forms in this category. Those are reactor moderator deionizers that contain carbon-14 and separations offgas filters, which contain iodine-129. It is anticipated that 50 deionizers, currently stored at the generator facilities, will be shipped to the Solid Waste Disposal Facility over the next three years. Additional waste streams could be identified that would exceed acceptance criteria for disposal and require storage while investigating treatment and/or disposal alternatives.

(All generation rates except those otherwise noted came from the *Savannah River Solid Waste Forecast FY 94* SWE-RP-92-1021. These numbers are not reflective of D&D activities.)

8.2 Existing Facilities

By volume, approximately 50 percent of low activity waste meets acceptance criteria for compaction in one of the two box compactors in operation in H Area and M Area. Compactible waste is packaged into cardboard boxes, plastic bags, or directly into steel 90 cubic feet (B-25) compactor boxes. Wastes are transferred to the compactor facilities where the compactor boxes are compacted to capacity through an iterative process of compaction, manual loading of additional LLW in cardboard boxes or plastic bags, and recompaction. Volume reduction ratios are heavily contingent upon waste densities but typically range from 4:1 to 8:1. A third compactor in L Area compacts bagged tritiated waste into 21 inch cardboard boxes, achieving volume reduction ratios of approximately 4:1.

The E Area Vault facility (EAV) became operational in September 1994 for the disposal and storage of certified, low-level waste. The EAV facility currently consists of a Low Activity Waste (LAW) vault, an Intermediate-Level Non-Tritium (ILNT) vault, an Intermediate-Level Tritium (ILTV) vault, a Long-Lived Waste Storage Building, and slit trenches for contaminated soil and rubble.

Low-Activity Waste (LAW) is placed in the LAW vault. The LAW vault is an above ground concrete vault approximately 650 feet long by 150 feet wide by 30 feet tall. The LAW vault is segmented into three seismicly isolated modules, each comprised of 4 cells. Each cell can hold approximately 1,000 standard B-25 waste boxes. The LAW vault provides engineered barrier disposal capacity for approximately 1,200,000 cubic feet of LLW. Currently, only compacted waste is being placed into the LAW vault for final disposal. Non-compacted waste is being staged in a separate LAW cell, awaiting further volume reduction before final disposal. Volume reduction strategies are outlined below.

The ILNT vault is a subgrade concrete vault approximately 200 feet long by 50 feet wide and 28 feet deep. The ILNT vault is subdivided into seven cells providing a combined disposal capacity of approximately 200,000 cubic feet of ILW. Wastes are top loaded and remotely released using a gantry crane. Waste containers are periodically grouted in place to further reduce radiation levels and provide for enhanced waste form immobilization. Cells are covered with concrete "T" blocks to provide radiation shielding and then covered with a rain cover.

The ILT vault cells have the same dimensions as the non-tritium vaults. However, the ILT vault has only two cells. One of the cells is designed with 140 concrete-formed silos to accept crucible waste-forms. The other ILTV cell has a volume of approximately 29,433 cubic feet and accepts miscellaneous boxed tritiated wastes. The ILNT and ILT vaults serve only as disposal facilities and are not utilized for storage of waste for future treatment.

The Long-Lived Waste Storage Building is a butler-type building providing weather protection for interim storage of wastes containing significant quantities of long-lived isotopes. Long-lived wastes are stored until treatment and/or disposal technologies can be developed. Naval core barrels are stored on gravel pads awaiting further evaluation for long term disposal.

There are three different categories of soils currently disposed in the SWDF. Suspect soils, which are removed from RMMAs but show no detectable contamination, are currently used as back-fill in the ELLT or slit trenches and are not counted in waste generation volumes. Slightly contaminated soil and rubble, typically <200mR/hr, is disposed of directly in slit trenches near the Intermediate Level Vault. This material is usually generated in large quantities and transported to SWDF in bulk containers (i.e. skip pans and dump trucks) for disposal. Highly contaminated soil and rubble is containerized in B-12s and disposed of in the LAWV or ILV as appropriate.

8.3 Issues and Assumptions

The following are the major issues affecting Low Level Waste management at SRS along with the assumptions used as the planning basis:

Issue: Accurate waste projections are essential to projecting need dates for additional disposal capacity. Several key issues including uncertainties in D&D and ER waste forecasting, downsized site missions, increased focus on waste minimization and volume reduction and proposed release of "clean waste" will significantly impact the validity of existing projections for waste disposal volumes. As such, reliable projections of need dates for future disposal facilities are unavailable.

Assumption: The combined effects of waste minimization (Section 2.2) and volume reduction (Section 8.4) initiatives and release of "clean waste" (Section 5) will optimize utilization of existing vault capacity. The combined results of these initiatives will reduce waste disposal volumes below those depicted in Case D of the LLW chart (Chart B3) in Appendix B. As such, planning and funding of additional disposal capacity will not be required within the five year window evaluated in this plan. If required, waste minimization and volume reduction technologies beyond those addressed in Section 8.4 will be evaluated and implemented to support this assumption.

Issue: DNFSB Recommendation 94-2, "Conformance with Safety Standards at Department of Energy (DOE) Low-Level Nuclear Waste and Disposal Sites" may have significant impact on future LLW operations and disposal at SRS. DOE response to DNFSB 94-2 includes re-evaluating the performance assessment process and may result in inclusion of all collocated LLW inventories in assessing compliance with performance objectives. In a worst case scenario, 94-2 could result in ceasing disposal operations in EAV. Additionally, tasks committed in the 94-2 Implementation Plan may redirect efforts identified in this plan.

Assumption: Response to 94-2 will not restrict disposal operation at EAV. Funding and resources will be available to support 94-2 in conjunction with plans identified in this plan.

Issue: A Waste Management Environmental Impact Statement (WM EIS) is being prepared to support all solid waste management activities at SRS. The EIS

evaluates options for LLW volume reduction, including offsite transportation and treatment, and is being prepared in parallel with the construction of CIF. The Record of Decision (ROD) is required for implementation of some volume reduction options including incineration at CIF. As such, the timing and results of the ROD may impact this plan.

Assumption: The WM EIS will evaluate cost effective LLW volume reduction and disposal alternatives.

Issue: Waste minimization and volume reduction initiatives will concentrate radionuclide activity of waste disposed in EAV. Evaluations have not been performed to ensure this concentrating of activity will not exceed performance limits.

Assumption: Waste disposal will not be restricted as a result of higher concentration activity. If required, additional PA studies may be performed to evaluate enhanced waste forms resulting from volume reduction activities or to remove conservatism in the existing PA.

Note: These additional studies are not currently funded.

8.4 Current Plan

Previous LLW plans primarily focused on construction of additional vaults for disposal of low-activity, intermediate-activity non-tritium and intermediate-activity tritium wastes. Site mission changes, increased focus on waste minimization and volume reduction and proposed release of "clean waste" have invalidated previously projected disposal capacity requirements. This plan redirects LLW efforts towards optimized utilization of existing disposal capacity. The plan addresses LLW activities in the following major areas:

- Disposal
- Storage
- Treatment
- Waste Certification and Data Tracking

8.4.1 Disposal

8.4.1.1 E Area Vaults

Waste disposal in the LAWV, ILNTV and ILTV will continue as planned. Vault utilization rates will decline significantly with implementation of waste minimization and volume reduction initiatives discussed in Section 8.4.3. This plan assumes that planning and funding for additional disposal capacity will not be required within this five year planning period. However, as waste minimization and volume reduction initiatives are implemented, need dates for future disposal capacity will be continuously re-evaluated.

Future revisions to this plan will better integrate waste minimization, volume reduction, and disposal capacity and technology requirements. The December 1994 report "Re-evaluation of Low-Level Waste Disposal Methods" considers optimization of future disposal technologies. As appropriate, the results of this report will be factored into the revised and integrated LLW plan.

8.4.1.2 Shallow Land Disposal

A Soil Management Plan has been issued to provide for cost-efficient disposal of suspect and contaminated soil. The plan utilizes soil sampling and analysis results to segregate soil into four levels for uncontrolled release, controlled release, shallow land trench disposal as LLW, and vault disposal as LLW. At DOE direction, soil qualifying for uncontrolled release is being utilized for backfill in 643-7E and controlled release soil is being managed as LLW for trench disposal. Pending further development of the statistical basis for soil sampling and analysis or implementation of conveyor monitoring, DOE concurrence is expected for release of soil qualifying for uncontrolled release.

Further utilization of shallow land disposal will be evaluated as disposal waste forms are modified and potentially enhanced through waste treatment initiatives. As appropriate and where funding is available, additional performance analyses will be conducted to support shallow land disposal. Stabilized CIF ash and blowdown resulting from incineration of LLW have already been identified as a potential candidates for shallow land disposal. These efforts would extend the life of existing disposal vaults.

Near term plans call for continued operational closure of 643-7E shallow land disposal facilities. These activities include continued backfill of the Engineered Low Level Trench (ELLT-4) and grouting of the Greater Confinement Disposal (GCD) cells and boreholes. These operational closure activities will transition to turnover of 643-7E shallow land disposal facilities to Environmental Restoration for final closure.

8.4.1.3 Performance Assessment Maintenance

The EAV Radiological Performance Assessment (RPA) required by DOE Order 5820.2A has been approved by DOE-HQ. The RPA provides reasonable assurance that the performance objectives required by

DOE Order 5820.2A will be met. The RPA projects the migration of radionuclides from disposed waste to the accessible environment and estimates the resulting dose to man. RPA results are incorporated into the E-Area Vault Waste Acceptance Criteria (WAC) to define waste that is acceptable for disposal.

SRS is strongly committed to maintaining and enhancing the RPA. Currently funded and proposed but unfunded activities have been specifically selected to:

- determine the impact of both design and operational changes beyond existing Performance Assessment (PA) envelopes,
- resolve analytical uncertainties,
- improve confidence in existing PAs and
- support design and operation of future facilities such as the Hazardous Waste/Mixed Waste Disposal Facility.

SRS will reevaluate the PA at least every five years and as necessary to consider changes in expected radionuclide inventories, operating conditions, or facility design that might impact results of the analyses.

The E-Area Vault facility is located adjacent to the inactive SRS low-level waste burial ground (643-E and 643-7E). The EAV PA did not consider the potential of contamination arising from the burial ground contributing to doses received as a result of EAV disposal activities. To determine the potential for interaction of contaminant plumes, a screening level analysis was performed to determine if overlap is possible. The study indicates that H-3 and U-238 have the potential to contribute to doses received at the EAV point of compliance. Further refinement of the screening analysis will be performed as required by commitments made in the DNFSB 94-2 Implementation Plan (see Section 8.3).

8.4.2 Storage

The current LLW plan calls for continued storage of special waste-forms while awaiting development of treatment and/or disposal options. These waste streams include:

- Naval reactor core barrels
- Heat exchangers
- Reactor deionizers

Naval reactor core barrels and reactor components are currently placed in interim storage above ground on gravel pads. Pending further performance assessment analysis and authorization from the WM-EIS, these wastes may be eligible for shallow land disposal in compliance with 5820.2A performance objectives.

68 out-of-service heat exchangers are stored in reactor facilities awaiting development of reuse and recycle alternatives. As discussed in Section 8.4.3 below, these out-of-service heat exchangers are candidates for the stainless steel Beneficial Reuse Program.

The approximately 50 reactor deionizers in storage at reactor facilities will be shipped to the Long-Lived Waste Storage Building (LLWSB) for continued storage. Options for the deionizers include treatment to extract C-14 and additional performance evaluations relaxing conservative assumptions and taking credit for waste form in efforts to demonstrate compliance with performance objectives.

8.4.3 Waste Treatment and Technology Development

8.4.3.1 Waste Minimization and Volume Reduction

The success of this LLW plan is contingent on immediate implementation of additional waste minimization and volume reduction initiatives. In conjunction with preparation of this plan, a more comprehensive waste minimization program is being developed and implemented. Elements of this revamped program will include waste volume allocation, a generator charge back for waste volume generation and increased utilization of innovative programs such as screening and release initiatives. This re-emphasized waste minimization effort will leverage the waste management infrastructure installed through the waste certification program to quickly implement improved methods for minimizing waste generation.

Improved volume reduction capabilities are essential in optimizing utilization of existing disposal capacity. A Request for Proposal (RFP) will solicit commercial expertise for volume reducing SRS wastes. The RFP does not specify a treatment technology but will award a contract for the volume reduction proposal which optimizes volume reduction and cost-efficient treatment and disposal. This initiative is expected to provide multiple treatment options including decontamination and recycling, scrap metal smelting, supercompaction and other commercially developed technologies. Volume reduction ratios are reasonably expected to reach or exceed 10:1. Such a volume reduction ratio supports assumptions that planning and funding of additional disposal capacity will not be required within this five-year planning period.

Project No. 83-D-148 (S-2787) provided funding to design and construct the Consolidated Incineration Facility (CIF). Which will incinerate hazardous, mixed, and low-level radioactive wastes. CIF could incinerate up to five million pounds of LLW per year. CIF is currently under construction and is planned for a first quarter FY 96 startup.

CIF incineration of SRS wastes is a treatment option to be evaluated in the Record of Decision (ROD) for the Waste Management Environmental Impact Statement (WM EIS). The WM EIS will cover the environmental effects of all wastes being considered for treatment and/or disposal at SRS including LLW. Authorization to operate CIF and incinerate LLW is pending the ROD of the WM EIS. Pending the ROD and issuance of the final permit, low-level waste will be campaigned, allowing disposal of CIF ash and blowdown as low-activity waste in the E-Area vaults. As noted above, consideration is also being given for disposal of this material in shallow land disposal which will further extend the life of EAV.

Until implementation of offsite volume reduction initiatives and/or incineration of LLW, operation of compactors in H and M Areas will continue. Contingent on new waste treatment capacities and their associated physical, chemical and radionuclide capabilities, operation of onsite compactors will be phased out during FY96.

SRS has accumulated over 7,000 tons of slightly contaminated excess equipment. The vast majority of this inventory is in the form of 68 out-of-service heat exchangers in storage at reactor facilities. D&D activities could potentially generate in excess of 10,000 additional tons of scrap metal. This material has a scrap value of $10 million with a potential disposal cost exceeding $13 million. Recycling this material not only negates disposal costs, but could also reduce costs for purchase of storage and disposal containers used in other waste management activities. This program, called the Beneficial Reuse Program, is currently out for private sector bid.

8.4.3.2 Technology Development and Vendor Forum

In a related effort, SRS is in the process of identifying priority technology needs. For LLW, priority technology needs include improved screening of soil and rubble and treatment of reactor deionizers. Other technology needs are expected to be identified and addressed through a Research and Development task in the DNFSB 94-2 Implementation Plan. This task is specifically expected to provide programs for increasing confidence in performance assessment results.

In pursuit of commercially developed technologies, this plan continues to support the "vendor forum" initiative. The "vendor forum" resulted in contracts being awarded for research and development or innovative demonstration of existing technologies to help solve SRS's treatment and disposal problems. Results of these vendor forum contracts will be evaluated for full scale implementation and integration into the LLW plan.

The four "vendor forum" contracts awarded for LLW volume reduction are described below:

- Incineration of tritiated oil

  This contract provides for transportation offsite, incineration/treatment, and return of residue ash. Waste will consist of approximately twenty-two 55-gallon drums of oil containing tritium ranging from 0 to 10 curies per drum.

- Clearance of suspect soil by a conveyor mounted monitoring system.

  Contractor is to provide demonstration services for clearance of suspect soils. The contractor shall perform assay and segregation of suspect soil into "clean" and "contaminated" components. The evaluation shall identify specific assay configurations and methodologies, detection levels, expected volume reductions, and estimated throughput and cost.

- LLW volume reduction by compaction, incineration, or metal melting.

  The contract provides for demonstration volume reduction capabilities at vendor offsite facilities. The scope of work is for volume reduction of 20,000 pounds of low level waste to include job control waste for incineration and compaction and scrap metal for smelting

- Incineration of non-hazardous liquid solvent

  Develop an incineration system based on the fluidized bed combustion reactor technology. The development system will treat 3,000 gallons of non-hazardous radioactive solvent currently stored in E Area. The waste is radioactive contaminated with alpha, beta and gamma emitters(Cs^{137}, Pu^{238}, Pu^{239}, Am^{241}, Cm^{244}, Co^{60}).

8.4.4 Waste Certification

The Savannah River Site (SRS) waste certification program requires low-level and mixed waste generators using the SWMD treatment/storage/disposal (TSD) facilities to characterize their waste streams and certify that their waste meets the acceptance criteria of the TSD

facilities. In July 1994, SWMD established a Waste Characterization Board comprised of site experts to review and approve a generator waste characterization plan to be incorporated into their certification program. Once a generator establishes a certification program, an assessment of that program is conducted by SWMD. The assessment includes technical review of the certification plan developed by the generator and a walk through of their facilities as a part of its physical assessment. The assessment of all current waste generators is complete. As identified, new waste generators will undergo waste certification activities prior to packaging and shipping waste to EAV. A reassessment process is being developed to ensure continued compliance with certification requirement. The process will integrate waste certification into site-wide self-assessment requirements and the SRS Facility Evaluation Board assessment program.

The EAV Waste Acceptance Criteria (WAC) requires that "For all types of container, void spaces within the waste and between the waste and its packaging shall be reduced as much as practical." Consistent with this requirement, Solid Waste Management has committed to not dispose of uncompacted waste which is compactible with available volume reduction resources. Compliance with the void minimization requirement and commitment to compaction are assessed during the waste certification process for each waste generator.

Currently, analytical support capability on site is inadequate to support the generator validation of waste stream characterizations. This is an issue which affects numerous waste types. No new site laboratory facilities are planned. Studies will be conducted to identify the best approach to providing sufficient lab capability.

8.5 Proposals and Near Term Actions

8.5.1 Proposals

Current plan proposals include:

- Operation of CIF incinerating low activity waste (pending outcome of the WMEIS)
- Screening of suspect soils to release clean soil and dispose of contaminated soil in shallow land disposal trenches
- Determination of alternative disposal programs including shallow land disposal for Naval Reactor core components and CIF stabilized ash and blowdown. (pending acceptable performance assessment review)
- Pursue recycling low-level contaminated stainless steel
- Waste minimization initiatives
- Offsite volume reduction initiatives
- Vendor Forum Initiatives
- Support DNFSB 94-2 Implementation Plan

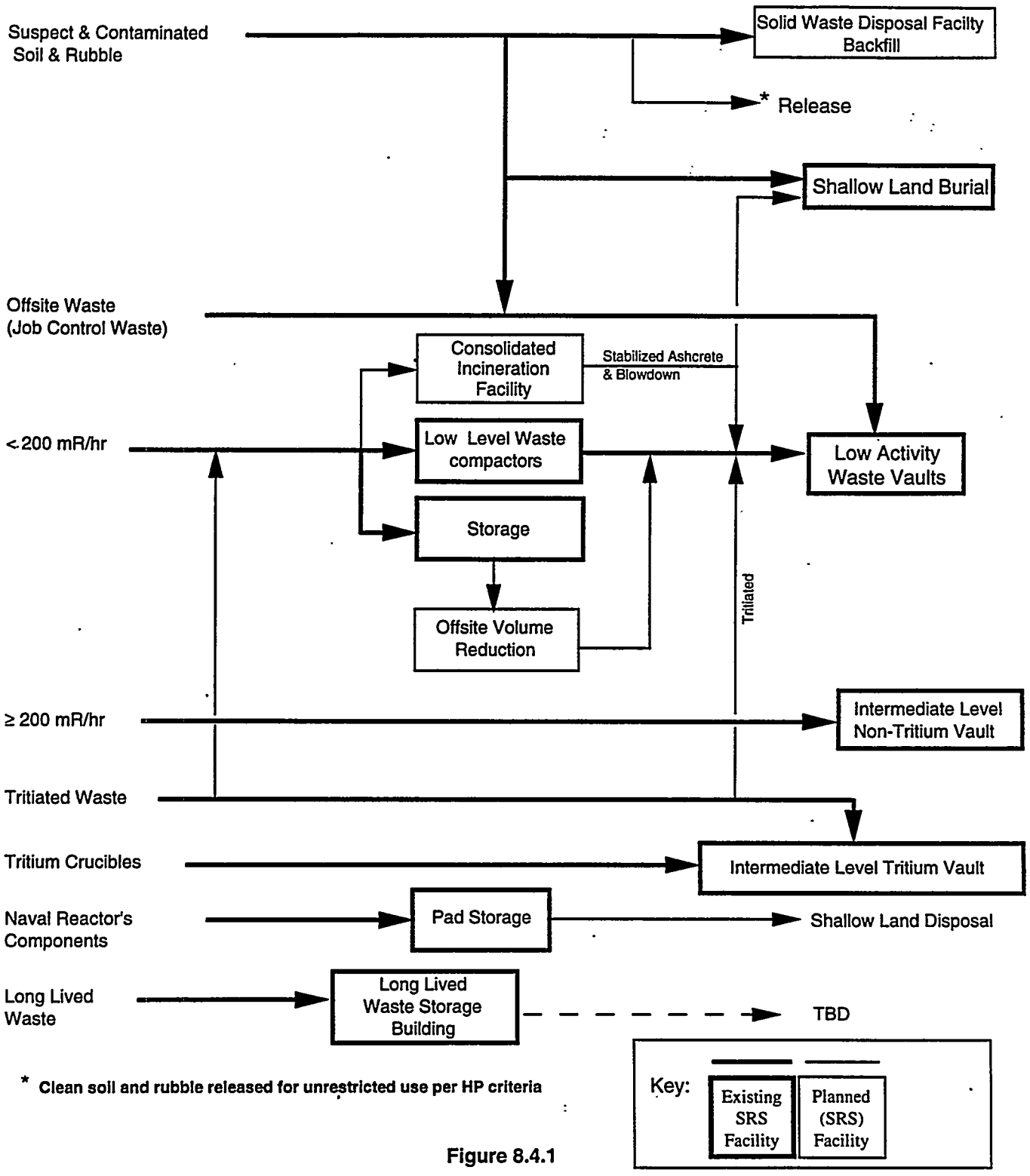
8.5.2 Near Term Actions

Near-term actions include:

- Evaluate laboratory support capability for characterization efforts. Identify viable options for both short- and long-term.
- In conjunction with the DNFSB 94-2 Implementation Plan tasks, initiate effort to improve reliability of waste forecasting, taking into consideration impacts of waste minimization and volume reduction efforts. The revised waste projections will be incorporated into planning for future disposal capacities and revisions to this LLW plan.
- Initiate studies to evaluate waste minimization and volume reduction technologies which will result in a 20% reduction from waste generated in FY94. Results will be incorporated into later revisions of the Solid Waste Management Plan.
- Award contract for commercial volume reduction of SRS LLW. In the interim, non-volume reduced waste will be stored awaiting treatment prior to final disposal.
- Support DNFSB 94-2 Implementation Plan commitment. As required, Baseline Change Proposals will be submitted to change funding or activities identified in the Annual Operating Plan.
- Support TMA-Eberline vendor forum demonstration for assay of suspect soils. If justified based on results, pursue full scale implementation of the TMA conveyor assay at SRS.
- Continue operational closure and maintenance of 643-7E. Prepare for turnover of 643-7E to Environmental Restoration.
- Develop RPAs for Naval Core Barrels, and other Stabilized Waste Forms.

FLOW DIAGRAM: Low Level Waste

SRS



* Clean soil and rubble released for unrestricted use per HP criteria

Figure 8.4.1

4/25/95

9.0 Transuranic Waste

9.1 Description of Waste Type

The radionuclide concentration limit for TRU Transuranic (TRU) waste is defined in Department of Energy (DOE) Order 5820.2A as waste contaminated with alpha-emitting transuranic radionuclides (TRU radionuclides have an atomic number greater than 92) with half-lives greater than 20 years in concentrations greater than 100 nCi/g of the waste matrix.

The radionuclide concentration limit for TRU waste applies to the contents of any single waste package at the time of assay. The mass of the waste container (including any liner) and shielding must not be used in calculating the TRU concentration.

Packaged TRU waste having a surface radiation dose rate less than 200 mrem/hr is classified as contact-handled TRU waste (CH-TRU). Packaged TRU waste having a surface radiation dose rate exceeding 200 mrem/hr, but less than 1000 rem/hr, is classified as remote-handled (RH-TRU).

TRU waste that contains hazardous waste constituents is identified as mixed transuranic (MTRU) waste and is therefore regulated under the Resource Conservation and Recovery Act (RCRA) and corresponding South Carolina Department of Health and Environmental Control (SCDHEC) regulations as mixed waste.

Radioactive wastes that contains TRU radionuclides in concentrations less than 100 nCi/g of the waste matrix is Low-Level Waste (LLW). Radioactive wastes that contains both TRU radionuclides in concentrations less than 100 nCi/g of the waste matrix and hazardous waste constituents is identified as Mixed Low-Level Waste (MLLW).

All waste at SRS containing greater than 10 nCi/g of TRU radionuclides is managed as TRU or MTRU waste and all waste at SRS containing less than 10 nCi/g of TRU radionuclides is managed as LLW or MLLW. Therefore, the discussion of TRU waste in this Solid Waste Management Plan includes all alpha emitting waste containing greater than 10 nCi/g of TRU radionuclides.

TRU waste generated and stored at SRS is composed of both Plutonium 238 (Pu 238) and Plutonium 239 (Pu 239). Pu 238 waste results primarily from the production of heat source Pu 238 while Pu 239 waste results primarily from the production of weapons grade Pu 239. Pu 238 has a specific activity of 17.12 Ci/g and a half-life of 87.7 years. Pu 239 has a specific activity of 0.06132 Ci/g and a half-life of 24,100 years. Inhalation of Pu 238 is approximately 280 times more damaging to the human body than Pu 239. SRS is the only site in the DOE complex with large quantities of Pu 238 waste.

In order to reflect DOE's current policy to ship TRU waste to the Waste Isolation Pilot Plant (WIPP), (see section 9.3), and since WIPP will only accept waste that is defined as TRU in DOE Order 5820.2A, the Site Treatment Plan (STP) and the Waste Management Environmental Impact Statement (WM EIS) have options contingent on the TRU concentration. Different options are given for waste between 10 and 100 nCi/g and for waste above 100 nCi/g.

9.2 Existing Facilities

SRS started generating TRU waste in the early 1950's. Since that time, two distinct phases of TRU waste management have occurred. The first phase occurred from 1953 until 1974 ,while the second phase began in 1974 and is still being practiced today. While the first phase focused on disposal of TRU waste the second phase is focused on TRU waste retrievable storage.

From 1953 to 1964, SRS TRU waste was disposed of by shallow land burial in trenches located in the Old Burial Ground, 643-E. Between 1965 and 1974, SRS continued to dispose of TRU contaminated waste in trenches. Waste containing less than 0.1 Ci/package was disposed of directly in trenches while packages with >0.1 Ci were placed in 165 concrete culverts prior to placement in trenches. A concrete culvert is a cylindrical container that is approximately 7.5-feet high and 7-feet in outside diameter,. It has 6-inch thick walls and a 6-inch thick lid and a 6 inch thick bottom. Waste too large to be placed in a concrete culvert was placed directly in the ground and encapsulated with concrete. There is approximately 4,534 m^3 of waste in these categories which account for approximately 8% of the total amount of TRU waste related radioactivity in the Burial Ground. This waste is the responsibility of the Environmental Restoration Department (ER), and it is not addressed in this plan. ER currently has no plans for the 165 concrete culverts buried prior to 1974. These concrete culverts are however, considered to be retrievable.

Starting in 1974, SRS began to store its TRU waste in a retrievable mode. Since that time, three variations of retrievable storage have occurred. The first type of retrievable storage was implemented from 1974 to 1986 and, is based upon AEC Manual M0511-144d4. With this type of storage method, TRU waste

containers are stored above grade on concrete pads (dimensions are approximately 60' x 150') which have been covered with approximately four feet of earthen cover. TRU Waste Storage Pads 1 -5 implement this method and are referred to as "mounded pads". These pads are permitted under Interim Status Subpart X with SCDHEC. Waste containers on these pads include concrete culverts, carbon steel boxes, SRTC casks, and single 55 and 83 gallon drums. Each concrete culvert can contain up to fourteen 55 gallon drums or up to 8 polyethylene HEPA filter boxes. At the time of placement, drums assessed to contain greater than (>) 0.5 Ci/drum (called "high activity drums") were placed into concrete culverts. Drums assessed at less than or equal to (≤) 0.5 Ci/drum (called "low activity drums") were placed directly on the pads. At the time of construction, the storage life of the mounded pad drum configuration was projected to be 20 years.

With the announcement that WIPP was to open in 1988, SRS modified its retrievable storage practice by eliminating the use of the earthen cover. This practice was started in 1986, and has been implemented on TRU Waste storage pads 6 - 13. TRU Waste storage pads 6-13 are permitted under interim status with SCDHEC as Subpart I units.

As a result of rainwater intrusion through the drum lid filter vent into the single 55 gallon pad drums stored on TRU waste storage pads 7-13, the current practice of storing vented and pre-1986 unvented 55 gallon drums of TRU waste has been implemented on TRU waste storage pads 14-17. TRU waste on these pads consists solely of 55 gallon drums that are stored on above grade concrete pads covered by weather enclosure structures to preclude rainwater intrusion. TRU Waste storage pads 14-17 are permitted under interim status with SCDHEC as Subpart I units.

The distribution of permitted storage is as follows:

Pads 1-5 1,111,000 gals. (4,205 m^3)

Pads 6-13 2,035,000 gals. (7,702 m^3)

Pads 14 -17 1,485,000 gals (5621 m^3)

Two additional TRU waste storage pads exist in the Burial Ground. TRU waste storage pads 18 and 19 are above grade concrete storage pads currently without weather enclosures. These two pads are not permitted with SCDHEC for the storage of mixed waste and are used for the storage of TRU waste. An application to permit TRU waste storage pads 18 and 19 for storage of mixed waste as Subpart I under Interim Status was submitted to SCDHEC on May 5, 1994 . SCDHEC approval is expected by October 1995.

At the end of FY94, SRS had approximately 9870 m^3 of TRU and MTRU waste in storage on pads. A summary of the waste by container is shown below:

Container Type	Pads 1-5	Pads 6-19
Single Drums	6,875	13,718
Carbon Steel Boxes	0	67
Misc. Boxes	22	15
Mech. Manipulator Boxes (Slaves)	81	1
SRTC Casks	174	59
In Concrete Culverts		
Drums	3,491	3,769
Poly Boxes	296	463
Misc. Boxes	58	2

This waste can be broken down as follows:

Cellulosic Materials	12%
Corroding metal/aluminum	13%
Corroding metal/steel	1%
Non-corroding metals	22%
Other organic materials	1.2%
Plastics	49%
Rubber Materials	0.8%
Solid inorganic materials	1%

The current projected generation rates for TRU waste are shown in Appendix B.

9.3 National Program

The current DOE strategy for management of TRU and MTRU waste is to segregate the TRU and MTRU wastes from the LLW and MLLW; to maintain the TRU and MTRU wastes in safe interim storage; to characterize, process if necessary and certify the waste packages to meet the Waste Acceptance Criteria (WAC) of WIPP; and to permanently dispose of applicable TRU and MTRU waste in WIPP.

Compliance with the requirements of the Federal Facility Compliance Act (FFCAct) for MTRU waste will be achieved using the RCRA No-Migration Variance Petition approach provided in the Code of Federal Regulations (CFR) Title 40, Section 268.6.

Under this strategy, no treatment other than that necessary to meet WIPP WAC is anticipated; however, the performance assessment and the EPA No-Migration Variance determination will ascertain what treatments, if any, will be required to ensure disposal compliance.

DOE is actively gathering inventory and characterization data for input into the WIPP performance assessment and preparing several regulatory submittals to EPA to demonstrate compliance with No-Migration Variance Petition requirements. The current plan was to submit a draft compliance certification package to EPA in March 1995; a No-Migration Variance Petition to EPA by May 1995; a revised RCRA Part B Permit application to the New Mexico Environment Department by June 1995; a final compliance certification package (including final performance assessment results) to EPA by December 1996; and to finalize the disposal WIPP WAC by June 1997. DOE plans to declare operational readiness for WIPP by December 1997. Disposal of contact-handled (CH) TRU waste will begin in June 1998, followed by remote-handled (RH) TRU waste in June 1999. These dates are contingent upon permit approval, certification of disposal compliance, and determination of No-Migration from the appropriate regulators and are subject to the availability of the funds.

In the interim, site-specific information is included in the following Sections, to outline activities being performed at SRS to maintain safe, compliant storage, waste characterization activities, and other activities planned to support the ultimate goal of shipment to and disposal at WIPP under a No-Migration Variance Petition.

9.4 Issues and Assumptions

The following items are the major issues affecting TRU Waste management at SRS along with the assumptions used as the planning basis:

Issue (Storage)

Additional TRU waste storage space is required for continued management of current and projected volumes of TRU waste.

Assumption:

Additional TRU waste storage pads will be constructed.

Issue (Storage)

SRS is storing TRU waste beyond the time periods originally anticipated. As a result, drums placed in direct contact with the earthen covers on TRU waste storage pads 2-5 and drums placed on TRU storage pad 6 are reaching their 20-year design life.

Assumption

TRU waste stored on the mounded pads 2-5 and on TRU waste storage pad 6 will be retrieved and re-configured to comply with RCRA storage requirements.

Issue (Characterization)

SRS does not have an adequate database that provides readily accessible information on the contents of TRU waste containers in storage.

Assumption

Paper and electronic records including necessary Computerized Radioactive Waste Burial Analysis System (COBRA) records of TRU wastes will be transferred into a database that allow easy data manipulation.

Issue (Characterization)

The inability of past assay technology to accurately analyze down to the 100 nCi/g level has resulted in SRS being unable to reclassify some waste as LLW or MLLW. Current records suggest that a significant fraction of SRS TRU waste could be reclassified as LLW or MLLW.

Assumption

All TRU and MTRU waste in storage will require characterization in order to reclassifying this waste to allow proper treatment and disposal.

Issue (Characterization)

Analytical capacity to support characterization efforts does not currently exist on site. There are no facilities on site that can provide the analytical sampling requirements necessary to support characterization of TRU and MTRU wastes. Current planning does not include new facilities considerations.

Assumption

Existing laboratory facilities on site will be reviewed to determine if capability and capacity is available from recent site mission changes. In addition, regional laboratory concepts will be considered, provided they can support operational needs. Temporary vendor laboratory facilities similar to those being considered for CIF support will also be considered for interim use until decisions can be made concerning long-term support.

Issue (Treatment)

SRS TRU Waste Management efforts regarding treatment will be limited pending a final WIPP-WAC.

Assumption:

WIPP will be the DOE TRU Waste Disposal Facility. The current WIPP WAC will be revised. Waste treatment may be required prior to shipment to WIPP. The final decisions on the WIPP No-Migration Petition and the WIPP schedule, and corresponding final decision on TRU Waste treatment will not be made before June 1997. The disposal alternatives in the Proposed Site Treatment Plan (PSTP) and the WM EIS, indicating disposal of TRU waste at WIPP, aligns with the current DOE position on the No Migration Petition and the current WIPP schedule.

Issue (Treatment)

Current TRUPACT II transportation limits make the shipment of hi activity Pu^{238} and Pu^{239} impractical and uneconomical without prior on site treatment or processing. These limits are based on heat load requirements which drive hydrogen generation from radiolysis within the un-vented TRUPACT II shipping container. The TRUPACT II limit for shipping Pu^{238} composed of organic solids (which is the primary Pu^{238} waste form at SRS) is 0.235 watts/drum. This limit is further decreased to as low as 0.0136 watts/drum depending on the number of layers of confinement within the drum. Additionally, the number of layers of confinement can only be determined by intrusive examination which prevents certification/shipment of most Pu^{238} waste without further on site treatment or processing.

Assumption

This waste will be treated to reduce hydrogen generation and to meet the TRUPACT II requirements and to allow more cost effective quantities to be placed in a TRUPACT II container.

9.5 Current Plan

The current TRU Waste Management Plan supports and is in alignment with the National Program initiatives. The plan identifies the specific activities necessary to safely store and manage this waste as well as the developmental steps toward potential treatment options. Execution of this plan will support the decision making process necessary to identify the appropriate technologies/facilities required to support the SRS TRU waste program for shipment of TRU waste to WIPP.

The plan addresses the following activities and provides a path forward for resolution:

- Interim Storage
- TRU Waste Retrieval
- Data Collection
- Characterization
- Treatment

The current plan is illustrated in Figure 9.5.1.

9.5.1 Interim Storage

Based on information provided by the National TRU Program Office concerning WIPP startup, it is necessary to provide continued safe storage capability at SRS. In support of this requirement, an " Interim Solid Waste Storage Plan For the Savannah River Site" has been developed. Extracting information from that document and from the "SRS Solid Waste Container Management Plan", the following storage scenario can be drawn to address the issue of additional storage space needs.

The retrieval of 8,809 pad drums from TRU waste storage pads 2-6 will begin in FY97. This effort will result in the 8,809-55 gallon drums being placed into 83 gallon drums (called overpacks). Storage of the overpacks will require the addition of four new TRU waste storage pads. This amount of pad space is necessary to store the overpacks on pallets, four overpacks to a pallet, with the overpacks/pallets stacked three high. This also allows for RCRA compliant storage where aisles are placed between the overpacks for inspection purposes. The concrete culverts and miscellaneous containers currently on storage pads 2-6 would remain as is. Should RCRA

compliant storage be required of this waste, additional pad space may be required.

Pad 1 currently consists of all concrete culverts. There are no plans in the near future to modify this pad configuration.

Pads 7,9,10,11 and 13 can be considered full in their current state. There are no plans in the near future to modify these pad configurations.

The "Interim Solid Waste Storage Plan For The Savannah River Site" identifies that HB-Line will generate 1740 drums of waste and 60 polyboxes in the next five years. FB-Line will generate 258 polyboxes. Assuming all these drums and polyboxes are placed in concrete culverts, (approximately 165 culverts in total) this waste would exceed the capacity of TRU Waste Storage Pad 12. Also identified is the generation of 25 black boxes from FB-Line. This waste would essentially fill TRU Waste Storage Pad 8 which is currently empty.

TRU Waste Storage Pads 14,15,16 and a portion of 17 contain palletized 55 gallon drums stacked three high. These drums satisfy RCRA storage requirements since aisle spacing has been incorporated into the configuration. It is suggested that the remainder of pad 17 be left empty should the movement of drums from any of these pads be necessary. Most of these drums are vented and require protection from rainwater intrusion.

Pad 18 currently contains 30 black boxes while pad 19 contains 5 black boxes. This waste will be relocated in FY96 to newly constructed temporary pads located near the E-Area Vault. Once this relocation is complete, weather enclosures can be erected over pads 18 and 19. Pad 18 can be used to store the other 2,600 drums identified in the "Interim Solid Waste Storage Plan For The Savannah River Site" that will be generated from 1995 through 2000. This would leave the equivalent of one pad, pad 19, for the storage of waste such as ITP filters, ITP thermowells/thermocouples, SED facility waste and other ER and D&D wastes.

The Interim Solid Waste Storage Plan For The Savannah River Site" also identifies the generation of 27 additional black boxes from 1995 through 2000. This waste would require the construction of at least one additional pad.

In summary, the existing 19 TRU waste storage pads will be needed with the addition of the equivalent of 8 new pads. Four news pads would support retrieval efforts while the other four pads would support storage of black boxes. The above information does not consider aisle spacing of the culverts and black boxes received between 1995 and 2000. Should these containers require aisle spacing, more storage space would be required.

The storage scenario defined above assumes the continued use of all the existing TRU waste storage pads. It should be noted that as ER closures continue in the burial grounds, operation of TRU Waste Storage Pads 1-6 and particularly pads 7-13 becomes more difficult. Encroachment of closure caps and the associated drainage impacts and modifications make vehicle operation, container handling and continued safe storage a challenge. SWE intends to review this subject in detail to begin development of long range planning of TRU and MTRU waste storage.

As part of the strategy, a container management plan has been developed to reorganize existing storage containers and maximize the efficient use of TRU storage space. The plan is aimed at achieving optimum utilization of available space considering various constraints such as criticality control, weather protection, RCRA permitting, segregation by waste type to the extent practical, container type, etc. Additional storage areas have been identified, permitted capacity allocations applied to these areas and a reapportionment of unused interim status capacity requested from SCDHEC.

Implementation of this interim storage strategy began in FY95. Initial effort on the storage strategy involved evaluation of existing mixed TRU waste storage capability to determine the adequacy of the currently RCRA permitted storage areas to accommodate the current inventory and future generation of mixed TRU waste containers.

9.5.2 TRU Retrieval

Drums placed in direct contact ($\leq$0.5 Ci/drum) with earthen covers have begun to reach their original 20 year projected life. A retrieval project has been initiated to provide the equipment and technology to safely recover these drums. Not only is container integrity a concern, but also the build-up of hydrogen gas within the containers. At the time these drums were placed in storage, the installation of drum filter vents was not yet practiced. As a result, radiolysis could result in the generation of Hydrogen gas creating a potentially explosive mixture. Once retrieved, the drums will be placed in overpacks, vented and purged, and then re-stored in a safe configuration. The project to provide equipment is funded under Line Item 90-D-

176. It has high priority and is scheduled for startup in FY97.

WSRC was tasked with performing a Buy or Make (BOM) analysis and providing to DOE-SR a recommended strategy, detailing which efforts are to be performed by onsite forces and which tasks should be assigned to a vendor for implementation. For the purposes of the analysis, it was assumed that the scope of the project was as defined in the current revisions of the Functional Performance Requirements (FPR) and Functional Design Criteria (FDC) documents.

The procedure which defines the construction BOM process was used for construction activities. Other efforts were evaluated based on criteria that included attributes such as cost effectiveness, safety, other DOE facility experience on retrieval and cost-comparison, as appropriate. The BOM results, recommendations and path-forward actions were issued to DOE-SR in April 1995. The addition of four new weather covered storage pads was identified as new project scope in the WSRC recommendation.

To address a Memorandum received from the Office of the Associate Deputy Secretary for Field Management, dated February 3, 1995, it is necessary to develop a Baseline Change Proposal (BCP) for submittal to Field Management no later than May 3, 1995. The BCP will identify the project scope as that defined in the DOE-SR approved FPR and FDC along with the addition of the four new weather covered storage pads. This BCP will also result in the descoping of the Transuranic Waste Facility from the LI project. Additional near term activities are defined in Section 9.7.

To support retrieval operations, a contract has been awarded under the Vendor Forum Initiatives (SW 26-03 TRU Waste Vent and Purge) which will provide details of the design, followed by fabrication and testing of a radioactive waste drum venting system that will collect and analyze a drum head space gas sample, purge the head space, and install a drum filter vent on a 55 gallon capacity drum or an 83 gallon drum (overpack). The equipment provided will allow the venting, gas removal and installation of a filter vent to allow the safe handling and processing of the drums.

9.5.3 Data Recovery and Transcription

Paper and electronic records including necessary Computerized Radioactive Waste Burial Analysis System (COBRA) records of TRU wastes will be transferred into a database (possibly the Waste Information Tracking System (WITS)) to allow easy data manipulation. Verification that the selected system has considered the potential applications to future processing, characterization, certification and transportation requirements will be conducted. The upgrade to this data management system, including both hardware and software could begin in FY95. A TRU Waste Container Database Work Plan was submitted to the Carlsbad Area Office to identify TRU waste related activities at SRS that need funding. The initial scope of this work plan would be to develop the database for those containers stored on Pad 6. The database would be sized to contain TRU waste container information from other storage areas which would be included in the database at some future time. The Work Plan includes evaluating existing databases at other DOE sites, including WITS at SRS. A Memorandum dated March 27, 1995, was sent from the Carlsbad Area Office authorizing $200,000 for development work in FY95. To date, no resources have been committed to this effort.

9.5.4 Characterization

As stated in section 9.1, radioactive wastes that contains TRU radionuclides in concentrations less than 100 nCi/g of the waste matrix is LLW. Radioactive wastes that contains both TRU radionuclides in concentrations less than 100 nCi/g of the waste matrix and hazardous waste constituents is identified as MLLW.

For newly generated waste, the SRS waste certification program requires low-level and mixed waste generators using the SWMD treatment/storage/disposal (TSD) facilities to characterize their waste streams and certify that their waste meets the acceptance criteria of the TSD facilities. A TRU waste certification program applicable to newly generated TRU and MTRU waste has not yet been put in place.

All waste currently in storage at SRS containing greater than 10 nCi/g of TRU radionuclides is managed as TRU or MTRU waste and all waste at SRS containing less than 10 nCi/g of TRU radionuclides is managed as LLW or MLLW. These wastes will continue to be managed as such until improved assay capability is available. At that time, it is anticipated that most of these wastes will be reclassified as LLW or MLLW.

To assist in determining if the waste drums contain hazardous constituents, a contract has been awarded

under the Vendor Forum Initiatives (SW 38-06 Surface Acoustic Wave). The scope of this contract is to identify appropriate technologies, evaluate them and select the most effective, then design, construct and fabricate a system to analyze volatile and semi-volatile compounds in the head space of TRU waste drums. The equipment provided will allow inspection of the head space by non-intrusive means thereby reducing the potential hazards of this operation and the segregation of drums with high specific gas contents for further processing.

A second contract has been awarded under the Vendor Forum Initiatives (SW 40-08 Assay and Tomography) This contract provides the for the services and equipment that will design, develop, test and produce operating instrumentation for TRU/LLW analysis and segregation and TRU waste characterization. A system shall be developed for use in analyzing and segregating LLW waste from TRU waste in an acceptable short period of time (15-45 minutes/container). The waste analysis and characterization system will be divided into two phases. The first will be the development, construction, testing and demonstration of a portable TRU/LLW analyses and segregation system. The second will be the TRU waste characterization system.

Solid Waste Engineering (SWE) recently completed a draft Quality Assurance Project Plan (QAPjP) for SRS in accordance with the Quality Assurance Program Plan (QAPP) for WIPP. The draft was submitted to DOE-SR in November 1994 for comment. Although the draft QAPjP contains many sections that require further development, the concept presented is that individual TRU waste generators would develop facility specific certification plans. Since the SWMD manages all the TRU waste in storage, it is considered to be a " TRU waste generator" that is required to develop a facility specific certification plan. WSRC has developed a QAPjP Compliance Work Plan which defines activities to be performed in FY95 to support further development towards certification. The QAPjP effort is funded through the Carlsbad Area Office. For near term activities, see section 9.7.

One activity funded by the Office of Technology Development to assist in characterization is the development of the Waste Inspection Tomography mobile unit (WIT) by Bio-Imaging Research, Inc. (BIR). This mobile system can be brought to the waste site and perform tomographic characterization of nuclear drums using a multi-modality approach. WIT is nondestructive and noninvasive, and produces quantitative results. The system is effective for LLW, TRU and mixed wastes in various matrices. The WIT is currently planned to be at SRS in late October and November 1995, for demonstration purposes. SWE and SRTC personnel are currently supporting the WIT demonstration.

One additional effort being undertaken by SWE is to apply the systems engineering approach to TRU waste characterization. This effort will involve the following:

a) Identify all the TRU waste characterization requirements necessary to comply with the WIPP WAC.

b) Identify the available alternatives (technologies/facilities) capable of satisfying the requirements. This would include alternatives for both newly generated and currently stored waste.

c) Evaluate the alternatives in order to develop a strategy that would satisfy the requirements. This could result in the selection of one alternative, modification of an alternative or a combination of alternatives.

d) Review the strategy against the requirements to ensure the selected alternative satisfies the requirements and make the necessary adjustments.

e) Implement the defined strategy.

This effort is viewed as a compilation of efforts. With this effort, the Assay and Tomography contract, the Surface Acoustic Wave contract, the Experimental TRU Waste Assay Facility, generator facilities, the WIT mobile unit and other commercially available technologies and services would be evaluated. The QAPjP could be further developed and the database necessary to support TRU waste characterization could be established. Analytical capabilities to support characterization efforts could be defined.

9.5.5 Treatment

The baseline assumption is that all TRU waste currently being generated and in storage at SRS will eventually be shipped to WIPP under the No-Migration Determination. The possibility exists that treatment may be required for a portion or all of the TRU waste which will eventually be prepared for shipment. Currently this treatment is required to permit the shipment of higher activity TRU in the TRUPACT II, but may also be required to meet LDR if WIPP does not receive the No-Migration Determination. The high activity Pu^{238} waste is 280 times more active than Pu^{239} and currently cannot be

economically shipped in the TRUPACT-II (the vehicle designed to transport TRU waste). Pu^{238} represents 36% of the TRU waste volume at SRS, and 68% of the total curies.

Treatment studies will be conducted to evaluate potential technologies which would treat TRU waste to meet LDR and to eliminate gas generation by destroying organics, thus preventing generation of hydrogen due to radiolysis. The Office of Technology Development (OTD) has funded several activities at SRS including vitrification and plasma hearth demonstrations. Both of these technologies provide stable waste forms and destroy organics and hazardous constituents to meet LDR requirements. Work will proceed in FY95 to develop a plasma hearth demonstration using simulated TRU waste. Vitrification activities are underway currently and will continue in FY95 to demonstrate that this technology will work with these waste streams. In addition, development of acid digestion technologies for organics is planned in FY96 provided funding is available.

As more information becomes available from the systems analysis work currently in progress at WIPP, and WIPP WAC requirements become final, SRS facility requirements necessary to characterize and certify wastes can be developed. Previous attempts to predict the outcome of the WIPP studies and proposed WAC requirements resulted in recommendations to develop characterization facilities such as the LOW Activity TRU Facility (LATF), which was conceptually developed around WIPP/ WAC Revision 4, providing characterization, repackaging and certification for low activity TRU waste. This facility was put on hold in FY93 based on continuing uncertainties in the WIPP program and the inception of the Site Treatment Plan (STP) development.

As a result of the SRS Citizen's Advisory Board (CAB) reviewing the SRS STP, the following recommendations were made by the CAB:

1)Categorize the SRS high activity TRU waste as an urgent problem.

2) Expedite the selection of an appropriate organic treatment for SRS TRU waste by year's end. DOE should commission an independent "Blue Ribbon" panel of experts to review the treatment and waste-form options in a report to DOE and a presentation before the CAB at its November 1995 meeting.

3) Assign the highest priority to obtain funding no later than the FY97 budget for a capital line-item project to treat TRU waste and convert it into a stabilized form. Funding has been targeted in the FY97 budget to begin work on a line item project for TRU waste treatment.

9.6 Proposals

The plan focuses on TRU waste interim storage, TRU waste retrieval under Project 90-D-176 or subcontract and characterization in support of the on-going efforts to identify final treatment and disposal options. SRS should begin to plan for improved long-term TRU waste storage which will enhance inspection capability, minimize further container degradation, and mitigate environmental, health and safety risks.

Development activities will continue to support waste retrieval and repackaging prioritization, support waste characterization requirements, and begin to investigate waste processing options for specific SRS needs such as Pu-238 waste.

One processing option being considered is to have a subcontractor load and transport the drums that contain less than or equal to 0.5 Ci/drum to a subcontractor's processing facility. At this facility, which would be located adjacent to or off site, the subcontractor would process the drums utilizing technologies of assay, characterization, volume reduction and repackaging to determine appropriate final disposition. After processing, the drums would be returned to SRS for storage on the TRU waste storage pads, or disposal in the E Area Vault, or dispositioned as hazardous waste/mixed waste.

SRS will pursue the identification of a TRU waste characterization facility, either as new construction or by conversion of an excessed facility, that will provide a means of obtaining data to support risk-based analysis for determining long-term storage requirements, support SRS treatment technology development activities, and provide for WIPP WAC compliant waste characterization. WSRC will continue to interface with other DOE sites to remain cognizant of their TRU waste program developments and exploit opportunities to take advantage of precedence there.

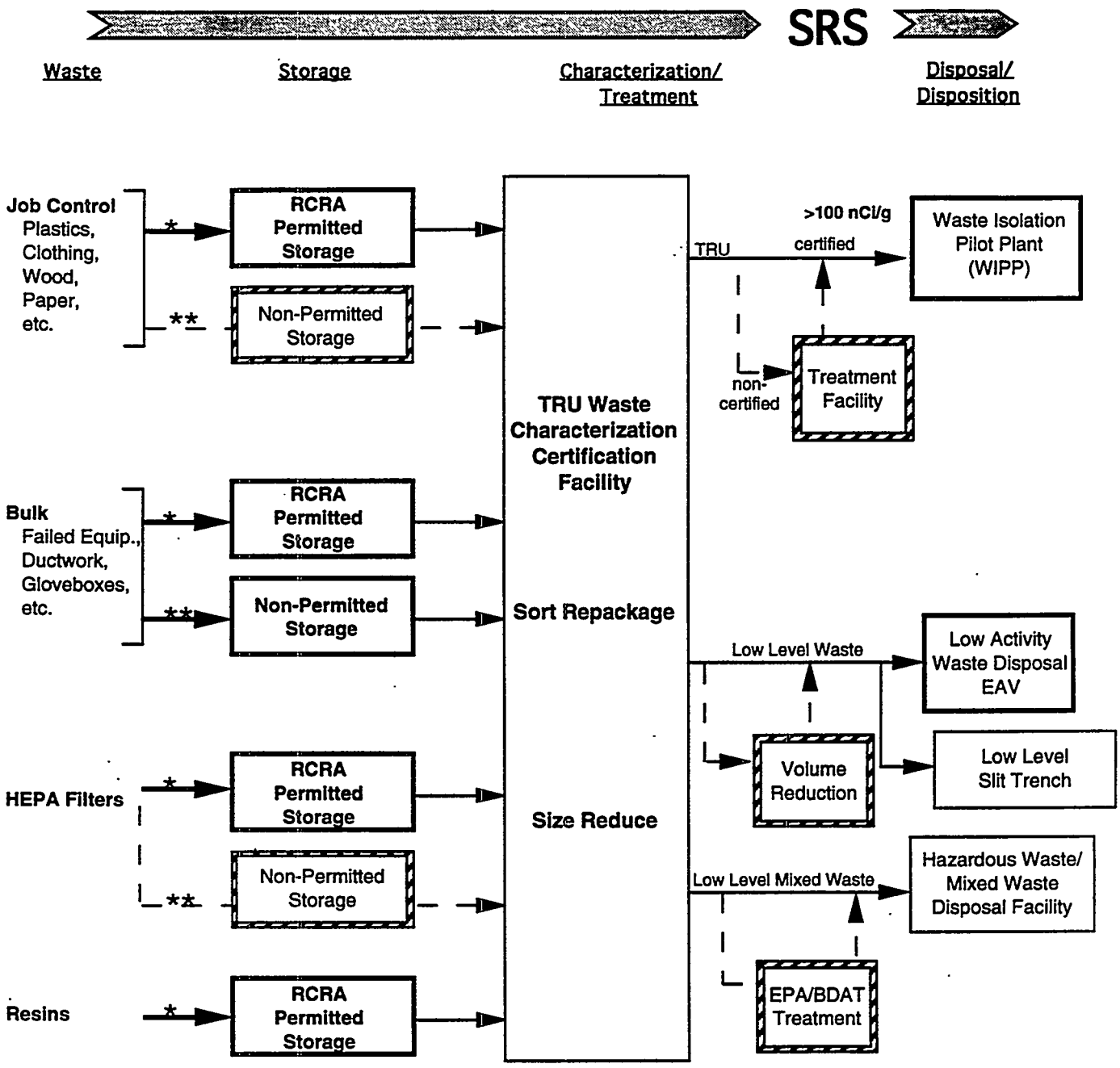
9.7 Near Term Actions

Near-term actions include:

- Complete TRU waste drum dewatering activities.
- Continue to place 55 gallon drums in RCRA compliant storage.

- Continue temporary pad project development necessary to relocate the black boxes of TRU waste located on TRU waste storage pads 18 and 19.
- Relocate the TRU waste on pads 18 and 19 .
- Continue project development to provide weather enclosures for pads 18 and 19.
- Visit Los Alamos, INEL and Hanford to acquire information on other retrieval and characterization efforts ongoing in the DOE complex.
- Complete the BCP for the revised project scope, initiate project design and procurement in support of retrieval of the 8809 drums under earthen covers on pads 2-6 under Project 90-D-176.
- Increase support for the WIT mobile unit demonstration in late October 1995.
- Complete the Baseline Inventory Report data call for TRU waste.
- Identify resources to support the TRU Waste Container Database Work Plan.
- Continue to support development of the QAPjP for SRS.
- Increase support of the systems engineering approach to TRU waste characterization.
- Address the CAB recommendations and take the appropriate actions.
- Proceed with TRU waste assay technology development in support of SRS needs.
- Proceed with technology development for TRU waste treatment in support of meeting TRUPACT II requirements.
- Complete the SRTC hydrogen gas generation studies to provide input into the TRU Characterization Facility design criteria.
- Support development of the Solid Waste Management Facility Safety Analysis Report.
- Reconstitute the TRU waste storage technical baseline.
- Review and revise as necessary the TRU waste storage facility waste acceptance criteria.
- Continue evaluation of excessed Reactor Facilities for possible TRU drum storage

FLOW DIAGRAM: Transuranic Waste



* Mixed
** Non-mixed

Figure 9.4.1

4/25/95

Appendix A - Acronyms and Definitions

Acronyms

ADM - Action Description Memorandum

A&L - Administration and Logistics

BDAT - Best Demonstrated Available Technology

BGI - Beta Gamma Incinerator

CDR - Conceptual Design Report

CFR - Code of Federal Regulations

Ci - Curie

CIF - Consolidated Incineration Facility

CMP - Chemicals, Metals, and Pesticides

CX - Categorical Exclusions

D&D - Decontamination and Decommissioning

DOE - United States Department of Energy

DWPF - Defense Waste Processing Facility

EA - Environmental Assessment

EAV - E-Area Vaults

EIS - Environmental Impact Statement

ELLT - Engineered Low-Level Trench

EPA - United States Environmental Protection Agency

ER - Environmental Restoration

ESAAB - Energy Systems Acquisition Advisory Board

ESH&QA - Environmental, Safety, Health, and Quality Assurance

ETWAF - Experimental Transuranic Waste Assay Facility

EU - Enriched Uranium

E&CSD - Engineering and Construction Services Department

FFA - Federal Facility Agreement

FFCA - Federal Facility Compliance Agreement

FFCAct - Federal Facility Compliance Act

FONSI - Finding of No Significant Impact

FPC - Functional Performance Criteria

FYP - Five-Year Plan

GCD - Greater Confinement Disposal

HATF - High-Activity TRU Facility

HLWM - High Level Waste Management

HSWA - Hazardous and Solid Waste Amendments

HW/MWDF - Hazardous Waste Mixed Waste Disposal Facility

HW/MWTB - Hazardous Waste Mixed Waste Treatment Building

HWSF- Hazardous Waste Storage Facilities

IDW - Investigation Derived Waste

ILNT - Intermediate-Level Non-Tritium

ILT - Intermediate-Level Tritium

ILW - Intermediate Level Waste

ISL - Interim Sanitary Landfill

ITP - In-Tank Precipitation

LATF - Low-Activity TRU Facility

LAW - Low-Activity Waste

LAWV - Low-Activity Waste Vaults

LDR - Land Disposal Restrictions

LDR FFCA - Land Disposal Restrictions Federal Facility Compliance Agreement

LETF - Liquid Effluent Treatment Facility

LSCOG - Lower Savannah Council of Governments

MSA - Major System Acquisition

MW - Mixed Waste

NEPA - National Environmental Policy Act

NMPD - Nuclear Material Production Division

NOD - Notice of Deficiency

NRC - United States Nuclear Regulatory Commission

NSL - New Sanitary Landfill

ORR - Operational Readiness Review

ORE - Operational Readiness Evaluation

OT&A - Operational Training and Assessment

PCBs - Polychlorinated Biphenyls

PEIS - Programmatic Environmental Impact Statement

PVC - Polyvinyl Chloride

RCA - Radiologically Controlled Area

RMMA - Radiological Materials Management Area

RPA - Radiological Performance Assessment

SAR - Safety Analysis Report

SCDHEC - South Carolina Department of Health and Environmental Control

SED Facility - Separations Equipment Development Facility

SREL - Savannah River Ecology Laboratory

SS&ES - Safeguard Security and Environmental Services

STP - Site Treatment Plan

SWDF - Solid Waste Disposal Facility

SWM - Solid Waste Management

SWSP - Solid Waste Storage Pads

TC - Toxicity Characteristic

TCLP - Toxicity Characteristic Leaching Procedure

TPC - Total Project Cost

TRU - Transuranic

TSCA - Toxic Substance Control Act

TSD - Treatment, Storage, and Disposal

TWF - TRU Waste Facility

USFS - United States Forest Service

WAC - Waste Acceptance Criteria

WIPP - Waste Isolation Pilot Plant

WM - Waste Management

WPF - Waste Preparation Facility

TSD - Treatment/Disposal/Storage

Definitions

Best Available Technology (BAT) or Best Demonstrated Available Technology (BDAT) - (1) The preferred technology for treating a particular waste, selected from others after taking into account factors related to technology, economics, public policy, and other parameters. As used in DOE Order 5400.5, BAT is not a specific level of treatment, but the conclusion of a selection process that includes several treatment alternatives. (2) Treatment technologies that have been shown through actual use to yield the greatest environmental benefit among competing technologies that are practically available.

Characterization - The determination of waste contents and properties, whether by review of process knowledge or sampling and analysis.

Chemical Fixation - Any waste treatment process that involves reactions between the waste and certain chemicals, and results in solids that encapsulate, immobilize, or otherwise tie up hazardous components in the waste to minimize the leaching of such components and to render the waste non-hazardous and more suitable for disposal.

CIF Blowdown - The liquid collected from the CIF offgas system as a result of neutralization of acidic materials with sodium hydroxide (Caustic). This material is stabilized for disposal.

Cleanup - (1) Actions undertaken during a removal or remedial response to physically remove or treat a hazardous substance that poses a threat or potential threat to human health and welfare, the environment, and/or real and personal property. Sites are considered cleaned up when removal or remedial programs have no further expectation or intention of returning to the site and threats have been mitigated or do not require action. (2) Actions taken to deal with a release or threat of release of a hazardous substance that could affect humans and/or the environment. The term "cleanup" is sometimes used interchangeably with either remedial action, removal action, response action, or corrective action.

Closure - Final Site Closure: Those actions that are taken as part of a formal decommissioning or remedial action plan, the purpose of which is to achieve long-term stability of the disposal site and to eliminate to the extent practical the need for active maintenance so that only surveillance, monitoring, and minor custodial care are required.

Closure - Operational Closure - Those actions that are taken upon completion of operations to prepare the disposal site or disposal unit for custodial care (e.g. addition of cover, grading, drainage, erosion control).

Compliance Agreements - Legally binding agreements between regulators and regulated entities that set standards and schedules for compliance with environmental statues. Include Consent Order and Compliance Agreements, Federal Facilities Agreements, and Federal Facility Compliance Agreements.

Contact-Handled Waste (CH Waste) - Waste or waste containers whose external surface dose rate does not exceed 200 mrem per hour at surface of container.

Corrosive/Corrosivity - (1) A solid waste exhibits corrosivity if (a) a sample of the waste is either aqueous and has a pH less than or equal to 2 or greater than or equal to 12.5, or it is a liquid and corrodes steel at a rate greater than 6.35 mm (0.250 inch) per year at a test temperature of 55_C (130_F). (2) A chemical agent that reacts with the surface of a material causing it to deteriorate or wear away. (3) Identifies waste that must be segregated because of its ability to extract and solubilize toxic contaminants (especially heavy metals) from other waste; identifies waste that requires the use of corrosion-resistant containers for disposal.

Crucibles - These are sections of steel pipe 19 3/4" long by 18" in diameter used to process tritium gas. Once the gas is removed, the crucibles are disposed of.

Curie - The unit used to describe the intensity of radioactivity. The curie is equal to 37 billion disintegrations per second.

Debris - Materials that are primarily non-geologic in origin such as grass, trees, stumps, and man-made materials such as concrete, clothing, partially buried whole or empty drums, capacitors, and other synthetic manufacturing items such as liners. (It does not include synthetic organic chemicals, but may include materials contaminated with these chemicals.)

Debris Rule - A set of treatment standards for debris contaminated with listed hazardous waste or debris

exhibiting certain hazardous waste characteristics. The Debris Rule was finalized by EPA on August 18, 1992, and became effective November 19, 1992.

Decommissioning - (1) Actions taken to reduce the potential health and safety impacts of DOE contaminated facilities, including activities to stabilize, reduce, or remove radioactive materials or to demolish the facilities; (2) Preparations taken for retirement of a nuclear facility from active service, accompanied by the execution of a program to reduce or stabilize radioactive contamination. (3) The process of removing a facility or area from operation and decontaminating and/or disposing of it or placing it in a condition of standby with appropriate controls and safeguards.

Decontamination - The removal of unwanted material (typically radioactive material) from facilities, soils, or equipment by washing, chemical action, mechanical cleaning, or other techniques.

Delist - Use of the petition process to have a waste stream's toxic designation rescinded.

Department of Energy Waste - Radioactive waste generated by activities of DOE (or its predecessors), waste for which DOE is responsible under law or contract, or other waste for which the DOE is responsible.

Disposal - The permanent isolation of waste with no intent of recovery.

Disposal Facility - (1) The land, structures, and equipment used for the disposal of waste. (2) A facility or part of a facility at which waste is intentionally placed into or on the land or water, and at which waste will remain after closure.

Effluent - (1) Airborne and liquid wastes discharged from a DOE site or facility following such engineering waste treatment and all effluent controls, including onsite retention and decay, as may be provided. This term does not include solid wastes, wastes for shipment offsite, wastes that are contained (e.g., underground nuclear test debris) or stored (e.g. in tanks) or wastes that are to remain onsite through treatment or disposal. (2) Wastewater (treated or untreated) that flows out of a treatment plant, sewer, or industrial outfall. May refer to wastes discharged into surface waters.

Elemental Lead (Activated and Non-Activated) (as a waste matrix) - Both surface contaminated and activated elemental lead. Activated lead includes lead from accelerators or other neutron sources that may result in irradiation. Surface contaminated lead materials include bricks, counterweights, shipping casks, and other shielding materials.

Environmental Impact Statement (EIS) - (1) A document prepared in accordance with the requirements of §102(2)(C) of NEPA. (2) A tool for decision making; it describes the positive and negative effects of the undertaking and lists alternative actions. The draft document (DEIS) is prepared by the EPA, or under EPA guidance, and attempts to identify and analyze the environmental impacts of a proposed action and feasible alternatives, and is circulated for public comment prior to preparation of the final environmental impact statement.

Environmental Restoration (ER) - Measures taken to clean up and stabilize or restore a site to pre-violation conditions that has been contaminated with hazardous substances during past production or disposal activities.

Environmental Restoration and Waste Management Programmatic EIS (EM PEIS): The environmental impact analysis that will investigate alternative strategies for conducting DOE's Environmental Restoration and Waste Management program. These strategies include the environmentally responsible management and restoration of nuclear facilities and the protection of worker and public health and safety through safe disposal of radioactive, hazardous, and mixed wastes. The environmental analysis will support DOE decisions on how to manage facility processes for treatment, storage, or disposal of radioactive , hazardous , or mixed wastes; approaches to be used to remediate contaminated sites; treatment technology; and policy considerations for decontamination and decommissioning (D&D) of DOE facilities at the end of their useful lives.

Excessed Facility - A facility that is no longer needed because of a change in mission

Existing Facility - Any building, structure, process, or activity that is being used to treat, store, or dispose of SRS solid waste.

Planned Facility - Those buildings, structures, processes, or activities that, in addition to existing

facilities, are required to complete the total Solid Waste program.

Proposed Facility - Those buildings, structures, processes, or activities that, in addition to or in place of existing or planned facilities, are identified to enhance the Solid Waste program.

Facilities - Buildings and other structures; their functional systems and equipment, including site development features such as landscaping, roads, walks and parking areas; outside lighting and communications systems; central utility plants; utilities supply and distribution systems; and other physical plant features.

Federal Facility Compliance Act (FFCAct) of 1992: The 1992 amendment to the Resource Conservation and Recovery Act (RCRA) which requires the Department of Energy to prepare plans describing the development of treatment capacities and technologies for treating mixed waste.

Federal Facility Compliance Agreement (FFCA) - An agreement between the DOE, a host state and/or EPA with respect to how and/or when some waste-related activity will be conducted to achieve compliance with applicable regulations in a timely manner. A major driver or constraint on activities that a particular site must undertake for waste operations.

Fiscal Year (FY): In the Department of Energy budget and planning cycle, the FY runs from October 1 of one year through September 30 of the following year.

Generation - Includes the wastes resulting from new production, rework operations, wastes generated from D&D operations, and wastes resulting from environmental restoration operations, including the recovery of pre-1970 wastes, should their recovery be determined to be necessary.

Generator - Refers to current or previously operated facilities of the DOE that have produced or are producing waste.

Groundwater - Liquid water occurring beneath the earth's surface in the interstices between soil grains, in fractures, or in porous formations.

Groundwater Contamination - The pollution of the underground sources of springs and wells. Contamination can result from indiscriminate land disposal of potentially hazardous waste materials that are then dissolved or suspended in free liquids, usually water, and leach downward through the unsaturated profile to the zone of saturation or from improperly constructed or operated wells. Movement of the toxic materials in the saturated zone is horizontal, and the rate of flow is determined by the gradient of the aquifer and its permeability. Correction of the problem is seldom limited to one site.

Hazardous Substance - (1)(a) Any substance designated pursuant to §311(b)(2)(A) of the FWPCA; (b) any element, compound, mixture, solution, or substance designed pursuant to §102 of CERCLA; (c) any hazardous waste having the characteristics identified under or listed pursuant to §3002 of the SWDA; (d) any toxic pollutant listed under §307(a) of the FWPCA; (e) any hazardous air pollutant listed under §112 of the CAA; and (f) any imminently hazardous chemical substance or mixture with respect to which the Administrator of EPA has taken action pursuant to §7 of TSCA. (2) Any material that poses a threat to human health and/or the environment. Typical hazardous substances are toxic, corrosive, ignitable, explosive, or chemically reactive. Any substance designated by EPA to be reported if a designated quantity of the substance is spilled in the waters of the United States or if otherwise emitted into the environment. (3) §101(14) of CERCLA, as amended, defines "hazardous substance" chiefly by reference to other environmental statutes such as the SWDA, FWPCA, CAA, and TSCA. The term excludes petroleum, crude oil or any fraction thereof, natural gas, natural gas liquids, or synthetic gas usable for fuel. Under the Act, OERR also may include other substances that it specifically designates as "hazardous".

Hazardous Waste (HW) - (1) Those wastes that are designated hazardous by EPA [or state] Regulations. (2) Byproducts of production or operation that can pose a potential hazard to human health or the environment when improperly managed and that posses at least one of four characteristics (ignitability, corrosivity, reactivity, toxicity), or that appear on special EPA lists. (3) A solid waste or combination of solid waste, that, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may (a) cause, or significantly contribute to, an increase in mortality or an increase in serious, irreversible, or incapacitating reversible illness; or (b) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed. (4) Those wastes listed by

EPA or meeting characteristics specified by EPA in their criteria pursuant to the RCRA. Disposal treatment or storage of hazardous waste can only take place in a site or facility issued a permit by EPA or a state. Note: Source, special nuclear material, and byproduct material, as defined by the AEA of 1954 as amended, are specifically excluded from the term hazardous waste.

High-Level Radioactive Waste (HLW) - (1) The highly radioactive waste material that results from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid waste derived from the liquid, that contains a combination of TRU waste and fission products in concentrations requiring permanent isolation. (2)(a) Irradiated reactor fuel, (b) liquid wastes resulting from the operation of the first cycle solvent extraction system, or equivalent, and the concentrated wastes from subsequent extraction cycles, or equivalent, in a facility for reprocessing irradiated reactor fuel, and (c) solids into which such liquid wastes have been converted. (3) As defined by the NWPA, high-level waste is (a) the highly radioactive material resulting from the reprocessing of spent nuclear fuel, including the liquid waste produced directly in reprocessing and any solid material derived from such liquid waste that contains fission products in sufficient concentrations; and (b) other highly radioactive material that the NRC, consistent with existing law, determines by rule to require permanent isolation.

Ignitability - A waste property describing waste with a flash point lower than 140°F.

Immobilization - Treatment of waste through macroencapsulation, microencapsulation, or sealing to reduce surface exposure to potential leaching media or to reduce the leachability of the hazardous constituents.

Immobilized Materials - Materials that are fixed in a matrix.

Incineration - (1) The controlled process by which combustible solid, liquid, or gaseous wastes are burned and changed into non-combustible gases and solid ash. (2) A treatment technology using combustion to destroy organic constituents and reduce the volume of wastes.

Ion Exchange - A process used to separate a mixed waste into its radioactive and hazardous constituents if the radioactive components are ionic. It will also concentrate the radioactive ionic species into a small volume, leaving a non-radioactive aqueous phase. The principal mixed waste application of this process is to recover metallic radionuclides from wastewaters or acid leach liquors.

Land Disposal Restrictions (LDRs) - Provisions of the HSWA requiring phased-in treatment of hazardous wastes before disposal. (2) A RCRA program that restricts land disposal of RCRA hazardous wastes and requires treatment to promulgated treatment standards.

Leachate - (1) Any liquid, including any suspended components in the liquid, that has percolated through or drained from hazardous waste. (2) A contaminated liquid resulting when water percolates, or trickles, through waste materials and collects components of those wastes. Leaching may occur at landfills and may result in hazardous substances entering soil, surface water, or groundwater.

Listed Waste - Wastes listed as hazardous under RCRA that do not require the Toxicity Characteristic Leaching Procedure because the dangers they present are considered self-evident.

Low-Level Radioactive Waste (LLW) - (1) Waste that contains radioactivity and is not classified as high-level waste, TRU waste, or spent nuclear fuel, or the tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content. Test specimens of fissionable material irradiated for research and development only, and not for the production of power or plutonium, may be classified as low-level waste, provided the concentration of TRU is less than 100 nCi/g. (2) Radioactive waste not classified as high-level waste, TRU waste, spent nuclear fuel, or byproduct material.

Macroencapsulation - Application of surface coating materials such as polymeric organics (e.g. resins and plastics) or a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media. Macroencapsulation specifically does not include any material that would be classified as a tank or container according to 40 CFR 260.10.

Metals Recovery - Recovery of metals or inorganics utilizing one or more of the following direct physical/removal technologies: (1) ion exchange; (2) resin or solid (i.e., zeolites) adsorption; (3) reverse osmosis; (4) chelation/solvent extraction; (5) freeze

crystallization; (6) ultrafiltration and/or (7) simple precipitation (i.e., crystallization). Note: This does not preclude the use of other physical phase separation or concentration techniques such as decantation, filtration, (including ultrafiltration) and centrifugation, when used in conjunction with the above listed recovery technologies.

Mixed Low Level Waste - Low level waste that also includes hazardous materials as identified in 40 CFR 261, Subparts C and D.

Mixed TRU Waste - TRU waste that also includes hazardous materials as identified in 40 CFR 261, Subparts C and D.

Mixed Waste - (1) Radioactive waste (as defined by the atomic Energy Act) that contains material listed as hazardous waste in Subpart D and 40 CFR 261 or that exhibits any of the hazardous waste characteristics identified in subpart C of 40 CFR 261. (2) Waste that contains both radioactive and hazardous components, as defined by the AEA and the RCRA. The term "radioactive component" refers only to the actual radionuclides dispersed or suspended in the waste substance.

Neutralization - Use of the following reagents (or waste reagents) or combinations of reagents: (1) Acids; (2) bases; or (3) water (including wastewaters) resulting in a pH greater than 2 but less than 12.5 as measured in the aqueous residuals.

Onsite - (1) Within a single research or production site of the DOE weapons complex; e.g. LANL is a site, as is INEL, SNL, etc. (2) The contaminated area and all potential areas in very close proximity to the contamination that must be taken into account for effective implementation of the response action.

Onsite Facility - A hazardous waste treatment, storage, or disposal area that is located on the generating site.

Plutonium-Uranium Extraction (Purex) Process - A solvent extraction process that may be employed in the reprocessing of uranium/plutonium-based nuclear fuels.

Process Water Deionizers - Vessels containing ion exchange resins which are used to remove dissolved impurities from Reactor process water.

Radiation - (1) Ionizing radiation that includes any or all of the following: gamma rays and x-rays, alpha and beta particles, high-speed electrons, neutrons, high-speed protons, and other atomic particles. This definition does not include non-ionizing radiations, such as sound, microwave, radiowave or visible, infrared, or ultraviolet light. (2) Refers to the process of emitting energy in the form of rays or particles that are thrown off by disintegrating atoms. The rays or particles emitted may consist of alpha, beta, or gamma radiation.

Radioactive Material Management Area (RMMA): An area where radioactive materials are used, handled, or stored. RMMAs may be storage areas for radioactive samples, sources, etc.

Radioactive Mixed Waste - (See Mixed Waste)

Radioactive Waste - (1) Solid, liquid, or gaseous material that contains radionuclides regulated under the AEA of 1964, as amended, and of negligible economic value considering costs of recovery. (2) A solid, liquid, or gaseous material of negligible economic value that contains radionuclides in excess of threshold quantities. Does not include material contaminated by radionuclides from nuclear weapons testing.

Radioactivity - (1) The spontaneous nuclear decay of material with a corresponding release of energy in the form of particles and/or electromagnetic radiation. (2) The property or characteristic of radioactive material to spontaneously "disintegrate" with the emission of energy in the form of radiation. The unit of radioactivity is the curie (or becquerel).

Radionuclide - (1) A species of atom having an unstable nucleus, that is subject to spontaneous decay. (2) Any nuclide that emits radiation. A nuclide is a species of atom characterized by the constitution of its nucleus and hence by the number of protons, the number of neutrons, and the energy content.

Reactivity - (1) A characteristic of a waste that is explosive, reacts violently with water, or generates toxic gases when exposed to water or liquids that are moderately acidic or alkaline. (2) An EPA characterization of hazardous waste that identifies waste that under routine management, presents a hazard because of instability or extreme reactivity.

Reconfiguration of the Weapons Complex PEIS: DOE is proposing actions which will reconfigure the Nuclear Weapons Complex to be smaller, less diverse, and less costly to operate. This environmental analysis will support the goal to safely and reliably meet the nuclear deterrent stockpile objectives set by the President and funded by

Congress. The reconfigured Complex would have fewer individual sites and generally lower capacity facilities and would comply with applicable environmental, safety, and health laws, regulations, and orders.

Remedial Action - (1) Activities conducted at DOE facilities to reduce potential risks to people and/or harm to the environment from radioactive and/or hazardous substance contamination. (2) Those actions consistent with permanent remedy taken instead of, or in addition to, removal action in the event of a release or threatened release of a hazardous substance into the environment to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health or welfare or the environment. (3) The term includes, but is not limited to, such actions at the location of the release as storage, confinement, perimeter protection, clay cover, neutralization, cleanup of released hazardous substances or contaminated materials, recycling or reuse, diversion, destruction, segregation of reactive wastes, dredging or excavations, repair or replacement of leaking containers, collection of leachate and runoff, onsite treatment or incineration, provision of alternative water supplies, and any monitoring reasonably required to ensure that such actions protect the public health and welfare and the environment.

Remote Handling - The handling of wastes from a distance so as to protect human operators from unnecessary exposure.

Remote-Handled Waste (RH Waste) - (1) Packaged waste with an external surface dose rate that exceeds 200 mrem per hour.

Resource Conservation and Recovery Act (RCRA) Part A Permit - The first part of a Resource Conservation and Recovery Act permit application that identifies treatment, storage, and disposal units within a to-be-permitted facility.

Resource Conservation and Recovery Act (RCRA) Permit, Part B - The detailed second part of a RCRA permit application that describes waste to be managed, and waste quantities, and facilities.

Saddles - Saddled shaped pieces of ceramic used as packing material in distillation columns. They provide surface area for vapor/liquid interaction. At SRS, saddles are coated with silver nitrate and used to remove radioactive iodine from process off-gas streams.

Segregation - The separation of waste materials to facilitate handling, storage, treatment, transportation, and/or disposal.

Site - A geographic entity comprising land, buildings, and other facilities required to perform program objectives. Generally a site has, organizationally, all of the required facilities for management functions. That is, it is not a satellite of some other site.

Site Closure and Stabilization - Those actions that are taken upon completion of operations that prepare the disposal site for custodial care and that ensure that the disposal site will remain stable and will not need ongoing active maintenance.

Slit Trench - Trenches cut into the ground in used for the disposal of radioactively contaminated materials. The name slit trench is used since these trenches are narrow and have irregular lengths based on available space. They are commonly placed between larger disposal trenches to effectively use available space.

Storage - (1) Temporary holding of waste pending treatment or disposal. Storage methods include containers, tanks, waste piles, and surface impoundments. (2) The containment of hazardous waste, either on a temporary basis or for a period of years, in such a manner as not to constitute disposal of such hazardous waste. (3) Retrievable retention of waste pending disposal.

Storage Facility - Land area, structures, and equipment used for the storage of waste.

Supercompaction - A volume-reduction method relying on mechanical compaction.

T-Blocks - T- shaped concrete structures used for shielding approximately 25' long by 34 " high and 2' across at the top.

Total Estimated Cost (TEC): The costs of the project, including the costs of land and land rights, engineering, design, and inspection costs, direct and indirect construction costs, and initial equipment necessary to place the plant or installation in operation. It includes corrective action for any deficiencies attributable to design and/or construction during Systems Testing and Integrated Systems Testing; cost of all as-built drawings and design bases; cost of development, preparation, studies,

review and approval of the Safety Analysis Report (SAR); cost of spares and contingency. TEC excludes WSRC indirect cost that will continue regardless of construction activity. TEC also excludes WSRC project support activities performed for internal management and technical support of the project manager by non-dedicated personnel. DOE and DOE Subcontractor costs are excluded from TEC.

Total Project Cost (TPC): Includes Total Estimated Costs, all research and development, operating, and plant and capital equipment costs specifically associated with project construction up to the point of routine operations.

Transuranic Waste (TRU) - This core definition appears in modified form in various relevant documents: Waste containing alpha-emitting radionuclides with an atomic number greater than 92 and half-lives greater than 20 years, at concentrations greater than 100 nCi/g of waste. Modifications include the following: (1) For purposes of management, DOE Order 5820.2A (a) considers TRU waste, as defined above, "without regard to source or form" [The proposed revision to the Order ("DOE Order 5820.2A Major Issues for Revision," May 6, 1992) contemplates removing this clause.]; (b) allows heads of field elements to determine that wastes containing other alpha-emitting radionuclides must be managed as TRU waste; and (c) adds "at time of assay", implying both that the classification of a waste as TRU is to be made based on an assay and that such classification can be superseded only by another assay. (2) For purposes of setting standards for management and disposal, 40 CFR 191.02(i) adds "except for: (a) high-level radioactive wastes; (b) wastes that the DOE has determined, with the concurrence of the Administrator [of EPA] do not need the degree of isolation required by this part; or (c) wastes that the Commission [NRC} has approved for disposal on a case-by-case basis in accordance with 10 CFR 61 [Licensing Requirements for Land Disposal of Radioactive Wastes]".

Treatment - (1) Any method, technique, or process designed to change the physical or chemical character of waste to render it less hazardous, safer to transport, store or dispose of, or reduced in volume. (2) Any activity that alters the chemical or physical nature of a hazardous waste to reduce its toxicity, volume, mobility, or render it amenable for transport, storage, or disposal.

Treatment Facility - The specific area of land, structures, and equipment dedicated to waste treatment and related activities.

Treatment System - The equipment and processes used for similar waste types at treatment facilities. A treatment system is the unit treatment operation or sequence of unit treatment operations carried out on all wastes that enter the system (e.g., a treatment system may consist of chemical reduction followed by precipitation, or an incinerator and a vitrification unit for the ash).

Treatment, Storage, and Disposal (TSD) Facility - Any building, structure, or installation where a radioactive or hazardous substance has been treated, stored, or disposed.

Waste Acceptance Criteria (WAC) - The criteria used to determine if waste and waste packages are acceptable for treatment, storage, transportation and disposal purposes.

Waste Certification - Activities to ensure that waste characterization is performed with sufficient accuracy to provide reasonable assurance that the waste acceptance criteria of the facility receiving the waste will be met.

Waste Characterization - Activities to determine the extent and nature of the waste. Note: Waste characterization may be based on process knowledge non-intrusive examination, or intrusive examination such as sampling and analysis.

Wasteform - The physical form of the waste such as sludges, combustibles, metals, etc.

Waste Isolation Pilot Plant (WIPP) - (1) The project authorized under §213 of the DOE national Security and Military Applications of Nuclear Energy Authorization Act of 1980 (Public Law 96-164; 93 Stat. 1259, 1265) to demonstrate the safe disposal of radioactive waste materials generated by atomic energy defense activities. (2) A research and development facility, located near Carlsbad, New Mexico, to be used for demonstrating the safe disposal of TRU wastes from DOE activities.

Waste Management - The planning, coordination, and direction of those functions related to generation, handling, treatment, storage, transportation, and disposal of waste, as well as associated surveillance and maintenance activities.

Waste Minimization - (1) An action that effectively avoids or reduces the generation of waste by source

reduction, improving energy usage, or by recycling. This action is consistent with the general goal of minimizing present and future threats to human health, safety, and the environment. (2) The reduction, to the extent feasible, of hazardous waste that is generated prior to treatment, storage, or disposal of the waste. Waste minimization includes any source reduction or recycling activity that results in either (a) reduction of total volume of hazardous waste, (b) reduction of toxicity of hazardous waste or (c) both.

Waste Segregation - The separation of waste materials to facilitate handling, storage, treatment, transportation, and/or disposal.

Waste Stream - A flow of waste materials with specific definable characteristics that remain the same throughout the life of the process generating the waste stream. A waste stream is produced by a single process or sub-process; however, that process or sub-process may be one that combines two or more input waste streams together to produce a single output waste stream.

Waste Type - A category of waste. This SWMP discusses five waste types: sanitary, hazardous, mixed low-level, low-level radioactive, and transuranic wastes.

Wastewaters - Wastes that contain less than 1 percent by weight total organic carbon (TOC) and less than 1 percent by weight total suspended solids (TSS) with the following exception: F001, F002, F003, F004, F005, wastewaters are solvent-water mixtures that contain less than 1 percent by weight TOC or less than 1 percent by weight total F001, F002, F003, F004, F005 solvent constituents listed in §286.41, Table CCWE (Constituent Concentrations in Waste Extract).

Appendix B - Waste Forecasts

Waste Forecasts

Summary

The waste generation rates for continuing operations used in the Solid Waste Management Plan (SWMP) are taken from the latest revision of the 30 year Solid Waste Forecast (FY94 WSRC-RP-94-532) (with the exception of Sanitary Waste). These forecasts were also used to develop the expected generation case in the Waste Management Environmental Impact Statement (WM EIS). These 30 year forecast rates were developed using the current generation rates as a basis and were adjusted to reflect expected future operations activity and expected D&D and ER work. Detailed forecasts were submitted by the generators for FY95, 96 and 97. The 30 year forecast assumed that the years FY98 through 2000 would basically flat line what was forecasted in FY97. Recognizing that the 30 year Solid Waste Forecast was generated last year, and that significant budget changes have occurred since then, resulting in reductions in expected waste generation numbers, the SWMP has developed a realistic forecast case which is reflected in the waste stream charts. These numbers are compared against the Thirty Year forecast numbers reflecting changes in the D&D and ER schedules for the next five years.

The majority of the Hazardous and Low Level Mixed Waste generation over the next five years is primarily a new category of waste called Investigation Derived Waste (IDW). This waste is comprised of purge water, soil and mud, and personnel protective equipment. It is assumed that it will not require long term storage with the exception of the personal protective equipment and other job control wastes. These job control wastes however, are forecasted to be small quantities and are not included in Table B.1.

The Low Level volumes forecasted and shown in Table B-1 are based on the compacted volumes at a nominal 4:1 ratio and include both Intermediate tritiated and nontritiated wastes.

Transuranic waste volumes included waste contaminated with 10-100 nCi/g transuranics and transuranic-mixed waste.

Waste generation forecast numbers will likely decrease from what is projected in Table B.1 due to the current programs initiated by Solid Waste Management (SWM). The main activities within the SWM program for the handling and disposition of municipal, hazardous, low-level mixed, low-level radioactive, and transuranic waste are as follows.

- Waste Minimization and Pollution Prevention
- Waste certification
- Waste storage
- Waste treatment

These activities are discussion in more detail in sections 2.0 and 4.0 of this document.

As indicated previously, the 30 year forecast did not consider future planned major D&D and ER activities. These forecast numbers were adjusted in the Savannah River Site Waste Management Draft Environmental Impact Statement (DOE/EIS-0217). This data is shown separately in Tables B2 and B3, respectively.

When the CIF begins operation in CY96., the generation of Low Level Mixed waste will be increased by an annual rate of 2100 drums per year. This waste generation is not included in table B.1. The impact of this activity on storage needs is included in chart B.2 for LLMW.

The 30 year forecast also does not include suspect soil , contaminated rubble and non-standard waste such as contaminated equipment from Radiological Materials Management Areas (RMMA).

To have a consistent unit of measure for the waste volumes that would be the most meaningful in evaluating storage and disposal requirements, all of the generator forecasts were converted to cubic meters. The cubic meter (m^3) equivalent for the most common waste containers is as follows;

- 55 gallon Drums ------- .212 m^3/drum
- B25 boxes ---------- 2.548 m^3/box
- B12 boxes ---------- 1.274 m^3/box
- Compactible boxes ------- .151 m^3/box

Waste generation forecasts in the following table are from the 30 year forecast (FY 94 WSRC-RP-94-532), less D&D and ER. The D&D and ER forecasts are shown on tables B2 and B3.

	Volume m^3					
WASTE TYPE	CY95	CY96	CY97	CY98	CY99	CY00
HAZARDOUS	88	88	57	57	57	57
MIXED	210	802	219	219	219	219
LOW LEVEL	11970	12726	12735	12735	12735	12735
TRANSURANIC	660	665	793	793	793	793

Annual Waste Generation Forecast from Continuing Operations

TABLE B.1

Assumptions

To provide the most meaningful presentation of the waste forecasts, a series of curves, by waste type, have been prepared. These curves cover the Five Year Planning window of CY95 through CY00. The multiple curves in each chart represent the treatment and disposal scenario relative to the usable storage capacity. They contain the following information as applicable:

- The total capacity for onsite storage or disposal.
- The total cumulative volume of waste generation starting with CY95 through CY00.
- The total cumulative volume of waste that will require onsite storage or disposal. This is given assuming treatment in the Consolidated Incineration Facility (CIF), offsite treatment & disposal (where applicable) and offsite treatment & onsite disposal.

The following assumptions were made in preparation of the curves:

1. The operating conditions for the waste generators are based on the operating conditions approved in the FY95 Five Year Plan and the FY95 Annual Operating Plan (AOP). Changes in these assumed operating conditions may require a revision to this SWMP.

2. The forecasted waste generation used herein is that provided in the SRS Solid Waste Forecast - FY94 (WSRC-RP-94-532) and is subject to the assumptions contained therein.

3. The option B, Expected waste forecast (DOE/EIS-0217D) is the basis for the curves. However, other activities not indicated in option B, but presently being considered, were also included in preparation of the curves.

4. The CIF will begin operation in 1Q CY96.

5. The storage contingency plan discussed, as Issue LLW-4 in section 8 of this report, will be implemented.

6. The CIF will incinerate waste on the basis of boxed solid waste with a surface dose rate less then 10 mr/hour and meeting CIF Waste Acceptance Criteria (WAC).. This represents approximately 40 % of the Low Level waste that will be generated.

7. Selected Hazardous waste as indicated in alternative B and the expected forecast, in WM EIS (DOE/EIS-0217-D) could be incinerated in CIF.

8. The moratorium on shipments of waste from RMMA will be lifted in the 3Q CY95.

9. The mixed Waste forecast includes waste generated from CIF Blowdown and ash stabilization based on PVC reduction in feed.

Hazardous Waste (See Chart B1)

There is adequate storage space to meet the near term storage need for the current inventory and forecasted waste generation for operation related wastes. The cumulative inventory curve for operations related waste with CIF in operation in the 1QCY96 indicates adequate storage space through the year 2000. The moratorium on offsite shipment of homogeneous waste from an RMMA has been lifted, this waste will be sent offsite for treatment and disposal, and will reduce the inventory, thereby increasing the available storage space. With CIF in operation, selected waste as indicated in Alternative B and the expected forecast of the WM EIS (DOE/EIS-0217D) will be incinerated and will improve the storage capability of the existing storage facilities.

However, the current inventory and forecasted waste generation including Operation, ER and D&D indicate that storage space will be depleted in 1QCY99. Since the estimates of solid waste generated by the Transition, ER and D&D activities are considered conservatively high, they will likely be revised, or updated to reflect replanned activities due to reduced funding. As new information becomes available, it will be incorporated in future revisions of the SWMP.

Mixed Waste (See Chart B2)

There is adequate storage space to meet the near term storage need for the current inventory and forecasted waste generation for operation related wastes with the availability of the following additional storage space.

- Building 643-43E operational by the end of 3QFY95
- Pad 315-M available by the end of 4QFY95
- Pads 20-22 available by the end of 4QFY95

With CIF operation, approximately 46% of the inventory can be treated by incineration and reduce the inventory thereby increasing the available storage space. However, as a result of CIF operation, the generation of mixed waste would increase due to CIF blowdown treatment and the stabilized ash.

However, the current inventory and forecasted waste generation including Operation, ER and D&D indicate that adequate storage space will be available through CY2000.

Low Level Waste (See Chart B3)

With one vault in operation , there is adequate disposal space for Operation, ER and D&D related wastes through CY2000 as discussed in option B and C below.

The following options were included in preparation of chart B3.

Option A: This option is based on Alternative B and the Expected forecast of the WM EIS where 35% of the solid waste is incinerated in the CIF assuming a minimum volume reduction 8:1.

Current inventory and forecasted waste generation rate indicate inadequate storage space to meet the near term storage need. Storage space may be depleted in 2QCY98.

Since the estimates of solid waste generated by the Transition, ER and D&D activities are considered to be conservatively high, they will likely be revised, or updated to reflect replanned activities due to reduced funding. As new information becomes available, it will be incorporated in future revisions of the SWMP.

Option B: 40% of the solid waste is incinerated in the CIF assuming a minimum volume reduction 8:1 and 40% shipped offsite for commercial volume reduction assuming a volume reduction of 8:1, with the reduced volume returned for disposal at SRS.

Current inventory and forecasted waste generation rate indicate adequate storage space with one vault in operation beyond CY2000.

Option C: 20% reduced solid waste generation due to the effect of SRS waste minimization initiatives, with all other conditions same as option B. Reduced waste generation is based on current activities within SWM program.

This option provides adequate storage space with one vault in operation beyond CY2000.

Transuranic Waste (See Chart B4 & B4.1)

At the forecasted generation rate of operations related waste, as shown in Chart B4, currently available storage space will be adequate through the CY2000 with the following actions.

1. Existing Non-Mixed TRU Waste stored in Black Boxes (BB) will be moved off the TRU pads and relocated to non-RCRA storage location.
2. All future generation of Non-Mixed TRU waste stored in BB will be placed in a non-RCRA storage location.
3. Additional storage pads will be required to accommodate Mixed and Non-Mixed TRU waste generation.

Design effort is in progress for construction of initially one gravel pad in the southern end of EAV area for storage of TRU waste relocated from the TRU pads.

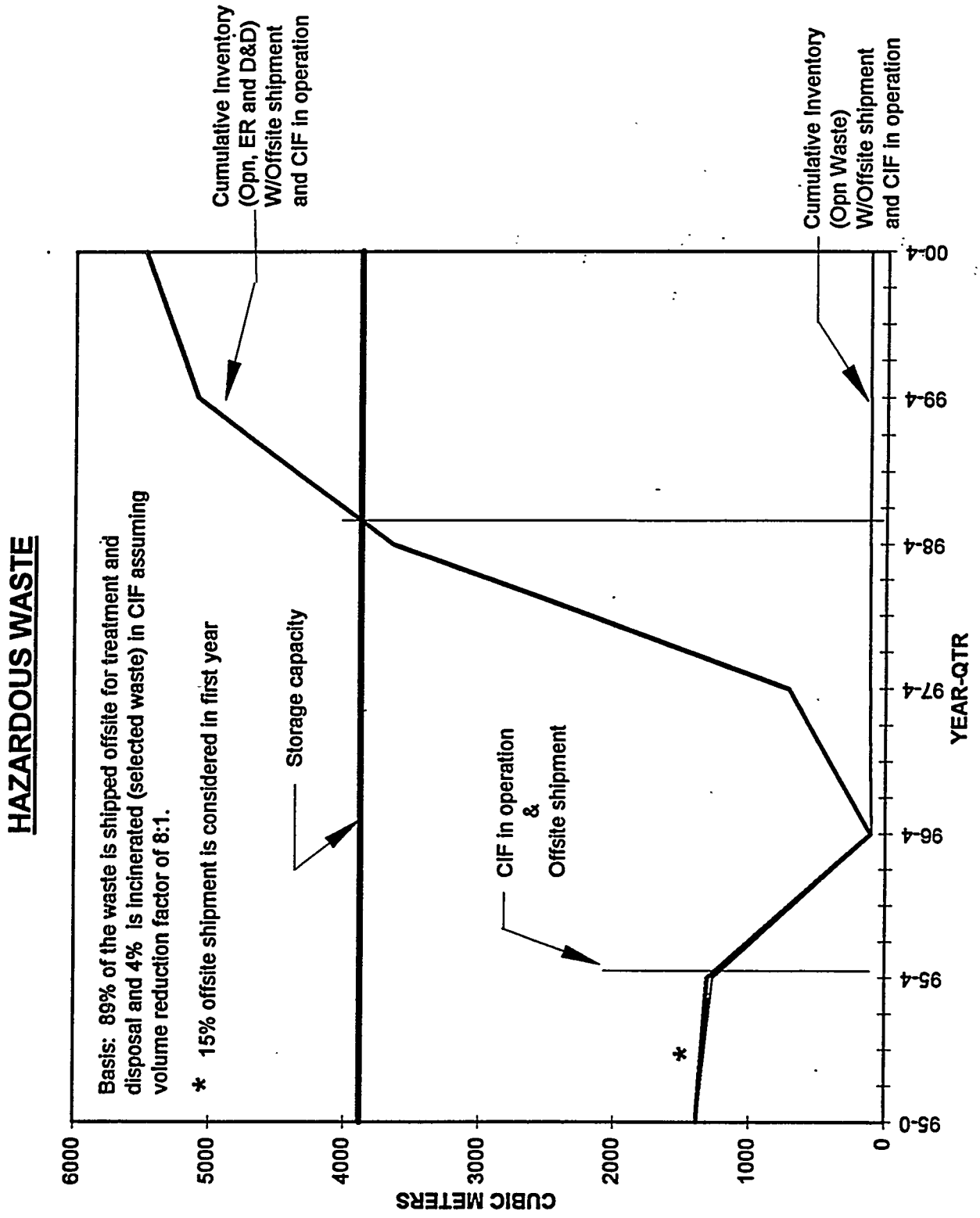

HAZARDOUS WASTE
Basis: 89% of the waste is shipped offsite for treatment and disposal and 4% is incinerated (selected waste) in CIF assuming volume reduction factor of 8:1.
* 15% offsite shipment is considered in first year
Cumulative Inventory (Opn, ER and D&D) W/Offsite shipment and CIF in operation
Cumulative Inventory (Opn Waste) W/Offsite shipment and CIF in operation
Storage capacity
CIF in operation & Offsite shipment
*
CUBIC METERS
YEAR-QTR
0
1000
2000
3000
4000
5000
6000
95-0
95-4
96-4
97-4
98-4
99-4
00-4

Chart B1

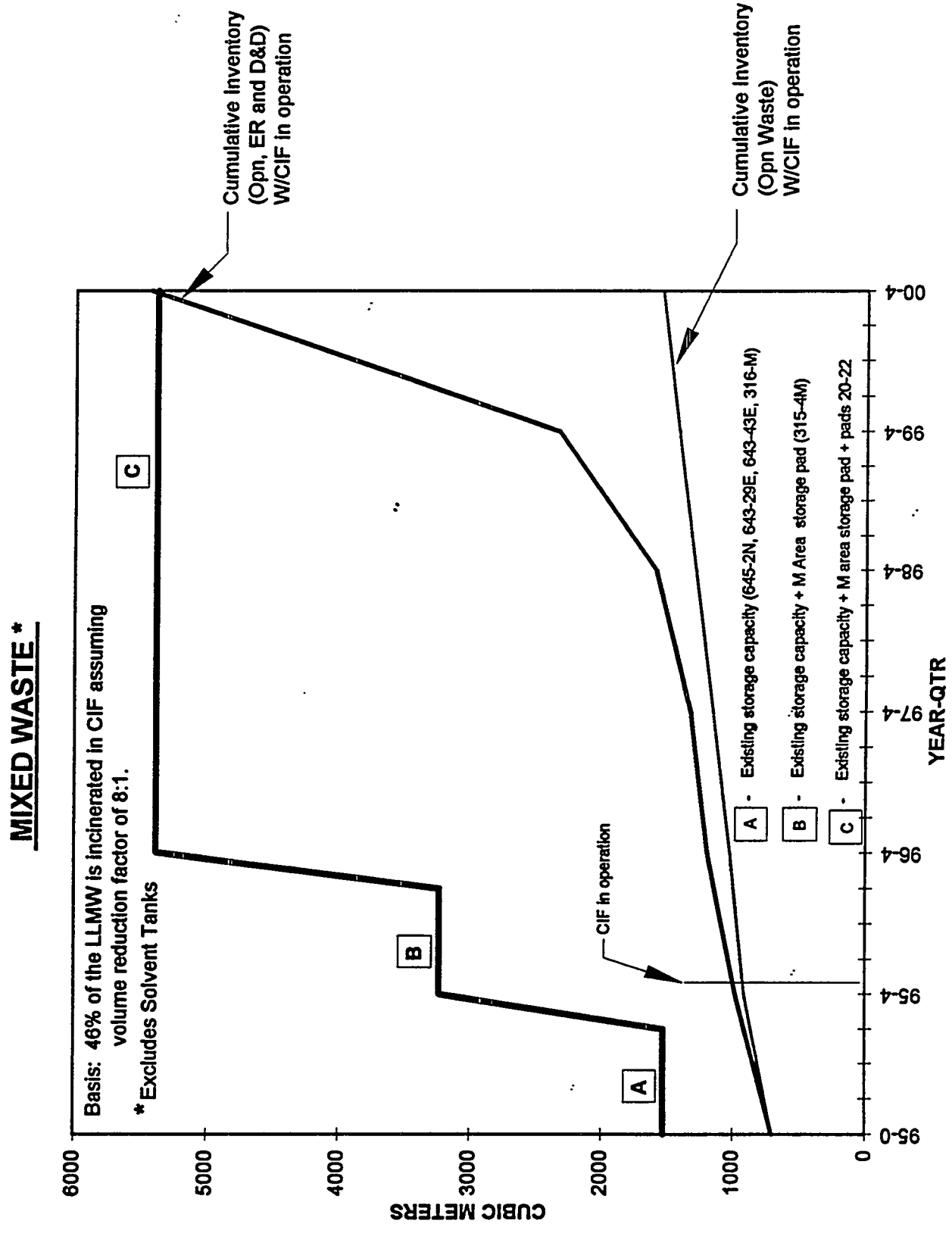

MIXED WASTE *
Basis: 46% of the LLMW is incinerated in CIF assuming volume reduction factor of 8:1.
* Excludes Solvent Tanks
Cumulative Inventory (Opn, ER and D&D) W/CIF in operation
Cumulative Inventory (Opn Waste) W/CIF in operation
CIF in operation
A - Existing storage capacity (645-2N, 643-29E, 643-43E, 316-M)
B - Existing storage capacity + M Area storage pad (315-4M)
C - Existing storage capacity + M area storage pad + pads 20-22
CUBIC METERS
YEAR-QTR
0
1000
2000
3000
4000
5000
6000
95-0
95-4
96-4
97-4
98-4
99-4
00-4

Chart B2

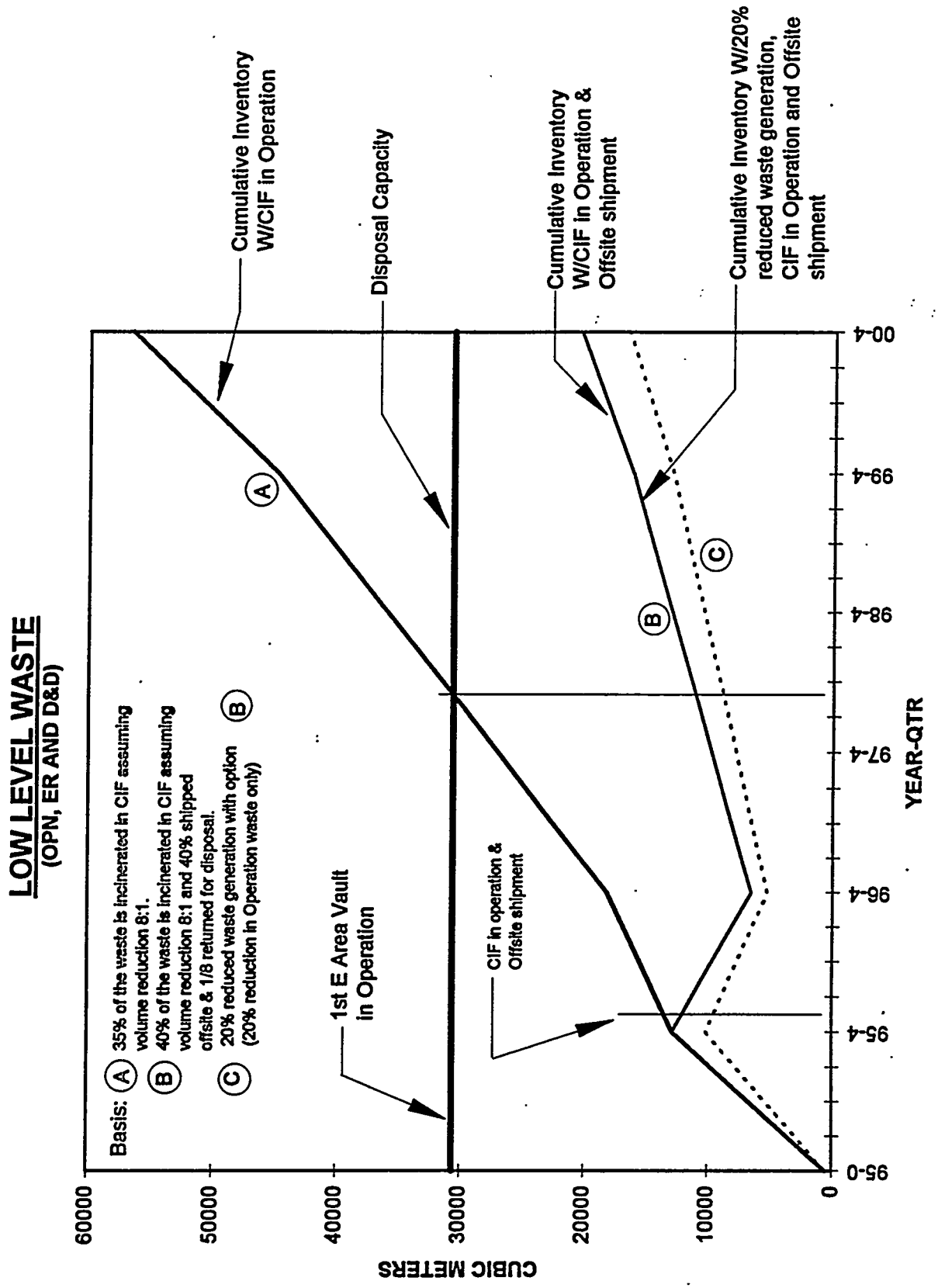

LOW LEVEL WASTE
(OPN, ER AND D&D)
Basis: (A) 35% of the waste is incinerated in CIF assuming volume reduction 8:1.
(B) 40% of the waste is incinerated in CIF assuming volume reduction 8:1 and 40% shipped offsite & 1/8 returned for disposal.
(C) 20% reduced waste generation with option (B) (20% reduction in Operation waste only)
Cumulative Inventory W/CIF in Operation
Disposal Capacity
Cumulative Inventory W/CIF in Operation & Offsite shipment
Cumulative Inventory W/20% reduced waste generation, CIF in Operation and Offsite shipment
1st E Area Vault in Operation
CIF in operation & Offsite shipment
A
B
C
CUBIC METERS
60000
50000
40000
30000
20000
10000
0
YEAR-QTR
95-0
95-4
96-4
97-4
98-4
99-4
00-4

Chart B3

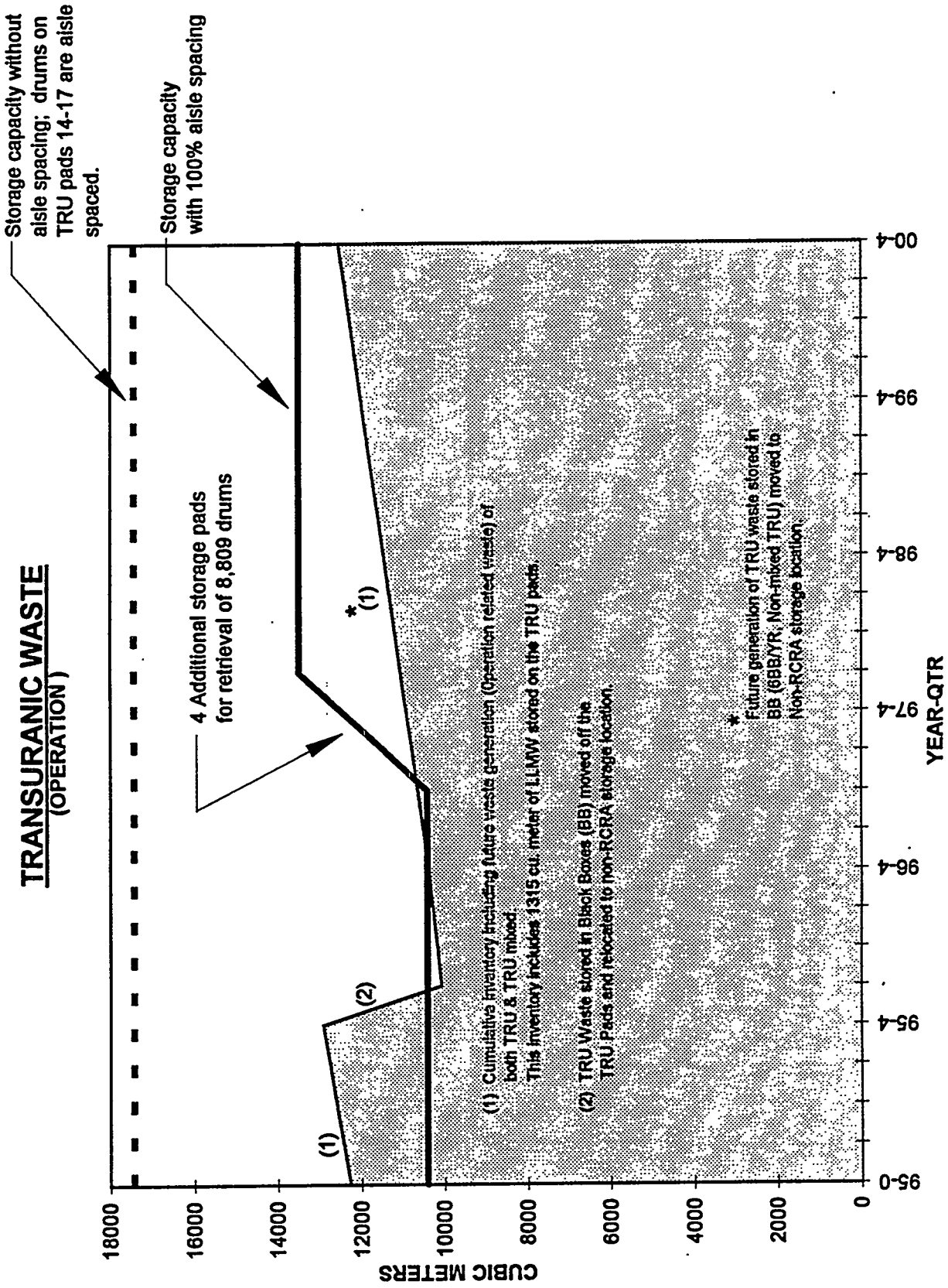

TRANSURANIC WASTE
(OPERATION)
Storage capacity without aisle spacing; drums on TRU pads 14-17 are aisle spaced.
Storage capacity with 100% aisle spacing
4 Additional storage pads for retrieval of 8,809 drums
(1)
(2)
*(1)
(1) Cumulative inventory including future waste generation (Operation related waste) of both TRU & TRU mixed
This inventory includes 1315 cu. meter of LLMW stored on the TRU pads.
(2) TRU Waste stored in Black Boxes (BB) moved off the TRU Pads and relocated to non-RCRA storage location.
* Future generation of TRU waste stored in BB (6BB/YR, Non-mixed TRU) moved to Non-RCRA storage location.
CUBIC METERS
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
95-0
99-4
98-4
97-4
96-4
95-4
00-4
YEAR-QTR

Chart B4

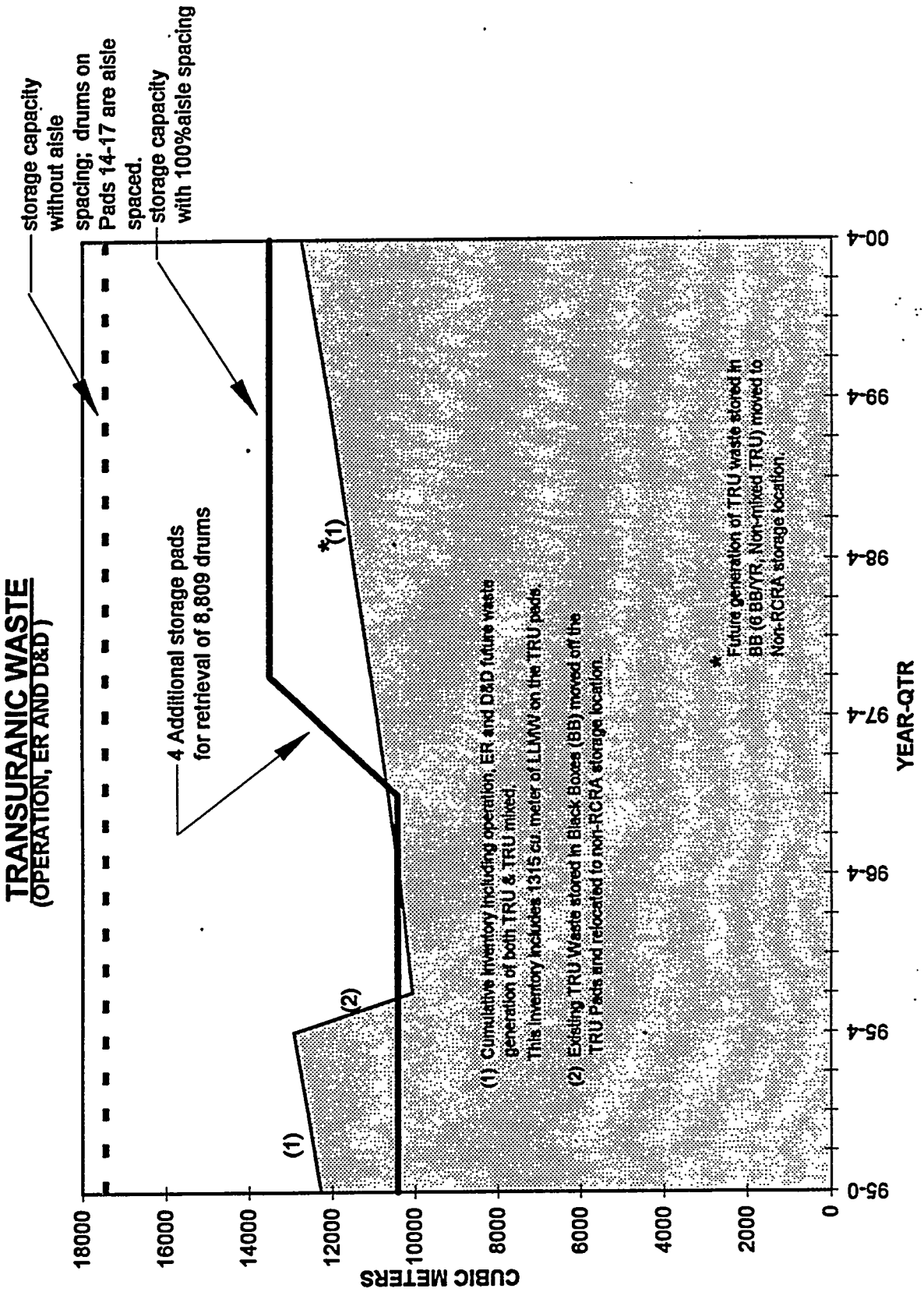

TRANSURANIC WASTE
(OPERATION, ER AND D&D)
storage capacity without aisle spacing; drums on Pads 14-17 are aisle spaced.
storage capacity with 100%aisle spacing
4 Additional storage pads for retrieval of 8,809 drums
(1)
(2)
*(1)
(1) Cumulative inventory including operation, ER and D&D future waste generation of both TRU & TRU mixed.
This inventory includes 1315 cu. meter of LLMW on the TRU pads.
(2) Existing TRU Waste stored in Black Boxes (BB) moved off the TRU Pads and relocated to non-RCRA storage location.
* Future generation of TRU waste stored in BB (6 BB/YR, Non-mixed TRU) moved to Non-RCRA storage location.
CUBIC METERS
YEAR-QTR
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
95-0
95-4
96-4
97-4
98-4
99-4
00-4

Chart B4.1

Table B2

Forecast of solid waste volumes generated by D&D in the period 1995-2000

Volume (m³)								
Fiscal Year	1995*	1996*	1997	1998	1999	2000		
Waste Type							Total	% of Total
LLW	277	598	0	206	33	4,229	5,343	39.3
LLMW	66	217	0	26	0	3,755	4,064	29.9
HW	10	33	1,694	216	973	1,107	4,033	29.6
TRU	0	0	0	37	0	133	170	1.2
Total	353	848	1,694	485	1,006	9,224	13,610	
% of Total	2.6	6.2	12.4	3.6	7.4	67.8		

* Years of funded D&D activities

Table B3

Forecast of solid waste volumes generated by ER in the period 1995-2000

Volume (m³)								
Year	1995	1996	1997	1998	1999	2000		
Waste Type							Total	% of Total
LLW	0	0	0	0	0	0	0	0
LLMW	0	0	0	200	1,011	1,230	2,441	2.9
HW	50	0	6,306	38,840	31,433	4,050	80,679	97.1
TRU	0	0	0	0	0	0	0	0
Total	50	0	6,306	39,040	32,444	5,280	83,120	
% of Total	0.1	0	7.6	47	39	6.4		

Table B4

Forecast of solid waste total volumes generated by D&D and ER for the period 1995-2000

	Volume (m³)			% of Waste		
	D&D	ER	Total	D&D	ER	Total
Waste Type						
LLW	5,343	0	5,343	100	0	100
LLMW	4,064	2,441	6,505	62	38	100
HW	4,033	80,679	84,712	5	95	100
TRU	170	0	170	100	0	100
Total	13,610	83,120	96,730			
%	14	86	100			

Table B5

Summary - SFIA Building/Structure Grouping By WSRC Division

	Group					
Division	I	II	III	IV	V	Total
SWER	1	0	0	0	117	118
NMPD	11	0	0	34	330	375
HLWM	0	3	1	0	498	502
E&CSD	0	0	0	2	716	718
Site Services	52	5	1	22	610	690
EF&RFSP	123	0	37	45	137	342
SS & ES	0	0	0	0	50	50
A & L	0	0	0	0	22	22
OT & A	0	0	0	0	1	1
ESH & QA	0	0	0	0	1	1
SREL*	0	0	0	0	25	25
USFS*	0	0	0	0	18	18
TOTALS	187	8	39	103	2525	2862

Notes

1. * Not WSRC Division. Asset owner organization responsible to DOE-SR

2. SFIA Group definitions-

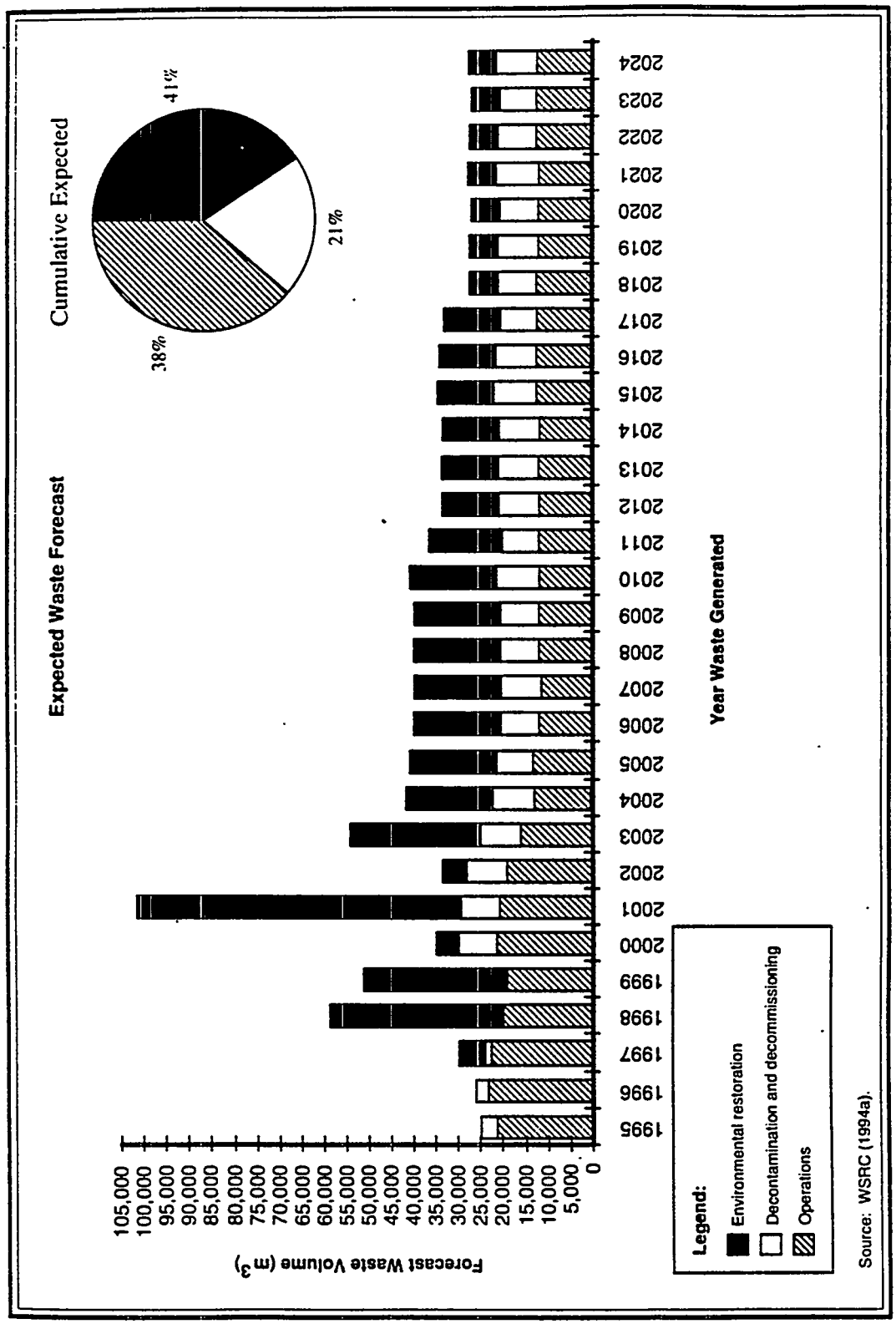
   Group I - Surplus Now

   Group II - Surplus, but not identified as such

   Group III - will be surplus within 5 years

   Group IV - "Watchlist" - Diminishing funding

   Group V - All other conditions; Active, uncontaminated, already owned by EM-40



Annual estimates of waste generated by each SRS mission activity for the 30-year expected waste forecast.

Figure B1

Appendix C - Regulatory Requirements

FEDERAL ACTS AND REGULATIONS

Federal regulatory requirements are minimum national standards for compliance. The EPA may delegate its regulatory authority by allowing individual states to regulate specific programs. This is why more than one regulating authority may appear in this document.

STATUTE: **The Emergency Planning and Community-Right-to-Know-Act (EPCRA) of 1986**

42 United States Code (U.S.C.) § 9601, Title III

REGULATING AUTHORITY: **Environmental Protection Agency (EPA) and SCDHEC**

SHORT DESCRIPTION:

The Emergency Planning and Community-Right-to-Know-Act (EPCRA) of 1986, enacted as a provision to SARA, requires industries to report the hazardous substances used at their facilities to state and local emergency planning units. This requirement includes reporting inventories (amounts onsite and typical usage) of these substances. Industries must also report all planned and unplanned releases to the environment.

Under SARA, SRS must file an annual Tier II Inventory Report by March 1 to the South Carolina Emergency Response Commission and to the local emergency planning committees in Aiken, Barnwell, and Allendale counties. SRS also supplies the report to Georgia's Emergency Response Commission as a courtesy. This inventory report lists all hazardous materials stored onsite in excess of specified quantities during the previous calendar year. (As required by SCDHEC, SRS uses a Tier II report as opposed to a Tier I report. The Tier II report documents chemical-specific data and gives more information than the Tier I report. For example, on the Tier I report, acids are listed only as "acids," while the Tier II report identifies specific acids and lists them separately).

SRS must also file an annual Toxic Chemical Release Inventory Report to the EPA and SCDHEC by July 1 for regulated chemicals if the combined usage of a chemical exceeded 10,000 LB during the previous calendar year.

STATUTE: **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**

42 U.S.C. § 9601 et seq.

REGULATING AUTHORITY: **Environmental Protection Agency (EPA)**

SHORT DESCRIPTION:

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, Public Law 96-510) as amended by the Superfund Amendments and Reauthorization Act (SARA, Public Law 99-499) in 1986, provides liability, compensation, cleanup, and emergency response for hazardous substances released to the environment. In December 1989, SRS was officially included on the National Priority List (NPL) or Superfund List. In accordance with Section 120 of CERCLA, DOE negotiated a Federal Facility Agreement (FFA) with the EPA-Region IV and SCDHEC to coordinate CERCLA and Resource Conservation and Recovery Act (RCRA) activities at SRS into one comprehensive strategy. The agreement was signed January 15, 1993 (see Resource Conservation and Recovery Act, Facility Investigation Program).

CERCLA also requires public participation in the selection of remediation alternatives. Included in this process is the establishment of an Administrative Record that documents the remediation alternatives and allows public review of these alternatives. The SRS Public Involvement Plan (PIP) addresses the requirements of CERCLA, RCRA, and the National Environmental Policy Act (NEPA).

CERCLA requires that the National Response Center (operated by the U. S. Coast Guard) be notified in the event that a non-permitted release of a reportable quantity of hazardous substance or radionuclide occurs. Materials are considered "released" when they are spilled, pumped, or leaked to the environment, or, enclosed in barrels or other closed containers which are then lost, discarded or abandoned. The CERCLA-reportable quantity varies according to the material (as specified in Table 302.4 of the CERCLA Regulations).

In the case of such a release, the SRS alerts the National Response Center to decide if government response is appropriate and to assess the response measures already taken. If the release of a reportable quantity could result in exposure of persons outside the boundaries of the facility (SRS boundary), the Emergency Planning and Community Right-to-Know Act (EPCRA) requires that the Local Emergency Planning Committee and the State Emergency Response commission of an area likely to be affected be notified.

STATUTE: **Resource Conservation and Recovery Act (RCRA)**

42 U.S.C. § 6901 et seq.

REGULATING AUTHORITY: **Environmental Protection Agency (EPA) and South Carolina Department of Health and Environmental Control (SCDHEC)**

SHORT DESCRIPTION:

The federal Resource Conservation and Recovery Act (RCRA) regulates the management of hazardous waste, non-hazardous waste, underground storage tanks containing petroleum products and hazardous substances, and medical waste. Subtitle C of RCRA mandates that hazardous wastes be treated, stored and disposed of in a manner that will minimize the threat to human health and the environment. To carry out this mandate, RCRA requires that owners and operators of hazardous waste management facilities obtain operating or post-closure care permits for certain waste management activities. Subtitle D of RCRA establishes the framework for the management of non-hazardous solid wastes.

Land Disposal Restrictions

The land disposal restrictions apply to waste management activities under two environmental laws -- the Resource Conservation and Recovery Act (RCRA) and the Safe Drinking Water Act (SDWA). The SDWA controls underground injection of hazardous wastes in deep wells; all other land disposal activities are regulated by RCRA.

The basic purpose of the land disposal restrictions is to prohibit the placement of untreated wastes in or on the land, thus encouraging waste minimization and waste recycling. Congress established the basic framework for the land disposal restrictions when it passed the Hazardous and Solid Waste Amendments of 1984 (HSWA). Eight major final rules have been published establishing land disposal restrictions for different types of wastes and different waste management activities.

The basic component of the land disposal restriction is that EPA must establish treatment standards that are protective of human health and the environment when the wastes are land disposed. Land disposal includes placement in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome or salt bed formation, underground mine or cave, or concrete vault or bunker.

The treatment standards either require the use of one or more specified treatment technologies, or require that wastes be treated to meet certain concentration limits on hazardous constituents. Where concentration limits are used, EPA assumes that a waste is treated with the best demonstrated available technology (BDAT), but the concentration of hazardous constituents in any treatment residues being land disposed cannot be higher than those obtained using BDAT.

Once BDAT has been identified for a particular waste, EPA next establishes an effective date for the land disposal restrictions based on the availability of BDAT capacity. The capacity determination is made on a nationwide basis -- no allowance is made for the fact that waste from a specific facility might have to be shipped all the way across the country to utilize the available capacity. If inadequate capacity exists to handle additional wastes subject to the land disposal restrictions, EPA can delay the effective date of the treatment standards for up to two years.

Underground Storage Tanks

Underground storage tanks at SRS store petroleum products such as gasoline, diesel fuel, and hazardous substances (as defined by CERCLA). All of these tanks are regulated under Subtitle I of RCRA. DOE-SR began a program to abandon or remove all regulated single-wall storage tanks at SRS by 1998. In areas where underground tanks are still needed, WSRC will replace the tanks with double-walled tanks having leak detection systems. The FFA addresses requirements for the High-Level Radioactive Waste Tank Systems.

STATUTE: **Clean Air Act (CAA) of 1970**

Clean Air Act Amendments of 1990

42 U.S.C. § 7401 et seq.

REGULATING AUTHORITY: **Environmental Protection Agency (EPA) and South Carolina Department of Health and Environmental Control (SCDHEC)**

SHORT DESCRIPTION:

The Federal Clean Air Act (CAA) establishes air quality and emission limits throughout the United States.

National Emissions Standards of Hazardous Air Pollutants (NESHAP)

The National Emissions Standards of Hazardous Air Pollutants (NESHAP) is a section of the CAA which sets air quality standards for air emissions of hazardous constituents such as radionuclides, benzene and asbestos.

For radioactive emission sources which have a potential to cause greater than 0.1 mrem/year dose to an offsite individual, NESHAP regulations require specific EPA-approved instrumentation, monitoring requirements, sampling methodology, calculations, point-source inventory and modeling. SRS has negotiated with the regulatory agencies an FFCA addressing those sources which currently do not meet the technology specified in 40 CFR 60 subpart H.

Asbestos Removal Program

Early construction projects at SRS used a significant amount of asbestos in fireproof wallboard (transit), gasket materials, ceiling tile, insulation floor tiles, roofing felt, and electric wiring. Consequently, the site has maintained an active asbestos removal program for the past six years, with only trained and licensed personnel removing asbestos. The NESHAP standard does not set a numerical threshold for asbestos fiber emissions; instead, it requires persons conducting asbestos-related activities, to follow approved procedures, and to adopt specific work practices to prevent releases of asbestos to the air. Asbestos is removed during maintenance and renovations of equipment and buildings. In 1992 SRS removed 11,384 linear feet and 5, 612 square feet of asbestos pipe and surface insulation. SRS also removed 81,671 square feet of transit panels in 1992.

Clean Air Act Amendments of 1990

There are 11 Sections identified as Titles in the new amendments. Title III addresses hazardous air pollutants and will have the most impact on SRS. Title V details permitting requirements. SCDHEC shall release their State Implementation Plan (SIP) not later than November 1993. As Maximum Achievable Control Technology (MACT) standards are promulgated SRS will have to comply with all applicable standards. Title VI is targeted toward phasing out chlorofluorocarbons and other ozone depleters. Title VII specifies fines and penalties, as well as "award fees" for reporting violators.

STATUTE: **Toxic Substance Control Act (TSCA)**

7 U.S.C. § 136 et seq.

REGULATING AUTHORITY: **Environmental Protection Agency (EPA)**

SHORT DESCRIPTION:

TSCA gives the EPA comprehensive authority to identify and control chemical substances manufactured, imported, processed or used. TSCA applies to all chemicals with the exception of nuclear materials, pesticides, food and drugs, tobacco products and fire arms related materials. Reporting and record keeping is mandated for new chemicals and for any chemical that may present a substantial risk of injury to health or the environment. The objectives of TSCA include the development of adequate data to determine the health and environmental effects of chemicals and to control any chemicals that present an unreasonable risk of injury. The sections of the Act most relevant to the Department of Energy (DOE) deal with requirements for:

- Regulating certain chemicals such as Polychlorinated Biphenyls (PCBs) that may be used in DOE facilities or processes.
- Maintaining long-term records on adverse reactions to health and environment alleged to have been caused by a substance or mixture and to permit inspection and submit copies of such records.

TSCA's primary impact to DOE is through its regulation of PCBs. Other regulations restrict the availability of materials for purchase by the DOE. Regulations important to DOE include the following from Title 40 of the Code of Federal Regulations (CFR):

- 40 CFR 717 Records and Reports of Allegations that Chemical Substances Cause Significant Adverse Reactions to Health or the Environment
- 40 CFR 761 Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce and Use Prohibitions

Determinations regarding compliance with TSCA must be made on a case-specific basis if a DOE activity involves the manufacture, processing, distribution in commerce, use, and/or disposal of a new or existing chemical substance or mixture that may present an unreasonable risk of injury to health or the environment.

By definition, TSCA regulated chemical substances and mixtures do not include "...any source material, special nuclear material, or byproduct material (as such terms are defined in the Atomic Energy Act of 1954 and regulations issued under such Act)..." [TSCA, Section 3(2)(B)(iv)]. Although TSCA excludes nuclear material, the TSCA-regulated portion of a mixed nuclear and regulated waste must comply with TSCA requirements.

STATUTE: **National Environmental Policy Act (NEPA)**

42 U.S.C. § 4321 et. seq.

REGULATING AUTHORITY: **Council of Environmental Quality (CEQ)**

SHORT DESCRIPTION:

The National Environmental Policy Act (NEPA) provides a means to evaluate the potential environmental impacts of proposed federal activities and to examine alternatives to those actions. In 1982, a formal NEPA compliance program was established at SRS.

REGULATION: Refrigerant Recycling

REGULATING AUTHORITY: Environmental Protection Agency (EPA)

SHORT DESCRIPTION:

Under the authority of the Clean Air Act Amendments of 1990, Title VI, the U.S. Environmental Protection Agency (EPA) has established regulations that accelerate the domestic phase out schedule for ozone depleting substances. Under these regulations, venting of class I and class II substances (

[Chlorofluorocarbons (CFC) and Hydrochlorofluorocarbons (HCFC)] is prohibited and the manufacturing of these substances will be phased out over the next several years. The cessation of the production of halons by January 1, 1994, and class I substances (CFCs) by the end of 1995 will require retrofitting or replacement of fire suppression systems, process chiller units, air conditioners and refrigeration units throughout SRS.

REGULATION: Federal Facility Compliance Act of 1992

REGULATING AUTHORITY: South Carolina Department of Health and Environmental Control (SCDHEC)

SHORT DESCRIPTION:

On October 6, 1992, the Federal Facility Compliance Act (FFCAct) was signed into law, waiving sovereign immunity of a Federal Facility from RCRA civil and criminal liabilities. The law requires the federal facilities submit a complete inventory of mixed waste stored and available and planned technologies designed to treat the mixed waste. This documentation is to be distributed to the EPA and each Governor's office in the state in which a DOE installation was located. The first deliverable was the Mixed Waste Inventory Report and Treatment Capacity Report, a DOE complex-wide document that was submitted on April 21, 1993.

Under the Act, DOE sites were also required to develop a site treatment plan between DOE, EPA and SCDHEC. Per the Federal Register, DOE is to submit a report in three phases to facilitate regulator's/stakeholders review and input. The conceptual report was issued in October 1993. The Draft Site Treatment Plan was completed in August 1994 and the Proposed Site Treatment Plan was submitted 30 March, 1995. **A Compliance Order must be signed by SCDHEC and DOE prior to 6 October, 1995.**

STATE ACTS AND REGULATIONS

Many of the South Carolina state laws mirror the federal laws. To obtain authority to administer regulatory programs, states must enact laws and regulations that are at least as restrictive as the EPA laws on which they are based. As with the federal laws, SRS must comply with all applicable state laws.

REGULATION: **South Carolina Solid Waste Policy and Management Act**

REGULATING AUTHORITY: **South Carolina Department of Health and Environmental Control (SCDHEC)**

SHORT DESCRIPTION:

The South Carolina Solid Waste Policy and Management Act (SCWPMA) became law in June 1991, due to inadequate regulations regarding solid waste and solid waste disposal. This law establishes the policy for the state of South Carolina regarding solid waste and provisions for the management of solid waste within the state.

REGULATION: **South Carolina Pollution Control Act**

REGULATING AUTHORITY: **South Carolina Department of Health and Environmental Control (SCDHEC)**

SHORT DESCRIPTION:

The public policy of South Carolina is to maintain reasonable standards of purity of air and water resources. This act grants SCDHEC the authority to abate, control, and prevent pollution. It also requires a permit to discharge sanitary wastewaters into the environment and requires continued compliance with the conditions of this permit.

REGULATION: **South Carolina Drinking Water Regulations**

(R.61-58)

REGULATING AUTHORITY: **South Carolina Department of Health and Environmental Control (SCDHEC)**

SHORT DESCRIPTION:

South Carolina Drinking Water Regulations 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. The SWMF complies with the South Carolina Drinking Water Regulations through coordination with Central Shops Works Engineering, the custodian of the domestic water distribution system.

REGULATION: **South Carolina Wastewater Regulations (R.61-67)**

REGULATING AUTHORITY: **South Carolina Department of Health and Environmental Control (SCDHEC)**

SHORT DESCRIPTION:

South Carolina Wastewater Regulations 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. This permit program is driven by the SC Pollution Control Act.

REGULATION: **South Carolina 72-300 (Standards for Stormwater Management and Sediment Reduction)**

REGULATING AUTHORITY: **South Carolina Land Resources Conservation Commission (LRCC)**

SHORT DESCRIPTION:

On May 26, 1993, the Land Resources Conservation Commission (LRCC) gained regulatory oversight in South Carolina. Any land disturbance activity requires an approved Storm Water Management and Sediment Reduction Plan prior to any construction/remediation.

REGULATION: **SCDHEC NPDES Permit Regulation**

REGULATING AUTHORITY: **South Carolina Department of Health and Environmental Control (SCDHEC)**

SHORT DESCRIPTION:

SCDHEC NPDES Permit (SC0000175 and SC0044903) 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. **SCDHEC NPDES Permit (SCR0000000)** authorizes stormwater discharges associated with industrial activity and requires that SRS implement a Stormwater Pollution Prevention Plan by October 1, 1993. **SCDHEC NPDES Permit (SCR100000)** authorizes stormwater discharges associated with industrial activity from construction sites that will result in the disturbance of 5 or more acres of total land area and will require preparation of a Stormwater Pollution Prevention Plan if eligible land-disturbing activities are undertaken.

REGULATION: **South Carolina Air Pollution Control Regulations (R.61-62)**

REGULATING AUTHORITY: **South Carolina Department of Health and Environmental Control (SCDHEC)**

SHORT DESCRIPTION:

South Carolina Air Pollution Control Regulations set standard requirements for construction and operating permits and for renewing permits, and require emergency action plans to deal with releases of hazardous air pollutants.

REGULATION: **South Carolina Ambient Air Quality Standards (R.61-62.5)**

REGULATING AUTHORITY: **South Carolina Department of Health and Environmental Control (SCDHEC)**

SHORT DESCRIPTION:

South Carolina Ambient Air Quality Standards set standards for visible emissions and requirements for opacity monitoring and source tests. This regulation also sets emissions limitations for certain source types and Prevention of Significant Deterioration (PSD) requirements.

REGULATION: **Industrial Solid Waste Disposal Site Regulation (R.61-66)**

REGULATING AUTHORITY: **South Carolina Department of Health and Environmental Control (SCDHEC)**

SHORT DESCRIPTION:

Industrial Solid Waste Disposal Site Regulation requires a permit for operating any industrial solid waste system and groundwater monitoring may be required as a condition of the permit. This regulation will soon undergo substantial changes, as required by the South Carolina Solid Waste Policy and Management Act of 1991.

REGULATION: **South Carolina Wastewater Regulations (R.61-67)**

REGULATING AUTHORITY: **South Carolina Department of Health and Environmental Control (SCDHEC)**

SHORT DESCRIPTION:

South Carolina Wastewater Regulations 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.

REGULATIONS: **South Carolina Hazardous Waste Management Regulations (R.61-79.124, R.61-79.260 -.270)**

REGULATING AUTHORITY: **South Carolina Department of Health and Environmental Control (SCDHEC)**

SHORT DESCRIPTION:

South Carolina Hazardous Waste Management Regulations describe the requirements of the hazardous waste management program administered by the State. Hazardous waste management in the Hazardous Waste Storage Facility (HWSF) is conducted under a Part B Permit issued in 1987. The Part B Permit was modified in 1992 to include the Consolidated Incineration Facility and construction began in January 1993. The Part B renewal permit applications for the permitted facilities were submitted to SCDHEC and are currently under review. 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 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 these regulations establish minimum standards on the

management of hazardous waste for owners or operators of permitted and interim status hazardous waste treatment, storage, and disposal facilities.

REGULATION: **South Carolina Hazardous Waste Facility Siting Standards (R.61-104)**

REGULATING AUTHORITY: **South Carolina Department of Health and Environmental Control (SCDHEC)**

SHORT DESCRIPTION:

South Carolina Hazardous Waste Facility Siting Standards establishes standards for the location of hazardous waste facilities that maximizes the protection of human health and the environment. These regulations became effective in South Carolina in 1991. Under these new regulations, existing and expanding permitted hazardous waste management facilities were required to submit a compliance demonstration within 180 days of the effective date of the regulation. Existing interim status facilities and planned facilities must demonstrate compliance with the siting standards as part of the permitting process.

REGULATION: **South Carolina Municipal Solid Waste Landfill Regulation (R.61-107.258)**

REGULATING AUTHORITY: **South Carolina Department of Health and Environmental Control (SCDHEC)**

SHORT DESCRIPTION:

South Carolina Municipal Solid Waste Landfill (MSWLF) Regulation went into effect in 1993 and requires an owner or operator of a solid waste disposal facility to obtain a permit to operate a municipal solid waste landfill. In addition, the MSWLF regulation contains provisions pertaining to location restrictions, operating criteria, design criteria, groundwater monitoring, corrective action, closure and post-closure care, and financial assurance. This regulation is the South Carolina equivalent of the Federal RCRA Subtitle D regulation.

CONSENT ORDERS AND AGREEMENTS

AGREEMENT: **Settlement Agreement 90-64-SW**

REGULATING AUTHORITY: **South Carolina Department of Health and Environmental Control (SCDHEC)**

SHORT DESCRIPTION:

Settlement Agreement 90-64-SW required SRS to conduct a survey of the entire site to determine locations where hazardous wastes were stored for more than 90 days in an area that did not have interim status or stored in any area that was not included in the hazardous waste permit for storage. SRS was given until March 1, 1991, to correct any deficiencies found during the survey. All deficiencies were corrected by the Agreement date, or in one case, within the 15 day extension period granted by SCDHEC. SRS added two additional deficiencies to the original list of locations. Both of these deficiencies were corrected before March 1, 1991.

AGREEMENT: **Settlement Agreement 87-52-SW**

REGULATING AUTHORITY: **South Carolina Department of Health and Environmental Control (SCDHEC)**

SHORT DESCRIPTION:

Settlement Agreement 87-52-SW required DOE to submit a revised Part B Permit Application for the RCRA post-closure of the Mixed Waste Management Facility (MWMF). DOE agreed to include additional groundwater monitoring information requested by SCDHEC.

AGREEMENT: **Settlement Agreement 91-51-SW**

REGULATING AUTHORITY: **South Carolina Department of Health and Environmental Control (SCDHEC)**

SHORT DESCRIPTION:

SCDHEC determined that DOE has violated South Carolina Hazardous Waste Regulations when rags or wipes contaminated with listed solvents were land disposed in portions of the Low Level Radioactive Waste Disposal Facility (LLRWDF) and the Sanitary Landfill. By entering into **Settlement Agreement 91-51-SW,** DOE agreed to refrain from further disposal of F listed solvent contaminated rags and wipes in the LLRWDF and the sanitary landfill and to manage those facilities that received solvent rags as interim status hazardous waste facilities. In addition, DOE has agreed to complete closure of those facilities meeting all requirements of RCRA.

AGREEMENT: **Federal Facility Agreement (FFA)**

REGULATING AUTHORITY: **Environmental Protection Agency (EPA) and South Carolina Department of Health and Environmental Control (SCDHEC)**

SHORT DESCRIPTION:

Federal Facility Agreement (FFA)

In accordance with Section 120 of CERCLA, DOE negotiated a Federal Facility Agreement (FFA) with the EPA-Region IV and SCDHEC to coordinate CERCLA and RCRA activities at SRS into one comprehensive strategy. This Agreement outlines the framework of remediation and schedules for producing work plans and site investigations.

AGREEMENT: **Land Disposal Restrictions (LDR) Federal Facility Compliance Agreement (FFCA)**

REGULATING AUTHORITY: **Environmental Protection Agency (EPA)**

SHORT DESCRIPTION:

LDR FFCA

On March 13, 1991, EPA and DOE-SR signed a Federal Facility Compliance Agreement to address SRS mixed (radioactive and hazardous) waste compliance with RCRA Land Disposal Restrictions. The FFCA allows SRS to continue to generate and store mixed wastes that are prohibited from land disposal. The Agreement was amended on April 24, 1992, to include third thirds waste streams that had become prohibited from land disposal with the expiration of a National Capacity Variance for Third Thirds mixed waste; it was amended again on April 2, 1993, to address facility changes.

TRANSPORTATION STATUTES AND REGULATIONS

STATUTE: **Transportation Safety Act of 1974, Title I, Hazardous Materials Transportation Act (HMTA), 49 U.S.C. 1801 et seq.**

REGULATING AUTHORITY: **U. S. DOT / Research and Special Programs Administration (RSPA).**

SHORT DESCRIPTION:

- Gave the Secretary of Transportation authority to promulgate and enforce hazardous materials regulations in interstate, intrastate and foreign commerce.
- Granted authority to the DOT to enforce the regulations by inspection and investigation and to levy civil and criminal penalties when violations occur.
- The RSPA was established to administer the regulatory program within the DOT.

STATUTE: **Hazardous Materials Transportation Uniform Safety Act of 1990 (HMTUSA), 49 U.S.C. App.1801.**

REGULATING AUTHORITY: **U. S. DOT.**

SHORT DESCRIPTION:

- Was enacted to promote the public health, welfare, and safety and to achieve greater uniformity by providing Federal standards for regulating the transportation of hazardous materials in interstate, intrastate, or foreign commerce.
- Redefined terms to clarify the applicability of the DOT's hazardous material regulations (HMR) to any government, or instrumentality thereof, when it offers hazardous materials for transportation in commerce. The scope of applicability of Federal, State, or local law, pertinent to HMR, is clearly stated to include any person under contract with any branch of the Federal government.
- Reaffirmed the DOT's preemptive authority to regulate the packaging and transportation of hazardous materials, including hazardous substances and hazardous wastes, in commerce.
- Directed the EPA's cooperation in assisting the Secretary of Transportation with the execution of responsibilities authorized by this act.
- Provided for the mandatory filing of registration statements by the shippers and carriers of hazardous materials and the permitting of carriers based on documented safety and financial responsibility.
- Defined additional federal standards for the training of employees performing functions subject to the HMR.
- Authorized the issuance of federal standards to be used by the States, Indian tribes, or other governments in establishing, maintaining, and enforcing highway route controls for hazardous materials transportation. The need for consultation and cooperation of those involved in route designations is addressed. Minimum procedural requirements for ensuring public participation in the process are mandatory.
- Authorized specific allocations of DOT inspectors (federal agents) to promote safety in the transportation of radioactive materials and to facilitate enforcement activities.
- Increased the civil and criminal penalties for violations of the HMR.

- Authorized the appropriation of Federal funding through 1993 to carry out the requirements of the HMTUSA.

REGULATIONS: **U. S. Code of Federal Regulations (CFR), Title 10 - Energy Chapter I - Nuclear Regulatory Commission (NRC) Part 71: Packaging and Transportation of Radioactive Material [10 CFR 71]**

REGULATING AUTHORITY: **Nuclear Regulatory Commission (NRC)**

SHORT DESCRIPTION:

- Specifies the standards for packaging of plutonium, fissile, and other radioactive materials in TYPE B quantities, including "special form."
- Imposes operating controls and procedures and sets forth quality assurance requirements for packaging design.
- Incorporated in requirements for exempt DOE facilities by DOE Directives.

DOE ORDERS (Other Than Transportation)

REQUIREMENT: **DOE Order 4700.1, Project Management System, June 2, 1992 (through change 1)**

REQUIREMENT AUTHORITY: DOE

SHORT DESCRIPTION:

This Order establishes a system that:

a) Ensures all projects are based on clearly defined missions and mission analyses and are developed with clear time-phased goals and objectives that support program requirements.

b) Ensures proper coordination by all appropriate line and staff elements beginning with program or project inception.

c) Provides a basis for determining priorities among programs and projects, and, in turn, relate these to various levels of resource availability.

d) Promotes project execution which achieves technical, schedule and cost objectives. Technical objectives include safeguards and security, environment, health, safety, quality assurance and all programmatic aspects.

e) Avoids commitment of major resources prior to adequate project definition.

f) Provides an overall plan for project execution including evaluation of project progress in relation to specific milestones.

g) Provides visibility on all key decisions and timely feedback for all levels of management, and maintain accountability and traceability of management decisions through and across all levels of the organization with the minimal amount of procedures and paperwork.

h) Centralizes authority for project approval and for allocation of resources, and assure line management authority for project execution and the utilization of resources in that execution.

i) Assure preparation of well planned budgets.

REQUIREMENT: **DOE Order 5400.1, General Environmental Protection Program, June 29, 1990 (through Change 1)**

REQUIREMENT AUTHORITY: DOE

SHORT DESCRIPTION:

This Order establishes environmental protection program requirements, authorities, and responsibilities for DOE operations for assuring compliance with applicable Federal, state, and local environmental laws and regulations, Executive orders, and internal Department policies. This Order more specifically defines environmental protection requirements that are generally established in DOE Order 5480.1B.

REQUIREMENT: **DOE Order 5400.3, Hazardous and Radioactive Mixed Waste Program, February 22, 1989**

REQUIREMENT AUTHORITY: DOE

SHORT DESCRIPTION:

This Order establishes the DOE hazardous and radioactive mixed waste policies and requirements and implements the requirements of the Resource Conservation and Recovery Act (RCRA) within the framework of the environmental programs established under DOE Order 5400.1.

REQUIREMENT: **DOE Order 5400.4, Comprehensive Environmental Response, Compensation, and Liability Act Requirements, October 6, 1989**

REQUIREMENT AUTHORITY: DOE

SHORT DESCRIPTION:

This Order establishes and implements DOE Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) policies and procedures as prescribed by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and under the authorities of Executive Order 12580 within the framework of the environmental programs established under DOE Order 5400.1.

REQUIREMENT: **DOE Order 5400.5, Radiation Protection of the Public and the Environment, January 7, 1993**

(through Change 2)

REQUIREMENT AUTHORITY: DOE

SHORT DESCRIPTION:

This Order establishes standards and requirements for operations of the DOE and DOE contractors with respect to protection of members of the public and the environment against undue risk from radiation.

REGULATIONS: **DOE Order 5820.2A - Radioactive Waste Management, September 26, 1988**

REGULATING AUTHORITY: **DOE**

SHORT DESCRIPTION:

This Order establishes policies, guidelines, and minimum requirements by which the Department of Energy (DOE) manages its radioactive and mixed waste and contaminated facilities.

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50. Mission Need And Design Capacity Review for the Consolidated Incineration Facility (CIF) (WER-CIF-93-0012)
51. Final Study on Alternatives for Treatment of the CIF Blowdown (SWE-CIF-930043)