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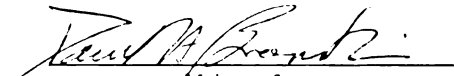
REGULATION OF RADIOACTIVE MIXED WASTE CLEANUP
AT U.S. DEPARTMENT OF ENERGY FACILITIES:
A CASE STUDY OF THE SAVANNAH RIVER SITE

presented by

G. Thomas St. Clair

has been accepted towards fulfillment
of the requirements for

DOCTOR OF PHILOSOPHY degree in RESOURCE DEVELOPMENT


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**REGULATION OF RADIOACTIVE MIXED WASTE CLEANUP
AT U.S. DEPARTMENT OF ENERGY FACILITIES:
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By

G. Thomas St. Clair

A DISSERTATION

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ABSTRACT

REGULATION OF RADIOACTIVE MIXED WASTE CLEANUP AT U.S. DEPARTMENT OF ENERGY FACILITIES: A CASE STUDY OF THE SAVANNAH RIVER SITE

By

G. Thomas St. Clair

In the late 1980's, the issue of waste management at U.S. Department of Energy (DOE) facilities that manufacture defense nuclear materials emerged as a significant national controversy. However, the cleanup process at DOE facilities was hampered due to the lack of clear statutory and jurisdictional authority of the two primary environmental laws that govern the cleanup of DOE facilities, the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This conflicting issue is particularly prevalent for "mixed wastes," which are wastes with a hazardous waste component and a radioactive component. In theory, CERCLA incorporates an interagency agreement process to resolve issues of dual jurisdiction in the cleanup of mixed wastes at Federal facilities on a site-specific basis.

A case study of efforts at the DOE Savannah River Site (SRS) to remediate mixed waste contamination focused on an analysis of applicable Federal and State of South Carolina laws and the attempt to use an interagency agreement incorporating provisions of CERCLA and RCRA to achieve a comprehensive cleanup of the facility. While not achieving a fully integrated cleanup program, the agreement established a process to coordinate CERCLA response obligations with the corrective measures required by the SRS RCRA permit. Negotiations of the

G. Thomas St. Clair

agreement were delayed by the complexity of integrating CERCLA requirements with a RCRA corrective action program already in progress and by the need to determine the role the State of South Carolina would play in cleanup remedy selection. Despite short term delays, the SRS interagency agreement provides a single set of rules allowing a more expeditious cleanup of the facility. A comparison of the SRS interagency agreement with a similar agreement negotiated for the DOE Hanford Reservation found that allowances were made for site-specific conditions and circumstances in the development of the two comprehensive compliance strategies.

The SRS interagency agreement will govern cleanup operations at the facility for at least 30 years. Future research might consider whether the CERCLA interagency agreement was successful in establishing the framework for an efficient cleanup of the SRS.

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CHAPTER I

INTRODUCTION

Overview of Environmental Compliance Issues At DOE Facilities

During the late 1980s, the issue of waste management at U.S. Department of Energy (DOE) facilities manufacturing nuclear materials emerged as a national controversy.¹ Extraordinary pressure from Congress, the U.S. Environmental Protection Agency (EPA), the states, and environmental organizations was applied to the Executive Branch to clean up the nuclear weapons complex and ensure its compliance with environmental laws.² Senator John Glenn (D-Ohio) has commented that it "will do precious little good to protect ourselves from the Soviets if, in the process, we poison or irradiate our own people."³

The pressure to clean up these facilities has intensified rapidly, producing a plethora of complex environmental compliance problems for DOE facilities. One such problem is the focus of this study: which laws are applicable to remediation of contamination at DOE facilities and what are the regulatory mechanisms for determining which laws have jurisdiction at specific waste sites. While EPA, host states, and Federal agencies share the ultimate goal of cleaning up Federal facilities, they disagree about which environmental law(s) should govern the cleanup of individual DOE installations. The importance of resolving these regulatory issues is put into perspective when the total cost of cleanup at DOE facilities is revealed. The General Accounting Office (GAO) has estimated that DOE may have to spend as much as \$150 billion over the next 50 years to comply with environmental and safety regulations in remedying contamination at its nuclear production facilities.⁴

The growing awareness of the magnitude of the problem has led to public concern for environmental hazards associated with the manufacture of nuclear weapons and a distrust on the part of some, of DOE's ability to properly manage its environmental programs. The opinion of some environmental organizations opposed to nuclear arms production was expressed in a document prepared by the Radioactive Waste Campaign:

That nuclear bombs can vaporize us all is something we've known since 1945. But even peace activists stopped paying much attention to the poisonous business of making, testing, storing, and repairing these warheads after the Atmospheric Test Ban Treaty of 1963. Conditioned by Three Mile Island and Chernobyl, and by the battles against Seabrook and Diablo Canyon, we think of peacetime nuclear dangers as being linked to power plants. And they are. But we forget that the huge network of bomb factories, test ranges, warehouses and waste disposal sites--some of it interwoven with the nuclear energy industry--is also poisoning our groundwater, contaminating the earth and polluting the air.⁵

A spokesperson for the Energy Research Foundation [(ERF), an environmental group based in Columbia, South Carolina, that is frequently critical of DOE operations] stated in 1988 that the DOE "has fought tooth and nail to avoid complying with environmental laws."⁶ The ERF spokesperson further indicated that in his opinion the environmental compliance problems at DOE facilities can overwhelm a state regulatory agency, leaving the oversight to citizens' groups. "We, citizens' groups should not have to be spending time in court to make sure the federal government obeys the law" he stated.⁷

Senator J. James Exon (D-Nebraska) has stated that "recent events have brought to the fore three basic realities about our nation's defense nuclear facilities: first, the nuclear weapons complex is essential to the maintenance of U.S. nuclear deterrent; second, the management of the nuclear weapons complex in a safe, environmentally

sound and cost effective manner is critical to U. S. national security; and third, the cleanup of environmental contamination and replacement of aging facilities are urgent national priorities."⁸

The explanation that is most frequently given for the lack of environmental compliance at DOE facilities is that the weapons complex was created during a wartime atmosphere that placed highest priority on nuclear material production with limited attention given to environmental consequences.⁹ DOE historically has utilized contractors to manage and operate (frequently referred to as the M&O Contractor System) most of its nuclear weapon production facilities.¹⁰ National security implications of the work performed at production facilities was the driving force for both DOE and the operating contractors. While DOE established production goals, it was the responsibility of the M&O Contractor to meet them. In the opinion of many of DOE's critics, DOE and its predecessors¹¹ failed to establish proper environmental and safety goals, and the contractors failed to identify and manage these problems.¹² This view is shared by the Secretary of Energy, James D. Watkins, who has stated "currently the United States is paying a high price for having emphasized the production of nuclear materials and weapons without due consideration for the environment, safety, and health of its citizens."¹³

From the establishment of the Atomic Energy Commission (AEC) in 1947 until recent court decisions requiring DOE to comply with environmental laws, DOE and its predecessors were perceived to have sole responsibility for the protection of human health and the environment.¹⁴ This self-regulated approach to environmental compliance was challenged in 1984 by the lawsuit Legal Environmental Assistance Foundation (LEAF) vs. Hodel.¹⁵ Results of this case found

DOE to be in violation of the Clean Water Act (CWA) and the Resource Conservation and Recovery Act (RCRA) at its Y-12 Plant in Oak Ridge, Tennessee.¹⁶ As a consequence of this legal ruling, DOE acknowledged the applicability of Federal environmental laws to weapon production facilities. However, six years after the LEAF vs. Hodel decision, DOE in the opinion of many regulatory officials has yet to achieve compliance with environmental regulations and is lagging in its efforts to clean up previously contaminated sites. One factor contributing to DOE's lack of compliance with environmental regulations is that it did not initially participate in some of the fundamental environmental rulemakings (e.g., RCRA). Because DOE failed to acknowledge the applicability of RCRA to its wastes at the time of promulgation, subsequent EPA rulemakings did not take into account technical considerations (e.g., hazards of radioactivity) of waste generated at DOE facilities or the lack of treatment capacity to adequately manage specific waste types.¹⁷

DOE acknowledged in a "flash report" that it "does not have a systematic approach to reasonably assure compliance with the environmental regulations" at its facilities.¹⁸ The report cited "lack of assurances that RCRA violations are promptly identified and addressed; conflicting or incomplete environmental data; and training deficiencies will lead to increased public doubt that DOE is capable of operating safe, healthful, and environmentally sound facilities."¹⁹ The report recommended taking immediate action to resolve these problems, and it warned that DOE faced the possibility of facility shutdowns, criminal prosecution of employees, and increased congressional oversight and restriction of internal operations, if it did not act promptly.²⁰

Problems Associated With Achieving Environmental Compliance

Virtually all the DOE nuclear weapon facilities are reported to have been contaminated with hazardous substances by processes involved in the production of nuclear materials.²¹ To date, soil or groundwater contamination of variable severity has been identified at more than 3,200 sites of the weapons facilities.²² As an example, measurable organic solvent groundwater contamination has been identified at the Lawrence Livermore National Laboratory, the Idaho National Engineering Laboratory, the Rocky Flats Plant, the Hanford Reservation and the Savannah River Site.²³ While this contamination is reported not to represent a significant threat to ecological systems, there is concern regarding off-site movement of the contaminants and the potential health hazard to people who ingest well water.²⁴ One of the reasons for the significant contamination at DOE facilities is that while initial waste disposal practices were similar to those used by private industries, disposal practices at the weapon production facilities did not improve as rapidly as private industries were forced to improve with the advent of environmental regulations. DOE had additional technical considerations (e.g., radioactivity) to incorporate into waste treatment and disposal facility designs which hampered timely response to documented contamination.

A variety of Federal and state environmental laws may be applicable to cleanup²⁵ of waste generated at DOE nuclear weapon plants, dependent upon the waste type of concern, the environmental resources potentially impacted, and the specific host state. Table 1 provides a summary of environmental laws applicable to cleanup at DOE nuclear facilities. The waste type most affected by the number of applicable environmental laws is "mixed waste," which has a hazardous waste component and a

**Table 1. Summary of Environmental Regulations
Applicable to Mixed Waste Cleanup Operations at DOE Facilities**

	<u>RCRA Actions</u>			<u>CERCLA Actions</u>	
	Closure of Hazardous Waste Management Facility	Closure of Mixed Waste Management Facility	Corrective Action for Releases of Hazardous Waste or Constituents from Solid Waste Management Units	Remedial Response for Release of Nonradiological Hazardous Substances	Remedial Response for Release of Radionuclides
RCRA (EPA & State Authorized Programs)	Must be closed in accordance with RCRA closure and post-closure requirements	Must be closed in accordance with RCRA closure and post-closure requirements; if entire facility is an NFL site, closure must undergo CERCLA review	Release must be characterized and corrective measures implemented following RCRA corrective action program procedure		
CERCLA (EPA Superfund Program)	Releases from RCRA permitted units may be a factor for placing site on NFL	If an NFL site, RCRA closure design must meet CERCLA remedial response criteria	Releases from RCRA SWMUs may be a factor for placing site on NFL	Release must be characterized and response action selected and implemented following CERCLA regulatory process	Release must be characterized and response action selected and implemented following CERCLA regulatory process
AEA (Implemented by DOE Administrative Orders)		Radiation exposure to workers must be reduced to as low as reasonably achievable			Radiation exposure to workers must be reduced to as low as reasonably achievable
NEPA (Implemented by DOE Administrative Orders)	DOE Orders require assessment of potential environmental impact	DOE Orders require assessment of potential environmental impact	DOE Orders require assessment of potential environmental impact	DOE Orders require assessment of potential environmental impact	DOE Orders require assessment of potential environmental impact
State & Local Pollution Control Regulations	May be applicable if a release to protected environmental media has occurred	May be applicable if a release to protected environmental media has occurred	May be applicable if a release to protected environmental media has occurred	Considered legally applicable to the substance, or relevant and appropriate to response action	Local & state jurisdiction of radionuclide release is a disputed issue at DOE facilities

radioactive component. EPA has published a Federal Register notice stating that mixed wastes containing both hazardous and radioactive components are subject to hazardous waste regulation.²⁶ Following publication of this notice, DOE issued the "byproduct rule" which states that all DOE generated radioactive waste that also contains a hazardous waste component is subject to dual regulation under both the Atomic Energy Act (AEA) and the Resource Conservation and Recovery Act (RCRA).²⁷ This action established a scenario of concurrent regulation for mixed waste, by different authorities, which also extends to cleanup actions where other Federal and state regulations are also applicable.

The two primary Federal laws which govern cleanup of mixed waste sites at DOE weapon plants are RCRA and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).²⁸ CERCLA provides procedures for remediating the release of hazardous substances (e.g., radionuclides), including the reporting of releases, evaluating remedies, determining the most suitable level of remedial action, and ensuring that the selected remedy is cost effective. Section 3004(u) of RCRA contains a corrective action provision for remedying environmental contamination caused by the release of hazardous waste or constituents. Corrective actions under this section of RCRA can be required for active and inactive solid waste management units (SWMUs). The fundamental objectives of the RCRA corrective action process are essentially the same as those of CERCLA; however, a number of significant differences (e.g., public participation and cleanup level determination) do exist between the two regulatory processes.

A GAO report to Congress states that one of the problems DOE facilities are having in complying with environmental laws governing

cleanup procedures is the different approaches DOE installations have employed to define and address their inactive waste sites. These different approaches depend upon whether CERCLA or RCRA is applied to a particular site.²⁹ The GAO report goes on to say that some installations treat purely radioactive sites as the areas to be addressed under provisions of CERCLA, while all others are identified as RCRA sites. Other field installations apply RCRA to all sites that became inactive after November 19, 1980, and CERCLA to sites that existed prior to that date. In the report, GAO recommended that DOE develop and prescribe, in cooperation with EPA and affected states, a comprehensive approach to identifying, assessing, and restoring inactive waste sites that integrates provisions of both CERCLA and RCRA.³⁰

While the GAO report documented that DOE has not been consistent in its application of CERCLA and RCRA provisions, it is also well documented that EPA itself has structured overlapping and conflicting requirements into the two primary regulatory processes governing cleanup at DOE facilities. For example, a DOE facility that is listed or proposed for inclusion on the CERCLA National Priorities List (NPL) may also have RCRA permitted (or interim status) units. In this situation, there are unresolved issues about which statute should be used as the primary vehicle to ensure cleanup or about how the provisions of the two statutes should be integrated to achieve a comprehensive cleanup. This is particularly so when a release from a RCRA-regulated unit is the cause for an NPL listing, rather than a contributing factor.³¹ Neither statute is entirely clear on resolution of these issues, although EPA has stated on numerous occasions that its goal is to implement the regulations associated with each statute in a

similar manner. In the case of mixed waste, the statutory overlap is broader than RCRA and CERCLA, as the AEA may also apply to mixed waste cleanup. AEA concerns are generally associated with worker safety and the control of equipment contaminated during waste site cleanup.

In addition to the issues over the applicable regulatory authority mentioned above, state or local hazardous waste regulations, independent of RCRA or CERCLA, may also apply to specific DOE remedial actions creating a jurisdictional problem. As an example, the jurisdictional conflicts may be between Federal regulatory programs (e.g., RCRA and CERCLA) or between state and Federal programs (e.g., an authorized state RCRA program and the Federal CERCLA program).

Statutory language clearly states that Federal facilities must comply both procedurally and substantively with the provisions of RCRA and CERCLA.³² In its Federal Facilities Compliance Strategy, EPA states that Federal agencies must comply with environmental laws in the same manner and degree as non-Federal entities.³³ However, a review of relevant EPA guidance documents indicates that the EPA approach to regulating the private sector is not consistent with this regulatory scenario.³⁴ If RCRA applies at a non-federal facility, the facility will not be evaluated or regulated by CERCLA.³⁵ All of the cleanup or corrective action at the private facility would be performed under RCRA authority. In contrast, at Federal facilities both RCRA and CERCLA apply. Consequently, the requirements of both regulatory programs must be met, necessitating the need for some form of coordination and/or integration.

Addressing the differences between regulation of Federal facilities and facilities in the private sector, a 1989 GAO report concluded that U.S. Department of Defense (DOD) facilities are not held to higher

standards when cleaning up contaminated sites than private industry. However, the report did find that DOD facilities proposed or included on the NPL with RCRA permits, unlike private facilities, must meet the requirements of both regulatory programs during cleanup operations unlike private facilities.³⁶ The GAO report recommended that EPA should draft regulations further implementing provisions of RCRA and CERCLA that will require the same factors to be considered (e.g., such as the types and amounts of contaminants) when prescribing cleanup requirements for DOD and/or private sector hazardous waste sites.³⁷

Integration of Regulatory Requirements Through Interagency Agreements

The issue of conflicting and duplicative regulatory requirements for the cleanup of mixed waste sites is of concern to DOE installations because of the possible need to conduct remedial actions at the same site under provisions of CERCLA, RCRA, and applicable state environmental laws. This would be both redundant and costly. A possible solution to this problem is the negotiation of an agreement between the Federal facility, EPA and the affected state which would outline a strategy to minimize the duplicative requirements of applicable environmental regulations. Such an agreement is required by CERCLA to perform remedial response action for Federal facilities listed on the NPL.³⁸ An interagency agreement (also called a Federal Facilities Agreement at many DOE facilities) is a comprehensive document that addresses hazardous substance (e.g., radionuclides) cleanups at Federal facilities from initial investigations through implementation of the selected remedial design.³⁹ EPA encourages the use of interagency agreements to integrate the cleanup provisions of both CERCLA and RCRA activities into one enforceable document, and to

serve as a comprehensive plan for investigatory and remedial activities.⁴⁰

EPA has designed the interagency agreement program in hopes of accelerating the cleanup program and avoiding duplication of regulatory requirements at Federal Facilities. On May 15, 1989, DOE, EPA, and the State of Washington entered into an Interagency Agreement to provide a legal and procedural framework for cleanup and regulatory compliance at the numerous hazardous waste sites at the DOE Hanford Reservation.⁴¹ The scope of this Agreement includes all CERCLA remedial actions and RCRA corrective measures. The Agreement also includes all activities related to RCRA permitting and RCRA closure. While negotiating parties agreed that any of the contaminated sites could be managed under either RCRA or CERCLA authority, each "operable unit" was assigned to a specific regulatory program and agency.⁴² After three months of implementation, the approach outlined in the Agreement was reported to be "running relatively smoothly."⁴³ However, not all Federal agencies are supportive of using interagency agreements. DOD has previously commented that reaching satisfactory agreements has been "extraordinarily difficult" and that such agreements are not always clear about how RCRA and CERCLA requirements should be integrated.⁴⁴

NEPA Documentation for DOE Cleanup Actions

Compounding the problem of RCRA and CERCLA authority over mixed waste cleanup at DOE facilities is the DOE requirement to provide National Environmental Protection Act (NEPA) documentation for all response actions at the nuclear weapons complex. While EPA considers CERCLA and NEPA to be functionally equivalent,⁴⁵ the applicability of NEPA to CERCLA remedial actions at Federal facilities is still an outstanding question.⁴⁶ Given the fact that no clarifying guidance has

come from either the U.S. Department of Justice or the Council on Environmental Quality, DOE has developed an internal policy for integration of NEPA and CERCLA documentation and public review requirements.⁴⁷ DOE has stated in correspondence to EPA that the absence of a clear acknowledgement of the role of NEPA in cleanup at Federal facilities has been, and will continue to be, a sensitive issue in negotiating interagency agreements.⁴⁸ For DOE, this NEPA issue remains a potential obstacle in meeting the requirements of CERCLA remedial actions in a timely manner.

Problem Statement and Hypothesis To Be Tested

The number of Federal facilities to be investigated for potential soil and groundwater contamination, the types and sources of contamination, the large size of these facilities, and the 30 years estimated to complete cleanup combine to create unique challenges for achieving compliance with environmental laws. This challenge is further complicated by the potential at each contaminated site for jurisdictional and/or statutory authority conflicts between Federal and state environmental programs. At DOE facilities there is the additional problem of the potential overlap with other laws, such as the AEA. Resolution of issues raised by conflicting and overlapping environmental provisions of RCRA and CERCLA are important to society because of increased risk to human health and the environment and potentially significant increases in cost if cleanups are not performed in a timely manner. Federal facilities with substantial cleanup obligations complain that monies spent meeting the administrative and procedural requirements imposed by duplicative environmental programs divert funds from the implementation of a cleanup remedy. Additionally, delays caused by compliance with all the regulatory

requirements applicable to a specific waste site allow contamination to further migrate through exposure pathways increasing the risk to human health and the environment. A negotiated compliance agreement has been suggested as a mechanism for resolving many of the site-specific compliance issues associated with DOE facilities that have proven difficult to resolve through Federal and state statutory enforcement mechanisms.

This study investigates the feasibility of using interagency agreements to achieve environmental compliance at Federal facilities when overlapping and conflicting regulatory requirements exist. Can EPA, the state, and a Federal facility agree on a facility-wide strategy to serve as a comprehensive plan for the investigation and implementation of remedial activities? To determine the usefulness of interagency agreements this study will present:

- A statutory overview of regulatory requirements applicable to Federal facility cleanup actions,
- A review of DOE procedures and policies governing environmental restoration of its nuclear weapons complex, and
- An assessment of the ability of interagency agreements to integrate RCRA and CERCLA regulatory requirements.

The hypothesis to be tested is whether an interagency agreement mandated by CERCLA for those Federal facilities with contamination problems that pose the greatest risk to human health and the environment can be used to successfully integrate and direct the remedial response actions of CERCLA, the corrective action provisions of RCRA, the pollution control provisions of applicable state laws, the AEA, and the environmental assessment provisions of NEPA. If an interagency agreement can be used effectively, it will eliminate the potential for a worst-case compliance scenario (i.e. the application of

requirements from all Federal and state regulatory programs governing cleanup at a Federal facility). As an example, if public involvement requirements for CERCLA, RCRA, and NEPA are not effectively integrated at a DOE facility with an extensive environmental restoration program, it could potentially have separate public meetings and/or hearings for each regulatory program over a thirty year period. Such a scenario would not be in the best interest of any of the agreement parties or the public.

Research Methods

A case study has been selected as the most appropriate method to investigate the complexities of environmental regulations governing mixed waste cleanup at DOE facilities. The DOE Savannah River Site (SRS) has been selected as the subject of the case study. The SRS, located near Aiken, South Carolina, is a major DOE installation involved in the production of and research on nuclear materials for national defense and peacetime applications. As one of the largest DOE facilities, SRS is confronted by numerous regulatory compliance issues related to the cleanup of mixed waste sites.

An article appearing in the June 14, 1988, issue of Newsweek summarized some of the public concern about production of nuclear materials at the SRS.⁴⁹ Among other claims, the article quoted a member of a local environmentalist group alleging that "low-level radioactive waste and toxic chemicals placed in the shallow, and unlined seepage basins since the 1950s are leeching into the soil and groundwater" potentially contaminating surrounding drinking water sources. In response to public concern about conditions at SRS, Energy Secretary James D. Watkins told the House Energy and Commerce Subcommittee on Energy and Power on March 21, 1989, that his goal was

to make the Savannah River Site the DOE "flagship" and a "template for excellence" for all DOE facilities.⁵⁰

The public notoriety SRS has received and DOE plans to make it a "flagship" of the nuclear weapons complex are significant reasons to use the facility as the subject of a case study. Itemized below are five additional features of the SRS that support its selection as the subject of the study:

- SRS has been issued a RCRA operating permit by the South Carolina Department of Health and Environmental Control (SCDHEC) and EPA, which specifies the investigation of 81 solid waste management units (SWMUs) for possible cleanup;⁵¹
- Several of the SWMUs slated for remedial investigation are also contaminated with radionuclides not regulated by RCRA. Remediation of these contaminants falls under the jurisdiction of CERCLA;
- SRS has settled a law suit that established closure dates for several mixed waste management facilities;⁵²
- On November 21, 1989, the EPA announced that the SRS was to be included on the National Priorities List, effective December 21, 1989.⁵³ In anticipation of this listing, the DOE began negotiating a CERCLA Section 120 Interagency Agreement with EPA and SCDHEC. The Agreement will establish the ground rules for the investigation and remediation of areas contaminated with hazardous substances; and
- SRS prepared a programmatic environmental impact statement (EIS) in 1987 regarding waste management activities needed for groundwater protection. The EIS contained commitments to prepare additional NEPA documentation for cleanup actions not specifically addressed in the EIS.⁵⁴

The SRS is currently negotiating the remediation of waste sites contaminated with hazardous substances under provisions of CERCLA in the form of an interagency agreement. However, the SRS also has a number of RCRA corrective action liabilities. SRS has a RCRA operating permit which specifies the remedial investigation and performance of any necessary corrective action at a number of SWMUs. On the other hand, the RCRA permit is limited in its extent of coverage to hazardous

wastes and hazardous constituents. Some CERCLA hazardous substances, such as radionuclides and nitrates, are not addressed by the RCRA permit. Therefore, the permit is not able to address all releases or potential releases to the environment at the SRS, necessitating the need for additional guidance which will be achieved through the governing provisions of the interagency agreement. Compounding this overlap between CERCLA and RCRA is the requirement for NEPA documentation of cleanup actions not specifically addressed in the 1987 EIS. This additional NEPA documentation will have to be coordinated with the two primary regulatory processes governing cleanup at the SRS.

This case study is used to determine whether the interagency agreement developed for the SRS has clarified the environmental restoration process for areas contaminated with mixed wastes at SRS, or burdened the cleanup process with even more administrative requirements. Particular emphasis is placed on the public involvement provisions of CERCLA, RCRA, and NEPA and how SRS has proposed to accommodate the public involvement provisions of the three regulatory statutes for each proposed cleanup action. A comparison is made between the interagency agreement of the SRS and the "Tri-Party Agreement" of the Hanford Reservation.

The study proceeds as follows. Chapter II discusses the type of waste materials generated at the SRS, explains previous mixed waste disposal practices and documents the extent of contamination at the SRS from mixed waste disposal practices and the need for cleanup. DOE programs designed to coordinate cleanup at DOE weapons manufacturing plants and the need to provide NEPA documentation for each cleanup action at DOE facilities are discussed in Chapter III. RCRA requirements for corrective action at solid waste management units and

the closure of hazardous waste management units are discussed in Chapter IV. This chapter also discusses the status of cleanup actions currently underway at the SRS under provisions of the RCRA permit and documents the RCRA closure dates that have been established by regulatory authorities and a court-ordered consent decree.

Chapter V reviews CERCLA requirements for remedial response action at sites contaminated with hazardous substances and describes the extent of CERCLA authority over the cleanup of mixed wastes. The basis for the nomination of the SRS to the NPL is discussed as is the CERCLA Section 120 Interagency Agreement process between DOE, EPA, and the State of South Carolina. The discussion notes that one the most significant differences between the RCRA and CERCLA regulatory cleanup processes for mixed wastes is the more extensive requirements under CERCLA for public participation. Chapter VI describes applicable State environmental laws and the State role in the cleanup of mixed waste at SRS. Additionally, the chapter discusses settlement agreements between the State of South Carolina and SRS which conflict with CERCLA authority over mixed waste and examines the State role in the CERCLA interagency agreement process. Because the State of South Carolina is a RCRA authorized state, it is involved in the approval of RCRA closure plans and SWMU permit modifications. This involvement is described in Chapter IV. SRS has established a number of RCRA closure dates with the State, and there is concern that these dates will be impacted by the various DOE cleanup programs and the CERCLA interagency agreement. An unresolved issue concerns whether the South Carolina pollution control regulations governing radionuclide groundwater cleanup apply at the SRS because they are in direct conflict with CERCLA requirements.

Chapter VII of the dissertation begins with a review of the

practical consequences of regulatory overlap: while CERCLA is the governing regulatory mechanism for cleanup at some federal facilities, SRS has initiated closure of numerous waste management units and has begun investigation of a number of inactive waste sites under provisions of RCRA. To comply with the overlapping provisions of RCRA and CERCLA governing waste site cleanup would be both redundant and expensive. This chapter examines the CERCLA interagency agreement to determine if in fact the two regulatory mechanisms have been integrated into a comprehensive program. The investigation documents the extent to which the established RCRA cleanup program has been incorporated into the agreement. A comparison is made with the CERCLA interagency agreement of the Hanford Reservation. The impact of the CERCLA interagency agreement on the state role in the cleanup of mixed wastes at the SRS is evaluated and the impact of DOE cleanup programs and budget prioritizations on established SRS RCRA cleanup schedules is examined. Conclusions and suggestions for future research complete the study.

Summary

Waste management at U.S. Department of Energy (DOE) nuclear production facilities became a national controversy in the late 1980s. Extraordinary pressure on DOE to clean up the nuclear weapons complex resulted in DOE being required to comply with environmental laws which proved to have overlapping and at times conflicting requirements. The Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) were enacted without provision for regulatory mechanisms to determine which law has jurisdiction when overlays and conflicts do exist. This has resulted in disagreements about which environmental law should govern

cleanup of individual DOE installations, especially in instances involving mixed waste (waste having a hazardous component and a radioactive component).

This study investigates the feasibility of using interagency agreements to facilitate environmental compliance at Federal facilities when conflicting regulatory requirements and differing enforcement considerations exist. The public notoriety the Savannah River Site (SRS) has received and DOE plans to make SRS a "flagship" of the nuclear weapons complex are reasons considered in selecting the facility as the subject of a case study.

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Chapter II

HISTORY OF WASTE DISPOSAL AT SRS

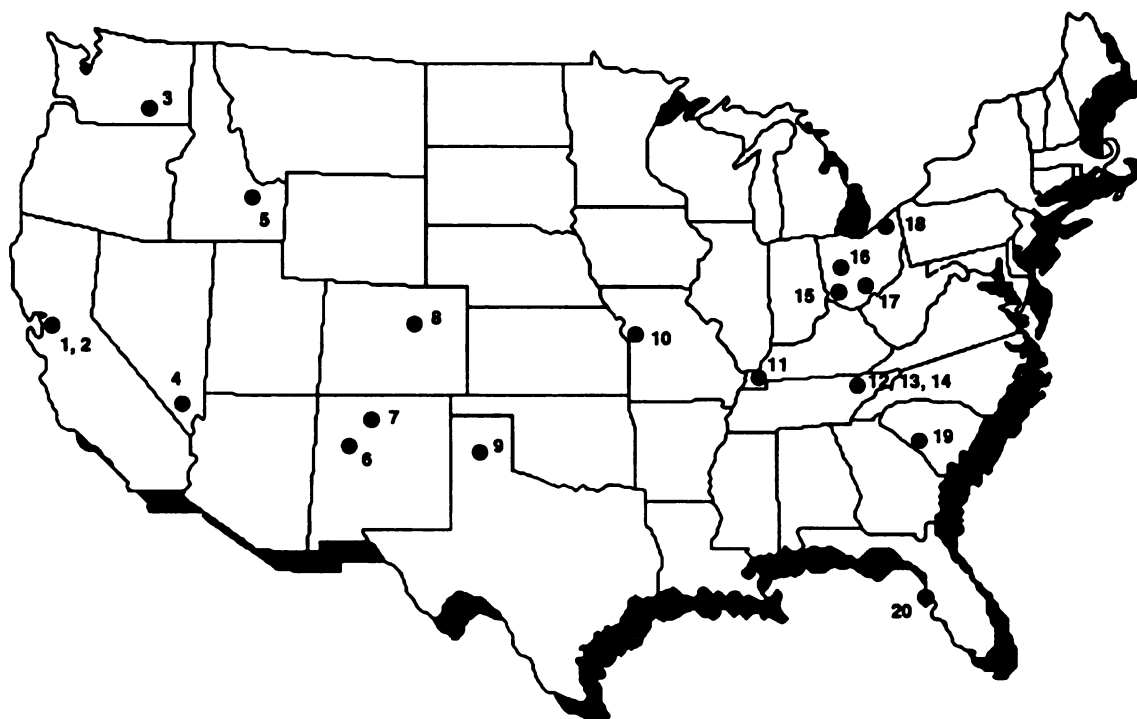
Introduction

This chapter (1) describes the U.S. Department of Energy (DOE) nuclear weapons process, (2) describes the mission of the Savannah River Site (SRS) and the production facilities located at the site, (3) describes the type of waste materials generated at SRS, (4) explains previous mixed waste disposal practices at SRS, and (5) documents the extent of contamination resulting from SRS mixed waste disposal practices and the cleanup required as the result of this contamination. The discussion shows that at the time of disposal, mixed wastes were managed at SRS by industry-accepted practices which included the use of seepage basins for liquids; disposal pits and waste piles for solids; and solid waste burial grounds for solid low-level radioactive wastes. These previous waste management practices assumed that the soil beneath the land based waste disposal units would act as a "giant sponge," preventing any contamination from reaching the groundwater beneath the site. These assumptions proved incorrect; the groundwater at some SRS waste disposal sites has been contaminated, necessitating the need for cleanup.

The DOE Nuclear Weapons Production Process

DOE manages a large complex of facilities engaged in the production of nuclear weapons, consisting of 20 major defense production facilities located in 13 states (see Figure 1).¹ The magnitude of the DOE weapons complex is illustrated by its annual budget of approximately \$10 billion and by the 80,000 person workforce employed by DOE and its contractors.² The nuclear weapons complex is divided

**Figure 1. Location of Major
DOE Nuclear Weapon Production Facilities**



- | | |
|---|--|
| 1. Lawrence Livermore National Laboratory (LLNL)
Livermore, California | 11. Paducah Gaseous Diffusion Plant
Paducah, Kentucky |
| 2. Sandia National Laboratory Livermore (SNLL)
Livermore, California | 12. Oak Ridge National Laboratory (ORNL)
Oak Ridge, Tennessee |
| 3. Hanford Reservation
Richland, Washington | 13. Oak Ridge Y-12 Plant
Oak Ridge, Tennessee |
| 4. Nevada Test Site
Las Vegas, Nevada | 14. Oak Ridge Gaseous Diffusion Plant
Oak Ridge, Tennessee |
| 5. Idaho National Engineering Laboratory (INEL)
Idaho Falls, Idaho | 15. Feed Materials Production Center (FMPC)
Fernald, Ohio |
| 6. Sandia National Laboratory Albuquerque (SNLA)
Albuquerque, New Mexico | 16. Mound Facility
Miamisburg, Ohio |
| 7. Los Alamos National Laboratory (LANL)
Los Alamos, New Mexico | 17. Portsmouth Gaseous Diffusion Plant
Piketon, Ohio |
| 8. Rocky Flats Plant
Golden, Colorado | 18. Ashtabula Plant
Ashtabula, Ohio |
| 9. Pantex Plant
Amarillo, Texas | 19. Savannah River Site (SRS)
Aiken, South Carolina |
| 10. Kansas City Plant
Kansas City, Missouri | 20. Pinellas Plant
St. Petersburg, Florida |

into three main types of facilities: (1) the nuclear materials production facilities, (2) the weapons production facilities, and (3) the weapons laboratories.³ The materials production facilities provide the raw nuclear materials for fabrication into warheads. The weapons production facilities supply non-nuclear components and assemble the warheads. The weapons laboratories are responsible for the design, development of the technical specifications, and the testing of nuclear weapons. A summary of current weapons complex facilities is provided in Table 2. The production of nuclear weapons is an integrated process involving several DOE production and laboratory facilities and SRS is only one step in the process.

The production of nuclear weapons by DOE originates with the mining of uranium at various sites in Colorado, New Mexico, Texas, Utah, and Wyoming.⁴ The ore is then shipped to the Paducah Gaseous Diffusion Plant in Paducah, Kentucky, for refinement and processing. Here, uranium-235 and uranium-238 are separated and enriched in a process involving various gases. Further enrichment follows at the Portsmouth Gaseous Diffusion Plant in Piketon, Ohio. At the Feed Materials Production Center located in Fernald, Ohio, uranium is converted to metal for nuclear reactor fuel and shipped to the Ashtabula Plant in Ashtabula, Ohio, where it is shaped into fuel assemblies (billets). From here the fuel assemblies were historically transported to one of two places, the Hanford Reservation in Richland, Washington, or the Savannah River Site (SRS) located near Aiken, South Carolina. Both of these sites were historically responsible for plutonium production, although all reactors have been shut down at Hanford. Along with the fuel assemblies from Ashtabula, the SRS also receives highly enriched uranium from the Y-12 Plant in Oak Ridge, Tennessee.

Table 2. The DOE Nuclear Weapons Complex Facilities**Materials Production Facilities**

Facility	Location	Primary Nuclear Weapons Function
Feed Materials Production Center	Fernald, Ohio (near Cincinnati)	Converts uranium to metal
Hanford Reservation	Richland, Washington	Recycles uranium and extracts plutonium from irradiated nuclear fuel
Idaho National Engineering Laboratory	Arco, Idaho (near Idaho Falls)	Recycles uranium from irradiated fuel from submarines and experimental reactors
Oak Ridge Gaseous Diffusion Plant	Oak Ridge, Tennessee	Enriches uranium (plant now closed)
Oak Ridge Y-12 Plant	Oak Ridge, Tennessee	Produces lithium; converts uranium to metal; processes beryllium
Paducah Gaseous Diffusion Plant	Paducah, Kentucky	Enriches uranium
Portsmouth Gaseous Diffusion Plant	Piketon, Ohio	Enriches uranium
Ashtabula Plant	Ashtabula, Ohio	Extrudes uranium metal
Savannah River Site	Aiken, South Carolina	Produces tritium and plutonium; recycles uranium and extracts plutonium from irradiated fuel

Weapons Production Facilities

Kansas City Plant	Kansas City, Missouri	Manufactures fuses and other non-nuclear parts for nuclear weapons
Mound Facility	Miamisburg, Ohio (near Dayton)	Manufactures detonators and other non-nuclear parts, recycles tritium
Oak Ridge Y-12 Plant	Oak Ridge, Tennessee	Assembles second stage of nuclear weapons
Pantex Plant	Amarillo, Texas	Final assembly
Pinellas Plant	Largo, Florida (near St. Petersburg)	Manufactures neutron generators
Rocky Flats Plant	Golden, Colorado	Assembles plutonium triggers for nuclear weapons

Weapons Laboratories

Lawrence Livermore National Laboratory	Livermore, California	Designs nuclear weapons
Los Alamos National Laboratory	Los Alamos, New Mexico (near Santa Fe)	Designs nuclear weapons; blends plutonium
Nevada Test Site	Mercury, Nevada	tests nuclear weapons
Oak Ridge National Laboratory	Oak Ridge, Tennessee	Nuclear research; sells radiosotopes
Sandia National Laboratories (Livermore and Albuquerque)	Albuquerque, New Mexico & Livermore, California	Research and development of nuclear weapons; coordinates transportation among nuclear weapons facilities

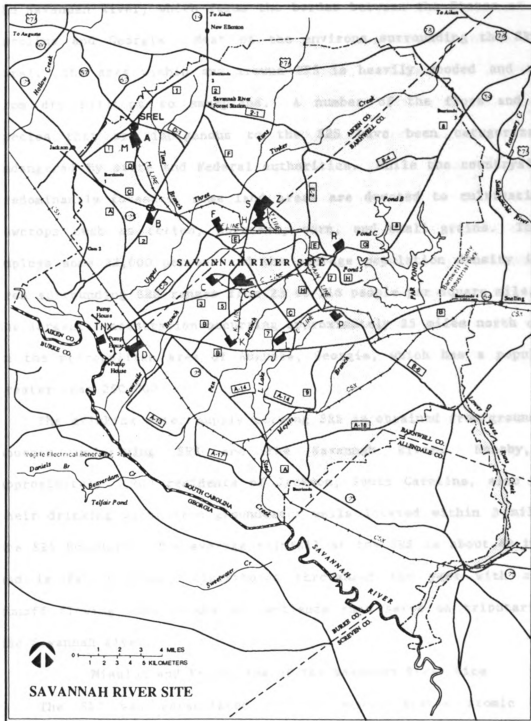
During the production process at SRS, fuel elements are bombarded by neutrons as the atoms are converted to plutonium or tritium. The spent fuel is then dissolved in boiling nitric acid. This process allows the plutonium or tritium to be separated from byproducts of uranium or lithium and other minerals. The recovered uranium or lithium is shipped back to the Feed Materials Production Center to repeat the cycle. After being processed at the SRS, the plutonium or tritium is then transported to the Rocky Flats Plant in Golden, Colorado. Here, the fissionable materials are incorporated as the final component to atomic triggers called pits. The pits are then transported to the Pantex Plant in Amarillo, Texas, where final assembly of the weapons occurs. In addition to assembly, the Pantex facility also disassembles warheads being taken out of service, modifies existing weapons, and tests components for reliability and conformity with design.

The production facilities are supported by the following DOE test laboratories: Lawrence Livermore National Laboratory at Livermore California; Sandia National Laboratory at Albuquerque, New Mexico; Los Alamos National Laboratory at Los Alamos, New Mexico; and Oak Ridge National Laboratory at Oak Ridge, Tennessee. These facilities provide research development, design, and engineering support to various DOE projects. The Nevada Test Site, Las Vegas, is available to DOE and its contractors to test nuclear devices under strictly controlled conditions.

Savannah River Site Description

The DOE's Savannah River Site (SRS) is located within the westernmost part of south-central South Carolina near Aiken, South Carolina (see Figure 2).⁵ The SRS incorporates approximately 300

Figure 2. Location of the Savannah River Site



square miles within Aiken, Allendale, and Barnwell Counties, South Carolina. Approximately 20 miles of the Savannah River forms the western boundary of the SRS. All surface water on the SRS flows into the Savannah River, which forms the border between the States of South Carolina and Georgia. Most of the environs surrounding the SRS are rural. The area within and around SRS is heavily wooded and ranges from dry hilltops to swampland. A number of the flora and fauna species that are indigenous to the SRS have been categorized as endangered by state and Federal authorities. While the countryside is predominantly forested, some land areas are devoted to cultivation of rowcrops such as cotton, soybeans, corn, and small grains. The SRS employs some 22,000 persons and the average population density in the area surrounding SRS ranges from 23 to 516 people per square mile, with the largest concentration occurring approximately 25 miles north of SRS in the metropolitan area of Augusta, Georgia, which has a population greater than 250,000

The drinking water supply serving SRS is obtained from groundwater sources underlying SRS and the Savannah River. Nearby, the approximately 3,200 residents of Jackson, South Carolina, also obtain their drinking water from groundwater wells located within 3 miles of the SRS boundary. The average rainfall at the SRS is about 48 inches, and is fairly evenly distributed throughout the year with surface runoff flowing into creeks and wetlands that serve as tributaries to the Savannah River.

Mission and Facilities of the Savannah River Site

The SRS was established by the United States Atomic Energy Commission in 1950 to produce nuclear materials, primarily tritium, plutonium-239, and highly enriched uranium fuel for the national

defense.⁶ The facility produces components for nuclear weapons in accordance with the authority and responsibility assigned to DOE under the Atomic Energy Act (AEA). Reactor operations produce plutonium and other nuclear materials required to meet the need for nuclear materials established by means of the Nuclear Weapons Stockpile Memorandum.⁷

Tritium production requirements, plus a smaller but significant component devoted to special isotopes such as plutonium-238, dominate anticipated demand for reactor capacity for nuclear materials production through at least the mid-1990s.⁸ SRS is presently the sole source of tritium. Tritium is required to maintain the full potential of nuclear weapons. Because tritium has a natural decay rate of 5.5 percent per year,⁹ stocks of tritium must be steadily replenished. SRS also produces plutonium-238, which is used in radioisotopic generators to provide electricity on space missions.¹⁰ An assessment by the Nuclear Weapons Council has confirmed a demand for plutonium-238 that will exceed DOE's supply in the early 1990s.¹¹

The SRS comprises 18 production, service, and research and development areas scattered throughout the 325 square mile site. Figure 2 shows the location of these major SRS facilities. Major SRS facilities include nuclear reactors, a fuel and target fabrication plant, a naval fuels material facility, two chemical separations plants, the Defense Waste Processing Facility (DWPF), and the Savannah River Laboratory (SRL). These are briefly described below.¹²

The SRS produces nuclear materials by manufacturing fuel and target components, irradiating the components in nuclear reactors, chemically extracting the desired nuclear materials from the irradiated fuel and targets, and separating radioactive waste from the desired materials. The fuel and target components are manufactured in the

300-M Area for shipment to the site reactors. The targets and fuel are placed in heavy-water moderated production reactors for irradiation. Originally the site operated five reactors, however, only three of the reactors, located in the 100-P, K, and L Areas, are currently operational. The other two reactors, in the 100-C and R Areas, are in cold standby and shutdown status, respectively. The irradiated fuel produced by the reactors is transported by shielded railroad cars to either the 200-F or H Area for recovery of nuclear materials. The 200-F and H separation processes dissolve some of the irradiated components in acid, and extract and separate the desired nuclear materials. Other products are extracted from irradiated components in separation processes in H Area. The liquid radioactive waste generated by the separation facilities is neutralized and stored in containment tanks until it can be processed in the Defense Waste Processing Facility (DWPF), currently under construction. The borosilicated waste produced by the DWPF will be stored onsite until a national repository is available for permanent storage. As previously stated, the nuclear materials produced at the SRS are shipped to other DOE facilities for additional processing.

The site also contains many production support, research and development, and waste management facilities. There are five coal-fired powerhouses located in various production areas to generate electricity and steam. The 700-A Area includes the administrative facilities for DOE and Westinghouse Savannah River Company (WSRC), the Savannah River Laboratory (SRL), and the University of Georgia Savannah River Ecology Laboratory (SREL). The Naval Reactor Fuel Material Facility, which was to produce fuel for the Navy's nuclear powered fleet and is being placed on cold standby, is located in F Area. In

addition to underground radioactive waste storage tanks, the SRS has a centrally located 196-acre site between F and H Areas for the disposal of solid low-level radioactive waste and the storage of transuranic (TRU) radioactive waste and mixed waste.

SRS Waste Management Practices

The SRS generates large volumes of wastes; Table 3 lists typical annual generation-rate estimates. In addition, the SRS has a large amount of waste in storage, as indicated in Table 4. Operations at the SRS result in the generation of a variety of hazardous, low-level, and mixed wastes. These include hazardous wastes such as spent degreasing solvents, low-level radioactive wastes such as contaminated gloves, wipes, and liquid discharges from disassembly basins in the reactor areas; and mixed wastes such as condensate from the evaporation of high-level waste (mercury with radionuclides), process water and laboratory wastes (solvents with uranium), tritiated waste oil, and solutions used in measuring radiation (liquid scintillation solvents).¹³ During nearly 40 years of operation, over 200 sites have been or are being used at the SRS for the storage, treatment, and/or disposal of solid and liquid wastes.¹⁴ Many of these sites contain radioactive or mixed waste.

Liquid wastewaters generated at the SRS were historically discharged to seepage basins.¹⁵ A seepage basin is an excavation in the ground designed and constructed to receive liquid waste streams containing chemical and radioactive wastes. Seepage basins were used at SRS to provide a means of reducing the amount of radioactive contamination reaching surface waters which drain the site.¹⁶ This was to be accomplished by "filtration, soil sorption, and radioactive decay."¹⁷ A 1977 environmental impact statement describing waste

Table 3
Typical Annual Waste Generation Rates for SRS Facilities^a

Waste Type	Amount
Hazardous	255 cubic meters
Nonhazardous	3,600 metric tons
High-level liquid radioactive	5,000-10,000 cubic meters ^b
Low-level solid radioactive	31,000 cubic meters ^c
Low-level liquid radioactive	460,000 cubic meters ^d
Mixed	4,750 cubic meters
TRU	1,130 cubic meters
Sanitary/domestic	4,000 cubic meters

- a. Source: Compiled from U.S. Department of Energy, Savannah River Waste Management Operations Plan - FY 1989, DOE/SR-WM-89-1, Savannah River Operations Office, Aiken, South Carolina (December 1988).
- b. Includes work-off of high-level waste inventory held in storage tanks.
- c. Includes low-level solid wastes shipped from offsite.
- d. Design flow rate.

Table 4
SRS Waste in Storage

Waste	Amount (cubic meters)
High-level liquid radioactive	128,000
Low-level solid radioactive	523,000
Hazardous	2,300
Mixed	1,900
TRU nonretrievable	4,534
TRU retrievable	5,870

Source: Compiled from U.S. Department of Energy, Savannah River Waste Management Operations Plan - FY 1989, DOE/SR-WM-89-1, Savannah River Operations Office, Aiken, South Carolina (December 1988).

management operations at the SRS reported that without the use of seepage basins, "large volume aqueous effluents containing low concentrations of radioactive materials would be released directly to plant streams or would require extensive treatment facilities."¹⁸ This conclusion indicates that as late as 1977 SRS officials still believed that the use of seepage basins was an acceptable disposal practice for wastewaters contaminated with low-level radioactivity.

SRS solid wastes containing low levels of radioactivity are either permanently disposed or temporarily stored in a burial ground complex located between the two chemical separation areas (see Figure 3).¹⁹ Materials that have historically been disposed at the burial ground complex include (1) contaminated equipment from the radiochemical separations area, (2) reactor hardware and resins, (3) spent lithium-aluminum targets, (4) oil from pumps in the tritium and reactor areas, (5) mercury from gas pumps in the tritium facilities, and (6) incidental waste from laboratory and production operations.²⁰

Radioactive waste received by the burial ground facilities is separated by type and the amount of radioactivity it contains.²¹ Solid waste contaminated with beta-gamma activity is generally packaged in steel containers and buried in "engineered earthen trenches."²² Low-level waste that is unsuitable for disposal in the steel containers is disposed in another type of trench and covered with at least four feet of soil.²³ Alpha waste with greater than 100 nanocuries per gram of radioactivity (i.e., transuranic or TRU waste) is currently stored in containers free of external contamination on concrete pads.²⁴ Polyethylene-lined galvanized drums are generally used as the primary container for the storage of TRU waste, although higher levels of TRU waste are additionally protected by closure in concrete cylinders.

Before 1966 all alpha waste generated at the SRS was buried in shallow trenches after packaging.²⁵ Between 1966 and 1974, solid waste containing higher levels of alpha radiation was placed in prefabricated concrete containers and then buried.²⁶ Waste that did not fit into the containers was encapsulated in concrete. Waste containing lower levels of alpha radiation was packaged in plastic bags and/or cardboard boxes and then placed in shallow burial trenches.²⁷ It should be noted that SRS TRU waste will eventually be retrieved and processed for ultimate disposal at the DOE Waste Isolation Pilot Plant located in New Mexico.²⁸

SRS Mixed Waste Management Facilities

Three SRS mixed waste management facilities have been selected to characterize contamination problems at the SRS. These facilities have been selected because of the extent of known contamination associated with each facility and the regulatory issues associated with cleanup. A brief discussion of (1) engineering design considerations, (2) characteristics of the waste received by the disposal facility, and (3) a description of the type and extent of contamination is provided for each facility. These waste facilities will be referenced throughout the study.

F-and H-Area Seepage Basins

The F-and H-Area Seepage Basins routinely received low-level radioactive and chemical wastewaters generated from the F-and H-Area separations facilities described above.²⁹ The basins were a series of unlined surface impoundments constructed in 1955 to receive and dispose of process wastewaters from the separation facilities.³⁰ The basins were formed by removing existing soils and constructing sloping sidewalls.³¹ The soils in the basins are reported to be "predominantly composed of medium to fine-grained, poorly-sorted sand with a silt and

clay content ranging from 30 to 50 percent."³² The three F-Area Seepage Basins cover an area approximately 5.5 acres in size while the four H-Area Seepage Basins cover an area of approximately 13.8 acres.³³ The F-Area basins had a total capacity of 14 million gallons, while the H-Area basins had a total capacity of 41 million gallons.³⁴ The seepage basins were hydraulically connected in series. The wastewater entering the two series of seepage basins entered through an underground pipeline and then cascaded from one basin to the next through a series of underground pipes.³⁵ Waste was received in the basins from 1955 to 1988. After November 1988, the effluent formerly discharged to the basins was diverted to an effluent treatment facility which has a surface water discharge.

The primary sources of the effluent discharged to the basins were from the separation nitric acid recovery units, the generalized purpose evaporator overheads, and the two waste tank farm evaporators.³⁶ Other sources of effluent discharged to the seepage basins were the cooling water from the tritium facilities, the water transferred from various retention basins, and the wastewater from the receiving basins for offsite fuel. The average daily flow into the F-Area basins during 1985 was approximately 110,000 gallons per day³⁷ and was approximately 150,000 gallons per day to the H-Area basins.³⁸

As previously stated, the purpose of these basins was to provide a controlled release and appropriate decay time for tritium and to utilize the soil column to effectively retain other radionuclides.³⁹ The basins were designed to allow the process wastewaters to percolate through the soil at the sides and bottom of the basins. All liquids entering the basins either percolated into the ground or evaporated. Seepage from the basins eventually entered the groundwater and is

continuing to seep into the Four Mile Creek drainage which eventually flows to the Savannah River (see Figure 2).⁴⁰

The separation facilities routinely discharged wastewaters containing nitrates to the seepage basins. Nitric acid was the major source of nitrates released to the basins.⁴¹ While release rates varied, the average release rate was approximately 200,000 kilograms per year to the H-Area basins and 220,000 kilograms per year to the F-Area basins.⁴² Typically, the basins also received approximately 91,000 kilograms of sodium hydroxide annually.⁴³ Before mid-1982 approximately 5500 kilograms of phosphoric acid and 550 kilograms of sodium dichromate were also sent to the H-Area basins annually.⁴⁴ Phosphoric acid and sodium dichromate are used in the cleaning of lithium-aluminum targets. These waste streams were sent to the waste tank farm evaporator after 1982 rather than being sent directly to the seepage basins.⁴⁵ F-Area operations occasionally use mercury to aid in dissolving aluminum-alloy fuels. It is estimated that the total quantity of chromium released to the H-Area basins during 1981 to 1983 was 740 kilograms.⁴⁶ Between 1971 and the end of 1984, it is estimated that 61 kilograms of mercury was released to the basins.⁴⁷

Groundwater investigations conducted at the site since 1981 have confirmed that the F-and H-Area Seepage Basins have impacted the quality of groundwater beneath the basins. The primary contaminants observed at wells monitoring the seepage basins are tritium, nitrate, mercury, gross alpha, nonvolatile beta, trichloroethylene, lindane, endrin, lead, cadmium, arsenic and total radium.⁴⁸ A groundwater quality assessment report for the first quarter of 1990 reports that "the primary contaminants observed at wells monitoring the H-Area Seepage Basins are tritium and nitrate."⁴⁹ A plume of tritium and

nitrate is reported to extend south from the seepage basins to the seepage line at Four Mile Creek.⁵⁰ Results of the sampling demonstrate that the highest level of contamination resulting from leaching of the basin sediments is found in the shallow water-table wells.⁵¹ However, at a few well locations elevated levels of tritium, nitrate, and sodium have been detected in the Congaree aquifer, which is located immediately beneath the water-table aquifer.⁵² According to results of the vast majority of groundwater monitoring wells placed in the Congaree, the clay layer which separates the shallow water-table aquifer and the Congaree is a significant barrier to most vertical contaminant migration.⁵³

Intensive groundwater monitoring studies of nitrate levels conducted in 1968 and 1969 of nitrate levels found values that ranged from 100 to 250 milligrams per liter, compared with concentrations of 3 milligrams per liter in natural groundwater.⁵⁴ Results of monitoring for radioactivity parameters indicate that tritium, strontium-90, and uranium have been detected routinely in the groundwater between the seepage basins in the separations area and Four Mile Creek in concentrations that are 10 times the natural background levels.⁵⁵

Basin sediment studies performed at the basins indicate that cesium and other radionuclides are retained by basin sediments and that none have migrated far enough to be detected in groundwater beneath the seepage basins in the separation areas and Four Mile Creek.⁵⁶ Investigations have been conducted to characterize the potential transport of mercury from the seepage basins. Results of these investigations indicate that most of the mercury discharged to the basins can be accounted for in the basin sediments and soils.⁵⁷ However, data on mercury content in the soils and sediments from the

outcrop along Four Mile Creek indicate mercury from the basins is migrating to the creek, but in very small quantities.⁵⁸

M-Area Settling Basin and Vicinity

The M-Area Settling Basin is an unlined surface impoundment constructed in 1958 that received waste effluent from three production buildings and two support laboratories.⁵⁹ The original design capacity of the settling basin was 8 million gallons.⁶⁰ The basin overflowed to a 920 foot long ditch, that directed the overflow to an adjacent Carolina bay.⁶¹ The Carolina bay is a marshy, oval shaped, natural depression that covers approximately 6 acres. The site was removed from service in 1985 and is currently undergoing closure as a permitted RCRA hazardous waste management facility.⁶²

The M-Area Settling Basin and its associated areas are located in the northwestern portion of the SRS approximately 1800 meters from the nearest plant boundary. The M-Area Hazardous Waste Management Facility consisted of the settling basin, overflow ditch, natural seepage area, a Carolina bay known locally as Lost Lake, and the inlet process sewer line. Process waters in the M-Area were initially released to Tims Branch, a tributary of Upper Three Runs Creek (see Figure 2). To restrict the offsite transport of enriched uranium, the M-Area Settling Basin was constructed to settle and contain the spent uranium residues.⁶³

Wastewaters that were released into the basin entered through a 30-inch diameter underground clay-tile sewer line. The sewer was lined with PVC in late 1983 following a 1981 study that revealed the existence of cracks and misalignments in the clay-tile sewer line that provided opportunities for releases to the environment.⁶⁴ Primary sources of wastewater discharged to the basin included the M-Area fuel

and target fabrication facilities. The wastewaters discharged to the basin can generally be characterized as electroplating waste from aluminum forming and metal finishing processes.⁶⁵ The wastewaters contained metal degreasing agents (chlorinated hydrocarbons), acids (nitric, phosphoric, and sulfuric), caustics (sodium hydroxide), and metals.⁶⁶ Metal finishing is conducted in all the M-Area building and the wastewater that is generated is similar to that produced by commercial aluminum-forming or metal-finishing industries.⁶⁷ The wastewaters are now discharged to an effluent treatment facility.

In addition to the discharge to the basins of the effluents described above, on at least two occasions drums of degreasing solvents were emptied into the basin.⁶⁸ In 1978 eleven drums of tetrachloroethylene were dumped into the basin and in 1979 two drums of tetrachloroethylene were dumped into the sewer line leading to the settling basin to dispose of remaining solvent after the transition to a new cleaning solvent (1,1,1-trichloroethane). From 1974 until 1983 it is estimated that 2940 kilograms of uranium-235 and uranium-238 were discharged to the basin. A total of $.9 \times 10^6$ kilograms of volatile organic solvents were released to the settling basin.⁶⁹

The basin had a distinct sludge layer that varied in depth from 0.15 to 0.9 meter.⁷⁰ The sludge was primarily composed of sodium hydroxide and phosphate precipitates. The sludge also contained the major inventories of iron, nickel, chromium, and uranium known to have been discharged to the settling basin.⁷¹ Studies conducted in 1982 and 1985 of the soils beneath the settling basin demonstrated that the top of the soil column had higher than background concentrations of such metals as zinc, lead, mercury, copper, and uranium.⁷² Studies conducted in 1985 after the basin no longer received waste verified

that limited quantities of hydrocarbons were in the soil beneath the settling basin, indicating that the basin and its sediments were no longer a source of organic contamination.⁷³

Results of groundwater investigations conducted in the general vicinity of the M-Area Settling Basin indicate that the primary contaminants in the groundwater are degreasing solvents (e.g., trichloroethylene, tetrachloroethylene and 1,1,1-trichloroethane).⁷⁴ Degreaser solvents have entered the groundwater in the Tertiary sediments of the M-Area from three primary sources, one of which is the settling basin.⁷⁵ The maximum concentration of the solvents occurs in the water table beneath the settling basin.⁷⁶ The concentration of the contaminants and the size of the plume are much smaller at greater depths.⁷⁷ In April 1985, SRS implemented a corrective action program to manage and remediate a plume of chlorocarbon contamination in the groundwater beneath M-Area. The program consists of a network of 11 recovery wells that pump in the area of known groundwater contamination.⁷⁸ Water from the recovery wells is fed to an air stripping column, where essentially all of the chlorocarbons are volatilized and removed from the influent stream. The air stripper discharges to a surface stream in the general vicinity.

Results of soil sampling in the receiving Carolina bay indicate that concentrations of lead, barium, copper, nickel, manganese, and zinc exceeded the M-Area background levels in several areas and were dependent upon the associated water depth.⁷⁹ Of the three chlorinated hydrocarbons detected most frequently in the groundwater beneath M-Area, only tetrachloroethylene was detected in any of the soil samples of Lost Lake.⁸⁰ Results of the groundwater sampling in M-Area indicate that the settling basin and the process sewer line are the major

sources of organic and inorganic contamination of groundwater in M-Area.⁸¹ While Lost Lake is also a source of contamination, it presents less problems than the other two sources.⁸²

Mixed Waste Management Facility

The Mixed Waste Management Facility (MWMF) is located in the Low Level Radioactive Waste Disposal Facility which is situated between the F-and H-Area Separations Facilities (see Figure 2). In 1986 SRS officials determined that hazardous waste and materials containing hazardous constituents had been disposed in certain areas of the burial ground complex.⁸³ These areas were subsequently identified as the MWMF. The MWMF is an area of approximately 58 acres that had originally been designed for the disposal of low-level radioactive waste materials.⁸⁴ An additional component of the burial ground complex is located in the immediate vicinity of the MWMF. The Old Burial Ground received essentially the same forms of waste as the MWMF until its use was discontinued in the early 1970s.⁸⁵

The MWMF consists of a number of individual trenches that are generally about 6 meters wide and 6 meters deep and have variable lengths up to 1,200 meters.⁸⁶ The trenches which are separated by approximately 3 meters were backfilled daily during landfilling operations. Waste was received at the MWMF from 1972 until 1986.⁸⁷ The trenches were backfilled with a minimum cover of 1.2 meters of soil. Mixed wastes disposed in the MWMF consisted of scintillation fluids, waste oil in absorbent material sealed in 55 gallon drums, lead shielding, wastes in metal disposal boxes, and radioactively contaminated equipment.⁸⁸ These materials were randomly placed in the trenches. The MWMF is unlined and there is no leachate collection system underlying the disposal facility.

Groundwater monitoring contamination of the general burial ground complex indicates that a plume of tritium exists below the MWMF and is migrating toward the present radioactive waste burial ground.⁸⁹ Nonradioactive chemical parameters that have been monitored in the groundwater include mercury, cadmium, and lead.⁹⁰ However, it has not been determined which of the waste management facilities (i.e., Old Burial Ground, MWMF, or the operating burial ground) is the source of these constituents.⁹¹ Results of groundwater monitoring for the first quarter of 1990 indicated that concentrations of tritium, gross alpha, carbon tetrachloride, trichloroethylene, 1,1-dichloroethylene, lead, and total radium were observed in excess of the primary drinking water standard in at least one monitoring well of the MWMF.⁹² Of these constituents, tritium and trichloroethylene are reported to be the primary contaminants in the groundwater at the burial ground complex.⁹³ Tritium concentrations have steadily increased in monitoring wells of the MWMF since testing for this parameter was initiated.

Summary

The DOE nuclear weapons complex consists of nuclear materials production facilities, weapons production facilities, and weapons laboratories located in 13 states. Uranium ore is mined, separated, refined, enriched, converted to metal, shaped into fuel assemblies, converted to plutonium or tritium (at SRS), and included in the final assembly of nuclear weapons. DOE's Savannah River Site, established in 1950 by the Atomic Energy Commission near Aiken, South Carolina, produces tritium and plutonium-239.

DOE's operations at the SRS have long used and generated a wide variety of hazardous and/or radioactive substances that have resulted

in radioactive waste, hazardous waste, and mixed waste. Some of the hazardous wastes include acids, nitrates, oils, reactive metals (e.g., sodium), and heavy metals (e.g., mercury). Historically, DOE has disposed of much of its own waste at each installation. For more than 40 years, SRS used disposal techniques that were the accepted practice at the time, but are no longer considered environmentally acceptable. According to DOE officials, SRS is phasing out the use of land based disposal sites that allow waste to contaminate the environment. However, many of the wastes sites that resulted from past operations at the SRS, while now inactive, still contain waste that can migrate and cause environmental problems.

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CHAPTER III

DOE MIXED WASTE CLEANUP POLICIES, PROCEDURES, AND REQUIREMENTS

Introduction

This chapter (1) documents the development of regulatory programs governing mixed waste management at DOE facilities, (2) describes DOE programs designed to coordinate cleanup at DOE weapon manufacturing plants, (3) examines the budget prioritization systems for DOE environmental restoration programs and evaluates the impact these systems may have on established schedules SRS has negotiated with Federal and state regulatory agencies, and (4) discusses the need to provide National Environmental Protection Act (NEPA) documentation for each cleanup action at DOE facilities.

Regulation of Mixed Waste at DOE Facilities

The requirement that DOE facilities comply with the Resource Conservation and Recovery Act (RCRA) was formalized on April 13, 1984, when the U.S. District Court of Tennessee ruled in LEAF vs. Hodel that RCRA requirements are not inconsistent with the Atomic Energy Act (AEA).¹ However, the full extent of RCRA jurisdiction at DOE facilities did not become clear until May 1987 when DOE issued its final rulemaking acknowledging the applicability of RCRA regulations to the hazardous component of mixed wastes which contain both radioactive and hazardous components.² As a result of these two events and the lead time required to design and construct hazardous waste management facilities that comply with RCRA requirements, DOE found themselves subject to RCRA regulations without sufficient time to achieve compliance.³ For example, many DOE facilities had solvent-contaminated low-level radioactive wastes for which treatment and disposal methods

consistent with RCRA had to be identified. Under provisions of RCRA, these wastes had to be land disposed in RCRA permitted or interim status facilities, or they had to be incinerated. Because DOE failed to become part of the RCRA regulated community at its inception, few of its hazardous waste disposal facilities met RCRA requirements. Since DOE maintained that RCRA did not apply to its wastes, DOE failed to participate in subsequent EPA hazardous waste rulemakings. Consequently, EPA regulations and performance standards did not take into account the technical considerations associated with the management of mixed wastes at DOE facilities.

Historically, all types of radioactive wastes had been regulated exclusively by the Atomic Energy Act (AEA) of 1954.⁴ However, many DOE nuclear weapon production activities result in the generation of radioactive wastes that also contain hazardous wastes and/or hazardous constituents. This waste type has come to be known as "mixed waste." When the first Federal regulations covering radioactivity were adopted, it was the general perception of the regulated community that they were intended to apply to all radioactive materials.⁵ No special provisions were ever made by the regulators of either nuclear materials or hazardous substances to control mixed wastes because the volume of waste that contained both radioactive and hazardous components had always been judged to be very small compared to the total quantity of hazardous waste generated in the United States.⁶

A July 3, 1986, EPA Federal Register notice required a state with RCRA authorization to revise its program, if necessary, and apply for authorization to regulate the hazardous component of mixed waste.⁷ EPA made this clarification because of confusion that existed in the interpretation of Section 1004(27) of RCRA, which excludes "source,

special nuclear, and byproduct material as defined" by the AEA and the definition of "solid waste" subject to provisions of RCRA.

On May 1, 1987, DOE published its own final "byproduct rule."⁸ In that rule DOE stipulates "that only the actual radionuclides in DOE waste streams will be considered byproduct material."⁹ The result of this interpretation is that DOE retains authority to regulate radiological components of mixed waste under the AEA, while the hazardous components of the wastes are regulated by EPA under RCRA. As a result of this rulemaking, DOE radionuclides are not subject to EPA, state, or local solid waste management requirements. In a subsequent notice of clarification issued by EPA on September 23, 1988,¹⁰ regarding the applicability of RCRA to hazardous waste facilities managing mixed waste, EPA stated that RCRA applies to any waste containing both RCRA hazardous constituents and AEA radioactive constituents. As a result of these notices and the DOE "byproduct rulemaking," DOE facilities were forced to comply with regulations for mixed waste management activities under both the AEA and RCRA.¹¹

Initially, DOE had petitioned EPA to exclude high-level and transuranic wastes from RCRA regulation on the premise that DOE waste management practices for these waste types were equivalent or superior to those mandated by RCRA.¹² However, an EPA task force in 1987 found that certain aspects of DOE waste management operations, such as groundwater monitoring and chemical analysis of wastes, were "clearly deficient."¹³ Consequently, all DOE mixed waste is subject to RCRA regulations independent of the nature of the radioactive component of the waste (i.e., low-level, high-level, or transuranic). On February 22, 1989, DOE issued Order 5400.3, establishing hazardous and radioactive mixed waste policy and requirements. This Order specifies

that all DOE hazardous and mixed wastes will be managed according to Subtitle C of RCRA.

Under RCRA, EPA may delegate to a state agency the authority to implement hazardous waste management regulations if the state agency program is equivalent to the Federal RCRA program. An authorized state program may adopt requirements more stringent and comprehensive than Federal requirements as long as they are not inconsistent with the Federal program. The EPA notice of July 3, 1986, referenced above allowed a state one year from the date of publication to make necessary regulatory changes and to demonstrate that its hazardous waste regulatory program applies to all hazardous waste, even if mixed with radioactive waste. A state requiring statutory amendments to regulate the hazardous component of mixed waste was given two years to incorporate the necessary changes. In addition, no state could be authorized to administer the corrective action provisions of Section 3004(u), unless the state could demonstrate that its definition of solid waste did not exclude the hazardous components of mixed waste.¹⁴ EPA took this action because it felt that the state must be able to apply its corrective action authorities at sites contaminated with mixed waste. Of the 43 states with RCRA authorization, nineteen have received authorization for mixed waste. In the remaining 24 states, mixed waste is not subject to regulation as a hazardous waste under RCRA.¹⁵

The fact that mixed waste is not regulated as a hazardous waste until a state receives authorization caused a number of DOE critics to contend that EPA was not enforcing environmental laws at Federal facilities and that DOE was using a loophole in the regulations to bypass RCRA requirements.¹⁶ The critics contended that DOE was

"shopping around" for states which had not yet received mixed waste authorization to allow disposal of mixed waste at unpermitted facilities. This EPA policy caused Rep. Mike Synar (D-Oklahoma) Chairman of the Government Operations Environment, Energy & Natural Resources Subcommittee, during a September 13, 1988 hearing, to wonder whether EPA had been coerced by DOE when he remarked: "There seems to be a reluctance on EPA's behalf to recognize that they have created a regulatory framework full of loopholes."¹⁷ EPA officials denied these charges maintaining that they are committed to enforcing strong RCRA requirements against Federal facilities, but must abide by statutory procedures.¹⁸

While mixed waste is subject to hazardous waste regulation, RCRA contains two provisions which recognize that certain industrial activities conducted under authority of the AEA may require special regulatory treatment. The first, which is commonly known as the "inconsistency clause" is contained in Section 1006(a) of RCRA and precludes any solid or hazardous waste regulation by EPA or a state that is inconsistent with the requirements of the AEA.¹⁹ For example, an inconsistency might occur when compliance with a specific RCRA requirement would violate national security interests. In such a case, the AEA would take precedence over RCRA, and the RCRA requirements would be waived. However, EPA has issued no specific guidance on how to implement this provision of RCRA.²⁰ As a consequence, the inconsistency clause has been little used by EPA or RCRA authorized states. The second RCRA provision which excludes AEA activities is Section 1004(27) of RCRA. This provision excludes byproduct, special nuclear, and source material regulated under AEA from the definition of solid waste and thus from regulation as a hazardous waste.²¹

Radioactivity Concerns of Mixed Waste Management at DOE Facilities

As indicated above, the management of mixed waste is more complicated than management of waste that is only hazardous because of the associated radiation hazards. Mixed wastes pose handling and disposal problems because workers and the environment must be protected from both the hazardous and radioactive material. In fact, the greatest potential danger to human health and the environment in most cases involving the management of mixed wastes is the radioactive component of the waste, rather than the hazardous waste component.²² To minimize the risk to human health, DOE Orders implementing requirements of the AEA specify that radiation exposure to workers must be reduced to as low as reasonably achievable (ALARA).²³

Mixed waste workers often wear personal protective equipment similar to that used at a typical hazardous waste site (e.g., respirators and air-supplied suits). However, most waste management facilities handling mixed wastes, must include one or more of the following protective measures: (1) shielding for radiation protection, (2) planning and rehearsing the assigned task under simulated, nonradioactive conditions so that the real task proceeds as quickly as possible, (3) performing work remotely through the use of mechanical manipulators, cranes, or television cameras, (4) performing work from a distance through the use of long-handed tools, ropes, or other special apparatus, and/or (5) ventilation controls. Even though such protective measures greatly reduce worker exposure to radiation contamination, the DOE ALARA principle requires that waste management tasks involving mixed waste such as obtaining samples, performing analyses, doing inspections, and extended periods of potential exposure be held to a minimum.²⁴ Consequently, there exists a direct conflict

between RCRA regulations requiring frequent inspections and waste characterization and the ALARA principles.

One example of the impact of the ALARA principle on the management of mixed wastes is the limitations it imposes on achieving compliance with RCRA waste characterization. Hazardous waste regulations require that wastes be characterized through chemical analysis or through process knowledge at their initial point of generation or prior to generation. For many of the mixed wastes generated at the SRS and at other DOE facilities, it is difficult to achieve the waste characterization through chemical analysis due to the radiation concerns or the lack of analytical capability for mixed waste samples. The analytical methods approved by EPA for hazardous waste characterization were not designed for waste with radioactive constituents.²⁵ In many cases, special procedures or alternative methods must be used to analyze mixed wastes.²⁶ Historically, process knowledge has been the primary method used to characterize mixed waste at the SRS, although more analytical capability is being developed.²⁷

Environmental Restoration and Waste Management Five-Year Plan

As a result of growing pressure from Congress to lay out a plan to clean up the nuclear weapons complex, DOE in August 1989 published a \$19.5 billion Environmental Restoration and Waste Management, Five-year Plan.²⁸ Pressure to prepare the plan was very evident after the potential cost of DOE cleanups emerged from a study conducted by the GAO. Results of the GAO study estimated that the cost for cleanup and modernization of the DOE weapons complex could reach up to \$150 billion and take more than 50 years to complete.²⁹

The five-year plan envisioned by DOE is the first phase of a much longer and more expensive effort to clean up the nuclear weapons

complex.³⁰ The document establishes the DOE program to be used over the next five years to achieve compliance with environmental regulations and to clean up contamination at inactive waste sites. The plan is scheduled to be revised annually, incorporating progress made on implemented programs and reflecting changes in DOE planning as more definitive cost estimates are developed for specific cleanup actions required to meet compliance obligations.

However, the DOE five-year plan is more than a plan to coordinate cleanup activities at nuclear weapons production facilities. The plan makes a clear and useful distinction between those actions that are required to remediate contamination from past waste management practices and those actions required to manage waste generated from current and future production operations.³¹ In the five-year plan DOE defines three discrete compliance-related activities: (1) "corrective activities," those activities necessary to bring active and standby facilities into compliance with local, state, and Federal rules; (2) "environmental restoration," which includes assessment and cleanup of surplus facilities and inactive sites; and (3) "waste management operations," which deals with treatment, storage, and disposal of wastes generated from ongoing operations at active facilities.

In the plan DOE makes two important observations concerning proposed environmental restoration activities. First, DOE notes that more than three fourth's of its environmental problems at inactive waste sites are in the earliest phases of assessment and investigation, for which available technology does not allow precise, characterization of the contamination problems. Secondly, cost-effective cleanup technologies are lacking to control and correct some forms of contamination. To illustrate the second point, Ray Berube, the DOE

Acting Assistant Secretary for the Environment, Safety and Health, stated at a hearing held before the Senate Armed Services Subcommittee on Strategic Forces and Nuclear Deterrence on February 2, 1989, that some of the spreading plume of volatile organic compounds (VOCs) could be contained at the Rocky Flats Plant, but that there is no known technology to halt VOCs that are now inaccessible or to halt the spread of underground radiation.³²

In a statement before the Senate Committee on Governmental Affairs on November 14, 1989, J. Dexter Peach, Assistant Comptroller General of the General Accounting Office (GAO) said the plan is "an important first step in beginning to lay out an approach for cleaning up DOE facilities" and complying with environmental laws.³³ He provided three important observations regarding implementation of the five-year plan. The first observation was that the cost estimates for resolving the environmental problems remains uncertain. He stated that "the full scope and magnitude of the environmental problems are not known at many DOE facilities since DOE is in the early phases of characterizing the problems." Based on GAO experience evaluating the EPA Superfund project, Mr. Peach indicated "that the less that is known about the extent of contamination, the more likely the cost estimates will increase."³⁴

The second observation was that new technologies are not yet available to accommodate all contamination problems or effectively reduce the cost of cleanup. Mr. Peach stated that new cleanup technologies are years away from being feasibly applied. He indicated to the Congressional Committee that "Congress will have to make decisions and tradeoffs regarding the proper balance between funding research and development looking for new ways to solve" cleanup

problems and funding their resolution through more conventional cleanup methods.³⁵

Citing the huge estimated costs, the number of government agencies involved, and the complex task ahead for DOE, Peach in his third observation called for a long-term national commitment to resolve the cleanup problems facing the DOE weapons complex. As Mr. Peach stated, it matters little whether DOE cleanup problems are viewed in a 1-year, 5-year, or 30-year context, "the Congress must realize that resolving the problems will be extremely costly--amounting to billions of dollars each year for decades."³⁶

DOE Cleanup Prioritization and Budgetary Considerations

The DOE Five-year Plan established protocol for expenditure of the FY 1989 budget, established the FY 1990 amended President's budget, and included a baseline for FY 91-95 budget formulation and projections. The proposed spending level for FY 1990 was about \$2.4 billion, rising to \$4 billion for FYs 1994 and 1995.³⁷

The plan presented a four category prioritization system used to set initial priorities for cleanup and compliance activities, while a process to develop criteria for setting priorities for future budget requests was being developed.³⁸ The plan's initial four priorities were to: (1) prevent near-term adverse impacts on workers, the public or the environment, including work that, if terminated, could result in significant program or resource impacts; (2) comply with agreements between DOE and Federal, state and local agencies not captured by the first priority; (3) further reduce risks, promote full compliance, be cost-effective and prevent disruption of DOE missions not covered in the first two priorities; and (4) undertake activities that go beyond external regulations but are included in DOE Orders or in

industry-accepted standards not required by regulations and not captured in other priorities. The initial prioritization system described above was acknowledged in the plan to be a "less sophisticated approach" than that ultimately to be employed by DOE, and even so was the subject of much criticism.

Certain aspects of the prioritization system were strongly criticized by EPA.³⁹ Their concern with the plan was that it would allow "trade-offs among compliance-related activities" rather than meeting the requirements of environmental laws. EPA officials urged that all activities associated with DOE facilities out of compliance with environmental regulations be included in the top priority category, as well as those that have been served an enforcement order or are the subject of a consent order or settlement agreement. EPA officials were also critical of portions of the DOE plan which stated that previously negotiated compliance agreements may have to be renegotiated after final national, consensus-based priorities and cleanup standards were developed.⁴⁰ EPA officials argued that States must be allowed to develop "regulatory schemes which reflect unique state considerations."⁴¹

A staff attorney for the Natural Resources Defense Council (NRDC), Dan W. Reicher, criticized the prioritization system contained in the Five-year Plan because it appeared to favor those sites that had already reached cleanup agreements with EPA and the states.⁴² In a review of the DOE proposed cleanup budget for FY91, James Werner of the NRDC stated before the House Armed Services Nuclear Facilities Panel that "DOE's FY91 budget underfunds waste site cleanup in favor of environmental projects designed to support ongoing weapons activities."⁴³ He suggested the budget request provided an excellent

opportunity for the "new team at DOE" to demonstrate its commitment to a change in priorities and the cleanup of inactive waste sites. Mr. Werner continued his statement indicating that the NRDC analysis of the budget request was somewhat discouraging because they had hoped for a significant reordering of priorities at DOE.

Prior to establishment of the DOE Environmental Restoration Program, remedial activities at the SRS were funded from budgets of the various operational units at the facility.⁴⁴ Under such a system, expenditures for remediation were difficult to track; consequently, it was difficult to evaluate performance and adequacy of total remedial efforts. It is anticipated that one of the positive results of the DOE Environmental Restoration Program is that it will facilitate the tracking of cleanup expenditures and provide a basis for internal and external evaluation of remedial programs by all parties concerned with the budgetary process.⁴⁵

One of the objectives of the DOE Five-year Plan was to ensure that all environmental requirements, including those previously agreed upon with Federal and state regulatory authorities, had been incorporated into the DOE planning and budget process. Consequently, the plan was designed to be consistent with commitments entered into by DOE facilities with regulatory authorities pursuant to CERCLA and RCRA. In the event that the five-year plan prioritization system results in a proposed implementation schedule that is not consistent with commitments made to regulatory agencies, the plan calls for the parties involved to work out any differences.⁴⁶ However, the plan also states that some agreements or commitments may have to be renegotiated.⁴⁷

One of the concerns of those responsible for the implementation of the DOE Environmental Restoration Program at field installations is the

possible interference with established dates for the closure of inactive waste sites. As previously stated, many of the ongoing closure activities at the SRS are being conducted in response to established closure dates negotiated with regulatory agencies. While the environmental restoration program is designed to accommodate established cleanup schedules to the extent possible, funding and priority constraints of the program may require that cleanup schedules be renegotiated. For example, a specific SRS remediation project may rank too low on the consolidated DOE priority listing to receive funding during the established cleanup schedule, or Congressional appropriations may be below the level that will allow completion of the site cleanup within the established timeframe.

DOE NEPA Policy

Compliance with environmental laws governing cleanup of hazardous waste normally brings to mind activities having implementing regulations with performance standards and/or permit requirements. Although the National Environmental Policy Act (NEPA), as amended, lacks permit requirements, it is of considerable importance to cleanup actions undertaken at DOE facilities. NEPA requires all Federal agencies to systematically evaluate the potential effects of their major actions on the environment and prepare environmental impact statements (EIS) for any proposed action that would have a significant impact on the environment.⁴⁸

Early in the history of NEPA, a dispute arose between the Council on Environmental Quality (CEQ) and EPA over the applicability of NEPA requirements to EPA permitting actions.⁴⁹ By statute, all of EPA's actions under the Clean Air Act and some actions under the Clean Water Act are exempt from NEPA's EIS requirements.⁵⁰ However, no NEPA

exemption is contained in the CERCLA or RCRA statutes. While EPA concedes that NEPA applies to remedial actions conducted under CERCLA, they state that they have patterned the consideration of alternative cleanup plans after the NEPA review process.⁵¹ EPA argues that the record of decision prepared for CERCLA remedial actions is the "functional equivalent" of an environmental impact statement prepared for NEPA.⁵² EPA's position on this issue is that remedial actions should not be delayed by the imposition of formal NEPA requirements. One study of Congressional guidance contained in the legislative history of CERCLA concludes that "Congress was careful to provide that where time was of the essence, where emergencies exist, the full NEPA EIS requirements was not necessary. But in other cases, where long-range solutions are sought, and time is not critical, Congress anticipated the use of the environmental impact statement process."⁵³ Implementation requirements for the procedural provisions of NEPA are promulgated by the CEQ (40 CFR 1500-1508) and each Federal agency in accordance with NEPA and CEQ regulations. DOE has adopted guidelines for complying with these procedural provisions.⁵⁴

For DOE, the applicability of NEPA to CERCLA remedial actions is still an outstanding question.⁵⁵ In comments submitted to EPA on the proposed revisions to the CERCLA National Contingency Plan (NCP), DOE requested that the "NCP should encourage the integration of these two processes where it is appropriate and applicable."⁵⁶ To that end, DOE requested that EPA acknowledge in Subpart K of the revised NCP that NEPA applies to CERCLA remedial actions at Federal facilities.⁵⁷ DOE stated in the comments to EPA that "Absence of this acknowledgement has been, and will continue to be, a sensitive issue in negotiating Federal Facilities Agreements (FFA), and a potential obstacle in meeting the

requirements of both NEPA and CERCLA remedial actions on time."⁵⁸ Given the fact that no clarifying guidance has come from either the U.S. Department of Justice or the CEQ, DOE has developed an internal policy for integration of NEPA and CERCLA documentation and public review requirements.⁵⁹

In accordance with the provisions of DOE Notice 5400.4, the requirements of NEPA and the process for the assessment and cleanup under CERCLA are to be integrated.⁶⁰ This policy is intended to integrate the requirements of NEPA with the planning and environmental review procedures of the CERCLA remedial response process so that all such procedures run concurrently rather than consecutively, thereby reducing the level of resources that would be needed to implement both processes separately. Further, this policy is intended to minimize the risk that DOE remedial actions will be delayed on procedural grounds. A key element of the integrated process is determining as early as possible in the remedial process the level of NEPA documentation required for a remedial action project so that appropriate CERCLA/NEPA planning is also achieved early in the process. DOE policy is that in most instances the primary instrument for this integration is the remedial response process prescribed by CERCLA. The CERCLA remedial response is to be supplemented to the extent necessary to meet the procedural and documentation requirements of NEPA. Additionally, the public review processes of CERCLA and NEPA are to be combined in connection with the CERCLA/NEPA documentation to minimize administration duplication.

DOE has received criticism for its lack of adequate NEPA documentation. As one example of such criticism, the Congressional Research Service released a report in January 1990 that criticized DOE

lack of compliance with NEPA. The report summarizes prior DOE compliance with NEPA in the following manner:

Today, 20 years later, the NEPA process is well established throughout the Federal Government. But several agencies have developed a poor reputation for compliance with the law, one of which is the Department of Energy (DOE). In particular, DOE's vast weapons production complex has been accused of failing to achieve the environmental balance envisioned in NEPA, by consistently placing production goals above all other concerns. Lawsuits have charged DOE with refusing to carry out required environmental reviews for defense-related activities and with failing to fully integrate NEPA procedures into its decision making process.⁶¹

The report indicated that while many lawsuits have been filed against DOE, only one major NEPA related lawsuit has been lost by the agency. However, several lawsuits or threatened suits have achieved their goals without ever having reached trial "when DOE agreed to prepare the EIS's or cancel the projects that had prompted the controversy."⁶²

The report reviewed NEPA compliance policy at DOE and its predecessor agencies, and was particularly critical of DOE NEPA policy during the Reagan administration.⁶³ The report stated that NEPA compliance at the DOE weapons complex was further eroded during the Reagan tenure by the authority of the field installations to make "case-by-case exemptions" to NEPA documentation through utilization of the "memorandum-to-file process." Under this policy a "memorandum-to-file" could conclude that there was no potential environmental impact from a specific proposed action and no further environmental assessment of the proposed action would be conducted.

In response to the criticism concerning its NEPA program, DOE issued policy directives aimed at dramatically improving all NEPA documentation. On February 5, 1990, the Secretary of Energy, James D. Watkins, ordered changes to the DOE procedures for complying with NEPA that he said would reverse a "decentralized, non-uniform and

self-defeating" approach to complying with the environmental planning statute.⁶⁴ The revised NEPA compliance procedures reversed the policy allowing field offices to prepare "memorandum-to-file" claiming no need for an assessment of environmental impact. The "memoranda-to-file" will not be used after the end of FY 1990.⁶⁵ DOE operating procedures had allowed these memos to be filed at the field offices without review by DOE-Headquarters NEPA staff.⁶⁶ The revised procedures outlined in the Secretarial Notice minimize the authority of the field offices to decide the appropriate level of NEPA documentation and requires the Energy Secretary to approve all programmatic and site-wide impact statements. The revised NEPA compliance policy eliminated a categorical exclusion that exempted from NEPA review "actions that are substantially the same as other actions for which the environmental impacts have been assessed in a NEPA document and determined by DOE to be clearly insignificant and where such assessment is still valid."⁶⁷ Eliminating this categorical exclusion ensures that each DOE remedial action will be reviewed individually for potential environmental impact. Additionally, the revised procedures require regular NEPA audits of program and field offices and require professional NEPA compliance positions within facility line organizations.

SRS Waste Management EIS

In December, 1987, DOE published an environmental impact statement which assessed the impact of proposed modifications of hazardous, low-level radioactive, and mixed waste management activities for the protection of groundwater, human health, and the environment at the SRS.⁶⁸ The purpose of the "Waste Management Activities for Groundwater Protection" EIS was to identify and select waste management strategies for the treatment, storage, and disposal of SRS generated wastes.

These strategies were developed to allow DOE to comply with groundwater protection and other regulatory requirements. The EIS was both a programmatic and a project-specific document. It was developed to "support broad decisions on future actions" of SRS waste management activities and to "provide project-related environmental input and support for project-specific decisions on proceeding with cleanup activities at existing waste sites."⁶⁹ The EIS considered four alternative waste management strategies, including the "no-action" alternative as required by CEQ regulations. The alternatives considered were based on a combination of site closure and other remedial actions for existing waste management facilities, the construction of new storage and disposal facilities, and the discharge of reactor disassembly basin purge water.

In its review of the final EIS, EPA stated that DOE had responded to most of its comments on the draft EIS, but that additional clarification was needed on the "programmatic nature of the remedial recommendations; commitments to do project-specific NEPA documentation for the proposed incinerator(s) and new waste storage facilities."⁷⁰ DOE did not formally respond to these comments, but addressed these concerns in the Record of Decision (ROD), which finalized much of the information and commitments made in the EIS.⁷¹ Specifically, the ROD addressed the issue of the need for additional NEPA documentation in the following manner:

Additional documentation in compliance with 40 CFR 1502.20 may be prepared if necessary to implement the project-specific actions discussed in and related to the modification of the SRP waste management activities assessed in DOE/EIS-0120.⁷²

The concept of preparing impact statements for entire programs (e.g., cleanup of a large Federal facility), with site-specific impact

statements or environmental assessments referring to the "programmatic EIS" for discussion of program-wide issues, is encouraged by CEQ regulations.⁷³ The process of nesting the site-specific NEPA documentation within the broader programmatic environmental impact statements is termed "tiering."⁷⁴ The CEQ regulations indicate that tiering is appropriate when the sequence of statements or analyses is from a program environmental impact statement to a site-specific statement or analysis.⁷⁵

Summary

The Atomic Energy Act (AEA) of 1954 was initially perceived by the regulated community to apply to all radioactive wastes. No special provisions were enacted to control what were thought to be small quantities of mixed wastes. DOE thought itself accountable only to AEA regulation and did not participate in the initial hazardous waste management rulemaking process. Consequently, EPA was unaware of DOE mixed waste technical considerations as important RCRA implementing regulations were promulgated.

In 1986, EPA stated that RCRA applied to any waste containing both RCRA hazardous components and AEA radioactive components. In 1987, three years after the LEAF vs. Hodel lawsuit, DOE acknowledged RCRA applicability to mixed waste at its facilities. Without lead time, DOE facilities were forced to comply with regulations for mixed waste management activities under both AEA and RCRA. AEA requires DOE to keep worker exposure to radiation as low as reasonably achievable (ALARA), consequently mixed waste management tasks must be kept to a minimum and process knowledge (at SRS) is the main method used to characterize mixed waste. Of 43 states with RCRA authorization, only 19 have received authorization for mixed waste. Mixed waste is not

subject to regulation as a hazardous waste under RCRA in the remaining 24 states.

In August of 1989, in response to a public outcry for cleanup of the DOE nuclear weapons complex, DOE announced an Environmental Restoration and Waste Management Five Year-Plan for cleanup of the weapons complex. The Five-year Plan is the first phase of a much longer program and approach to be used to cleanup DOE inactive waste sites. Annual revisions to the plan will be made. DOE cleanup prioritizations and budgetary considerations may require renegotiation with Federal and state regulatory agencies of previous cleanup commitments. Each DOE remedial action is to be reviewed individually for potential environmental impact under provisions of NEPA. The SRS Waste Management Environmental Impact Statement of December 1987, may require additional NEPA documentation to address waste sites not previously addressed and new remedial technologies.

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CHAPTER IV

RCRA Issues Associated With Mixed Waste Cleanup at SRS

This chapter (1) reviews RCRA requirements for the closure of hazardous waste management units and for corrective action at solid waste management units (SWMUs), (2) describes the extent of RCRA authority over the cleanup of mixed waste, (3) discusses the regulatory status of closure and corrective actions currently underway at SRS under provisions of the jointly issued EPA and State of South Carolina RCRA permit, and (4) presents the RCRA closure dates that have been established by regulatory authorities and a court-ordered consent decree. As a waste management facility with an active RCRA permit, SRS as of August 30, 1990, had initiated investigation of 81 solid waste management units for potential corrective action under terms of its hazardous waste permit.¹ However, these investigations do not specifically address the radioactive component of mixed waste. All hazardous waste cleanup performed to date at SRS has been done under provisions of the RCRA permit.

Overview of the Closure and Corrective Action Provisions of RCRA

In 1976, Congress passed the Resource Conservation and Recovery Act (RCRA) which gave EPA broad authority to develop a comprehensive regulatory program to govern the management and disposal of all waste including hazardous waste.² The primary emphasis of the hazardous waste sections of RCRA concern the identification, handling, and disposal of wastes in an environmentally sound manner. Under RCRA, EPA is responsible for identifying wastes that are subject to regulation and for regulating and permitting generators, transporters, treaters, storers, and disposers of waste covered by the regulations. RCRA also

gave EPA broad authority to promulgate regulations necessary to protect human health and the environment from adverse impacts associated with hazardous waste management.³ This "cradle-to-grave" regulatory system for hazardous waste was designed to track and properly manage waste from the point of generation to final disposition. EPA regulations generally apply within each state unless EPA concurs that the state requirements are as stringent as, or more stringent than, the EPA requirements.⁴ In such a case EPA authorizes the state program to operate in lieu of the Federal program. As of May 1990, 43 states were authorized to operate the base RCRA regulatory program.⁵

All facilities that treat, store, or dispose of hazardous or mixed waste are required to obtain a RCRA permit. Although RCRA requires facilities to operate under the conditions of a permit, Congress recognized that it would take many years for EPA or authorized states to issue all of the necessary permits. Thus, Congress established interim status under Section 3005(e) of RCRA, which allows owners or operators of facilities, who meet certain conditions, to continue operating under interim status until a final permit application is approved or denied.

Eligible facilities are granted interim status as long as they submit a Part A application. Part A of the application is a short standard form that collects general information about the facility, the wastes handled, and the waste management activities conducted at the facility. These facilities are subject to RCRA interim status standards (40 CFR Part 265) until a Part B application is submitted and the permit is approved or denied. DOE facilities with units containing radioactive mixed wastes became subject to the interim status requirements of 40 CFR Part 265 upon promulgation of the May 1, 1987,

DOE "byproduct rule," and were required to submit Part A of their permit application (see Chapter III for discussion of byproduct rule).

Federal facilities must comply with the requirements of RCRA. Section 6001 of RCRA expressly subjects Federal facilities to the governing provisions and regulations of RCRA, including requirements for permits, corrective action, and reporting. Consequently, DOE treatment, storage, and disposal facilities must have RCRA permits and must address releases of hazardous waste/constituents.

RCRA Closure and Post-Closure Care Requirements

EPA regulations contain procedures and standards for closing facilities that treat, store, and dispose of hazardous waste on-site and, in some situations, the required monitoring and maintenance of the facilities after closure.⁶ The purpose of the closure and post-closure care requirements is to ensure that all hazardous waste management facilities close in a manner that (1) minimizes the need for further maintenance and (2) controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated rainfall or waste decomposition products to the ground or surface water or to the atmosphere.⁷ "Closure" is defined as the period when hazardous wastes are no longer accepted by the hazardous waste management facility and during which time the owner/operator completes treatment, storage, and disposal activities and closes the facility in accordance with applicable regulatory requirements.⁸ "Post-closure" is the period (usually 30 years) after closure during which owners/operators of disposal facilities must conduct various monitoring and maintenance activities.⁹ As a general rule, when hazardous waste management facilities are closed and can demonstrate

that all waste and contaminated materials, including soils, have been removed, the owner/operator is not required to perform post-closure care. In this situation, "clean closure" has been achieved but must be certified by regulatory authorities. However, where waste or waste residues remain onsite after closure, post-closure care is generally required.

There are general closure requirements for all hazardous waste management facilities, and more specific design and performance standards for individual types of waste management facilities (e.g., containers, tanks, surface impoundments, waste piles, landfills etc.).¹⁰ For land based units such as surface impoundments, landfills or waste piles, the unit may be closed with waste materials in place thereby requiring compliance with post-closure care regulations; or the unit may be closed by removing or treating the waste materials to meet specified standards to eliminate the need for post-closure care.¹¹ A closure that is performed with some level of remaining waste material or residue may be chosen because of the expense associated with removing all waste materials, or it may not be technologically feasible to remove all waste materials.¹² To initiate closure an owner or operator must prepare a closure plan and maintain a copy of the plan at the facility until all closure activities are completed and closure is certified.¹³ Closure activities are completed according to a timetable outlined in the regulations and a schedule specified in the plan.¹⁴

Post-closure care is required for disposal facilities when waste materials are not removed or treated to specified treatment levels.¹⁵ Because the hazardous waste component of radioactive mixed waste is subject to RCRA subtitle C regulation, owners and operators of mixed waste facilities must comply with the post-closure requirement of

40 CFR Subpart G. The regulations require 30 years of post-closure care for each land based disposal unit, beginning after completion of closure to ensure the integrity of waste containment systems and to detect any releases to the environment.¹⁶ As with the closure requirements, all post-closure care activities must be specified in a plan that is approved by regulatory authorities and maintained at the facility until post-closure care is concluded.¹⁷

Hazardous waste cleanup performed to date at the SRS has primarily involved the RCRA closure of mixed waste disposal facilities. The M-Area Settling Basin has been closed in accordance with the closure plan contained in the SCDHEC approved Part B Post-Closure Care permit. The project work is mechanically complete and awaiting certification by regulatory authorities. Additionally, a 58-acre section of the Radioactive Waste Burial Ground is being closed as the Mixed Waste Management Facility. As of October 1990, closure activities were nearing completion.

RCRA Corrective Action Program

When RCRA was first enacted in 1976 it did not effectively deal with the potential for a release of hazardous waste or hazardous constituents from inactive waste management units at permitted facilities.¹⁸ However, the 1984 Hazardous and Solid Waste Amendments (HSWA) to RCRA greatly expanded corrective action authorities for releases of hazardous wastes or constituents.¹⁹ Because of the significance of this provision of RCRA, it is quoted below:

Standards promulgated under this Section shall require, and a permit issued after November 8, 1984, by the Administrator or a State shall require, corrective action for all releases of hazardous waste or constituents from any solid waste management unit at a treatment, storage, or disposal facility seeking a permit under this subchapter, regardless of the time at which waste was placed in such unit. Permits issued under

section 6925 of this title shall contain schedules of compliance for such corrective action (where such corrective action cannot be completed prior to issuance of the permit) and assurances of financial responsibility for completing such corrective action.²⁰

Prior to the enactment of HSWA, the corrective action program only required that releases of hazardous constituents to the groundwater from specific types of waste management units be controlled.²¹ The HSWA rule and accompanying regulations significantly broadened the scope of the RCRA corrective action program from simply detecting and correcting releases into the uppermost aquifer to cleaning up continuing releases to environmental media resulting from other waste management units and practices at RCRA facilities.²² Section 3004(u) of HSWA requires corrective action for releases of hazardous wastes or constituents from any solid waste management unit (SWMU) at a storage, treatment or disposal facility that is subject to RCRA permitting requirements. Corrective action regulations apply regardless of when the waste was placed in the SWMU.

On July 15, 1985, EPA promulgated regulations that codified the statutory language of the new Section 3004(u) containing the corrective action program of HWSA.²³ The implementing regulations essentially reiterated the statutory language of 3004(u). On December 1, 1987, EPA issued a companion to the 1985 rulemaking that further modified 40 CFR 264 and 270 to implement the statutory provisions of HSWA.²⁴ Issues addressed in the second rulemaking included provisions for submittal of Part B permit applications and the corrective action of release extending beyond a facility boundary. The revised regulation required descriptive information on all solid waste management units at the facility, and all available information pertaining to any past or current release from these units. The second codification rulemaking

also required facility owners/operators to address corrective action for releases that may have migrated beyond the facility boundary.²⁵

The scope of the 3004(u) authority is largely defined by its key terms. The term "release" as used in the corrective action program is defined by EPA guidance documents as "any spilling, pouring, emitting, emptying, discharging injecting, pumping, escaping, leaching, dumping, or disposing of hazardous wastes (including hazardous constituents) into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing hazardous wastes or hazardous constituents).²⁶ The term "solid waste management unit" is defined as "any discernible unit at which solid or hazardous wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous wastes."²⁷ Such units include any area at a facility at which hazardous wastes or hazardous constituents have been routinely and systematically released.²⁸ It should be noted that the definition of a SWMU does not include an accidental spill from production areas and units in which wastes have not been managed (e.g. product storage areas).²⁹ The cleanup of these types of incidents would be governed by other Federal and state environmental laws.

Corrective action at SWMUs can also be required and implemented through other provisions of RCRA. Section 3004(v) requires that corrective action "be taken beyond the facility property boundary where necessary to protect human health and the environment unless the owner or operator of the facility can demonstrate that, despite the owner or operator's best efforts, the owner or operator was unable to obtain permission to undertake such action."³⁰ Additionally, Section 3008(h) of RCRA authorizes EPA to issue administrative orders or bring court

action to require corrective action or other measures, as may be appropriate, when there is a release of hazardous waste or hazardous constituents from a RCRA facility operating under interim status.³¹

EPA issued a draft "National RCRA Corrective Action Strategy" in October 1986 to inform the regulated community and the public of the Agency's overall plans for implementing the HSWA corrective action program.³² The strategy provided an overview of the RCRA corrective action authorities, and described the basic process for identifying, investigating, and remediating releases at RCRA facilities. The draft strategy also discussed EPA's plans for establishing priorities for corrective action, discussed the relationship between EPA and the states in implementing the program, and clarified the factors influencing the management of corrective action.³³ The EPA strategy statement noted that Federal facilities are subject to the same basic corrective action requirements which apply to any facility owned or operated by private parties.

On July 27, 1990, EPA proposed requirements for corrective action of solid waste management units at facilities which have been issued a RCRA permit.³⁴ This proposed rulemaking would create new implementing regulations (Subpart S of 40 CFR 264) for hazardous waste management facilities to define requirements for conducting facility assessments and investigations, evaluating potential corrective measures, and selecting and implementing corrective measures. While the corrective action program defined in the 1984 Hazardous and Solid Waste Amendments (HWSA) to RCRA became effective upon promulgation, the proposed rulemaking is intended "to establish a comprehensive regulatory framework for these statutory authorities."³⁵ The proposed rulemaking would serve to promote national consistency in implementing this

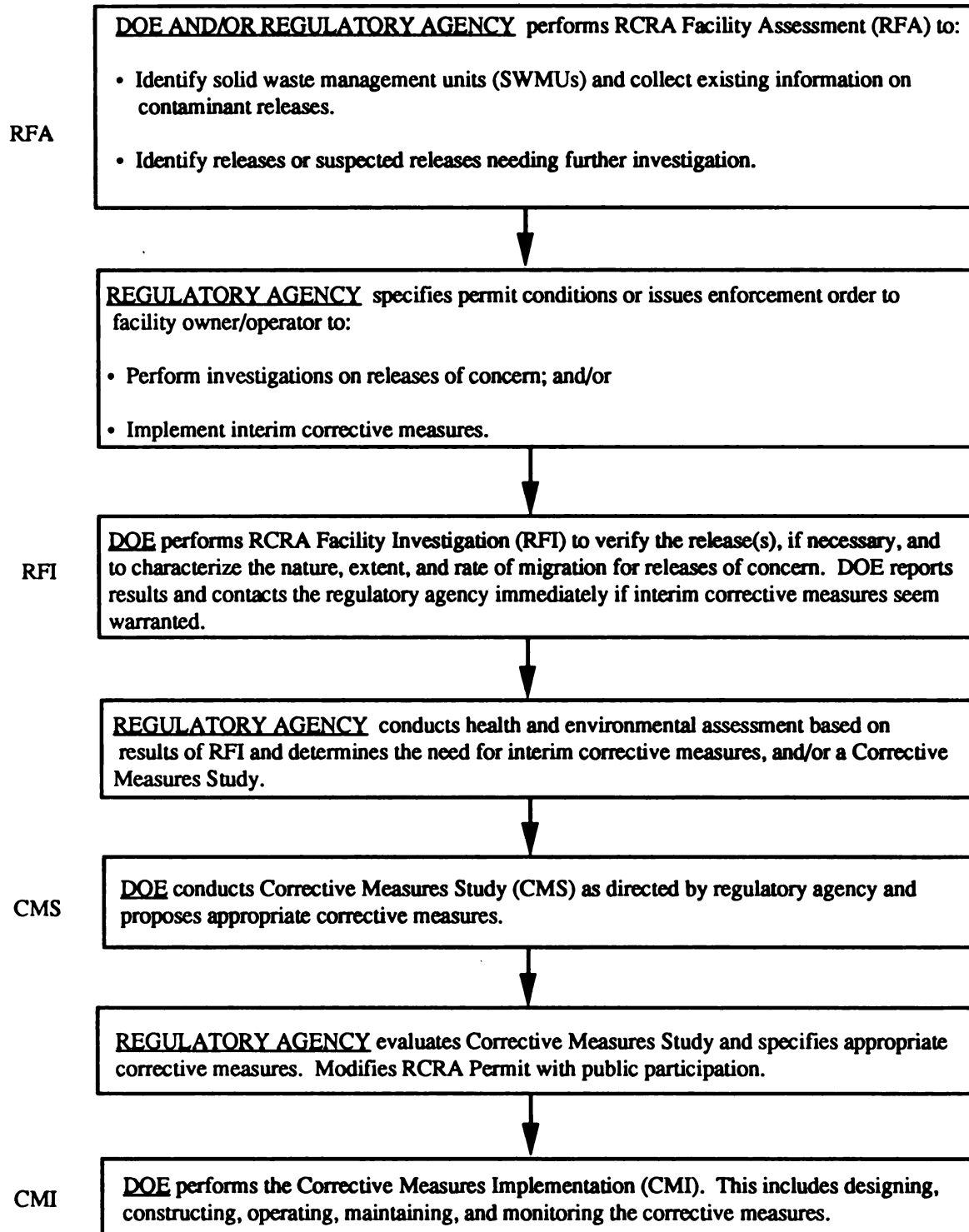
important component of RCRA, and would establish standards for states to demonstrate equivalency to EPA and obtain corrective action authority.

The RCRA Corrective Action Process

The four basic steps of the RCRA corrective action program used by EPA to identify potential releases, characterize them, and select and implement appropriate corrective measures are: (1) the RCRA Facility Assessment (RFA), (2) the RCRA Facility Investigation (RFI), (3) the Corrective Measures Study (CMS), and (4) the Corrective Measures Implementation (CMI).³⁶ Following this process, each step serves as a screen, sending forward to the next step those solid waste management units identified at a facility which have been determined to be a potential environmental problem, and eliminating from further consideration those SWMUs where no problem has been identified. A summary of the overall corrective action process for the identification and correction of releases to the environment at solid waste management units is depicted in Figure 3. These four steps are discussed in more detail below and will be contrasted to the analogous CERCLA remedial response process in Chapter VII.

RCRA Facility Assessment (RFA)

The initial step of the corrective action process is the assessment of a facility by the appropriate regulatory agency to identify actual or potential releases from RCRA units and other SWMUs at the facility, and is generally performed as a component of the hazardous waste permitting review process. As stated in EPA guidance "the objective of this assessment is to determine whether there is sufficient evidence of a release to require the owner/operator to undertake additional investigations to characterize the nature, extent and rate of migration

Figure 3. RCRA Corrective Action Process Applicable to DOE Facilities

of contaminant releases of concern."³⁷ An initial assessment is made using existing information found at the facility and a visual site inspection to confirm available information and to note any visual evidence of releases. If deemed necessary, sampling may be conducted to make determinations of potential releases.

The product of the RFA is a listing of solid waste management units that EPA considers to have released or have the potential for releasing hazardous constituents and warrant further investigation. If the regulatory agency believes that immediate action should be taken to protect human health and/or the environment, the owner/operator of the facility may be asked to implement some form of interim corrective measures. These actions are generally short-term actions responding to immediate threats, such as actual or potential exposure to hazardous waste or constituents, drinking water contamination, and other similar situations.³⁸

RCRA Facility Investigation (RFI)

The second step of the corrective action process is the RCRA Facility Investigation (RFI). Once a regulatory agency determines that an RFI should be conducted, the requirements for further investigation are generally stipulated in a hazardous waste permit including a schedule for implementing the RFI.³⁹ The purpose of the investigation is to characterize the nature, extent and rate of migration of contaminant releases identified in the RFA. The scope of the RFI can range from a simple site evaluation to a complex multi-media investigation that is typically focused on special concerns identified in the RFA.⁴⁰ Unlike the RFA, the RFI is performed by the facility owner/operator. As with the RFA, a regulatory agency can determine that interim corrective measures should be implemented.

Corrective Measures Study (CMS)

If the potential need for corrective measures is identified to mitigate the release of hazardous constituents, the owner/operator is responsible for performing a CMS to recommend specific measures to correct the problem. The objective of the CMS is to ensure that the proposed corrective measures will be effective in mitigating the threat imposed by an identified release of hazardous constituents. The CMS may include actions to control the source of the contamination (e.g., preventing the continued migration of contamination, by removing, stabilizing, and/or containing the contaminants) or actions to abate problems caused by the migration of contaminants into the environment from their original source.⁴¹ After evaluation of alternative corrective measures, the owner/operator is responsible for demonstrating that the preferred corrective measure will effectively mitigate any real or potential threat to human health and/or the environment. Regulatory authorities then review the recommendation, provide the public an opportunity to review and comment, and approve a corrective measure for implementation to mitigate identified releases.⁴²

EPA has not yet enacted regulations or prepared formal guidelines for this phase of the corrective action program.⁴³ Consequently, the selection and implementation of corrective measures is a process of case-by-case negotiation with authorized state agencies and EPA.

Corrective Measures Implementation (CMI)

After a corrective measures action is selected by regulatory agencies, it is the responsibility of the owner/operator to design and construct the selected remedy and to ensure that it is properly operated and maintained. As with the CMS step of the corrective action program, EPA has not yet enacted regulations or prepared

guidelines for the implementation of corrective measures.⁴⁴ Although, EPA and authorized states are responsible for compliance oversight throughout the entire corrective action process.

Administration of the Corrective Action Program

EPA and authorized states are the responsible agencies for management of the corrective action program.⁴⁵ Currently, the corrective action program is being implemented by EPA and six states that are authorized to implement the HSWA corrective action program. Permits issued pursuant to Section 3005(a) of RCRA, including permits issued by states that are authorized to implement HSWA provisions of RCRA programs, are required to contain corrective action requirements. Additionally, pursuant to Section 3008(h) of RCRA, EPA may require corrective action at unpermitted or interim status facilities. After EPA or state approval of the facility investigation and selected corrective measures for each specific SWMU, the hazardous waste management permit is modified to provide a compliance schedule for design, implementation, operation, and maintenance of the selected corrective measures.⁴⁶ The modification is treated as a major permit modification to the RCRA permit and therefore provides opportunities for public review and comment.⁴⁷

RCRA Public Participation Provisions For Permit Modifications

EPA procedures for issuing and modifying RCRA permits, including public participation requirements, are specified in 40 CFR 124. While the requirements outlined below are EPA regulations, they also apply to public involvement in state RCRA programs. However, state programs may have different and more elaborate procedures involving public participation (e.g., more extensive notification requirements). Once a permit application submitted to regulatory authorities is judged to be

complete, EPA issues a draft permit which incorporates all applicable conditions, compliance schedules, and monitoring requirements. The draft permit is then made available for public review and comment in accordance with RCRA 7004(b). A permit "fact sheet" must accompany draft permits for major facilities where significant public interest is anticipated.⁴⁸ The fact sheet must include a discussion of the principal facts and legal findings used in the preparation of the draft permit.⁴⁹ A 45-day comment period on the draft permit application is required, during which time any party can submit a "written notice of opposition" and request a public hearing. If a public hearing is requested, or if the Regional EPA Administrator determines on his or her own initiative that opposition to the proposed action exists, an "informal public hearing" is held.⁵⁰

RCRA public hearings are not intended to be full evidentiary hearings. Generally speaking, witnesses who offer testimony may be questioned by the hearing officer.⁵¹ After the close of the comment period and completion of any required public hearings, EPA or the authorized state decides whether to issue or deny the permit application. A response to public comments made on the application must accompany the final permit decision. Once a final decision is made, the permit becomes effective within 30 days unless the decision is challenged by a party who commented or participated in the public hearing.⁵² See Chapter VII for a discussion of some of the pertinent differences between CERCLA and RCRA public meetings.

Once a RCRA permit is issued, it may be modified only for specific reasons. Traditionally, modifications that affected the capacity or the operation of the facility were considered to be "major modifications" and consequently were subject to the permitting review

process discussed above, including public participation.⁵³ There also existed a number of "minor" modifications to RCRA permits (e.g. trial burns, land treatment demonstrations) that were not subject to the formal repetition of the permitting process.⁵⁴ However, on September 28, 1988, EPA published a final rulemaking that revised the RCRA permit modification procedures.⁵⁵ The final rule established three classes of permit modifications (i.e., Class I, II, and III) to replace the "major" and "minor" modification procedures of the previous regulation.⁵⁶

The EPA purpose in amending the previous permit modification procedure was to provide both owners/operators and the regulatory authority more flexibility to change specified permit conditions, to expand public participation opportunities, and to allow for expedited approval if no public concern exists for a proposed permit modification.⁵⁷ The adopted rule is not applicable in RCRA authorized states (e.g. South Carolina) until the state revises its program to adopt equivalent requirements under state law. Consequently, the SRS is subject to the "major" and "minor" permit modification procedure for all state authorized permit modifications (i.e., RCRA closures) and the three class permit modification procedure for EPA regulated actions (i.e., RCRA correction actions). EPA has suggested that DOE should consult with South Carolina on how a conforming modification to the state hazardous waste permit can be made simultaneously with a modification of the EPA issued permit.⁵⁸

As noted above, SWMUs scheduled for corrective action are specified in permits issued by EPA or an authorized state. When the permit is modified at a later date to incorporate more specific corrective action, the modification of the permit is considered a Class I, II, or

major modification triggering public participation permitting procedures. As of October 1990, the SRS had 81 SWMUs listed in its hazardous waste permit slated for corrective action.⁵⁹ This number of potential corrective actions will require frequent modification of the SRS hazardous waste permit, giving the general public numerous opportunities to comment on cleanup actions at the SRS.

DOE RCRA Implementation Order

On February 22, 1989, DOE issued DOE Order 5400.3, Hazardous and Radioactive Mixed Waste Program, to implement the requirements of RCRA within the framework of existing DOE environmental programs.⁶⁰ The Order did not outline specific strategies for achieving compliance, rather it indicated that it is the policy of DOE to "manage all Departmental hazardous and radioactive mixed wastes according to the requirements of Subtitle C" of RCRA and the requirements of the AEA, respectively.⁶¹ The Order further indicates that RCRA applies to the extent it is not inconsistent with the AEA and that the radioactive component of mixed wastes is subject to the requirements of another DOE Order (Order 5820.2A).⁶² The Order also defines "mixed waste" as waste containing both radioactive and hazardous components regulated by the AEA and RCRA respectively.⁶³ The Order restricts the definition of the radioactive component of mixed waste to the actual radionuclides dispersed or suspended in the waste material.⁶⁴

SRS Hazardous Waste Permit Activities

Section 3005 of RCRA requires owners and operators of treatment, storage, and disposal (TSD) facilities to obtain a hazardous waste permit. In accordance with Section 3006 of RCRA, the State of South Carolina has assumed responsibility for implementing a hazardous waste permitting program that is at least equivalent to the Federal program

promulgated under the 1980 amendments of RCRA.⁶⁵ As discussed above, hazardous waste permits frequently contain provisions for the investigation and possible corrective action of RCRA SWMUs. Because the State of South Carolina has not yet received corrective action authority, this part of the SRS permit was issued by EPA.⁶⁶ South Carolina has also promulgated corrective action requirements equivalent to EPA provisions. Consequently, the SRS must comply with both the EPA and State requirements with regard to corrective action and negotiate with two agencies should disagreements arise.

The South Carolina Department of Health and Environmental Control (SCDHEC) issued final hazardous waste management regulations in 1980.⁶⁶ In accordance with DOE policy, and as required by SCDHEC regulations, DOE-SR submitted to SCDHEC a notification of Savannah River Site (SRS) hazardous waste activities and a "Part A" of a hazardous waste management facility permit application on September 29, 1980, with copies to EPA Region-IV.⁶⁷ In 1983 SCDHEC conducted an initial RCRA inspection at SRS and in 1984 directed DOE-SR to submit "Part B" of its hazardous waste management facility permit application.⁶⁸ DOE-SR submitted the Part B application on February 11, 1985.⁶⁹ Since these original submittals, DOE-SR has submitted revised Parts A and B, as required, to respond to process changes and regulatory requirements. On September 30, 1987, SCDHEC issued a RCRA permit to SRS for operation of four storage facilities and post-closure care of the M-Area Settling Basin.⁷⁰ The SRS currently has 5 permitted facilities and 98 individual hazardous waste management units under interim status.⁷¹ Additionally, a number of treatment and disposal facilities are either in the design stage or under construction at the SRS to accommodate the large volume of waste in storage.

SRS RCRA Facility Investigation Program Plan

Part V of the SRS hazardous waste permit lists those SWMUs EPA and SCDHEC have scheduled for further investigation and possible corrective action at the SRS.⁷² In response to this permit condition, SRS prepared a generic RCRA Facilities Investigation (RFI) Program Plan which describes the proposed process for investigating areas contaminated with hazardous wastes and constituents. The SRS RCRA Facility Investigation Program Plan was developed to provide a framework for the completion of the RFI phase of the corrective action program at the SRS.⁷³ The SRS Program Plan will allow the development of unit-specific RFI work plans for all 81 SWMUs to determine the extent of contamination in relation to background levels characteristic of the region. The plan outlines how SRS will prepare unit-specific plans for all solid waste management units and outlines the schedule for SRS to submit the unit-specific work plans to EPA and SCDHEC for approval. The site-specific RFI work plans will address sampling activities, quality assurance/quality control measures, and safety precautions to be taken at the individual contaminated areas. The findings of these initial investigations will then be summarized in a final RFI report for each area of contamination. During the unit investigation phase, a detailed soils assessment will be made and can include surface water, groundwater, and ambient air. On September 6, 1989, EPA Region-IV approved the RCRA component of the SRS RFI Program Plan.⁷⁴

The SRS Federal Facility Agreement (FFA), CERCLA Section 120 Interagency Agreement, currently being negotiated with EPA and SCDHEC proposes to expand site investigations begun under the RCRA corrective action program "to address (1) releases at or from units not included

in the RCRA permit and (2) releases of hazardous and/or radioactive substances not regulated by DOE's RCRA permit."⁷⁵ The draft FFA is being structured to eliminate duplicative investigations of the same area of contamination by integrating the RCRA corrective action program with the CERCLA remedial response program. As a result, the RFI Program Plan has been renamed the RFI/RI Program Plan. The CERCLA remedial investigation (RI) is analogous to the RCRA facility investigation phase of the RCRA corrective action program.

RCRA Regulation of SRS Mixed Waste Facilities

A regulatory chronology of two SRS mixed waste management facilities previously discussed in Chapter II is presented below. This section discusses the regulatory status of ongoing RCRA closures and presents the closure dates that have been established by regulatory authorities and a court-ordered consent decree.

F-and H-Area Seepage Basins

As indicated in Chapter II, the F-and H-Area Seepage Basins received wastewater containing radionuclides and other chemicals from the F and H Separations Areas. On February 6, 1985, SRS submitted the original RCRA Part B permit application to SCDHEC for the seepage basins in response to an August 2, 1984, request from the State of South Carolina. SCDHEC reviewed the application and issued a Notice of Deficiency (NOD) on November 21, 1985.⁷⁶ SRS responded to the NOD through comments delivered to SCDHEC on December 27, 1985. Additional revisions to the groundwater portions of the Part B were submitted on March 3 and May 9, 1986. SCDHEC reviewed these responses and issued a second NOD on October 2, 1986.⁷⁷ This second NOD was incorporated into an Administrative Settlement Agreement between the State of South Carolina and DOE which became effective May 1, 1987.⁷⁸

In accordance with provisions of the Agreement, SRS modified its Part B permit application for the basins and submitted the revised permit application, which included an Alternate Concentration Limit (ACL) demonstration for groundwater remediation, to SCDHEC on April 15, 1988.⁷⁹ While stating that the permit application had improved, SCDHEC determined that the application was still deficient, and gave notice that the operating permit and the ACL demonstration were denied.⁸⁰ However, SCDHEC denial of the operating permit for the seepage basins did not relieve SRS of its responsibilities under RCRA and South Carolina law to obtain a post-closure care permit. As a result of the operating permit denial, RCRA interim status for the seepage basins was terminated on November 8, 1988.⁸¹ As a consequence, an Amendment to Settlement Agreement 87-27-SW was prepared.⁸² This Agreement required the submittal of a Post-Closure Care Part B permit application to SCDHEC by December 3, 1990. SRS is required to include an implementable corrective action plan to remediate groundwater contamination in the post-closure care permit application.

As a consequence of the operating permit denial, SCDHEC pulled the closure plans for the basins from the Part B permit application and submitted them for public review and comment. Following public review and comment SCDHEC approved the closure plans on June 23, 1989.⁸³ Closure of all govern seepage basins is scheduled for July of 1992. Closure of the basins will consist of physical and passive chemical stabilization of the basin sludge and supernate and construction of a closure cap which conforms to RCRA standards.

Mixed Waste Management Facility (MWMF)

Prior to 1986, analytical results indicated that radioactive lead buried in the SRS Burial Ground was not a hazardous waste. As

previously indicated, lead is used as shielding at the SRS for protection from radiological exposure. When the lead reaches a prescribed level of contamination, it is disposed of as low-level solid radioactive waste at the SRS low-level burial ground.⁸⁴ Lead is not a listed hazardous waste. In order to determine whether the lead was hazardous by characteristic, an EP Toxicity test was conducted in 1984 on SRS lead. The lead was found to be nonhazardous by characteristic.⁸⁵ However, new analytical data obtained in March 1986 contradicted the previous data and indicated that the lead shielding was hazardous by characteristic.⁸⁶

Since the burial ground was not a permitted RCRA landfill, DOE halted disposal operations in the area that had received the lead and other potential RCRA wastes and initiated compliance actions with EPA and SCDHEC.⁸⁷ In 1986, SRS submitted an application for a RCRA permit for post-closure care of the unit to SCDHEC. However, because the MWMF had never been a RCRA unit, the MWMF was not in compliance with RCRA standards and the permit application was declared to be deficient (primarily due to the lack of a RCRA groundwater monitoring system).⁸⁸ As a consequence of the noted deficiencies, a Settlement Agreement was entered into by DOE and SCDHEC (Settlement Agreement 87-52-SW) outlining requirements for completion of the post-closure permit application. Since that time SRS and SCDHEC have worked to resolve the deficiencies in the permit application. On July 13, 1989, SCDHEC issued a letter informing DOE that deficiencies still existed in the application.⁸⁹ Negotiations are ongoing to resolve these problems.

The MWMF closure plan was approved by SCDHEC in December of 1987.⁹⁰ At that time the closure schedule indicated that closure would be completed within three years after the approval date of the closure

plan. This established a commitment to close this facility by December of 1990. The closure plan specifies that a low permeability cap will be installed over the entire MWMF to minimize the transport of hazardous constituents to the groundwater. Mechanical closure activities began in the February of 1989. As of September 1990, completed closure activities included initial fill placement, clay layer placement, and dynamic compaction.⁹¹

NRDC LAWSUIT

RCRA contains provisions which allow citizens to sue anyone allegedly violating RCRA.⁹² In 1985, the Natural Resources Defense Council (NRDC), Energy Research Foundation (ERF), South Carolina League of Women Voters (LWV), and the Georgia Conservancy (GC) entered such a lawsuit (Natural Resources Defense Council, Inc. et.al., v. Herrington) against DOE for hazardous waste management practices at SRS.⁹³ The State of South Carolina joined the environmental groups as a plaintiff in 1986. Generally, the suit alleged that six SRS waste management areas, and perhaps others, should be subject to RCRA but were not being managed in accordance with RCRA requirements.⁹⁴ The NRDC complaint identified several SRS solid waste management units that the NRDC claimed should, but did not, have RCRA permits. DOE contented that the waste areas in question should not be categorized as managing hazardous waste and thus were not subject to environmental regulation.⁹⁵

Settlement negotiations were initiated in 1986 and continued during 1988. To avoid protracted litigation the parties signed a consent decree on May 26, 1988, to resolve the compliance issues.⁹⁶ Resulting requirements of the Consent Decree were:

- Mixed Waste Management Facility - The lawsuit settlement specified that this facility was subject to the hazardous waste laws of Subtitle C of RCRA and that DOE was to close

the unit in accordance with RCRA and the South Carolina Hazardous Waste Management Act. DOE was instructed to obtain a Post-Closure Care permit from SCDHEC and undertake corrective action and post-closure care, if necessary.

- Metallurgical Laboratory and Acid/Caustic Basins - The lawsuit settlement specified that these waste management areas were to be permitted as RCRA units. The settlement required that a RCRA Part B permit application be submitted to SCDHEC and EPA for the basins by August 14, 1989. This action was to be preceded by the submittal of RCRA closure plans for the acid/caustic basins.
- Savannah River Laboratory Basins and New TNX Basin - While not establishing that these basins were subject to Subtitle C of RCRA, the settlement required that the basins be closed in accordance with the process outlined in the agreement. This include the submittal to SCDHEC of a "conventional groundwater quality assessment/corrective action feasibility plan" and a closure plan that was to be reviewed consistent with the procedural requirements applicable to RCRA closure plans.⁹⁷

After tentative agreement on the lawsuit a representative of the plaintiff stated "It is certainly my hope that the Department of Energy will make a good faith effort from now on to comply with the letter, and the spirit of all environmental laws, and that they will make this kind of cleanup and waste management the priority in funding requests. It seems to me that they are beginning to make an effort to comply. The settlement's a big step in that direction."⁹⁸ "What (DOE) agreed to was that certain facilities were subject to RCRA and the state has authority to enforce that in South Carolina" stated Sam Finklea, a lawyer for SCDHEC.⁹⁹

Settlement of the NRDC lawsuit had two notable results. First, the Consent Decree established closure schedules for a number of RCRA hazardous waste management units and other solid waste management units at the SRS. Included in the list of units to be closed were several seepage basins that DOE maintained had never received hazardous waste during operation of the facilities, that were directed to be closed in

a "RCRA like manner."¹⁰⁰ Secondly, the Consent Decree included a formal role for the plaintiffs in assessing the adequacy of SRS plans and studies for remediating the sites addressed by the settlement.¹⁰¹ The first documents submitted as part of the Consent Decree review process were not well received by the NRDC and ERF.¹⁰² Representatives of the NRDC stated that the Technical Data Summaries for the New TNX Seepage Basin and Savannah River Laboratory Seepage Basins "contain gross ... inadequacies that are so severe that the data they provide cannot be relied upon to draw any conclusions except that the groundwater is contaminated."¹⁰³

Summary

In 1976, Congress passed the Resource Conservation and Recovery Act (RCRA) which gave EPA broad authority to develop a comprehensive regulatory program to govern the management and disposal of all waste including hazardous waste. All facilities that treat, store, or dispose of hazardous wastes on-site must comply with applicable closure requirements. Owners/operators of disposal units at which wastes are left in place after closure that cannot meet "clean closure" performance standards must conduct monitoring and maintenance activities for 30 years to ensure that pollutants are not released to the environment. The 1984 amendments to RCRA greatly expanded EPA's authority to address release(s) of hazardous constituents from solid waste management units (SWMUs) at facilities subject to RCRA permitting requirements. Section 3004(u) of RCRA requires that corrective measures be performed for releases of hazardous constituents regardless of when the waste was placed in the SWMU.

As a DOE facility with an active RCRA permit, SRS has initiated investigation of 81 SWMUs for corrective action as a condition of the

permit. Radioactive components of mixed waste are not specifically addressed by these investigations. Closure dates for a number of waste units at the SRS have been established by regulatory authorities and a court-ordered consent decree. A lawsuit initiated against the SRS (Natural Resources Defense Council Inc., et al., v. Herrington) has been settled, and closure schedules for a number of RCRA hazardous waste management units and other SWMUs established. Hazardous waste cleanup accomplished to date at the SRS has primarily been RCRA closures.

REFERENCES

1. Originally 65 solid waste management units were listed in the SRS hazardous waste permit. New units are added to the list as they are identified.
2. P.L. 94-580, 90 Stat. 2795 (1976), 42 U.S.C. 6901 et. seq.
3. RCRA is a law containing a series of subtitles, only some of which address hazardous waste management. Other sections address solid waste management (Subtitle D) and the recovery and recycling of solid waste materials (Subtitles B, E, and F). Subtitle C of RCRA is the principal portion of the law devoted to hazardous waste regulation, including corrective action.
4. Sections 3006 and 3009 of RCRA establish the basic Federal/state relationships for the RCRA program. Section 3006 empowers the EPA Administrator to evaluate and authorize state programs to operate the RCRA programs in lieu of EPA and provides that a permit issued by an authorized state has the same legal status as a permit issued by EPA.
5. U.S. Department of Engery, Closure of Hazardous and Mixed Radioactive Radioactive Waste Management Units of DOE Facilities, Office of Environmental Guidance, ECD(RCRA)-002/0690 (June 1990) p. 2-6.
6. Federal standards for closure of RCRA hazardous waste management facilites are contained in 40 CFR 264 and 265.
7. U.S. Environmental Protection Agency, RCRA Orientation Manual, EPA/530-SW-86-001 (January 1986) p. III-49.
8. Ibid.
9. Ibid., p. III-50.
10. 40 CFR 264 and 265; Subparts I through R.
11. U.S. Department of Energy, Closure of Hazardous and Mixed Radioactive Radioactive Waste Management Units, p. 3-3.
12. Ibid.
13. Ibid., p. 3-4.
14. Ibid., p. 3-7.
15. Ibid., p. 3-16; The post-closure care requirements are contained in 40 CFR 264.117-264.120 for permitted facilities and 265.117-265.120 for interim status facilites.
16. Ibid., p. 3-18.
17. Ibid., p. 3-19.

18. 55 Fed. Reg. 30800 (07/27/90).
19. Ibid.
20. Section 3004(u) of RCRA.
21. 55 Fed. Reg. 30800 (07/27/90).
22. Section 3004(u) of RCRA was codified as 40 CFR 264.101 in 50 Fed. Reg. 28702 (07/15/85).
23. 50 Fed. Reg. 28702 (07/15/85).
24. 52 Fed. Reg. 45788 (12/01/87).
25. Ibid.
26. U.S. Environmental Protection Agency, National RCRA Corrective Action Strategy (draft), (Undated) p. 3.
27. Ibid.
28. Ibid.
29. Ibid., p. 4.
30. Section 3004(v) of RCRA.
31. Section 3008(h) of RCRA.
32. U.S. Environmental Protection Agency, National RCRA Corrective Action Strategy (draft), p. 7.
33. Ibid.
34. 55 Fed. Reg. 30798 (07/27/90).
35. Ibid., p. 30799.
36. U.S. Environmental Protection Agency, National RCRA Corrective Action Strategy (draft), p. 7.
37. Ibid., p. 9.
38. Ibid., p. 10.
39. Memorandum entitled "Interim Final Corrective Action Plan" from Gene A. Lucero, Director of Office of Waste Programs Enforcement and Marcia Williams, Director, Office of Solid Waste to Addresses (rubber stamped 14 November 1986).
40. U.S. Environmental Protection Agency, RCRA Corrective Action Plan (Interim Final), OSWER Directive No. 9902.3 (November 1986) p. 2.

41. Ibid., pp. 35-42.
42. Ibid., p. 47.
43. U.S. Environmental Protection Agency, National RCRA Corrective Action Strategy (draft), p. 13. (Draft regulations that would establish a framework for implementing the Federal RCRA corrective action program have been published by EPA in 55 Fed. Reg. 30798, 07/27/90. The proposed rule will further define the requirements for conducting corrective action investigations, evaluating and potential remedies, and selecting and implementing corrective measures at RCRA facilities.)
44. Ibid., p. 14.
45. Ibid., p. 16.
46. Fortuna, R. C., and D. J. Lennett, Hazardous Waste Regulation: The New Era, An Analysis and Guide to RCRA and the 1984 Amendments, McGraw-Hill Book Company (1987) p. 270.
47. Ibid.
48. 40 CFR 124.6-124.8.
49. 40 CFR 124.8.
50. 40 CFR 124.12.
51. Fortuna and Lennett, Hazardous Waste Regulation, p. 153.
52. 40 CFR 124.19.
53. 52 Fed. Reg. 35838 (9/23/87)
54. 40 CFR 124.5.
55. 53 Fed. Reg. 37912 (9/28/88).
56. 40 CFR 270.42
57. 53 Fed. Reg. 37913 (9/28/88).
58. Letter, Scarbrough to Wright, 13 March 1990.
59. NUS Corporation, Summary Chronology of Environmental Actions at the Savannah River Site, Savannah River Center, Aiken, South Carolina (October 1990) p. 3-2. (Originally 65 solid waste management units were listed in the SRS hazardous waste permit. New units are added to the list as they are identified.)
60. DOE Order 5400.3, Hazardous and Radioactive Mixed Waste Program (02/22/89).
61. Ibid., p. 4.

62. DOE Order 5820.2A, Radioactive Waste Management (09/26/88).
63. DOE Order 5400.3, p. 4.
64. Ibid.
65. The State of South Carolina was granted authorization by EPA to implement an equivalent base RCRA hazardous waste management program on November 22, 1985.
66. The 1984 Hazardous and Solid Waste Amendments (HSWA) to RCRA made many changes to the RCRA program. For this reason, EPA enforces HSWA requirements in states that are authorized only for the base RCRA program until these states receive HSWA authority.
67. SRS Federal Facility Agreement, Section V. Stipulated Facts, Item E. (29 August 1990 draft) p. 21.
68. NUS Corporation, Summary Chronology, p. 3-4.
69. Ibid.
70. South Carolina Department of Health and Environmental Control, Hazardous Waste Permit No. SC1-890-008-989 issued on 30 September 1987.
71. NUS Corporation, Summary Chronology, p. 3-2.
72. Part V.A.1 of the DOE Savannah River Site Hazardous Waste Permit.
73. Westinghouse Savannah River Company, RCRA Facility Investigation Program Plan, Savannah River Site, (June 1989).
74. SRS Federal Facility Agreement, Section V. Stipulated Facts, Item M. (29 August 1990 draft) p. 23.
75. SRS Federal Facility Agreement, Introduction, (29 August 1990 draft) p. 2.
76. Part B Application Notice of Deficiencies/Warning Letter, Truesdale to Whitfield, 21 November 1985.
77. Savannah River Site Settlement Agreement 87-27-SW, p. 3.
78. Letter, Jeter, to Wright, 6 May 1987; Settlement Agreement 87-27-SW between South Carolina Department of Health and Environmental Control and the U.S. Department of Energy effective 1 May 1987.
79. Letter, Wright to Culler, 15 April 1988; Alternate concentration limits (ACLs) are determined by SCDHEC on site-specific circumstances.
80. Letter, Culler to Wright, 16 August 1988.

81. Interim status for the seepage basins terminated on the effective date of the permit denial in accordance with R.61-79.270.73(a).
82. Letter, Jeter to Wright, 15 June 1989; Amendment to Settlement Agreement 87-27-SW Concerning Post-Closure Care Part B Permit Applications for the F-and H-Area Seepage Basins.
83. Letter, Coffey to Wright, 23 June 1989.
84. U.S. Department of Energy, Waste Management Activities for Groundwater Protection, Savannah River Plant, Aiken, South Carolina, Vol. 2, Final Environmental Impact Statement, DOE/EIS-0120 (December 1987), p. B-37.
85. Ibid.
86. Ibid.
87. Ibid.
88. Settlement Agreement 87-52-SW, Concerning deficiencies of the Mixed Waste Management Facility Post-Closure Care Permit Application (12 November 1987); Findings of Fact, Items 10 and 12.
89. Letter, Wilson to Wright, 13 July 1989.
90. Letter, Wilson to Wright, 9 December 1987.
91. The research for this study included a number of interviews with members of the EPA Region-IV and the DOE technical staff. As requested by these individuals, they are not identified by name in these footnotes, but the author is convinced that the information furnished by them accurately reflects conditions at the SRS.
92. Section 7002 of RCRA authorizes citizens to sue Federal agencies and other generators, transporters, and owners/operators of waste management facilities in violation of a permit, regulation, or RCRA requirement.
93. Natural Resources Defense Council, Inc., et al., v. Herrington, Civil Action No. 1:85-2583-6.
94. Ibid, p. 2.
95. Ibid.
96. Ibid.
97. Ibid., pp. 3-12.
98. Statement of Frances Close Hart of the Energy Research Foundation as reported in the Aiken Standard, "Group 'Encouraged' By Tentative SRP Settlement," May 27, 1988.

99. Ibid.
100. Natural Resources Defense Council, Inc., et al., v. Herrington, Civil Action No. 1:85-2583-6; (Savannah River Laboratory Seepage Basins and the New TNX Basin, pp. 6-8).
101. Ibid.
102. Report on Defense Plant Waste, "NRDC, ERF Blast Savannah River Technical Seepage Basin Data," 1, 13 (21 July 1989) p. 130.
103. Ibid.

CHAPTER V CERCLA ISSUES ASSOCIATED WITH MIXED WASTE CLEANUP AT SRS

Introduction

This chapter (1) reviews CERCLA requirements for remedial response action at sites contaminated with hazardous substances, (2) describes the extent of CERCLA authority over the cleanup of mixed wastes, (3) explains the basis for the nomination of the SRS to the National Priorities List (NPL), and (4) discusses the CERCLA Section 120 Interagency Agreement negotiation process between DOE, EPA, and the State of South Carolina. Amendments to CERCLA in 1986 devoted a special section to Federal Facilities that requires the negotiation of an interagency agreement for any Federal facility placed on the NPL. The agreement establishes a framework and schedule for conduct of remedial response actions. The discussion below indicates that one of the most notable differences between the RCRA and CERCLA regulatory processes governing cleanup at a Federal facility has to do with the extensive public participation CERCLA requires during the selection process for cleanup remedies.

Overview of CERCLA

Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as "Superfund," in 1980 and amended it in 1986 with the Superfund Amendments and Reauthorization Act (SARA), which extensively revised and added new authorities to CERCLA.¹ CERCLA serves two fundamental purposes: it establishes the requirements for reporting and responding to spills of hazardous substances, and it governs the remedial response activities of hazardous substances at inactive waste sites.² While EPA regulations apply within each state, unlike RCRA, CERCLA does not allow

EPA to authorize a state program to operate in lieu of the EPA program.³ CERCLA is "triggered" when there is an imminent or substantial endangerment to human health or the environment from the release or threat of release of a hazardous substance. CERCLA response actions are initiated by a "release or threatened release" into the "environment" of a "hazardous substance, pollutant or contaminant." Each of these terms has a specific meaning that is important when interpreting the extent of CERCLA authority over a specific contamination scenario. While the CERCLA definitions are similar to corresponding RCRA terminology, there are important statutory distinctions when applied to the same contamination scenario. These definitions are examined below.

Under CERCLA Section 101(14) a "hazardous substance" is defined as any substance that EPA has designated for special consideration under the Clean Air Act (CAA), the Clean Water Act (CWA), the Toxic Substance Control Act (TSCA), and any "hazardous waste" under RCRA.⁴ For the sake of convenience, EPA maintains a list of CERCLA regulated substances, which currently numbers 724 hazardous substances, plus 1500 radionuclides.⁵ Congress has excluded only two basic types of substances from the definition of "hazardous substance:" (1) petroleum⁶ and (2) natural gas products. As noted above, CERCLA authority includes Clean Air Act hazardous pollutants, which includes in the definition "any radioactive (including source material, special nuclear material, and byproduct material) substance."⁷ It is clear, therefore, that DOE radionuclides are hazardous substances subject to CERCLA requirements.

A "release" has been defined very broadly under CERCLA to cover almost any possible way in which a hazardous substance, including RCRA

hazardous wastes or constituents, could enter the environment. A release as defined by Section 101(22) of CERCLA means "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment."⁸ The release may be sudden, as in the case of a spill, or slow, as in the gradual seepage or leaching of hazardous substances from a source of contamination (e.g., such as a leaking, inactive landfill).⁹ This interpretation is important because hazardous substances have slowly entered the soil column and groundwater from SRS seepage basins, and land disposal facilities over a period of nearly forty years.¹⁰

CERCLA remedial response authority only extends to releases that have reached the "environment."¹¹ Consequently, any evaluation of the applicability of the response authority of CERCLA must involve a determination of the applicability of the term "environment." Section 101(8) of CERCLA defines "environment" very broadly to mean "(A) the navigable waters, the waters of the contiguous zone, and the ocean waters for which the natural resources are under the exclusive management authority of the United States ... and (B) any other surface water, groundwater, drinking water supply, land surface or substrata, or ambient air within the United States or under the jurisdiction of the United States."¹² Several court decisions have established that EPA response authority over the release of hazardous substances into the environment includes contaminants remaining entirely within a building.¹³ This is significant to a large Federal facility such as the SRS which has numerous buildings contaminated with radionuclides scheduled for eventual decontamination and decommissioning.

Under Section 104(a)(1) of CERCLA, whenever there is a release or substantial threat of a release, to the environment of any hazardous

substance under circumstances where the contaminant may present an imminent and substantial danger, EPA is authorized to direct or undertake removal and/or direct or undertake remedial actions.¹⁴ For purposes of this discussion, a "removal" is defined as a short-term, limited response to a more manageable problem,¹⁵ and a "remedial action" is defined as a longer term, more permanent and generally more expensive solution for a more complex contamination problem.¹⁶ A CERCLA removal action may be initiated immediately to stabilize a contaminated area and to prevent the further spreading of hazardous substances. At some sites, both a removal and a remedial action might be appropriate. However, before EPA may proceed or require a Federal agency through negotiation of an interagency agreement to implement the longer term remedial action at a site contaminated with hazardous substances, the site must first be placed on the National Priorities List (NPL).¹⁷

Site Characterization and Remedy Selection

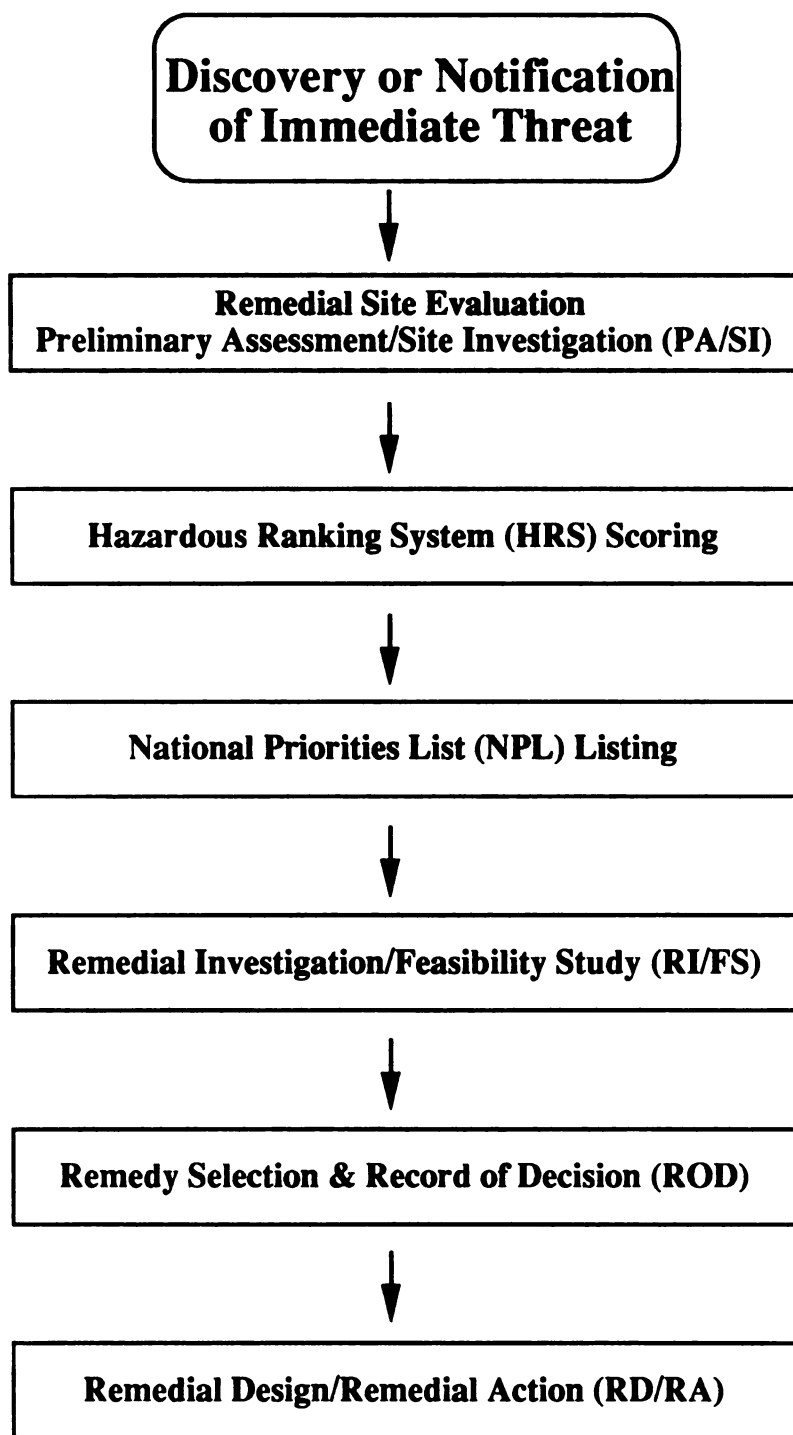
The National Contingency Plan (NCP) is the regulation that implements the oil and hazardous substance release provisions of CERCLA and establishes the framework for cleaning up the nation's worst hazardous waste sites.¹⁸ Among the new provisions SARA added to CERCLA was a requirement that the NCP be revised within 18 months of the enactment of SARA.¹⁹ After several months of governmental administrative conflict, EPA published the belated rulemaking on March 8, 1990.²⁰ The revised NCP implements the regulatory changes required by SARA, reorganized the NCP to conform more accurately to the sequence of CERCLA response actions based on nine years of Superfund management experience, and clarified language of the old NCP.²¹ The CERCLA remedial action process outlined in the NCP process is codified

in 40 CFR 300, Subpart E, and consists of five steps involving remedial investigation and implementation. These are (1) site identification, (2) preliminary assessment and site inspection, (3) establishment of priorities for remedial action using the National Priorities List (NPL), (4) remedial investigation and feasibility study, and (5) remedial action design and construction. Section 105(8) of CERCLA requires EPA to establish the NPL so that facilities having "top priority among known response targets" could be designated.²² Remedial action sites are evaluated for listing on the NPL using the Hazard Ranking System (HRS), which is codified in Appendix A of 40 CFR 300. Detailed remedial investigation and feasibility studies are required for all sites and facilities that are included on the NPL. The remedial action process is described in more detail below and is summarized in Figure 4. Two other regulatory issues affecting selection of a remedial response are also discussed. These involve the applicability of other environmental laws to CERCLA remedial actions.

Site Identification

Before EPA can respond to a release (or threat of a release) of a hazardous substance, the release must be identified. Potentially contaminated sites needing EPA response action are identified by two regulatory mechanisms contained in CERCLA.²³ The release reporting provisions of CERCLA Section 103 are the primary source of this information.²⁴ This section mandates that any person operating a vessel or facility is required to report the release of a hazardous substance from the vessel or facility that exceeds established reporting quantities. From this list of facilities reporting releases exceeding reportable quantities, EPA determines which sites should be added to the national inventory of potential NPL sites.²⁵

**Figure 4. CERCLA Remedial Response Process
Applicable to DOE Facilities**



Preliminary Assessment/Site Investigation

Once a potential site is identified, it is subjected to a series of investigations and reviews to determine the need for response action by EPA.²⁶ The first of these investigations is the preliminary assessment (PA). The preliminary assessment is an initial review of existing information to assess a site and the hazardous substances present and make a determination if additional investigation or action is required.²⁷ The revised NCP adopted in March 1990, granted any person the right to petition EPA, or a Federal agency itself, to perform a preliminary assessment when a suspected release is from a Federal facility and the petitioning individual is or may be affected by the release.²⁸ Often the data obtained during conduct of the preliminary assessment is inconclusive for purposes of evaluating a site for potential addition to the NPL and additional evaluation is needed. Therefore, a site inspection (SI) is conducted to augment the data collected in the PA and to generate sampling and other field data from which conclusions are formulated regarding the need for further action or investigation.

Hazard Ranking System

If a release or threat of a release is identified during the initial investigations, the preliminary assessment/site inspection (PA/SI) information is used to prioritize the contaminated area against other contaminated sites located throughout the country using the Hazard Ranking System (HRS).²⁹ The HRS rates the toxicity and persistence of the contaminants of concern, possible migration pathways, and the potential of human or other environmental exposure to the contamination.³⁰ Scoring for the HRS is based on several factors including waste volume and toxicity and distance to target population.³¹

National Priorities List

CERCLA requires EPA to maintain a National Priorities List (NPL) which prioritizes the need for remedial action at sites where hazardous substances have been released or there is potential for a release of hazardous substances.³² Based on the HRS score assigned to a site, EPA proposes the site for inclusion on the list. The current EPA policy requires that a site receive a score of at least 28.5 out of 100 points to be placed on the NPL and thus be subject to CERCLA remedial action response authority.³³ Once a site is listed on the NPL, further site investigation and remedy selection procedures are mandated by CERCLA.

Remedial Investigation/Feasibility Study

Following inclusion on the NPL, a site is subject to the remedial investigation (RI) and feasibility study (FS) requirements of CERCLA. The purpose of the remedial investigation is to verify the existence of a release and document its potential environmental and human health impacts.³⁴ During a remedial investigation a full characterization of the site is performed. Field investigations are performed to define the physical characteristics of the site (e.g. soils, geology, and hydrogeology); determine the extent of contamination to air, surface water, and groundwater resources; and identify exposure pathways that exist at the site.³⁵ A baseline risk assessment is then conducted to determine toxicity of substances found at the site and the potential for exposure to surrounding populations.³⁶ Results of these investigations and evaluations are used to establish the cleanup standards that will be imposed on the site if remediation is required.

The remedial investigation is designed to also provide information to the feasibility study. The feasibility study involves the development and screening of a range of remedial alternatives, ranging

from a treatment alternative that would eliminate the need for long term maintenance of the site, to a containment option involving little or no treatment, to a "no action" alternative.³⁷ The alternatives that are judged to be the most suitable are further analyzed and compared against one another based on their relative strengths and weaknesses when compared with remedy selection criteria established by EPA guidance.³⁸ Thus, results of the RI/FS process is the fundamental mechanism by which EPA selects a specific remedial action for an NPL site, whether a non-Federal or Federal facility.

Applicable or Relevant and Appropriate Requirements (ARARs)

Section 121(d) of CERCLA requires that Federal facility remedial actions comply with requirements and/or standards under Federal and state environmental laws.³⁹ The laws that must be complied with are those that are applicable or relevant and appropriate to the hazardous substances, pollutants, or contaminants at a site or to the circumstances of the release.⁴⁰ In defining ARARs, EPA says that a requirement under another environmental law may be either "applicable" or "relevant and appropriate" to a remedial action, but not both.⁴¹ Applicable requirements mean those standards or requirements that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances at a CERCLA site.⁴² Relevant and appropriate requirements mean those standards or requirements that address problems or situations sufficiently similar to those encountered at a CERCLA site such that their use is "well-suited" to a particular site.⁴³ Only those state standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.⁴⁴ A requirement that is judged to be relevant and appropriate must be complied with to the same

degree as if it were applicable.⁴⁵ It is possible for only a component of an overall standard or requirement to be considered relevant or appropriate. Potential ARARs related to the location and contaminants at a specific remedial action site need to be identified during the remedial investigation step of the CERCLA response process.⁴⁶ Procedures and criteria used to establish ARARs for site-specific remedial actions are specified in the SRS FFA and other DOE negotiated interagency agreements.

RCRA Land Disposal Restrictions (LDRs)

Any evaluation of the regulatory processes governing cleanup at a Federal facility must include a discussion of the applicability of RCRA land disposal restrictions (LDRs) to CERCLA response actions. The 1984 amendments to RCRA included provisions restricting the land disposal of RCRA hazardous wastes.⁴⁷ The RCRA land ban prohibits, with certain exceptions, the land disposal of hazardous wastes unless the wastes are first treated to standards established by EPA or the wastes are placed in units from which no hazardous waste or constituents can migrate.⁴⁸ The RCRA standard is based on what can be achieved by using the "best demonstrated available technology" (BDAT) for treatment of the waste material.⁴⁹ The issue of the extent to which the land disposal restrictions apply to CERCLA response actions was raised by the regulated community, including several Federal agencies, in comments on the proposed CERCLA NCP,⁵⁰ which is the framework for cleanups performed under CERCLA.

The preamble to the proposed NCP indicated that RCRA LDRs are considered to be applicable or relevant and appropriate (ARARs) to CERCLA response actions remedies when the action constitutes land disposal or "placement" of a restricted RCRA hazardous waste.⁵¹ In

particular, the discussion proposed that situations involving the excavation of contaminated soil and debris for treatment and subsequent redeposition in the area of contamination constitute actions which meet the statutory definition of "placement" or "disposal", and thus require compliance with LDR as an ARAR.⁵² However, actions involving RCRA wastes that are consolidated within the area of contamination, treated in-situ, and/or capped do not constitute placement or disposal, and thus do not require compliance with LDR. Consequently, normal earth moving and grading operations within a land disposal unit do not constitute "placement" and it is not necessary to invoke ARAR waivers for such action.⁵³

On October 10, 1989, EPA issued a supplemental notice and request for comment⁵⁴ concerning the applicability of RCRA land disposal restrictions to CERCLA response actions. The EPA supplemental notice indicated that many members of the regulated community objected to the proposed NCP interpretation of the applicability of RCRA LDRs as ARARs because it reduced the number of treatment options available for consideration and could substantially delay the implementation of CERCLA response actions.⁵⁵ As an example, EPA stated that it is not uncommon for contaminated sites to have large quantities of soils contaminated with heavy metals, as well as low concentrations of organic hazardous constituents.⁵⁶ An environmentally protective and cost-effective remedial solution for such soils could be to excavate them, treat them with stabilizing agents in a treatment unit, and redeposit the treated material into the excavated areas with appropriately designed liners and caps. As EPA indicated; this remedy could be the preferred solution at a number of contaminated sites, however, it generally would not be available as an option given the

interpretation of land disposal in the proposed NCP.⁵⁷ For these reasons commenters suggested that the proposed NCP should be modified to allow excavation, treatment, and redeposition of hazardous waste without the action being considered land disposal.⁵⁸ DOE also proposed further broadening the interpretation to allow similar wastes from several different CERCLA sites within a Federal facility boundary to be excavated, stored, and treated at a central treatment unit within the facility boundary without triggering LDRs.⁵⁹ For these reasons, EPA stated in the final NCP rulemaking that the many issues raised in the supplemental notice would be deferred for a subsequent rulemaking and that the interpretation announced in the preamble to the proposed NCP would remain in effect.⁶⁰ While the definition of "placement" was not changed in the final NCP, the applicability of LDRs to CERCLA responses was substantially narrowed.⁶¹

In what might be described as a major policy decision, EPA announced that RCRA LDR treatment standards are generally inappropriate for CERCLA response actions involving contaminated soil and debris.⁶² The problems identified include the inappropriateness of incineration of large volumes (thousands of cubic meters) of low-level contaminated soil and debris generated at CERCLA sites and the inability to achieve combustion LDR methods for contaminated soils and debris.⁶³ Consequently, EPA implemented a simplified procedure for obtaining a variance from the BDAT treatment standards that focuses on justifying a proposed alternative level based on EPA guidance.⁶⁴

Applicability of CERCLA to Federal Facilities

CERCLA, as amended in 1986, devotes a special section to Federal facilities.⁶⁵ Former Section 107 of CERCLA relating to Federal facilities was replaced by Section 120 of SARA. Section 120 applies to

all Federal facility remedial response actions, including sites not listed on the NPL.⁶⁶ Section 120 makes all substantive and procedural provisions of CERCLA explicitly applicable to Federal facilities, including all guidelines, rules, and regulations on facility evaluations, inclusion on the NPL, and conduct of remedial action.⁶⁷ Section 120 also establishes special requirements and timetables for Federal facilities. As an example, Section 120(c) requires the establishment of a Federal Agency Hazardous Waste Compliance Docket.⁶⁸ The docket identifies the universe of Federal facilities to be evaluated for possible contamination by compiling information submitted to EPA and state regulatory agencies under provisions of RCRA and CERCLA. It should be noted that the docket does not list all Federal facilities, rather only those that may be contaminated with hazardous substances. The purpose of the docket is threefold:

- To identify the universe of Federal facilities that must be evaluated to determine if they pose a risk to public health and the environment;
- To compile and maintain the information submitted to EPA on these facilities; and
- To provide a mechanism to make this information available to the public.⁶⁹

The docket primarily functions as a repository of information for the public and is available for public inspection at EPA regional offices. Each Federal facility docket maintained by a regional EPA office contains documents submitted by the Federal facility and any relevant correspondence about that facility. The docket was first published on February 12, 1988, in the Federal Register.⁷⁰ A total of 1,095 Federal facilities were included in the initial docket listing.⁷¹ SRS was one of these facilities.⁷² Every six months EPA is required to publish an update to the docket.⁷³

Once a Federal facility is listed on the docket, it must conduct a preliminary assessment and, if necessary, a site investigation within 18 months of having been listed. Federal agencies have been delegated the authority to conduct the preliminary assessments for each of their facilities on the docket by Executive Order 12580.⁷⁴ The intent of this initial assessment of a Federal facility is to determine if a release to the environment has occurred or if a significant threat of a release was present, and whether or not the Federal facility should be evaluated for possible inclusion on the NPL.⁷⁵ The docket is not intended to serve as an NPL listing for Federal facilities, but rather a mechanism for identifying those facilities that should perform an assessment of potential contamination at the facility. All Federal agencies included on the initial docket listing were required to submit preliminary assessments for their respective installations by April of 1988.⁷⁶ In response to this requirement, SRS submitted preliminary assessments for 66 individual sites known to pose some risk to the environment and human health.⁷⁷

Once the preliminary assessments are submitted, EPA evaluates the site information and lists facilities on the NPL using the same criteria that are applied to non-Federal facilities (i.e., the HRS). Federal facilities are placed in a separate section of the NPL that is specifically allocated to Federal facilities. On July 22, 1987, EPA issued a rulemaking that formally listed Federal facilities, including two DOE installations, on the NPL for the first time.⁷⁸ The November 21, 1989, NPL rulemaking resulted in a final NPL of 1010 sites, 79 of them in the Federal section. However, it should be noted that while Federal facilities are eligible for listing on the NPL, CERCLA Section 111(e)(3) prohibits the expenditure of CERCLA monies at Federally-owned

facilities.⁷⁹ Inclusion of a Federal facility on the NPL does serve the purpose of alerting the public and providing information on the facility concerning potential risks to human health and the environment. Additionally, NPL listing also assists the Federal agency to establish priorities for remedial activities and budget requests.

If a Federal facility is included on the NPL, Section 120(e)(1) of CERCLA mandates that the Federal agency controlling the facility, in consultation with EPA and the state, commence a remedial investigation and feasibility study for that facility. The remedial investigation must be started no later than 6 months after inclusion on the NPL, and "onsite remedial action" must commence within 15 months of completion of the feasibility study.⁸⁰ EPA and the state are responsible for publishing enforceable "timetables and deadlines for the expeditious completion" of the investigations and studies.⁸¹ Once results of the investigations are available EPA is responsible for conducting a review of the results.

Executive order 12580, which delegates authorities contained in CERCLA, delegates Section 104 response authority to DOE for releases on or originating from their facilities.⁸² The Executive Order requires that this response authority be exercised in accordance with Section 120, which provides the EPA Administrator with the final decision on remedy selection should DOE and EPA disagree.⁸³

CERCLA Section 120 Interagency Agreements

Section 120(e) of CERCLA also requires Federal agencies to enter into interagency agreements (IAG) with EPA for the completion of all necessary remedial actions within 180 days of review by EPA of the remedial investigation and feasibility study results.⁸⁴ However, it

has been DOE policy to encourage all facilities of the nuclear weapons complex to negotiate IAGs as soon as the facility is placed on the Federal facility docket.⁸⁵ The IAGs are intended to be binding, enforceable documents which cover the entire remedial process, from investigation through construction and implementation of the remedy. EPA intends that the agreements be designed to meet all of the facility's cleanup obligations under CERCLA, RCRA and applicable state law, and serve as a "regulatory framework" for the cleanup of a Federal facility.⁸⁶

EPA Region-IV, which is the EPA regional office having jurisdiction over the SRS, published a memorandum relating its RCRA/CERCLA strategy for Federal facilities that were being proposed for the NPL:

Region-IV's position on a proposed policy for placing on the NPL Federally-owned facilities that are subject to the corrective action authority of the Resource Conservation and Recovery Act (RCRA) is to apply comprehensive authority of both statutes to assess releases at Federal facilities and effect remedial action encompassing the entire installation. The Region intends to minimize the administrative overlap of the NPL sites where a RCRA permit is issued which includes corrective action for solid waste management units.⁸⁷

In this policy statement EPA Region-IV acknowledged that overlapping and conflicts between the two primary environmental laws governing cleanup at a Federal facility existed and that these issues were primarily administrative. It is important to note that a Section 120 Interagency Agreement cannot serve as the replacement for a RCRA permit for a facility seeking a hazardous waste operating permit after having been included on the NPL.

The interagency agreements are intended to provide a vehicle for EPA and the state to oversee the cleanup process, and can provide for reimbursement of state oversight costs associated with provisions of the implementation of the agreement. At a minimum, CERCLA Section 120

requires that the IAG contain provisions requiring a review of cleanup alternatives and the remedy selected, a schedule for cleanup accomplishment and arrangements for operation and maintenance of the facility after the remedial action is complete. However, in cases where there is a failure to agree, the ultimate authority to select remedies at Federal facilities that have entered into an IAG remains with EPA. The EPA encourages the host state to be involved in the IAG process since the state cleanup standards will be "applicable or relevant and appropriate" to the CERCLA action.

On March 13, 1989, EPA announced an NPL listing policy⁸⁸ that allows EPA to consider Federal facilities that may be subject to RCRA closure and corrective action authorities. Significantly, this Federal facility listing policy is contrary to that for private facilities, because EPA generally does not place private facilities subject to RCRA Subtitle C provisions on the NPL.⁸⁹ However, EPA believes that the majority of Federal facilities sites that could be placed on the NPL have RCRA operating units within their property boundaries. Thus, application of the non-Federal NPL listing policy regarding RCRA would result in the NPL listing of very few Federal facilities.⁹⁰ The EPA policy statement concludes that the NPL "listing will help other Federal agencies set priorities and focus cleanup efforts on those sites presenting the most serious problems."⁹¹

The policy statement indicates that EPA might have decided to defer Federal facility sites subject to RCRA based on a desire to avoid duplication in remedial actions; however, EPA concluded that avoiding duplication might best be accomplished through the CERCLA Section 120 process of developing comprehensive IAGs.⁹² The policy statement specifies that "EPA will attempt to use the IAG process to achieve

efficient, comprehensive solutions to site problems, and where appropriate, to divide the responsibilities among the various applicable authorities."⁹³

To facilitate the negotiation of facility-specific IAGs, the DOE and EPA negotiated model IAG language for key sections of all interagency agreements in 1988.⁹⁴ The negotiated model language resolved a number of national policy issues that were hampering facility-specific cleanup negotiations. The model agreement provides specific language to be include in each facility-specific agreement. The ten provisions covered in the model IAG language were:

- Jurisdiction
- Purpose
- Statutory Compliance/RCRA and CERCLA Integration
- Consultation with EPA and State Authorities
- Dispute Resolution
- Enforceability
- Stipulated Penalties
- Extensions
- Force Majeure
- Funding

As can be gleaned from the list above, a number of the model language provisions represented policy and legal considerations which EPA and DOE officials felt should apply consistently to all negotiated agreements, thus reducing the negotiating and approval time to implement the agreements. The model language was also designed to allow flexibility on the more technical provisions of the agreements based on facility-specific negotiations of site conditions.⁹⁵ The model agreement is to be used by EPA regional offices as they negotiate with DOE facility operators to reach cleanup plans. This language includes an EPA assessment of penalties in case of a failure to comply with the final resolution of a dispute, a failure to meet certain critical deadlines, or a failure to fulfill a term or condition of the

agreement.⁹⁶ EPA makes the final decision on cleanup and on any dispute arising under terms of the agreement.⁹⁷ While the model agreement was silent on the specific roles that states would play, it was EPA's intention that host states would be equal partners in the negotiation process and that the concerns of individual states would be factored into the agreements during facility-specific negotiations.⁹⁸ "Under CERCLA we can't give states veto power over remedies selected to clean up a site," stated EPA officials. "But we can write an agreement in a way to meet a state's need for input short of ultimate control" of the decision-making process.¹⁰⁰

CERCLA Public Involvement

EPA policy requires that a community relations plan accompany any CERCLA remedial investigation and response.¹⁰¹ Once a site has been evaluated for remedial response, community relation efforts become an important component of site activities.¹⁰² At the beginning of the remedial investigation/feasibility study (RI/FS) stage, the lead agency¹⁰³ conducts interviews with affected residents and community leaders to determine their level of interest in the site, major concerns and issues, and information needs. Based upon the results of the community interviews, a community relations plan is prepared and an administrative record for selection of a response action is established at or near the site of concern.¹⁰⁴ Executive Order 12580 authorizes Federal agencies to establish the administrative record for selection of response actions for facilities under their jurisdiction, custody, or control. The administrative record includes documents which EPA or the lead agency considers or relies upon in the selection of a response action. In addition EPA requires that an information repository be established at or near the site to comply with requirements of CERCLA

Section 117(d), which states that each item developed, received, published, or made available to the public under Section 117(d) must be made available for public inspection and copying. Upon completion of the process, the lead agency develops a recommended remedial action plan to present to the public.¹⁰⁵

DOE generally satisfies Section 117(d) requirements through the issuance of a proposed remedial action plan.¹⁰⁶ The plan generally describes the remedial alternatives considered for a site, and identifies the DOE preferred remedial alternative, and provides a rationale for preferring that alternative. Section 117 states that the affected community must be notified and invited to participate in the selection of remedial alternatives for contaminated areas. CERCLA requires a comment period of at least 30 days, during which a public meeting is to be held. Interested persons may submit comments for inclusion in the administrative record file during the 30-day public comment period. A written response to significant comments must be included in the administrative record file. The CERCLA public meeting encourages an impromptu verbal exchange with the public and attempts to keep the agenda as informal as possible, unlike the more formal RCRA public hearing.¹⁰⁷ This difference in statutory requirements for public involvement creates conflict for RCRA/CERCLA integration and potential duplication of administrative procedures.

Following receipt of comments on the remedial action plan, the lead agency formalizes its final remedy selection through a Record of Decision (ROD).¹⁰⁸ To support the selection of a remedial action, all facts, analyses, and site-specific policy determinations are documented in the ROD. After the ROD is signed, the lead agency publishes a notice of availability of the ROD and makes it available for public

inspection. As explained by EPA in its interim guidance document on the RI/FS process, the ROD is:

(T)he centerpiece of the administrative record against which the Agency's decisionmaking may be judged by the courts. In addition to containing an accurate and complete summary of the site, the threat it poses, and the selected remedy, the ROD must describe the relative strengths and weaknesses of each alternative considered and offer a clear justification for the final decision is made.¹⁰⁹

CERCLA Section 117(b) requires publication of the ROD by the lead agency before commencement of the remedial action.

DOE CERCLA Compliance Strategies

DOE issued Order 5480.14 on April 26, 1985, prior to the amendment of CERCLA by SARA. This Order outlined a five-phase program to achieve compliance with CERCLA requirements at DOE facilities.¹¹⁰ However, none of the phases contained in the Order corresponded precisely to the requirements for a preliminary assessment as established by CERCLA Section 120.¹¹¹ Additionally, none of the phases described in Order 5480.14 corresponded precisely to either a remedial investigation or feasibility study, as is required by CERCLA Section 120(e) when a DOE facility is placed on the NPL. Thus, the changes made to CERCLA by SARA dictated that the CERCLA compliance program prescribed by DOE Order 5480.14 be modified to reflect the new statutory requirements.

Consequently, DOE issued a replacement order (DOE Order 5400.4) on October 6, 1989, which described in its entirety the revised CERCLA compliance program to be used by DOE.¹¹² The following policy statement is contained in the replacement DOE Order:

- 1) It is the policy of DOE to respond to releases and potentially imminent releases of hazardous substances where such releases are on, or the sole source of the release is from, any facility or vessel under DOE jurisdiction, custody or control, including vessels bareboat chartered and operated. This response shall be in accordance with the provisions of CERCLA, as amended,

as well as those of the NCP and Executive Order 12580. DOE responses shall include both removal and/or remedial actions, as appropriate, to reduce adverse impacts on public health and the environment from releases regardless of whether the facility is on the National Priorities List (NPL).

- 2) DOE will enter into Interagency Agreements (IAGs) and/or Federal Facility Agreements (FFAs) at both NPL and non-NPL sites, as appropriate, with Federal, State, and local entities for the execution of remedial actions under the requirements prescribed in DOE Order 5400.2A and under Section 120(e) of CERCLA. These agreements are subject to the Federal Budget Process and shall contain provisions that do not represent a commitment of funding beyond current public law.¹¹³

As noted above, the DOE policy contained provisions indicating that DOE could not be expected to commit to a greater degree of cleanup in the negotiation of IAGs than that provided by Congressional appropriations. This policy statement is significant in that the IAGs currently being negotiated by each DOE facility listed on the CERCLA Federal facilities docket contain enforceable compliance schedules. While EPA and the host state have agreed upon a specified compliance, the ability of DOE to comply is dependent upon suitable funding appropriations.¹¹⁴

SRS CERCLA History of Compliance

Preliminary CERCLA Compliance Activities

To date, the SRS has completed one CERCLA response activity that might best be categorized as a removal action.¹¹⁵ In 1984 the previously disposed waste and contaminated soil was excavated from the SRS Chemicals, Metals, and Pesticides (CMP) Pits and placed in storage, removing what was considered to be a significant source of contamination.¹¹⁶ The CMP Pits consisted of seven unlined pits that were used for the disposal of selected nonradioactive waste between 1971 and 1979.¹¹⁷ Typical wastes disposed of in the pits included

drums of solvents such as trichloroethylene and tetrachloroethylene, and other liquid wastes such as flouorocarbons, oil, paint thinner, and various acids.¹¹⁸ Berryllium, titanium, calcium and cadmium were disposed of in a separate metals pit.¹¹⁹ The excavated soil and debris is being stored onsite until it can be incinerated.¹²⁰ The pits were backfilled and capped and monitoring wells installed to document the extent of contamination.

Contaminants found in the groundwater at the monitoring wells include benzene, methylene chloride, tetrachloroethylene, toluene, nitrate, sulfate, and zinc.¹²¹ All seven sites are listed in the SRS Hazardous Waste Permit for corrective action and were included in various listings of potential CERCLA sites previously submitted to EPA.¹²² The seven CMP Pits are examples of inactive waste sites at the SRS over which multiple regulatory programs have authority for cleanup operations.¹²³ As an example, the excavated soil and debris from the pits that is currently in storage will be subject to RCRA LDR treatment standards once removed from storage and incinerated.¹²⁴

On July 14, 1989, EPA proposed 52 Federal facilities, including the SRS, for inclusion on the NPL.¹²⁵ At the time of this announcement, EPA Administrator William K. Reilly stated that "This is another step that makes good the President's pledge to elevate the priority of Federal facility cleanups. Many of the these facilities are much larger and more complex than other Superfund sites, with wide varieties of hazardous and radioactive wastes."¹²⁶ On November 21, 1989, the EPA announced that the SRS was to be included on the NPL, effective December 21, 1989.¹²⁷

The HRS score prepared by EPA that resulted in the listing of SRS on the NPL differed significantly from preliminary scores developed by

SRS.¹²⁸ On October 16, 1987, the SRS submitted to EPA HRS scores and supporting information for 66 sites potentially contaminated with hazardous substances.¹²⁹ On April 28, 1988, the SRS submitted to EPA preliminary assessments for these sites.¹³⁰ Aggregation of these 66 sites based on physical proximity resulted in 36 waste areas being scored by SRS using the HRS. None of the draft HRS scores developed by SRS exceeded 25, well below the target score of 28.5 used by EPA for placement of sites on the NPL.¹³¹ However, the EPA evaluated several contaminated areas at the SRS and aggregated these areas to achieve an HRS score for the entire facility of 47.70.¹³²

In practice, EPA does not normally consolidate sites for scoring purposes. However, if the source of contamination is similar and comes from similar processes, and potentially contributes to the same groundwater or surface water resources, it is EPA policy to aggregate sites for purposes of HRS scoring.¹³³ An independent appraisal of the EPA SRS scoring package indicated that EPA was "conservative in its assessment" applied during the HRS scoring exercise.¹³⁴ For example, the EPA was careful not to double count persons who were employees at the SRS as well as residents of nearby communities during the determination of target populations.¹³⁵ However, the important result of the HRS scoring exercise was that the entire site was placed on the NPL, rather than specific waste sites. EPA Region-IV's stated policy with regard to an entire Federal facility listed on the NPL when a RCRA permit has been issued is:

Where Federal facilities have been listed installation-wide under Section 104(d)(4) of CERCLA, and a RCRA permit has been issued for corrective action for solid waste management units, requirements applicable to inclusion on the NPL will encompass those sites/hazardous substances pursuant to the authority of CERCLA.¹³⁶

As a consequence, all RCRA closures and corrective actions involving mixed waste at the SRS are also subject to review and approval by EPA Region-IV under CERCLA authority for compliance with applicable remedial response criteria with regards to the hazardous substances (e.g. radionuclides) that may be present as a contaminant.¹³⁷

SRS CERCLA Section 120 Federal Facility Agreement (FFA)

In anticipation of the NPL listing, SRS began negotiations in April 1989 with EPA and South Carolina Department of Health and Environmental Control (SCDHEC) to develop a CERCLA Section 120 Interagency Agreement (IAG). Initially the IAG was perceived by SRS officials as the mandated vehicle for achieving compliance with CERCLA requirements imposed by inclusion of the facility on the NPL.¹³⁸ However, it became apparent early in the negotiations that the interagency agreement should be expanded to address all potential RCRA 3004(u) corrective action requirements.¹³⁹ As a result, the IAG evolved into the SRS Federal Facility Agreement (FFA) which is a document that not only addresses how SRS will comply with CERCLA remedial response requirements but how these activities will be coordinated with the established SRS RCRA corrective action program. DOE considers the FFA to be on "umbrella" document which includes the CERCLA IAG.¹⁴⁰

The SRS FFA is tentatively scheduled to be released for a 45-day public comment period during November 1990.¹⁴¹ The draft Agreement establishes the framework and schedule for developing and monitoring appropriate response actions at the SRS in accordance with CERCLA and RCRA. The FFA expands the corrective action process begun at the SRS under the RCRA permit to address (1) releases at or from units not included in the RCRA permit, and (2) releases of hazardous or radioactive substances or both not regulated by the RCRA permit.¹⁴²

The FFA also establishes requirements for the prevention and mitigation of releases or potential releases at or from high-level radioactive waste tank system(s) at the SRS.¹⁴³ Liquid high-level waste generated by the separation facilities at the SRS is received and stored in large, carbon steel tanks.¹⁴⁴ After the insoluble solids are allowed to settle and form a sludge layer, the liquid layer is removed and evaporated.¹⁴⁵ The radioactive portion of the sludge will eventually be treated and temporarily stored onsite before ultimate disposal at a national repository. The SRS currently has 51 large underground waste tanks that store and treat high-level waste. Each tank has a storage capacity of approximately one million gallons.¹⁴⁶ Provisions of the FFA direct SRS to submit wastewater construction and operation permits for these tank system(s) by March 1, 1991.¹⁴⁷ For these waste units only, the FFA specifies that SCDHEC will be designated as the oversight agency responsible for review and approval of all documentation relevant to the high-level waste tank systems.¹⁴⁸ While these waste tanks do store large quantities of high-level waste, the regulatory issues associated with these tanks are outside the scope of this study. This is because the high-level waste tanks have been designated wastewater treatment facilities that require state issued discharge permits.

The SRS FFA will direct the comprehensive remediation of the facility. General purposes of the Agreement are:

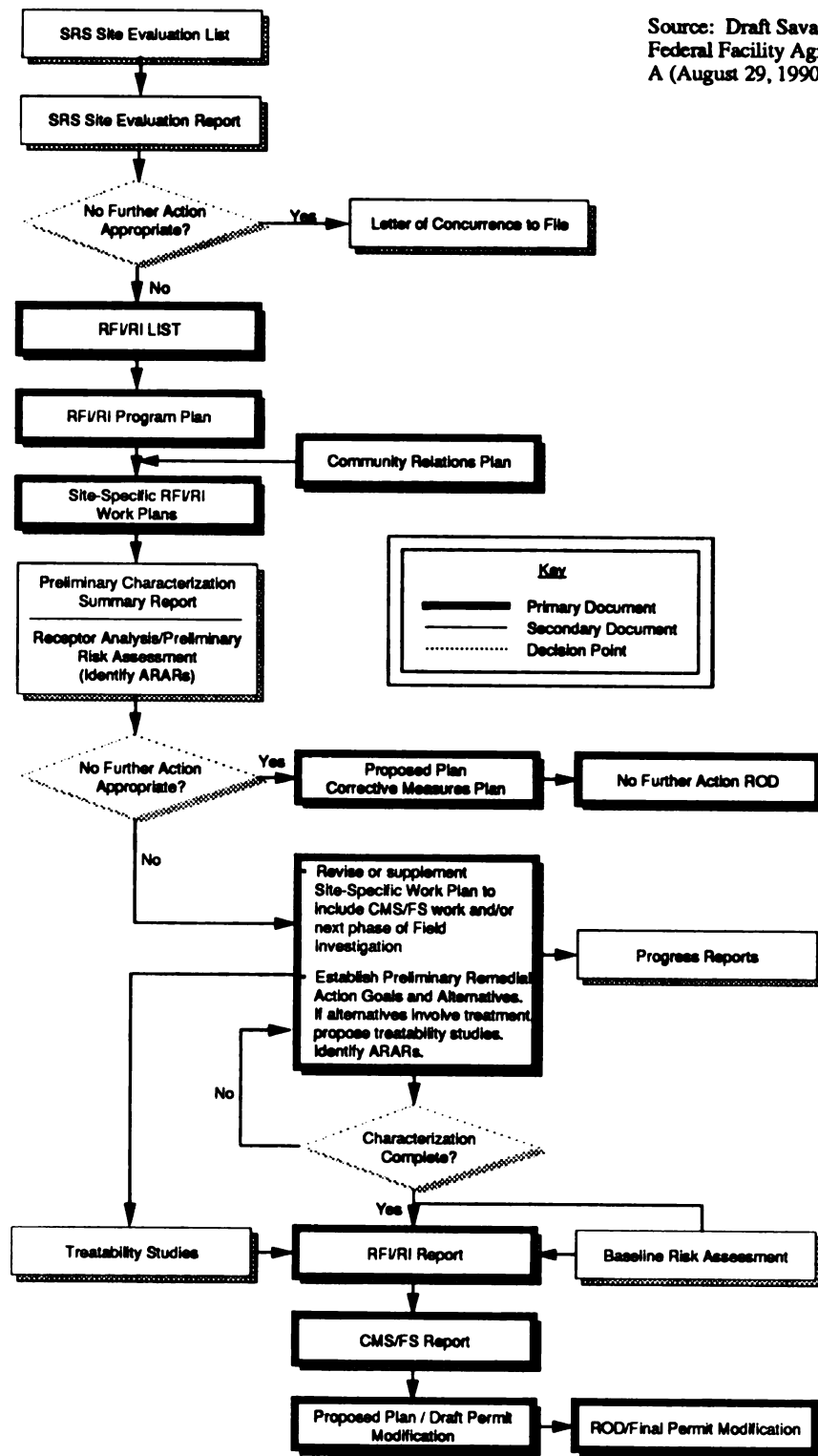
- To ensure that the environmental impacts associated with past and present activities at the SRS are thoroughly investigated and that appropriate corrective/remedial action is taken as necessary to protect the public health and welfare and the environment;
- To ensure that all releases of hazardous substances, pollutants or contaminants as defined by CERCLA and all releases of hazardous wastes or hazardous constituents as

defined by RCRA are addressed so as to achieve a comprehensive remediation of the SRS.

- Prevent, mitigate or abate releases or threatened releases of hazardous substances from high-level radioactive waste tank systems prior to final corrective/remedial action at the SRS;
- To establish a procedural framework and schedule for developing, implementing, and monitoring appropriate response actions at the SRS in accordance with CERCLA, the National Contingency Plan, RCRA, and in accordance with applicable South Carolina law;
- To facilitate cooperation, exchange of information and participation of the Parties, and ensure the quality of data management; and
- Minimize the duplication of investigative and analytical work, and documentation, and ensure the quality of data management.¹⁴⁹

The three parties decided during negotiation of the SRS FFA to integrate RCRA and CERCLA investigation procedures to also include hazardous substances (i.e., radionuclides). As a consequence of the integration, the RCRA RFI Program Plan became known as the RFI/RI Program Plan as the reporting requirements of the two regulatory programs have been integrated to produce a single document. The integrated RCRA/CERCLA process for SRS operable units is illustrated in Figure 5 and described below. The depicted process will be used by EPA to track primary and secondary documents as well as key decisions points in the investigation and remedy selection process as outlined in the FFA. Primary documents (e.g., Community Relations Plan, RFI/RI Work Plan, Record of Decision, etc.) are those documents required by either RCRA and/or CERCLA and are initially issued by DOE in draft form subject to review and comment by EPA and SCDHEC.¹⁵⁰ Secondary documents are typically feeder documents that are components of the primary documents. Appendix D of the FFA mandates the enforceable schedule for the submittal of primary documents to EPA and SCDHEC.

Figure 5. Integrated RCRA/CERCLA Process for SRS Operable Units



Appendix C of the FFA contains a list of 63 "operable units" to be investigated under the RFI/RI program. The remediation of an environmental release can be divided into a number of operable units, depending on the complexity of the problems associated with the release.¹⁵¹ Operable units may address geographic portions of a release site, specific release site problems, or initial phases of a remedial action, or may consist of any set of remedial actions performed over time or any actions that are concurrent but located in different part of the release(s) site.¹⁵² The designation of operable units at the SRS will be an evolving process as additional information on the nature and extent of contamination for specific environmental releases is developed. Also included as an Appendix to the FFA is a list of 301 "areas of concern" to be evaluated for possible inclusion on the list of operable units at a future date.

As newly discovered locations of potential environmental releases are identified they will be placed on the site evaluation list for prioritization and eventual evaluation. Utilizing the SRS prioritization scheme, a site evaluation report will be generated which follows EPA guidance and includes a preliminary assessment and site investigation if necessary. After the evaluation, if no further action is proposed and EPA and SCDHEC concur, the file on that site will be closed. If more investigation and possible remediation is appropriate, the site will be placed on the RFI/RI list of operable units during the annual prioritization of activities for the next year. A site-specific work plan is developed according to the RFI/RI Program Plan. After the first phase of sampling, a Preliminary Characterization Summary Report and a Receptor Analysis/Preliminary Risk Assessment Report are developed. Based on these reports, the site is evaluated once again to

ascertain whether further remedial action is required. If no further action is warranted after public involvement, a "No Further Action Record of Decision" is prepared and signed by all three FFA Parties.

Otherwise, the second phase of the remedial investigation is initiated. This phase requires the work plan to be revised or supplemented to provide information and data for the development of the Corrective Measures/Feasibility Study (CMS/FS). Preliminary remedial action goals and cleanup alternatives are established and considered. Treatability studies are initiated if such information will be necessary to properly evaluate specific cleanup alternatives. Applicable and relevant and appropriate requirements (ARARs) are identified during this phase. Additionally, a baseline risk assessment is prepared during this phase of the process to evaluate potential impact to human health and the environment.

All the data mentioned above is used to compile the RFI/RI Report, which fully characterizes the risks and contamination associated with the operable units. The CMS/FS Report, is then prepared which evaluates possible remedial alternatives for the site. With the concurrence of EPA and SCDHEC, DOE will select a preferred alternative for public review and comment in a Proposed Plan/Draft Permit Modification. A public meeting/hearing will be held in the middle of the comment period. Based on all the available information, the FFA Parties will sign a Record of Decision (Final Permit Modification) which selects the cleanup alternative.

An important RCRA/CERCLA integration document required by the FFA is the Community Relations Plan (CRP). The CRP will be designed to fulfill the public participation requirements of CERCLA, RCRA, and NEPA and to incorporate community preferences in order to enhance public

participation. It is anticipated that the CRP will be implemented for the entire 30 years of the DOE Environmental Restoration Program. Under the provisions of CERCLA, an Administrative Record is to be maintained for those documents which are considered during the selection of a response action. As stated in the FFA, the complete Administrative Record is to be maintained at the SRS. In addition, copies of the current index to the Administrative Record and, at a minimum, microfilm of selected documents from the Administrative Record, will be available at various information repositories located throughout the surrounding community.

Summary

Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in 1980 and amended it in 1986 with the Superfund Amendments and Reauthorization Act (SARA). CERCLA establishes requirements for reporting and responding to releases of hazardous substances and governs the remedial response activities of hazardous substances at inactive waste sites. Unlike RCRA, CERCLA does not allow EPA to authorize state programs to operate in lieu of the EPA program. The National Contingency Plan (NCP) is the regulation that implements the oil and hazardous substance release provisions of CERCLA and establishes the framework for cleaning up the nation's worst contaminated sites. When releases of hazardous substances are identified, a preliminary assessment and investigation of the site are conducted. If a release or threat of a release is identified the collected information is used to compare the contaminated area against other contaminated sites located throughout the country using the Hazard Ranking System (HRS). An HRS score of 28.5 or greater out of 100 points places the site on the National Priorities List (NPL). Once

on the NPL, the site is subject to remedial investigation, feasibility study, and risk assessment to select the most suited remedial action. CERCLA requires public participation throughout the entire remedial response process beginning with the initial investigation to characterize an environmental release.

The 1986 amendments to CERCLA devoted a special section to Federal facilities. The new section created a Federal Agency Hazardous Waste Compliance Docket which identifies all Federal facilities that must be evaluated for potential risk to human health and the environment. SRS was placed on the Docket in 1988. EPA performed an HRS scoring exercise for the SRS and arrived at an aggregate score of 47.70. As a result, the entire facility was placed on the NPL in 1989 and all RCRA closures involving mixed waste and RCRA corrective actions mandated by terms of the SRS hazardous waste permit became subject to review under provisions of CERCLA. In anticipation of the NPL listing, SRS began negotiations in April 1989 with EPA and SCDHEC to develop a CERCLA Section 120 Interagency Agreement. During negotiations the parties identified the need to expand the CERCLA IAG into an agreement that also addressed the established SRS RCRA corrective action program. The expanded IAG became known as the SRS Federal Facility Agreement (FFA). A Community Relations Plan will be developed and submitted to all Parties under provisions of the FFA to coordinate the public participation requirements of CERCLA, RCRA, and NEPA.

REFERENCES

1. Codified as amended at 42 USCA 9601-9675 (1982 & Supp. V 1987).
2. 55 Fed. Reg. 8667 (03/08/90); National Oil and Hazardous Substances Contingency Plan.
3. Ibid., p. 8668.
4. By definition all RCRA hazardous wastes are also CERCLA hazardous substances.
5. 55 Fed. Reg. 30166 (07/24/90).
6. See CERCLA, Section 101(14).
7. See Clean Air Act, Section 302(g).
8. See CERCLA, Section 101(22).
9. Cudworth, J. A., and J. D. Bauer, "EPA and State Authority Over DOE Groundwater Radionuclides," In: 1988 DOE Model Conference Proceedings Vol. 5 (October 1988) p. 1568.
10. Ibid.
11. 55 Fed. Reg. 8839 (03/08/90); 40 CFR 300.400(a).
12. See CERCLA 101(8); or 40 CFR 300.5.
13. See BCW Associates Ltd. v. Occidental Chem. Corp., Civ. No 86. 86-5947 (E.D. Pa. Sept. 29, 1988); (placement of hazardous wastes inside an enclosed manufacturing facility may constitute disposal of such wastes into or on any land so as to satisfy the CERCLA definition).
14. 55 Fed. Reg. 8667 (03/08/90).
15. Ibid.
16. Matthews, Robert A., and Peter L. Gray, ed., Superfund Claims and Litigation Manual, Executive Enterprises Publication Co., Inc, (1990) p. 13.
17. U.S. Environmental Protection Agency, "The Superfund Enforcement Process: How it Works (Environmental Fact Sheet)," Office of Waste Programs Enforcement (Summer 1988) p. 2.
18. 55 Fed. Reg. 8667 (03/08/90).
19. Ibid.
20. U.S. Department of Energy, Summary of National Contingency Plan and an Analysis of the Implications for DOE, Office of Environmental Guidance (August 1990) p. 1.

21. Ibid.
22. U.S. Environmental Protection Agency, "The Superfund Enforcement Process," p. 2.
23. Matthews and Gray, Superfund Claims and Litigation Manual, p. 11.
24. Ibid.
25. 55 Fed. Reg. 8667 (03/08/90).
26. U.S. Environmental Protection Agency, "The Superfund Enforcement Process," p. 2.
27. Matthews and Gray, Superfund Claims and Litigation Manual, p. 11.
28. See 40 CFR 300.405(6); 55 Fed. Reg. 8841 (03/08/90)
29. U.S. Environmental Protection Agency, "The Superfund Enforcement Process," p. 2.
30. Matthews and Gray, Superfund Claims and Litigation Manual, p. 11.
31. Ibid.
32. 54 Fed. Reg. 10520 (03/13/89).
33. Ibid.
34. U.S. Environmental Protection Agency, "The Superfund Enforcement Process," p. 2.
35. Matthews and Gray, Superfund Claims and Litigation Manual, p. 11.
36. Ibid.
37. Ibid.
38. Ibid.
39. 52 Fed. Reg. 32496 (08/27/87).
40. Ibid.
41. Ibid., p. 32497.
42. Ibid.
43. Ibid.
44. Ibid.
45. Ibid.
46. Ibid.

47. RCRA, Section 3004(d)(2).
48. Land Disposal Restrictions require waste that is to be placed in or on the land (e.g., in a surface impoundment, landfill, waste pile), to comply with specified treatment standards. For example, where standards are expressed as concentration levels for a waste, the waste cannot be placed in or on the land unless the concentration of regulated constituents is below the promulgated standards, usually after treatment.
49. EPA has set and continues to set treatment standards based on the Best Demonstrated Available Technology (BDAT) approach where "best" identifies the treatment technology that offers the largest reduction of toxicity or mobility of waste. Treatment standards can be set as concentration levels or as specified treatment technologies.
50. 55 Fed. Reg. 8762 (3/8/90).
51. CERCLA Section 121(d)(2) specifies that onsite remedial actions shall attain "other Federal standards, requirements, criteria, limitation, or more stringent state requirements that are determined to be legally applicable or relevant and appropriate (ARARs) to the specified circumstances to the site."
52. 55 Fed. Reg. 8762 (03/08/90).
53. Ibid.
54. 54 Fed. Reg. 41567 (09/10/89).
55. Ibid., p. 41568.
56. Ibid.
57. Ibid.
58. Ibid.
59. Ibid.
60. 55 Fed. Reg. 8762 (03/08/90)
61. Ibid.
62. Ibid.
63. Ibid.
64. Ibid.
65. Davidson, G. M., and Christopher Grundle, "EPA's Federal Facility Hazardous Waste Compliance Program," Federal Facilities Environmental Journal, 1, 1 (Spring 1990) pp. 55-69.

66. CERCLA, Section 120(a)(4).
67. CERCLA, Section 120(a)(2).
68. 53 Fed. Reg. 4280 (02/12/88).
69. Ibid.
70. Ibid.
71. Ibid., p. 4281.
72. Ibid., p. 4299.
73. CERCLA, Section 120(c).
74. Executive Order 12580 of January 23, 1987, Superfund Implementation.
75. 53 Fed. Reg. 4280 (02/12/88).
76. Ibid., p. 4282.
77. NUS Corporation, Summary Chronology of Environmental Actions at the Savannah River Site, Savannah River Center (October 1990) p. 3-9.
78. 52 Fed. Reg. 27620 (07/22/87).
79. CERCLA Section 111(e)(3) states that "No money in the Fund shall be available for remedial action, other than actions specified in subsection (c) of this section, with respect to federally owned facilities.
80. CERCLA, Section 120(e)(2).
81. CERCLA, Section 120(e)(1).
82. Executive Order 12580 of January 23, 1987, Superfund Implementation.
83. Ibid.
84. Davidson and Grundle, "EPA's Federal Facility Hazardous Waste Compliance Program," p. 58.
85. DOE Order 5400.4, Comprehensive Environmental Response, Compensation, and Liability Act Requirements (10/6/89) p. 4.
86. Davidson and Grundle, "EPA's Federal Facility Hazardous Waste Compliance Program," p. 58.
87. Memorandum, "Region IV's RCRA/CERCLA Strategy for Investigation and Remediation of Federal Facilities, from Tobin to Lingle and Diamond (rubber stamped 19 August 1988) p. 2.

88. 47 Fed. Reg. 10520 (03/13/89).
89. Ibid., p. 10521.
90. Ibid.
91. Ibid.
92. Ibid., p. 10523.
93. Ibid.
94. Memorandum, "Agreement with the Environmental Protection Agency - Model Provisions for CERCLA Federal Facility Agreements," Baynard to Managers of DOE Operations Office (31 May 1988).
95. Ibid.
96. Model Provisions for CERCLA Federal Facility Agreements negotiated between DOE and EPA.
97. Model Provisions for CERCLA Federal Facility Agreements (Resolution of Disputes).
98. Davidson and Grundle, "EPA's Federal Facility Hazardous Waste Compliance Program," p. 58.
99. Environmental Reporter (Current Developments), "EPA, DOE Reach Model Compliance Agreement To Guide Regions in Cleanups Under Superfunds," 19, 6 (10 June 1988) p. 197.
100. Ibid.
101. U.S. Environmental Protection Agency, "The Superfund Enforcement Process," p. 2.
102. 55 Fed. Reg. 8667 (03/08/90); National Oil and Hazardous Substances Contingency Plan.
103. For CERCLA remedial response actions at the SRS the DOE is considered the "lead agency."
104. U.S. Environmental Protection Agency, Community Relations in Superfund, A Handbook (Interim Version), OSWER Directive 9230.3B (June 1988) p. 2-1.
105. Ibid.
106. Ibid., p. 4-7.
107. Ibid., p. 4-10.
108. U.S. Environmental Protection Agency, "The Superfund Enforcement Process," p. 2.

109. U.S. Environmental Protection Agency, Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (Interim Final), OSWER Directive 9355.3-01 (October 1988) p. 2-4.
110. Memorandum, "Department of Energy (DOE) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Program," from Pelletier to Distribution (27 August 1987).
111. Ibid.
112. DOE Order 5400.4, Comprehensive Environmental Response, Compensation, and Liability Act Requirements (10/6/89).
113. Ibid., p. 4.
114. Ibid.
115. As defined by Section 101(23) of CERCLA, remove or removal means the cleanup or removal of released hazardous substances from the environment; such actions as may be necessary to take in the event of the threat of releases of hazardous substances into the environment.
116. U.S. Department of Energy, Waste Management Activities for Groundwater Protection, Savannah River Plant, Aiken, South Carolina, Vol. 2, Final Environmental Impact Statement DOE/EIS-0120 (December 1987) p. B-107.
117. Ibid.
118. Ibid.
119. Ibid.
120. Ibid.
121. Scott, S. C., N. L. Kolb, V. Price, and H. W. Bledsoe, Environmental Information Document, CMP Pits, DPST-85-712E, E.I. du Pont de Nemours and Company, Savannah River Laboratory, Aiken, South Carolina (1987) p. 5.
122. The research for this study included a number of interviews with members of the EPA Region-IV and the DOE technical staff. As requested by these individuals, they are not identified by name in these footnotes, but the author is convinced that the information furnished by them accurately reflects site conditions at the SRS. Hereafter, these shall be cited as DOE or EPA staff interviews.
123. The CPM Pits are listed in the SRS Hazardous Waste Permit as solid waste management units slated for corrective action. The CMP Pits are also listed as probable operable units in the draft Federal Facility Agreement for the Savannah River Site (Appendix C). The CPM Pits were among the 66 waste sites for which DOE performed Preliminary Assessments and submitted to EPA.

124. Once a hazardous waste placed in permitted storage prior to the effective date of a Land Disposal Restriction (LDR) rulemaking is removed, it must be treated to meet LDR treatment standards in accordance with 40 CFR 268.50.
125. 54 Fed. Reg. 29820 (07/14/89).
126. Report on Defense Plant Waste, "EPA Proposes Adding 52 Sites to Federal Facilities NPL List," 1, 13 (21 July 1989) p. 128.
127. 54 Fed. Reg. 48184 (11/21/89).
128. Draft Hazard Ranking Scores (HRS) prepared by DOE for the SRS were all below 24; however, DOE employed limited aggregation in developing these scores. (Based on conversation with DOE environmental staff).
129. NUS Corporation, Summary Chronology of Environmental Actions at the Savannah River Site, Savannah River Center (October 1990) p. 3-9.
130. Ibid.
131. Ibid.
132. U. S. Environmental Protection Agency, Final HRS Package for the Savannah River Site.
133. 48 Fed. Reg. 40663 (09/08/83).
134. Letter, St. Clair to Whitaker, 15 September 1989.
135. Ibid.
136. Memorandum, "Region IV's RCRA/CERCLA Strategy for Investigation and Remediation of Federal Facilities," from Tobin to Lingle and Diamond (rubber stamped 19 August 1988) p. 2.
137. Ibid.
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CHAPTER VI

STATE REGULATION OF MIXED WASTE CLEANUP AT SRS

This chapter (1) discusses the generic concerns of state governments about cleanup operations at DOE facilities, (2) describes applicable state regulations and the role of the State of South Carolina in the cleanup of mixed waste at SRS, (3) examines settlement agreements between South Carolina and SRS which conflict with CERCLA authority over mixed waste, and (4) examines the role played by a state in the CERCLA interagency agreement process. Because the State of South Carolina is a RCRA authorized state it is the permitting agency for RCRA hazardous waste permits, including post-closure care permits. However, the State of South Carolina has not yet received corrective action authority as contained in the 1984 Hazardous and Solid Waste Amendments (HSWA) to RCRA, thus all corrective action at the SRS must be approved by EPA. Although, South Carolina has promulgated state corrective action regulations that are equivalent to the Federal regulations.

SRS has established several RCRA closure dates with EPA and the State of South Carolina. However, there is concern that these dates will be impacted by the various DOE cleanup programs and the CERCLA interagency agreement discussed in Chapter V. An unresolved issue is the potential conflict between South Carolina pollution control regulations and CERCLA authority governing remediation of groundwater contaminated with radionuclides at the SRS.

State Concerns Associated with Cleanup Actions at DOE Facilities

Numerous jurisdictional disputes have arisen between state and Federal agencies as environmental compliance problems at Federal

facilities have become evident. This situation has developed in large part over the ill defined boundary lines between Federal and state regulatory authority as that authority applies to Federal facilities. In its Federal Facilities Compliance Strategy, EPA states that "with the exception of limited Presidential exemptions, Federal agencies generally must comply with all provisions of Federal environmental statutes and regulations as well as all applicable state and local requirements."¹

However, state representatives assert that Federal facility compliance with environmental laws and regulations is not a foregone conclusion.² While these representatives believe that state oversight of Federal facilities is a fundamental responsibility, they assert that numerous obstacles exist to effective enforcement of state laws and regulations. They cite as an example, the inability of a state to assess and collect penalties at Federal facilities.³ It should be noted that this issue is now the subject of several legal cases throughout the country.⁴ Additional barriers claimed by state representatives include "limited access to sites and information, and state enforcement efforts that are hampered by Federal agencies' narrow interpretation of Federal and state statutes and regulations."⁵

In 1989 ten governors, whose states contain or border nuclear weapons production and research facilities, submitted a letter to DOE outlining a national program for cleaning up contaminated sites at these facilities.⁶ The governors stated that the Federal government has deferred for too long taking action to cleanup the contamination and has put public health, safety, and the environment at risk: "The time has come to resolve this critical issue," the governors go on to say, "We are calling for decisive Federal action to establish a

comprehensive national program for the cleanup of all DOE defense and research facilities."⁷

To address some of the state concerns over the delay in the cleanup of contamination at DOE facilities, a special task force was created with representation from the National Governors' Association and the National Association of Attorneys General.⁸ Several corrective measures suggested in a report produced by the task force are summarized below:

- Improve Environmental Compliance - To improve environmental compliance at Federal facilities the task force recommended that Congress should amend applicable Federal laws to clearly waive Federal sovereign immunity from the application and enforcement of Federal and state environmental laws.
- Establish Independent Oversight - The task force recommended that Congress should ensure that state environmental personnel are given full access to sites and compliance data. They also encouraged the formation of a state/Federal work group to assist in the resolution of Federal facility compliance issues at a high policy level.
- Establish a National Agenda and Schedule for Cleanup - Many states are concerned that Federal agencies are proposing unduly long schedules for cleanup at facilities in their states and that cleanup efforts will be concentrated at a few DOE facilities with sites judged to have the most severe contamination. Consequently, the task force suggested that Congress adopt a goal of not more than thirty years for completion of all restoration at Federal facilities. Additionally, Congress should require the development of national criteria to guide decisions regarding cleanup.
- Fund Environmental Restoration and Compliance - To accomplish the goal of cleaning up the DOE nuclear weapons complex within thirty years, the task force recommended that Congress provide adequate funding for environmental restoration activities. Additionally, the task force suggested that strict Federal policies for reimbursing states for the costs associated with oversight work at Federal facilities should be established.
- Develop Comprehensive Waste Management Programs - The task force indicated that there is an urgent need for all Federal facilities to develop comprehensive waste management programs that address the most serious problems in a prioritized manner.⁹

The task force also strongly recommended that Section 120(e) of CERCLA be amended to include the affected state in the interagency agreement (IAG) negotiations governing cleanup at Federal facilities. From a policy perspective, EPA has always maintained that states should participate in the IAG negotiation process. As an example, in a 1988 policy statement regarding enforcement actions under RCRA and CERCLA at Federal facilities, EPA identified the following benefits of state participation in the IAG process:

- Appropriate application of state cleanup standards,
- Public participation requirements,
- Enforceability,
- Involvement in setting priorities,
- Dispute resolution, and
- Review and comment on technical documents.¹⁰

The policy statement concluded by stating that "this type of agreement would resolve differences between EPA and state requirements up front."¹¹

Some states view participation in the IAG process as an expedient mechanism for protecting the health and environment of their citizens. While other states fear that participation in the negotiation of an IAG will be an admission that Federal law preempts state control over the National Priorities List (NPL) Federal facility. One of the advantages of including a state as a signatory to an IAG is that it gives the regulated Federal entity a single authority to respond to; with the planned result of expediting the cleanup process at that facility. Some advocates of the IAG process suggest that by entering into a cooperative process with a Federal entity responsible for actually cleaning up a contaminated site, a state regulatory agency saves themselves and their constituents time and resources while ensuring that cleanup is done right the first time.¹²

However, not all states share this position. Some states prefer to enter into a consent decree with Federal facilities which is then monitored and enforced by the Federal court system. States such as Ohio believe that consent orders are easier to enforce.¹³ However, most states are of the opinion that each state should make the decision to enter into the IAG negotiation process on a case-by-case basis.¹⁴

The State Role in the Cleanup of Mixed Waste at SRS

The state role in the two primary regulatory programs which govern cleanup of mixed waste at the SRS is described below.

Resource Conservation and Recovery Act (RCRA)

Section 3006(b) of RCRA allows states to apply to EPA for authorization to administer and enforce a hazardous waste program pursuant to Subtitle C. Authorized state programs are carried out in lieu of the Federal program. The State of South Carolina was granted final authorization by EPA to operate an equivalent hazardous waste program on November 22, 1985. It should be noted, however, that approved state programs may be subject to EPA modifications: (1) EPA may initiate the revision of a state program or require the adoption of Federal amendments by specific dates, (2) EPA may withdraw its approval, or (3) it may transfer state RCRA jurisdiction back to the Federal government if the state is not providing satisfactory enforcement. As an example of the need for EPA driven modifications, the 1984 amendments to RCRA made substantial changes to the Federal program. For this reason, EPA enforces HWSA requirements (e.g., corrective action requirements and land disposal restrictions) in states that are authorized only for the base RCRA program until the states receive appropriate authorization. South Carolina has not yet received full HWSA authorization.

On July 3, 1986, EPA promulgated a rule that required states authorized for the base RCRA program to revise their programs to include the hazardous components of radioactive mixed wastes.¹⁵ As of May 30, 1990, nineteen states had received mixed waste authorization, including South Carolina.¹⁶ Thirteen of DOE's 20 nuclear facilities are located in states with mixed waste authorization.¹⁷

The incomplete authorization of state RCRA programs has led to confusion regarding regulatory authority and has created some potential "regulatory loopholes" for mixed waste. For example, if a facility that handles radioactive mixed waste is located in a state without a base RCRA program, the waste is subject to Federal RCRA and radioactive waste requirements, as well as any applicable state requirements. If a facility that handles radioactive mixed waste is located in a state with a base RCRA program but without mixed waste authorization, the mixed waste is not defined as a hazardous waste, and thus the hazardous component is not regulated as a hazardous waste under RCRA.¹⁸ Although, in this situation state hazardous waste management regulations may be applicable. If the hazardous waste management facility is located in a state with mixed waste authorization, then only state regulations apply. Because mixed waste is not regulated under HSWA, the mixed waste authorization status of a state is totally independent of and unaffected by its HSWA authorization status.

Thus, the State of South Carolina is responsible for permitting all hazardous waste facilities that manage mixed waste at the SRS, but EPA has RCRA authority for all corrective action involving mixed waste contamination. However, after September 25, 1990, mixed waste that exhibits the toxicity characteristic is always defined as hazardous waste, regardless of the authorization status of a state. This is

because mixed waste containing toxicity characteristic constituents is regulated under HSWA, and thus the EPA Regions are responsible for implementing all requirements pertaining to such waste.

Regulation of Radionuclides in Groundwater

While regulatory authority with respect to nonradioactive components of mixed waste has been clearly established, the same is not true for state regulation of radioactive constituents. As previously discussed, operations of the SRS since the early 1950s have resulted in contamination of the groundwater beneath various portions of the facility. Contaminants at the SRS include hazardous waste, hazardous constituents, and hazardous substances, including radionuclides. South Carolina has included radionuclide standards in its groundwater protection regulations, but it has not overtly tried to regulate radionuclides in the groundwater at the SRS.¹⁹ As an example, disassembly basin purgewater is discharged to reactor seepage basins. Although the purgewater is nonhazardous, it does contain tritium.²⁰ As yet, the State of South Carolina has not required a permit for the discharge of tritium to the groundwater from these basins.²¹

As discussed in Chapter IV, one of the reasons given for the denial of the operating RCRA Part B permit application for the F-and H-Areas was the lack of sufficient quantitative data on groundwater contamination by radioactive constituents. DOE contended that RCRA does not apply to radioactive constituents, and objected to the consideration of radioactive constituents in the review and registered a complaint with SCDHEC on this issue. As a consequence of the permit denial, DOE and SCDHEC amended Settlement Agreement 87-27-SW which required the submittal of a Post-Closure Care Part B permit application to SCDHEC by December 3, 1990. The settlement agreement amendment

contains language which, if enforced, would require the SRS to address nonhazardous waste constituents (e.g., nitrates and radionuclides) pursuant to the South Carolina Pollution Control Act (PCA):

DHEC's August 10, 1988, MOD (notice of deficiency) includes deficiencies relating to hazardous constituents in the groundwater as defined by RCRA as well as concerns and deficiencies relating to groundwater contamination by other constituents e.g., nitrate, radionuclides, as defined by the South Carolina Pollution Control Act (PCA). DOE agrees to address the hazardous constituents pursuant to RCRA. Further, DOE agrees to address the non-hazardous constituents pursuant to the PCA or MOA, as appropriate, to include a proposed course of action with justification.²²

Signing this agreement established a precedent for the State to regulate radionuclides at the SRS. While the PCA is implemented by regulations governing radionuclides in the groundwater, the authority of South Carolina over SRS facility groundwater radionuclides is a subject that has not been resolved. South Carolina maintains that the Clean Water Act (CWA) and the State PCA confer sufficient groundwater regulatory authority. Although the question of legal authority over radionuclides in the groundwater at the SRS has not been resolved, the DOE cooperates with the State by supplying information on radionuclides in the submittal of its hazardous waste permit applications and other regulatory compliance documents.²³

Closure dates for a number of waste sites at SRS have been established by regulatory authorities and a court-ordered consent decree. The closure of a contaminated settling basin (M-Area Settling Basin) was established for completion by July 1990. Another RCRA closure plan has been approved for a land disposal facility (Mixed Waste Management Facility) with an established closure date of December 1990. DOE has submitted other closure plans to SCDHEC that, once approved, will establish additional closure dates. Results of the NRDC

lawsuit discussed in Chapter IV established closure schedules for a number of other RCRA solid waste management units.

Comprehensive Environmental Response, Compensation, and Liability Act

CERCLA contains provisions intended, in part, to alleviate state concerns about Federal facilities' responsibilities for releases of hazardous substances. Section 121(f)(1) of CERCLA requires that all states be provided an opportunity for "substantial and meaningful" involvement in the selection of remedial response actions and enforcement activities. To meet this requirement and to strengthen the state role, a new Section (Subpart F, "State Involvement in Hazardous Substance Response") was added to the revised National Contingency Plan (NCP) in March 1990.²⁴ While Subpart F is new, it combines concepts that were discussed in several sections of the old NCP. Subpart F codifies in one place all regulatory requirements for state participation and involvement in CERCLA authorized response activities.

As provided in CERCLA Section 120(f), the substantive requirements of Subpart F do apply to Federal facility responses, and Federal facilities must involve the states in remedial response actions taken at Federal facilities. Section 120 contains a broad waiver of sovereign immunity and directs Federal facilities to comply with CERCLA both procedurally and substantially to the same extent as any private party. Section 120(f) of CERCLA specifies that opportunities for state participation in Federal facility cleanup actions are to be governed by Section 121, which outlines a state's opportunities to participate in the selection of a cleanup remedy, as well as a state's right to seek review of the selected remedy. CERCLA Section 121(d) makes other state laws effective to the extent they are applicable, relevant, or

appropriate requirements (ARARs). EPA intends to further address state involvement at Federal facilities in the proposed National Contingency Plan (NCP) Subpart K (Federal Agencies), that is scheduled to be published in the Federal Register in the fall of 1990.²⁵

State Participation in the SRS FFA Negotiations

On November 17, 1989, SCDHEC advised DOE that it was no longer going to participate in the SRS Federal Facility Agreement (FFA) negotiations. Lewis Shaw, SCDHEC Deputy Director, was quoted as saying in a local news article that the two Federal agencies "haven't paid us a whole lot of attention in this negotiation."²⁶ "We have been negotiating for several months and we have failed to meet our goals (of increasing the State's regulatory authority over the SRS)," Shaw commented.²⁷ "We have felt sort of like a weak sister in this negotiation process."²⁸ Among SCDHEC's stated objections to the FFA negotiation process were:

- The agreement would transfer some of SCDHEC's regulatory authority over the SRS to EPA.
- There is no provision for public input before the agreement is signed.
- The amount of money to be dedicated to the cleanup has not been established.
- The specific sites to be cleaned up have not been identified.²⁹

Energy Research Foundation (ERF) spokesperson Brian Costner had praise for SCDHEC's decision to pull out of the negotiation process, but indicated that "ERF was disheartened that DOE and EPA were unwilling to address the State's concerns in the FFA."³⁰ Conversations with DOE representatives indicated that among other concerns, SCDHEC felt its authority was being jeopardized by inclusion of the high-level waste storage tanks in the Agreement.³¹ In fact, once EPA agreed to

allow State wastewater permitting authority to govern tank operations, SCDHEC resumed its role as a Party to the FFA negotiations.³²

SCDHEC pullout from the FFA negotiations could have been very costly to the State as it would not have been eligible for reimbursement of oversight expenses associated with CERCLA and RCRA cleanup activities at the SRS. The SRS FFA indicates that "DOE agrees to reimburse the State for all costs incurred by the State specifically related to the implementation of this Agreement at the SRS and not inconsistent with the National Contingency Plan."³³ The specifics of the cost reimbursement arrangement are not contained in the Agreement, as this is an issue that will be negotiated between SCDHEC and DOE independent of the FFA, but the reimbursement is anticipated to exceed a million dollars annually.

The precedent for reimbursing states for oversight expenses was made in a Federal Facility Agreement involving the Lawrence Livermore Laboratory, where DOE agreed to pay up to \$325,000 to the State of California for "costs directly related to implementation" of the Agreement.³⁴ This agreement was the second three party interagency agreement to be signed by DOE since the promulgation of Section 120 of CERCLA, and was considered to be a major breakthrough for EPA. Resolution of the state reimbursement issue was thought to have "paved the way" for other agreements in the negotiation process, as the issue had been the major holdup for a number of interagency agreements. A consensus was reached within DOE in the fall of 1988 that DOE should pay states for "reasonable" costs incurred under provisions of CERCLA interagency agreements.³⁵ Such a policy was reported to be in the best interest of DOE because it would encourage states to enter into the IAG negotiation process, leading to faster site cleanups.³⁶ While model

language was developed by DOE for implementing this policy (generally following the example of the Lawrence Livermore Agreement), it was recognized that each agreement would be negotiated on a case-by-case basis, especially as regards DOE reimbursement of state costs.

Summary

The State of South Carolina is a RCRA authorized state and is the permitting agency for hazardous waste permits, including post-closure care permits. The State has not yet received HWSA corrective action authority, but is one of nineteen states having mixed waste authority. Consequently, South Carolina is responsible for permitting SRS hazardous waste facilities that manage mixed waste, but EPA retains corrective action approval and permitting responsibility. Legal authority over radionuclides in the groundwater at the SRS remains in question. South Carolina maintains that the Clean Water Act and the State Pollution Control Act confer sufficient regulatory authority for South Carolina to regulate radionuclides at SRS. If South Carolina pursues regulation of radionuclides at SRS a direct conflict with EPA CERCLA authority may result.

In 1989, 10 governors submitted a letter to DOE outlining a national program for cleaning up contaminated sites at nuclear weapons production and research facilities. The governors expressed concerns about limited access to DOE facilities and information, the hampering of state enforcement efforts by narrow interpretations of environmental regulations by Federal agencies, and the inability of states to assess and collect penalties at Federal facilities (this last issue is the subject of several pending legal cases). The National Governors' Association and the National Association of Attorneys General formed a task force to address state corrective measure concerns and recommended

that CERCLA be amended to include affected states in interagency agreements. The EPA has continually encouraged the participation of host states in the interagency agreement process. Some states, such as Ohio, prefer the use of consent orders which are monitored and enforced by the Federal court system to achieve compliance at a Federal facility with state environmental laws. The State of South Carolina participated in the CERCLA Section 120 Interagency Agreement negotiations at the SRS after some "strategic balking."

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CHAPTER VII

CONFLICTS AND CONGRUENCES OF MIXED WASTE REGULATION AT SRS

This chapter examines the mandated CERCLA interagency agreement to determine if the CERCLA remedial response and the RCRA corrective action programs have been successfully integrated into a comprehensive cleanup program that does not place unnecessary administrative burdens on the SRS. CERCLA is the governing regulatory mechanism for cleanup of Federal facilities on the National Priorities List (NPL). However, SRS and other DOE facilities had initiated both the closure of hazardous waste management units and investigation of inactive solid waste management units under provisions of RCRA prior to placement of the Federal facility on the NPL. Full SRS compliance with both RCRA and CERCLA statutory requirements could be redundant, entail additional cost, and potentially delay cleanup operations, and therefore might endanger human health and the environment.

This chapter (1) documents the extent to which the established RCRA cleanup program has been utilized in the agreement to integrate the two regulatory programs and ensure an efficient cleanup process for the SRS, (2) contrasts the proposed RCRA/CERCLA integration approach of the SRS FFA with the "lead agency concept" of the Hanford Reservation Tri-Party Agreement, (3) evaluates the impact of the CERCLA interagency agreement on the state role in the cleanup of mixed wastes at the SRS, and (4) examines the impact of DOE cleanup programs and budget prioritization scenarios on established SRS RCRA cleanup schedules. The chapter concludes by assessing the potential consequences of proceeding with cleanup at a Federal facility without negotiating an interagency agreement.

The Need for Integration of Regulatory Requirements

The large size of many DOE facilities (e.g., the SRS occupies over 300 square miles) and the types and sources of contamination at these facilities combine to create unique challenges for ensuring compliance with environmental laws. While DOE, EPA, and host states share the ultimate goal of restoring these sites, the challenge of achieving this goal is hindered by the overlapping requirements of Federal environmental laws and by jurisdictional issues between Federal and state regulatory programs. For mixed waste, this challenge is even greater as provisions of the Atomic Energy Act (AEA) may also be applicable to cleanup operations (see Table 1). These regulatory overlaps have the potential for slowing the cleanup process by imposing additional administrative burdens and requiring duplicative cleanup activities.

Chapters IV and V have demonstrated that Federal facilities must comply with requirements of both RCRA and CERCLA. Section 6001 of RCRA specifically subjects DOE facilities to the permitting and corrective action provisions of RCRA. For example, all DOE facilities that treat, store, and dispose of hazardous waste must have a RCRA permit and are responsible for addressing releases of hazardous waste and/or hazardous constituents. CERCLA devotes an entire section, enacted as a component of the 1986 amendments to CERCLA, to Federal facilities. Section 120 of CERCLA establishes special requirements and timetables for remedial activities applicable to each Federal facility. As discussed below, the applicability of these regulatory requirements has been subject to differing interpretations by DOE installations.

A 1988 General Accounting Office (GAO) GAO study found that "different approaches are being used to address" the inactive waste

sites at DOE installations.¹ The issue of which environmental law applied at a specific installation centered on what constitutes a "CERCLA site" versus a "RCRA site."² The GAO study reported that representatives of the Hanford Reservation and the SRS considered sites that became inactive after the effective date of RCRA (November 19, 1980) to be RCRA sites for purposes of remediation.³ Consequently, these inactive "RCRA sites" were not routinely reported to DOE for inclusion in the annual CERCLA report to Congress as sites potentially requiring remediation under CERCLA as required by Section 120(e)(5). At Rocky Flats, DOE officials told GAO that all their sites, except for radioactive sites were being managed as "RCRA sites."⁴ As a consequence, only 6 of the 102 inactive waste sites at Rocky Flats were considered by DOE to need remedial response under provisions of CERCLA. On the other hand, an official of Lawrence Livermore National Laboratory indicated to GAO that all of its sites were considered to be "CERCLA sites" because the entire facility had been listed on the National Priorities List (NPL).⁵ Some facilities did not consider the radioactive component of the waste when considering the potential hazard of mixed wastes. Consequently, the GAO expressed concern that "radioactive waste sites may be given a secondary priority if DOE installations implement RCRA first and then address provisions of CERCLA secondly."⁶

The GAO report indicated that DOE officials from all the inventoried installations expressed concern about the additional administrative burdens of having to comply with both CERCLA and RCRA. For example, the Idaho National Engineering Laboratory reported scoring inactive waste sites under the Hazard Ranking System (HRS) for DOE's CERCLA program and then rescoring them using a variation of the HRS

system for the state RCRA program.⁷ The GAO noted that meaningful comparisons of waste sites could not be made because DOE installations used different evaluation methods, or in some cases none at all, meaning that DOE had no common basis to assess contaminated sites throughout the weapons complex.⁸ GAO contended that without a basis for comparison, it would be difficult for DOE to establish priorities and allocate monies for cleanup actions. According to the GAO report, one of the primary reasons that DOE installations used differing regulatory approaches to address their inactive waste sites was because "they received varying instructions from their EPA and state regulators."⁹

The GAO recommended that DOE develop and prescribe, in cooperation with EPA and the appropriate states, a comprehensive approach to identifying, evaluating, and cleaning up inactive waste sites that integrates provisions of both CERCLA and RCRA.¹⁰ The GAO also recommended that DOE update its waste site inventory to account for all DOE inactive waste sites and the relative hazards associated with each site.¹¹ The GAO specified that DOE should follow EPA's RCRA/CERCLA integration strategy outlined in J. Winston Porter's January 1988 Memorandum.¹² In this memorandum, EPA noted several areas of overlap between RCRA and CERCLA. In particular, these overlaps affect Federal facilities with a RCRA permit that are also undergoing CERCLA remedial investigations.¹³ In such cases, EPA encourages the use of CERCLA-required interagency agreements to incorporate requirements of both RCRA and CERCLA into a comprehensive compliance strategy.

EPA recognizes that "there is some risk of overlap or even conflict"¹⁴ when CERCLA action is prescribed at a Federal facility that is also subject to RCRA authority:

How RCRA authorities are affected (if at all) when CERCLA also applies to a site is a matter that varies greatly depending upon the facts of the site. In some cases, the NPL site is physically distinct from the RCRA-regulated hazardous waste management units, and corrective action or closure at the regulated units may proceed under RCRA while at the same time a cleanup action is proceeding at another area of the property under CERCLA, without the risk of inconsistency or duplication of response action. In other cases, the releases or contamination plumes may overlap, such that a comprehensive solution under one statute may be the most efficient and desirable solution. The questions of which authority should control, and how to avoid potential duplication or inconsistency, are often implementation issues, to be resolved in light of the facts of the case and after consultation between EPA and the concerned State.

EPA's belief is that in most situations, it is appropriate to address sites under CERCLA, pursuant to an enforceable agreement (i.e., an IAG under CERCLA section 120), signed by the Federal facility, EPA, and, where possible, the State.

One of the reasons that Federal facilities are subject to dual regulation is that EPA has established a policy of enforcing some regulatory requirements differently at Federal facilities than at non-Federal facilities. On March 13, 1989, EPA published a policy statement announcing EPA's intention of including on the NPL Federal facility sites that meet eligibility requirements, even if such facilities are also subject to the corrective action authorities of Subtitle C of RCRA.¹⁷ This is not the policy EPA applies to non-Federal facilities. Nevertheless, the EPA policy statement says that because the great majority of Federal facility sites that could be placed on the NPL have RCRA-regulated hazardous waste management units, they are also subject to RCRA corrective action authorities.¹⁸ EPA argues that to apply the NPL deferral policy used for non-Federal facilities with RCRA regulated units to Federal facilities "would result in very few Federal facilities on the NPL."¹⁹ EPA believes Congress clearly intended that Federal facilities be placed on the NPL, even if RCRA corrective action authorities are also applicable,

and that this intent is evidenced by the nature of the comprehensive system of site identification and evaluation established by CERCLA Section 120 (e.g. Federal Agency Hazardous Waste Compliance Docket).²⁰ Additionally, EPA argues Congress established the interagency agreement process to evaluate the need for cleanups at Federal facilities. EPA concludes if all Federal facilities subject to RCRA Subtitle C were deferred from NPL listing, Congressional intent would again be circumvented because few Federal facilities would come within the IAG process.²¹ The EPA position that Federal facilities on the NPL cannot be deferred to RCRA authority makes it inevitable that many sites will continue to be subject to the overlapping and frequently conflicting requirements of both statutes.

A commenter on this EPA policy argued that the agency's position was inconsistent with CERCLA Section 120(a), which requires that Federal facilities comply in the same manner as any nongovernmental entity. EPA justified its position by pointing out that Congress legislated a number of requirements in addition to, or in place of those applicable to private facilities; hence, Congress "recognizes the need to address certain unique aspects of Federal facilities differently than for private sites."²² EPA contends its policy is valid because the criteria to list Federal facilities on the NPL is no more "exclusionary than the criteria to list non-Federal sites."²³

In a July 27, 1990, proposed rulemaking, EPA presented requirements under RCRA for corrective action of solid waste management units (SWMUs).²⁴ The purpose of the proposed rulemaking is to establish a comprehensive framework for implementing EPA's corrective action program. Because current CERCLA remedial response and RCRA corrective action requirements often overlap and conflict, a

primary goal of the proposed rulemaking is to achieve a consistency between the two regulatory programs to eliminate any advantage for the regulated community to proceed under one program rather than the other.²⁵ EPA anticipates that the proposed RCRA corrective action program will parallel that established for CERCLA remedial actions. While EPA acknowledges that the "two programs have procedural differences," EPA anticipates that similar solutions will be developed for common environmental problems.²⁶ An important provision of the proposed rulemaking is that CERCLA remedial actions performed at Federal facilities following procedures outlined in the CERCLA National Contingency Plan (NCP), would be considered to be consistent with the proposed RCRA corrective action requirements, and therefore additional studies or cleanup actions would not be required.²⁷

CERCLA Section 120(i) mandates that Federal facilities comply with RCRA requirements, including corrective action. EPA acknowledges in the preamble to the proposed corrective action rulemaking that Federal facilities at which hazardous wastes are managed will be subject to both CERCLA remedial action and RCRA corrective action authorities. The Preamble goes on to offer a solution for this overlapping of regulatory requirements:

EPA intends to coordinate the application of RCRA and CERCLA authorities through the use of interagency agreements (IAGs), as provided under the authority of Section 120(e) of CERCLA. The IAGs will provide the vehicle for explicitly defining the procedural and technical requirements for corrective action, in satisfaction of the statutory and regulatory authorities of both RCRA and CERCLA.²⁸

The preamble also indicates that activities required under both regulatory programs would be coordinated with "already-established Federal facility remedial programs" (e.g., DOE's Waste Management and Environmental Restoration Five-Year Plan).²⁹

Impact of FFA Negotiations on SRS Mixed Waste Cleanup Operations

Negotiations for the SRS CERCLA Section 120 Interagency Agreement (FFA) began in March 1989, between DOE, EPA, and the South Carolina Department of Health and Environmental Control (SCDHEC) in anticipation of SRS being placed on the NPL. SRS was proposed for inclusion on the NPL in July 1989,³⁰ and the listing became effective December 21, 1989.³¹ Prior to the inclusion of SRS on the NPL, all SRS cleanup operations involving hazardous and/or mixed waste were performed under Subtitle C of RCRA as either closure of hazardous waste management units or preparation of work plans for investigation of potential releases of hazardous constituents at solid waste management units (SWMUs). The most significant impact to SRS waste management activities resulting from negotiation of the SRS FFA was a delay in the conduct of scheduled site-specific RCRA Facility Investigations. This delay occurred while selected CERCLA administrative provisions and procedures for the sampling of radionuclides were incorporated into the RCRA Facility Investigation (RFI) Program Plan and the site-specific work plans (see Chapter IV for a discussion of the RCRA corrective action program at the SRS).

EPA had initially approved the SRS RFI Program Plan in June of 1989 before negotiation of the FFA determined that the RFI Program Plan should be expanded to include CERCLA requirements. While DOE, EPA and SCDHEC were negotiating a comprehensive program in the form of an interagency agreement to govern SRS cleanup operations for the next thirty years, scheduled investigations were delayed up to six months to incorporate the required CERCLA provisions.³²

Other problems resulted from the length of time taken to complete negotiations of the FFA. EPA had originally intended that the SRS FFA

be finalized within three to six months.³³ Eighteen months after initiation of negotiations, a final draft agreement was ready for public review and comment.³⁴ To conduct interagency agreement negotiations in a "timely and efficient manner," EPA adopted a Federal Facilities Negotiations Policy.³⁵ "We now have specific tools and procedures in place to resolve RCRA and CERCLA compliance cleanup issues, but we never came out with a policy that clearly tells the world EPA wants to move forward on cleanups and agreements," stated Chris Gundler, Director of the EPA Federal Facilities hazardous Waste Compliance Office.³⁶ The policy requires that a deadline be established for conclusion of negotiations. If negotiations are not completed within 90 days, a 30-day extension can be granted according to the policy. If no agreement is reached by the established deadline, the EPA Regional Office should elevate the dispute to EPA Headquarters for resolution or approval to take enforcement action.

Similarly, if the state is too slow to negotiate or is making what EPA considers unreasonable demands upon the involved Federal facility, EPA will be prepared, after the 120-day negotiation period, to eliminate the state from further negotiations and establish a two-party interagency agreement between EPA and the Federal facility.³⁷ States are fearful, however, that the timetable for interagency agreement negotiation may force EPA to favor two-party agreements that would exclude the host state.³⁸

Three primary issues caused delay in the negotiation of the SRS FFA. One of the problems encountered during negotiation was the development of the most appropriate mechanism for integration of RCRA and CERCLA at the SRS, considering that SRS had an established RCRA corrective action program.³⁹ Compounding the problem of the

integration of RCRA and CERCLA was the inclusion of the SRS high-level waste tanks in the FFA. At the time negotiation of the FFA was initiated, the high-level waste tanks had RCRA interim status and Part B permit applications were being developed for submittal to SCDHEC.⁴⁰ EPA proposed during negotiation of the FFA to include the high-level waste tanks in the interagency agreement under CERCLA authority.⁴¹ The State of South Carolina maintained that the tanks should be under State permitting authority.⁴² Secondly, the State of South Carolina was concerned about jurisdictional problems (e.g., the state role in remedy selection). In November of 1989, SCDHEC threatened to withdraw from participation in the negotiation process if these issues could not be resolved.⁴³ Thirdly, limited technical staff resources at DOE, EPA, and SCDHEC, combined with the number of interagency agreements being negotiated by EPA and DOE extended the SRS FFA negotiations.⁴⁴

Resolution of these procedural and jurisdictional issues took more time than anticipated.⁴⁵ If the time to negotiate the FFA had been shorter, some of the ongoing RCRA closures involving mixed waste (e.g., Mixed Waste Management Facility, M-Area Settling Basin, and F-and H-Areas Seepage Basins) at the SRS could possibly have been expanded and/or modified to incorporate CERCLA concerns, minimizing a future administrative burden. While RCRA closures have not been delayed as a direct result of FFA negotiations, inclusion of the entire SRS facility on the NPL potentially subjects RCRA closures involving mixed waste to CERCLA review. Such a review is conducted to determine whether the closure meets CERCLA remedial response standards and criteria outlined in the National Contingency Plan (NCP). If EPA determines that the RCRA closure does not meet CERCLA response criteria, EPA may require that portions of the RCRA closure be

modified to meet CERCLA requirements. The SRS FFA specifies that reviewing agencies or results of public review and comment may determine that additional response action is required for the RCRA closures. DOE has agreed, subject to the dispute resolution provisions of the Agreement, to conduct the additional CERCLA imposed work at RCRA closures.⁴⁶ The actual closure as performed under provisions of RCRA is not governed by the FFA.

Anticipated Consequences of FFA Implementation at the SRS

While negotiation of the Federal Facility Agreement (FFA) resulted in short term delays in the conduct of initial remedial investigation at the SRS, it provides a single set of rules for the entire facility providing for a more expeditious cleanup. For example, the FFA has established a procedural framework for conduct of remedial actions and corrective measures to be performed at the SRS for the 30-year duration of the DOE Environmental Restoration Program. The FFA provides a clear definition of roles for all parties and addresses the complex and often conflicting interrelationships between Federal and State of South Carolina authorities. The discussion below examines the mandated CERCLA interagency agreement to determine if the two regulatory programs have been integrated into a comprehensive cleanup program or if additional administrative burdens have been placed on the SRS.

RCRA/CERCLA Integration

The FFA was specifically structured by the negotiating Parties to be a vehicle for integrating the RCRA corrective action program dictated by terms of the SRS hazardous waste permit and the CERCLA remedial response program dictated by inclusion of the SRS on the NPL. Early stages of the negotiations focused on how the overlapping

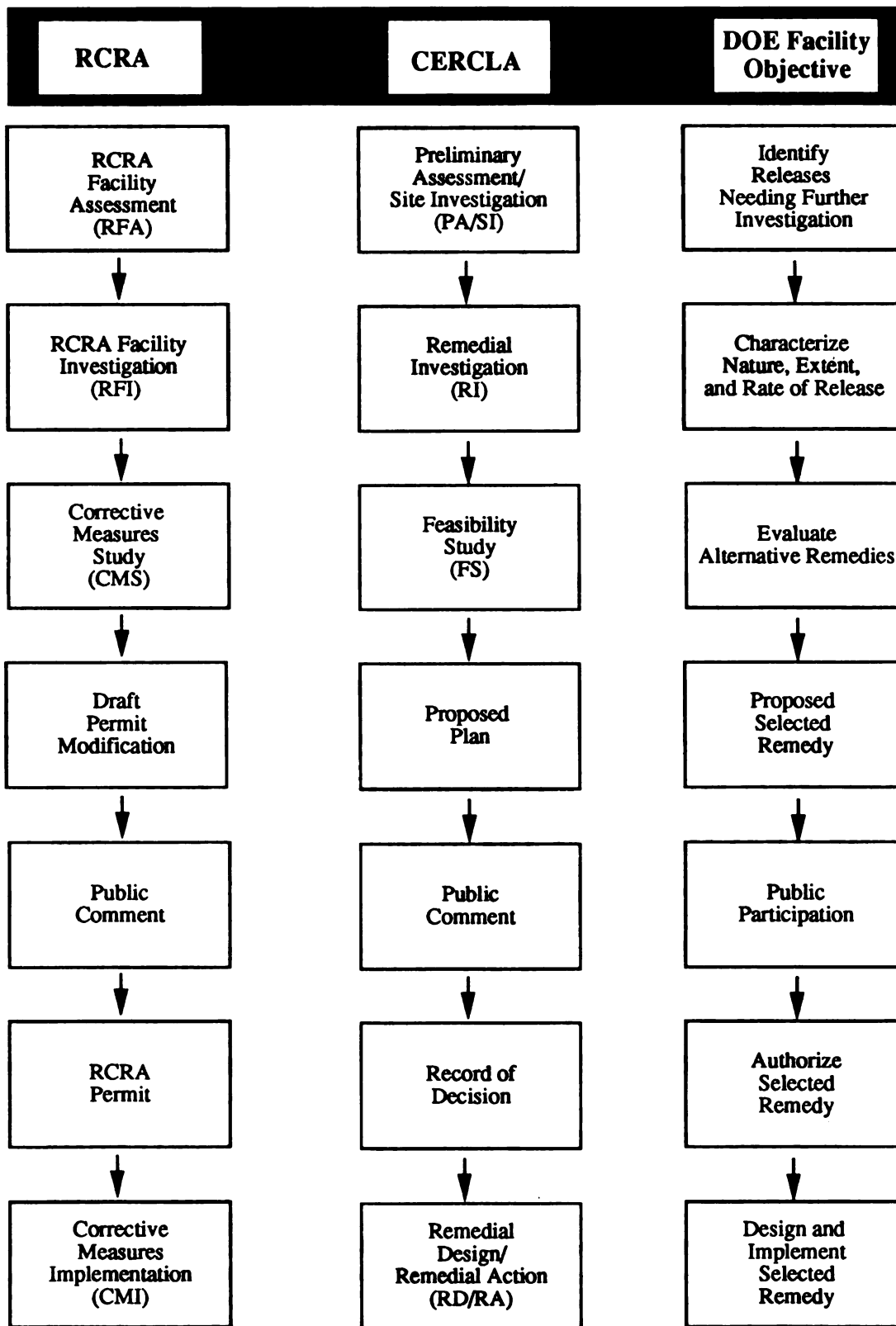
requirements of RCRA and CERCLA could be managed.⁴⁷ Since many of the inactive waste sites at SRS are contaminated with mixed waste, it became apparent to the negotiating parties that efficiency required a single agreement addressing the cleanup requirements of both regulatory programs. To accomplish this goal, the negotiating parties decided to augment the established RCRA corrective action program with provisions of the CERCLA remedial action program to achieve an integrated cleanup program.⁴⁸ The strategy developed for the integration of RCRA/CERCLA in the SRS FFA consisted of the following items:

- Establish a procedural framework and schedule for prioritizing all response actions
- Integrate technical documents in context of both RCRA/CERCLA
- Consolidate the Administrative Record for both RCRA/CERCLA
- Combine RCRA/CERCLA public participation activities
- Coordinate CERCLA requirements with RCRA closure activities⁴⁹

To accomplish the integration of the two regulatory programs, the RCRA corrective action program had to be supplemented with several requirements (e.g. performance of baseline risk assessment, community relations plan, identification of ARARs) from the National Contingency Plan in order to meet all the CERCLA requirements of the remedial response process leading up to a Record of Decision (ROD) (see Figure 6). Additionally, the established RCRA corrective action program was modified to incorporate provisions for the investigation of radionuclides at mixed waste sites.

The draft FFA for SRS includes a section modified from the model IAG language which specifically addresses the issue of RCRA/CERCLA integration:

**Figure 6. Comparison of RCRA Corrective Action Process
and CERCLA Remedial Response Process**



Source: Hanford Tri-Party Agreement Action Plan

The parties intend to integrate the DOE's CERCLA response obligations with the corrective measures required by its current RCRA permit. The Parties intend that the response actions under this Agreement, together with the corrective measures under the RCRA permit, achieve comprehensive remediation of releases and threatened releases of hazardous substances, hazardous wastes, hazardous constituents, pollutants or contaminants at or from the Site. Thus, response under CERCLA will address releases of radionuclides and other hazardous substances not presently addressed in the RCRA permit.⁵⁰

While the integration approach as defined above may seem simple in concept, its development was a major hurdle in the negotiation of the SRS FFA. The primary difficulty with the proposed integration concept was that the two regulatory programs were initiated by DOE at SRS at different times. The RCRA corrective action program had been in existence for several months before negotiation of the FFA was initiated. SRS had prepared an RFI Program Plan that was in the process of being reviewed by EPA. In addition, several RFI site-specific work plans were in the process of being prepared at the initiation of FFA negotiations.

The approach of applying both regulatory programs to the same site and producing a single document to meet requirements of all regulatory programs is a unique concept and differs from an integration approach recommended by EPA. EPA has recommended a division of responsibility between the two regulatory programs as described in a March 13, 1990 policy statement:

In some circumstances it may be appropriate under an IAG to divide responsibilities, focusing CERCLA activity only on prescribed units, leaving the cleanup of other units under the direct control of RCRA authorities, such as where RCRA-regulated hazardous waste management unit is physically distinct from the CERCLA contamination and its cleanup would not disrupt CERCLA activities. Alternatively, the IAG can prescribe divisions of responsibility, such as stating that CERCLA will address ground water contamination while RCRA will address the closure of regulated hazardous waste management units.⁵¹

Enforcement Actions

The FFA has established an extended schedule for completion of cleanup at the SRS which avoids the imposition of different enforcement actions by Federal and South Carolina regulatory agencies. EPA and SCDHEC each could have initiated enforcement action against DOE at the SRS and could have imposed compliance and/or cleanup schedules in lieu of entering into the CERCLA interagency agreement (e.g., FFA). For example, EPA and SCDHEC could have required a significantly more aggressive schedule for the initiation of preliminary assessments and investigations of the 81 RCRA solid waste management units after SRS was placed on the NPL. The FFA, in contrast, allows several years to complete this initial phase of the cleanup process.

As previously discussed in Chapter IV, a precedent has been established giving SCDHEC jurisdiction over radionuclides in groundwater resources beneath the SRS, in accordance with terms of Settlement Agreement 87-85-SW, although SCDHEC has never attempted to exercise this authority.⁵² The FFA will provide a mechanism for all State environmental laws and conditions of settlement agreements entered into by DOE and SCDHEC to be considered as "applicable or relevant and appropriate requirements" (ARAR) during remedy selection, eliminating the need for the State to find other regulatory vehicles for pursuing enforcement action.

FFA Prioritization and Funding Considerations

Provisions of the SRS FFA require DOE to establish priorities annually for implementing the work required under the Agreement. Work proposed to be performed for the next fiscal year is to be identified and ranked by DOE and then submitted to EPA and SCDHEC for review. The "Environmental Restoration Activities Report" is required to

include the activities SRS intends to include in its budget submittal for the next fiscal year. If after review of the proposed work assignments for the coming year, EPA and SCDHEC cannot agree on the proposed work, the dispute resolution procedures outlined in the FFA can be implemented.

Without the FFA, no formal mechanism would be available by which EPA and SCDHEC could review all SRS cleanup priorities on an annual basis. Priorities would be established and reviewed as SRS submitted remedial and corrective action plans to either EPA or SCDHEC. However, the two agencies would not be involved jointly in reviewing all proposed cleanup actions. Initially SCDHEC would be responsible for reviewing and approving SRS RCRA closures and supporting EPA's decisions on SRS RCRA corrective action measures. Once SCDHEC receives RCRA corrective action authority, it would be responsible for final approval of all SRS RCRA corrective measures. However, SCDHEC would have no authority over CERCLA remedial response actions. On the other hand, a significant advantage of the SRS FFA is that it allows both Federal and State regulatory agencies the opportunity to review and comment on all SRS cleanup operations and priorities jointly on an annual basis and to dispute the proposed priorities if disagreements should develop.

Funding for cleanup of Federal facilities is requested by the Executive Branch as a component of the DOE budget and appropriated and overseen by Congress. Thus Congress plays an important role in the cleanup of DOE facilities by providing sufficient funds for complying with RCRA and CERCLA. The SRS FFA considers the possibility that funding may not be provided by Congress to accomplish all the work agreed upon for a specific fiscal year. By terms of the FFA, DOE is

obligated to take "all necessary steps and make efforts to obtain timely funding to meet its obligations under this Agreement."⁵³ According to provisions of the FFA, if appropriated funds are not available to fulfill DOE's obligations under the FFA cleanup priorities and compliance schedules may have to be renegotiated. However, EPA and SCDHEC reserve the right to initiate any other action which would be appropriate if the FFA did not exist. If SCDHEC or EPA should ever attempt such an enforcement action, DOE has reserved its right to raise as a defense that failure to complete required actions was due to lack of sufficient funding.

A provision was incorporated into the FFA to address previously negotiated remedial action schedules. "The establishment of priorities under this Agreement, shall be coordinated with the schedules and milestones for corrective action contained in the DOE's RCRA permit(s) and outstanding administrative orders and consent agreements entered into between DOE and SCDHEC as of the effective date of this Agreement."⁵⁴ Thus SRS established cleanup commitments outlined in Chapter IV become important considerations for prioritizing cleanup efforts at the SRS. The FFA also acknowledges that DOE has national cleanup obligations established as a component of the DOE Environmental Restoration and Waste Management Five-year Plan and that some site-specific cleanup schedules may have to be renegotiated, as indicated below:

(T)he Parties recognize that application of the 5-Year Plan's national prioritization system may result in a proposed implementation schedule for environmental restoration and waste management activities that is different from the schedules specified in this Agreement: the Parties shall work to address and resolve any such differences and reserve the right to modify this Agreement, and where necessary to invoke the appropriate dispute resolution provisions of this Agreement.⁵⁵

While the DOE five-year plan was developed to accommodate established remedial schedules contained in negotiated agreements and consent orders, funding appropriations and national priority constraints may require that certain closure dates established for SRS facilities be rescheduled. Established closure dates most likely to be impacted by DOE environmental restoration prioritization are some of the sites associated with the NRDC Consent Order (see discussion contained in Chapter IV). A notable consequence of the NRDC lawsuit is that several SRS waste sites were directed to be closed in a "RCRA-like manner," even though it was never demonstrated that the units received hazardous waste during their operational life. This mandate has the potential to divert funds from the cleanup of waste sites that may pose a greater risk to human health and the environment to sites for which a court-ordered closure date has been established.⁵⁶

Use of the FFA Dispute Resolution Process

The dispute resolution section of the SRS FFA provides EPA, SCDHEC, and DOE with the ability to formally dispute issues associated with primary documents. In the case of the SRS FFA, the EPA Administrator makes the final decision in disputes, should it not be resolved at lower levels. However, the dispute resolution process has been structured by DOE and EPA in such a manner that all but extraordinary situations should be resolved at either the project manager or director level. During negotiation of the SRS FFA, SCDHEC officials expressed concern about a perceived loss of State authority over remedial actions and threatened to withdraw from participation in the FFA if the State was not given equal power.⁵⁷ EPA responded to the State by indicating that CERCLA statutory language does not allow the ultimate authority over response actions to be delegated and that other provisions of the

FFA addressed State concerns.⁵⁸ Two sections of the FFA ultimately protect State interests in the "Covenant Not to Sue/Reservation of Rights" Section of the FFA:

- By entering into this Agreement, the SCDHEC does not waive any right or authority it may have under South Carolina law.
- Notwithstanding this Section, or any other Section of this Agreement, the SCDHEC shall retain the right to obtain judicial review of any final decision of EPA on selection of a remedial action pursuant to any authority the SCDHEC may have.⁵⁹

Resolution of a dispute under terms of the SRS FFA is considered a final resolution and is incorporated into the FFA as a term and condition of the Agreement. However, the dispute resolution process must be invoked before EPA or the State can seek judicial relief.

Consequences of the NEPA Review Process

The DOE obligation to conduct National Environmental Protection Act (NEPA) assessments for all remedial actions as directed by DOE Secretary of Energy Notice 15 and DOE Order 5400.4, is not addressed in the draft SRS FFA. During negotiation of the SRS FFA, EPA Region-IV representatives stated that the DOE NEPA policy was an internal matter that should not be addressed in the FFA.⁶⁰ EPA and SCDHEC representatives indicated that this was a matter that did not directly involve either agency, and that DOE would have to complete NEPA reviews within the timeframes outlined in the FFA.⁶¹ DOE representatives argued that DOE NEPA policy should be acknowledged in the FFA because of potential delays in the submittal of primary documents caused by extended reviews of NEPA documentation for specific SRS remedial actions.⁶² Many DOE field office personnel are concerned about the ability of DOE-Headquarters to review and process the several hundred NEPA evaluations that will be prepared for the

cleanup activities of the DOE weapon complex facilities in a timely manner.⁶³ Consequently, field office personnel foresee potential delays in their ability to implement selected remedies and comply with schedules contained in the negotiated interagency agreements.⁶⁴

Discussion with DOE representatives indicate that the Council on Environmental Quality (CEQ) is in the process of making a determination concerning the functional equivalency of RCRA corrective actions and CERCLA response actions with NEPA.⁶⁵ However, until such time that CEQ should make a determination of functional equivalency, DOE field installations are obligated to perform NEPA evaluations for all proposed remedial actions and RCRA closures. An important court decision was made in August of 1990 on the functional equivalency of RCRA and CERCLA when the U.S. Court of Appeals for the Eleventh Circuit upheld EPA's decision to issue a RCRA permit to "the largest waste management facility in the United States" without preparing an environmental impact statement.⁶⁶ The court held that RCRA is the functional equivalent of NEPA and "comprehensive in its field of application."⁶⁷ While not specific to RCRA corrective actions, the decision that the RCRA permitting process is functionally equivalent to NEPA could potentially alter the need for DOE to provide NEPA documentation of its corrective actions because the same administrative process is involved.

The SRS has two options for meeting the mandate to provide adequate NEPA evaluation for remedial projects and fully integrate this process with the CERCLA remedial actions as required by DOE Order 5400.4. The first option involves "tiering" off an existing SRS environmental impact statement⁶⁸ addressing alternative remedial actions for waste site cleanup at the SRS. This could be accomplished

by preparing a supplement to an existing environmental impact statement to address operable units listed in the FFA and the development of new remedial technologies that were not addressed in the original environmental impact statement. The second option available to the SRS is the preparation of a site-specific NEPA evaluation that would be included in the RFI/RI report. In the proposed RCRA corrective action rule discussed previously in this Chapter, EPA acknowledges that in some cases NEPA evaluations will be conducted concurrently with RCRA corrective action studies and encourages the merging of the two studies into one integrated document, such as the RFI/RI report.

Impact of Land Disposal Restrictions on CERCLA Response Actions

The SRS FFA does not specifically address the issue of compliance with RCRA LDRs, although RCRA LDRs will be considered as "applicable or relevant and appropriate requirements" during remedy selection. This omission may require that the FFA be amended to specifically address LDR issues associated with the SRS cleanup of mixed waste at some time in the future. SRS may violate LDR storage and disposal regulations associated with the excavation of soil and debris because of limited national capacity for the treatment of mixed waste. The SRS strategy for compliance in most cases will be to treat the waste in place and not remove the contamination from the waste unit in order to avoid subjecting it to LDR treatment standards. For example, all RCRA closures performed to date at the SRS have involved in-situ treatment, and therefore has not subjected the unit to LDR regulation.

While the SRS has not been confronted with LDR issues associated with the excavation of soil and debris, it is currently negotiating a Federal Facility Compliance Agreement (FFCA) with EPA for alleged

violations of the LDR storage prohibition for mixed waste. A Notice of Noncompliance with RCRA land disposal restrictions was transmitted to DOE from EPA Region-IV on May 21, 1990.⁶⁹ The FFCA will address treatment and disposal options for all mixed waste currently being stored at the SRS in violation of the LDR storage prohibition. However, the FFCA currently being negotiated by the SRS is not being structured to address future LDR violations at the SRS. The FFCA deals exclusively with existing nonconformances. Consequently, the mechanism most likely to address this issue with regard to excavated soil and debris in the future is the FFA rather than the FFCA.

Public Involvement Provisions of the SRS FFA

An important component of the SRS FFA is the coordination of CERCLA and RCRA public involvement programs. According to provisions of the FFA:

The Parties intend to combine the administrative records and files developed for activities under the RCRA permit and response actions under this Agreement in order to facilitate public participation in the selection of RCRA/CERCLA response actions and to ensure comprehensive remediation of the site. The parties intend to integrate the procedures for the selection of response action(s) under this Agreement with the administrative procedures for the modification of the DOE's RCRA permit. The parties intend to modify the DOE's RCRA permit to incorporate the remedial actions selected under this Agreement as corrective measures, when appropriate.⁷⁰

Within the limitations of statutory requirements, the FFA provides for the integration of RCRA and CERCLA public participation. For example, a single administrative record will be maintained for all cleanup activities at the SRS. Because many of the cleanup activities at the SRS will potentially involve mixed waste, both regulatory programs are applicable and the FFA negotiating parties decided that one administrative record should be maintained for both RCRA and CERCLA related activities. This policy is in keeping with the proposed

RCRA corrective action rulemaking which specifies that an information repository similar to that currently required under provisions of CERCLA be established for RCRA corrective actions at Federal facilities.⁷¹ As a Federal agency, DOE is delegated the authority to maintain the administrative record under provisions of CERCLA for each installation, including the SRS.

Statutory requirements of the two environmental laws prevent a total integration of the two public participation programs. Notable differences exist in regulatory procedures for conduct of public notification, public review and comment, and public meetings. For example, the RCRA public hearing and CERCLA public meeting have such different formats that combining them may prove to be difficult. A RCRA public hearing is more formal than a CERCLA public meeting. The lead agency makes a formal presentation, but all comments and responses are typically made in writing. Verbal exchanges with the public typically are not made. The CERCLA public meeting, on the other hand, encourages an impromptu verbal exchange with the public and tries to keep its meetings as informal as possible. EPA officials believe that these statutory differences in the public participation processes may make combining the RCRA public hearing with the CERCLA public meeting difficult.

A proposed solution to this problem would be to hold the hearing and the meeting on the same day but at different times. While this policy effectively deals with both statutory requirements, it places additional administrative burdens on the Federal facility. Another significant difference between the RCRA public hearing and the CERCLA public meeting is the designation of the lead agency. For RCRA, either SCDHEC or EPA will be designated as the lead agency and

therefore will be responsible for conduct of the public hearing. For CERCLA, the FFA has designated DOE as the lead agency.

While not achieving a totally integrated public participation program, the FFA does establish a process to coordinate public involvement in the selection of remedial response actions with the administrative procedures to modify the SRS Hazardous Waste permit to incorporate RCRA corrective measures. Integration of the two programs will require that regulatory authorities be flexible in the interpretation and implementation of regulatory requirements.

Comparison of the SRS FFA and Hanford Tri-Party Agreement

One of the first interagency agreements to be successfully negotiated by DOE was for the Hanford Reservation, the most seriously contaminated of all DOE's nuclear facilities.⁷¹ A CERCLA Section 120 Interagency Agreement was entered into by the Washington State Department of Ecology (Ecology), EPA, and DOE concerning the Hanford Reservation on May 15, 1989.⁷² This document is entitled the Hanford Federal Facility Agreement and Consent Order, but is commonly referred to as the Tri-Party Agreement. Initial reaction to the agreement was favorable. The Tri-Party Agreement is a 30-year commitment, continuing through the year 2020. The Tri-Party Agreement was described as "The ultimate Federal Facility Agreement" by Christopher Grundler, Director of EPA's Federal Facilities Task Force.⁷³ "We are delighted with this agreement," said Washington Governor Booth Gardner. "This ensures that we can get on with cleaning up this facility with real guarantees that the job will be done timely and correctly."⁷⁴

The Hanford Reservation is the largest CERCLA site in the nation, encompassing 560 square miles in South-central Washington. DOE and its predecessors originally used the site to produce plutonium.⁷⁵ In later

years, as the production of plutonium was stopped, the facility was primarily used for research and development of advanced nuclear reactors and renewable energy technologies. At a July 11, 1990 press conference, Energy Secretary James D. Watkins announced a major change in the management structure of the facility. "We're changing the Hanford mission to waste management because we don't have the need for plutonium production," said Watkins, adding that a change in the management structure to a team geared toward environmental restoration was needed to tackle the 30-year cleanup effort at the large and complex facility.⁷⁶

Cleanup operations at Hanford involves two types of sites. Fifty-five treatment, storage, and disposal groups which contain over 300 individual hazardous waste management units have been identified at the Hanford site which will either have to be permitted and/or closed in accordance with RCRA and the Washington Hazardous Waste Management Act.⁷⁷ In addition, approximately 1000 "past-practice" units have been identified that must be investigated and, if necessary remediated.⁷⁸ "Past-practice" refers to a waste management unit where wastes have been disposed (intentionally or unintentionally) in the past and that is not subject to RCRA permitting authority for storage, treatment, or disposal. The waste sites at Hanford range from relatively simple sites such as maintenance shop wastes that have contaminated surrounding soils to extremely complex sites like the single-shelled tanks storing high-level radioactive waste.⁸⁰ The groundwater beneath the Hanford Site has been contaminated as a result of past-practices. Results of remedial investigations conducted to date indicate tritium and nitrate to be the most widespread contaminants in the groundwater.⁸¹ Chromium, cyanide, and carbon tetrachloride are

hazardous constituents which have been detected in the groundwater near operating areas.⁸²

The CERCLA "operable unit" concept was adopted as a method to manage the large number of contaminated waste sites at the Hanford facility.⁸³ An operable unit at Hanford is defined as a group of land disposal units that are placed together for the purposes of conducting remedial investigations and subsequent remedial response actions. The Hanford facility was divided into 74 operable units plus four additional groundwater operable units.⁸⁴

A major milestone in the negotiation of the Tri-Party Agreement was the decision by the parties that any of the operable units could be managed under either RCRA or CERCLA authority.⁸⁵ The EPA and Ecology jointly determine whether an operable unit will be managed under the authority of RCRA or CERCLA. This is particularly significant because most of the past-practice activities at Hanford involved mixed waste.⁸⁶ Consequently, one of the first areas of agreement between the negotiating parties was that, in general, the radioactive component of mixed waste could be addressed as part of a RCRA corrective measure.⁸⁷

However, the Hanford Agreement did not extend RCRA or State authority over the regulation of radionuclides. Rather it provided an understanding that mixed waste cleanup was an element of a comprehensive site-wide investigation and remedial action plan for the entire facility. The Tri-Party Agreement states that "the corrective action process selected for each operable unit shall be sufficiently comprehensive to satisfy the technical requirements of both statutory authorities and the respective regulations."⁸⁸ The regulatory authority over radioactive waste remediation remained with CERCLA, as this was not a responsibility that could be divided.

A comparative analysis of several DOE interagency agreements cautioned other Federal facilities to be careful that additional authority is not given to states through the CERCLA interagency agreement process.⁸⁹ For example, a provision of the DOE Rocky Flats interagency agreement was cited as giving the State of Colorado authority to address radionuclides.⁹⁰ As discussed in Chapters III and VI, a state with RCRA mixed waste authority only has jurisdiction over the hazardous component of mixed waste. Inclusion of such a delegation of authority in an interagency agreement raises the issue of whether or not state jurisdiction over CERCLA units at Rocky Flats constitutes a transfer of authority in violation of CERCLA Section 120(e), even if EPA retains jurisdictional oversight responsibility.

To manage the regulatory oversight of each operable unit the "lead agency" concept was developed during negotiation of the Tri-Party Agreement to "minimize duplication of effort and maximize productivity."⁹¹ EPA and Ecology agreed that the compliance oversight workload should be shared rather than duplicated by both Federal and State agencies.⁹² By definition the lead regulatory agency is responsible for overseeing all activities that are related to a specific operable unit. However, the EPA and Ecology retain their respective legal authorities and can only make decisions on actions to be taken pursuant to those authorities.⁹³ Generally, EPA will be the lead regulatory agency for operable units that contain no units requiring RCRA permitting and contain primarily "CERCLA-only substances" (e.g., radionuclides).⁹⁴ Ecology will be the lead agency for operable units that require RCRA permits and the lower priority past-practice units.⁹⁵ The decision of which agency is lead for a specific operable unit is made jointly by EPA and Ecology. The parties

involved in the negotiation of the Tri-Party Agreement believed that having a "lead agency" for each operable unit would help to resolve jurisdictional disputes between EPA and the State and would minimize the administrative burdens associated with having to deal with two agencies on every aspect of the Agreement's implementation.⁹⁶

A comparison of the SRS FFA and the Hanford Tri-Party Agreement indicates that while the two interagency agreements are generally similar in format, and in many provisions, the two agreements do contain differences directly related to facility-specific and/or site-specific circumstances. Table 5 describes some of the differences between the SRS FFA, the Hanford Tri-Party Agreement, and DOE Model Language developed to assist DOE facilities in the negotiation of CERCLA interagency agreements. The provisions in the Hanford Tri-Party Agreement regarding coordination between regulatory agencies and the State's role are the most detailed. For example, the Tri-Party Agreement is unique in providing a series of provisions that integrate EPA and State responsibilities, including a special dispute resolution procedure for resolving jurisdictional and other disputes between EPA and Ecology.⁹⁷ The DOE is not a party to that dispute resolution process since it only involves decisions between regulatory agencies.

At the time negotiations for the two interagency agreements were initiated, the two facilities were at different stages of achieving compliance with RCRA. The SRS had received its RCRA hazardous waste permit from EPA and the State of South Carolina in 1987 and had a number of RCRA closures in progress. Consequently, the RCRA permitting and/or closure of hazardous waste management units at the SRS was not an issue addressed in the FFA. Hanford, on the other hand, had over 300 individual RCRA units that needed to be closed or permitted to

Table 5. Comparison of Federal Facility Agreements

Issue	Savannah River Site	Hanford Reservation	DOE Model Language
Agreement identifies hazardous waste management units requiring permits; establishes compliance schedules	No; state permit issued 09/30/87	Over 300 individual units identified in agreement	Not applicable
Agreement purpose statement includes intention to integrate CERCLA and RCRA activities	Yes	Yes	Yes
State given lead regulatory role for certain response or corrective actions	No (state will have lead when receives HSWA corrective action authority)	State has lead for lower priority past practice operable units	No
Separate CERCLA and RCRA actions contemplated	No	Lead agency concept provides for separate actions	No
EPA given ultimate authority; regarding remedy selection	Yes	Yes	Yes
Separate dispute resolution process for EPA and state disputes	No	Yes	No
Agreement indicates that public participation programs of RCRA and CERCLA will be coordinated	Yes	Yes	Implied
Work scope and detailed compliance schedules contained in Action Plan as part of agreement	No; RFI Program Plan contains work scope, sites to be investigated and schedules are appended to agreement	Yes	Model language encourages use of Action Plan
DOE requirements to perform NEPA impact assessments discussed in agreement	No	Action Plan states that NEPA requirements will be integrated with regulatory programs	Not applicable

operate in accordance with RCRA. Thus, a major objective of the Tri-Party Agreement was to bring the Hanford facility into full RCRA compliance. While there are numerous unrelated hazardous waste management units spread over large geographic areas at the Hanford facility, the installation is considered to be a single RCRA facility. Consequently, one hazardous waste permit will be issued by EPA and Ecology and modifications made to that permit for the addition of new units or to perform corrective action at an operable unit. The Tri-Party Agreement recognizes the State's lead role in permitting and closure of treatment, storage, and disposal facilities at the Hanford facility.

A significant result of the RCRA/CERCLA integration approach used at the SRS is that a primary document required by the FFA is prepared to meet the requirements of both RCRA and CERCLA in contrast to the Hanford "lead agency concept," that requires compliance with only one regulatory program. At Hanford a document is prepared to meet either the requirements of RCRA or CERCLA. While the integration approach of the SRS FFA may have the appearance of duplicative requirements, in actuality it differs little from the "lead agency" approach of the Tri-Party Agreement.⁹⁸ For example, the umbrella document for investigation of environmental releases at the SRS is the RCRA Facility Investigation Program Plan. The FFA states "For the operable unit(s) which DOE is required to conduct an (Remedial Investigation) RI, the Parties agree that the approved DOE RFI Program Plan meets the investigation requirements of both CERCLA and the purposes of the Agreement." This document was modified to address certain CERCLA administrative issues and the investigation of radionuclides. The lead agency concept assigns an operable unit at the Hanford facility to

either a RCRA or CERCLA program based on the type of facility in question and the nature of contaminants present. At Hanford, the State is responsible for RCRA permitting even though it is a component of the interagency agreement. The State of South Carolina is responsible for all RCRA permitting of SRS hazardous waste management facilities. EPA has authority for remediation of purely radioactive sites at Hanford and SRS, as EPA cannot delegate this responsibility.

Perhaps the primary benefit of the lead agency concept adopted in the Hanford Tri-Party Agreement is that DOE only has to deal with one regulatory agency for each operable unit which avoids the administrative burdens of having to deal with two agencies on every aspect of interagency agreement implementation.⁹⁹ For example, hundreds of primary and secondary documents will be submitted to regulatory agencies at the SRS and Hanford during the 30-years of the DOE Environmental Restoration Program. At Hanford, comments will only come from the lead agency. Additionally, the lead agency concept will assist in the identification of which public participation process should be used for remedy selection. Again, this should minimize administrative burdens for the Federal Facility as provisions of only one public participation process will have to be followed.

Cleanup Without an Interagency Agreement

Implementing remedial action at a Federal facility, or for a component of a Federal facility, that does not have an interagency agreement or has not included the host state as a party to the Agreement, can cause litigious delay and unnecessary legal costs. The fate of the Rocky Mountain Arsenal may best illustrate the consequences resulting from the application of different and conflicting state and Federal statutory schemes to a single contaminated site at a Federal

facility.¹⁰⁰ The Arsenal is a 27 square mile Federal facility located ten miles northeast of Denver, Colorado.¹⁰¹ It was constructed in 1942 by the U.S. Army to manufacture and assemble chemical warfare agents, chemical products, and incendiary munitions.¹⁰² The Arsenal was also used for detoxification and disposal of these materials and other waste products.¹⁰³ Beginning in the 1950s, the Army leased portions of the Arsenal to private operators, including the Shell Oil Company, for the manufacture of pesticides and herbicides. A portion of the Arsenal, Basin F, was constructed in 1956 to store and dispose of contaminated liquid wastes generated as a result of chemical manufacturing and processing activities by the Army and Shell. The Arsenal was mentioned as early as 1962 in Rachael Carson's Silent Spring as a major source of groundwater contamination and was one of the first Federal facilities to be listed on National Priorities List (NPL).¹⁰⁴

In 1983, the Army submitted a RCRA closure plan for Basin F to the Colorado Department of Health. The State approved the plan and the basin was scheduled to undergo closure in 1987. However, the Army chose not to implement the State approved RCRA closure plan, and began work on a CERCLA remedial investigation/feasibility study (RI/FS) in 1984. These investigatory studies were not completed as of September 30, 1990, and a Record of Decision for remedial actions is not scheduled to be completed until 1993.¹⁰⁵

Unlike the rest of the Arsenal, Basin F was not included as a component of the original NPL listing.¹⁰⁶ Although the basin was initially intended for inclusion, EPA deferred it to the RCRA corrective action program.¹⁰⁷ This decision was to plague the Army for several years because it lead to continual litigation with the State of Colorado. As a RCRA authorized state, Colorado brought suit in 1986 to

require the Army to halt the CERCLA interim response action and close Basin F pursuant to the State issued RCRA closure plan.¹⁰⁸ State officials contended that Basin F was subject to regulation under State law and argued that the governing CERCLA process denied the State a meaningful role in the cleanup effort. The Federal government countered by arguing that (1) the court should give precedence to CERCLA because it is the more recent statute governing cleanup at Federal facilities, (2) that closure under RCRA would disrupt and duplicate the ongoing CERCLA remedial response action, and (3) that RCRA enforcement by a state would undermine the goals and policies that Congress set forth in CERCLA with regard to the independence of the two statutes.

Judge Jim R. Carrigan of the U.S. District Court for the District of Colorado ruled that "Nothing in the cited statutes indicates that a CERCLA action should take precedence over a RCRA enforcement action. On the contrary, it appears that CERCLA was intended to operate independently of and in addition to RCRA, and the statutory schemes are not mutually exclusive."¹⁰⁹ The court stated that CERCLA Section 120(a)(4) preserved state enforcement actions at Federal facilities that, like Basin F, were not listed on the NPL. Shortly after the court's decision, the Army moved for reconsideration of the decision, and the State sought to proceed administratively against the Army to compel it to close the basin in compliance with State law.¹¹⁰ Both of these motions were still pending before the court as of September 30, 1990. However, the State has issued an administrative compliance order against the Army requiring closure of the basin and imposing a fine of \$1.5 million against the Army for refusing to comply with provisions of the administrative order.¹¹¹

While the State and the Army were engaged in litigation, the EPA placed Basin F on the NPL, thus placing all of the Arsenal's remedial actions under the governing provisions of CERCLA Section 120.¹¹² On the same day, EPA issued a policy statement which among other topics clarified the responsibilities of state and Federal authorities under CERCLA at NPL sites.¹¹³ While suggesting the advantage in addressing Federal facilities cleanup actions comprehensively through negotiation of an IAG, EPA recognized there would be some occasions when a RCRA authorized state would decline to participate in the interagency agreement process.¹¹⁴ In these situations, EPA concluded that a state could not interrupt an ongoing CERCLA action at an NPL site by imposing state law according to CERCLA Section 122(e)(a). EPA interpreted this Section as giving it the authority to prohibit state-ordered remedial activities at an NPL site once an RI/FS had been initiated.¹¹⁵ EPA recognized that Section 120(a)(4) restricted similar authority at non-NPL sites.

Following the logic of this EPA interpretation, the listing of Basin F on the NPL divested the State of Colorado of the authority to enforce its laws unless authorized by EPA. Since EPA, Shell, and the Army have entered into an IAG governing the cleanup of the Arsenal, including Basin F, it is unlikely that EPA would authorize the Army to comply with the State's administrative compliance order. EPA indicates in the policy statement that state participation in the remedial process at an NPL site is provided for through Section 121 which specifically provides that ARARs of RCRA and state law must be achieved with regard to any on-site remedy undertaken at the Federal facility.¹¹⁶ The negotiated Rocky Mountain Arsenal interagency agreement requires compliance with all RCRA ARARs. Thus unless the

Federal court system should rule otherwise, the State issued RCRA closure plan will be considered as an ARAR to the remedial design for Basin F.

Summary

The large size of many DOE facilities, the types and sources of contamination at these facilities, and inconsistent guidance from regulatory authorities combine to create unique challenges for ensuring compliance with environmental laws. Compounding this challenge is the EPA policy that Federal facilities listed on the National Priorities List (CERCLA) cannot be deferred to RCRA authority. This stance subjects Federal facilities to the overlapping and frequently conflicting requirements of both statutes, unlike non-Federal facilities. The two laws have distinct substantive and procedural requirements that probably cannot entirely be overcome through regulation and policy statements. To solve this dilemma EPA encourages the use of CERCLA-required interagency agreements to integrate requirements of both RCRA and CERCLA into a comprehensive compliance strategy. The fate of the Rocky Mountain Arsenal best illustrates the litigious delay and unnecessary legal costs that can result when conflicting jurisdictional issues are not resolved at a Federal facility cleanup site.

In anticipation of SRS being placed on the NPL, negotiations of the CERCLA Section 120 Interagency Agreement began in March 1989, between DOE, EPA, and SCDHEC. The negotiations were delayed by the complexity of integrating CERCLA requirements with a RCRA corrective action program already in progress, by the need to determine the role the State of South Carolina would play in cleanup remedy selection, and by limited technical staff resources at DOE, EPA and SCDHEC. Despite

short term negotiation delays, the SRS interagency agreement provides a single set of rules allowing a more expeditious cleanup of the facility.

DOE, EPA and the State of Washington signed an earlier IAG (the Tri-Party Agreement) for the Hanford Reservation in 1989. The site was divided into operable units to manage the large numbers of contaminated waste sites. By terms of the Tri-Party Agreement, operable units can be managed under either RCRA or CERCLA authority. EPA and the State of Washington decide jointly which has authority for each operable unit. The process for designation of the regulatory program and the lead agency for each operable unit forms the basic implementing structure of the Tri-Party Agreement. A comparison of the SRS FFA and the Hanford Tri-Party Agreement found that allowances were made for site-specific conditions and circumstances in the development of the two comprehensive compliance strategies. In contrast to the Hanford "lead agency concept," the SRS FFA combines many RCRA and CERCLA provisions under one unified authority.

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CHAPTER VIII

SUMMARY, CONCLUSIONS, RECOMMENDATIONS

Summary

Waste management at U.S. Department of Energy (DOE) nuclear production facilities became a national controversy in the late 1980s. As a result, extraordinary pressure was placed on DOE to clean up the nuclear weapons complex and achieve compliance with environmental laws. One of the reasons for the significant contamination at DOE facilities is while initial waste management practices were similar to those used by private industry, disposal practices at the weapons production facilities did not improve as rapidly as private industries were forced to improve with the passage of environmental regulations.

While EPA, host states, and DOE share the ultimate goal of cleaning up DOE's nuclear production facilities, they disagree about which environmental law(s) should govern the cleanup of individual DOE installations. The two primary Federal laws which govern cleanup of hazardous waste at DOE facilities are the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The fundamental objectives of the RCRA corrective action program are essentially the same as those of the CERCLA remedial response program; however, a number of differences do exist between the two regulatory programs (e.g., public participation procedures, basis for remedy selection, etc.).

The waste type most affected by the multiplicity of applicable environmental laws is "mixed waste," which has a hazardous waste component and a radioactive component. The statutory overlap for mixed waste cleanups may include not only RCRA and CERCLA but also the Atomic Energy Act (AEA). In addition to these Federal environmental laws,

state, or local hazardous waste regulations, independent of RCRA and CERCLA, may also apply to specific remedial actions creating further jurisdictional problems. A possible solution to these jurisdictional problems is the negotiation of an agreement between the DOE facility, EPA, and the host state which would outline a strategy to minimize the duplicative requirements of applicable environmental laws. The fate of the Rocky Mountain Arsenal (Basin F) illustrates the litigious delay and unnecessary legal costs that can result when conflicting jurisdictional issues are not resolved at a Federal facility cleanup site and provides justification for use of an interagency agreement.

This study has investigated the feasibility of using interagency agreements to facilitate environmental compliance at DOE facilities when conflicting regulatory requirements and differing enforcement considerations exist. The public notoriety the Savannah River Site (SRS) has received and DOE plans to make SRS a "flagship" of the nuclear weapons complex are reasons considered in selecting the facility as the subject of this study. During the nearly 40 years the SRS has been operated, over 200 sites have been or are being used for the management of hazardous and/or mixed wastes. Liquid mixed wastes were previously discharged to seepage basins and various types of solid mixed wastes were buried in earthen trenches. While these waste management practices are no longer used at the SRS, contamination of groundwater resources beneath the SRS has occurred.

Until 1984, DOE thought itself exempt from hazardous waste regulation and only accountable to AEA requirements. Following the LEAF vs. Hodel court decision and the DOE byproduct rulemaking, DOE found itself subject to hazardous waste regulation for large volumes of waste, without sufficient time to achieve compliance. In August of

1989, in response to a public outcry for cleanup of the DOE nuclear weapons complex, DOE announced an Environmental Restoration and Waste Management Five-year Plan for cleanup of the weapons complex. The five-year plan is the first phase of a much longer and more extensive program to cleanup DOE inactive waste sites. DOE cleanup prioritization and budgetary considerations may require renegotiation of established cleanup commitments with Federal and state regulatory agencies.

In anticipation of being placed on the list of the most seriously contaminated sites in the country (National Priorities List), the SRS began negotiation with EPA and SCDHEC to develop a CERCLA Section 120 Interagency Agreement. During negotiations the parties identified the need to expand the CERCLA Interagency Agreement into an agreement that also addressed the established SRS RCRA corrective action program. The expanded agreement became known as the Federal Facility Agreement (FFA). The negotiations themselves were delayed by the complexity of integrating CERCLA requirements with the RCRA corrective action program already in progress, by the need to determine the role South Carolina would play in remedy selection, and by limited technical staff resources at DOE, EPA, and SCDHEC. Despite short term negotiation delays, the SRS FFA was successful in providing a single set of rules for cleanup of the entire facility. These rules contained in the FFA should result in a more expeditious cleanup. A comparison of the SRS FFA and the Hanford Tri-Party Agreement indicates that while the two interagency agreements are generally similar in format, and in many provisions, the two agreements do contain differences directly related to facility-specific and/or site-specific conditions and circumstances. The Hanford Reservation was divided into 74 operable

units to manage the large number of contaminated waste areas at the facility. Operable units can be managed under RCRA or CERCLA. EPA and the State decide jointly which regulation and which agency will have authority for each operable unit. In contrast to the Hanford "lead agency concept," the FFA at SRS combines many RCRA and CERCLA provisions under one unified authority.

Conclusions

The hypothesis to be tested by this study was whether an interagency agreement mandated by CERCLA for Federal facilities on the National Priorities List (NPL) could be used to successfully integrate and direct the remedial response obligations of CERCLA, the corrective action provisions of RCRA, applicable state environmental law requirements, and the environmental assessment provisions of NEPA. One measure of success of such an agreement is whether or not the facility that has entered into such an agreement is able to avoid a worst-case compliance scenario, or the enforcement of all applicable Federal and state laws at a particular area of contamination. If the conflicting and overlapping regulatory requirements applicable to a specific DOE facility are integrated into a single set of rules that are effectively implemented, the interagency agreement process has been a success in its application. As illustrated by the Rocky Mountain Arsenal example, when unresolved Federal and state jurisdictional disputes are allowed to continue at a Federal facility, litigious delay and unnecessary legal costs result.

The large size of many DOE facilities, the types and sources of contamination at these facilities, and inconsistent guidance from regulatory authorities combine to create unique challenges for ensuring compliance with environmental laws. Compounding this challenge is the

EPA policy that Federal facilities listed on the National Priorities List (CERCLA) cannot be deferred to RCRA authority. This stance subjects Federal facilities to the overlapping and frequently conflicting requirements of both statutes, unlike non-Federal facilities. The two laws have distinct substantive and procedural requirements that probably cannot entirely be overcome through negotiation of an interagency agreement.

Within the constraints of statutory authority, the SRS Federal Facility Agreement (FFA) has achieved an integration of RCRA and CERCLA cleanup programs. The SRS FFA demonstrates that the CERCLA Section 120 Interagency Agreement process can be utilized as a vehicle for achieving an efficient, comprehensive cleanup of large Federal facilities. However, as can be determined from an evaluation of the SRS FFA and the Hanford Tri-Party Agreement, the success of the interagency agreement process requires flexibility in interpretation of applicable environmental laws and regulations and requires some concessions from negotiating parties. The Hanford Tri-Party Agreement and the SRS FFA are examples that the negotiation of an interagency agreement must provide for differences in site-specific conditions and circumstances. For example, the governing mission of DOE facilities varies greatly (e.g., the SRS continues to be a significant DOE production facility while the mission of the Hanford Reservation is environmental restoration).

While the need to conduct NEPA environmental evaluations was not contained in the SRS FFA and only briefly acknowledged in the Action Plan of the Hanford Tri-Party Agreement, the DOE requirement for NEPA documentation has the potential for delaying the cleanup process for the weapons complex. This is because of limited technical staff

resources at DOE-Headquarters to review and approve the hundreds of NEPA environmental evaluations that will reach DOE-Headquarters following initial investigation of the contaminated waste sites.

Two regulatory issues that may test the effectiveness of the SRS FFA are (1) State jurisdiction of radionuclides in the groundwater beneath the SRS and (2) the need to renegotiate established cleanup commitments. Regulatory authority over DOE radionuclide groundwater contamination has not been resolved. In theory, the FFA provides a mechanism for all State environmental laws and conditions of settlement agreements entered into by DOE and South Carolina Department of Health and Environmental Control (SCDHEC) to be considered, eliminating the need for the State to find other regulatory vehicles for pursuing enforcement action. The compliance schedules contained in a court-ordered consent decree involving SRS may have to be adjusted to accommodate the national DOE environmental restoration prioritization system of the DOE Environmental Restoration Program. Results of DOE weapons complex-wide prioritization system may delay some of the lower priority consent decree mandated RCRA closures.

Recommendations

This study has proposed use of an interagency agreement to integrate overlapping and conflicting regulatory requirements into a comprehensive compliance strategy for large Federal facilities. One of the limitations of the current study is that it was only able to evaluate applicable regulatory requirements and the development of a procedure to integrate them. The effectiveness of interagency agreements to actually achieve an efficient cleanup program at DOE facilities is a topic for future study. Because the DOE Environmental Restoration Program will be implemented over a 30-year period, it

offers an excellent opportunity for study regarding the effectiveness of interagency agreements to resolve conflicting environmental issues and the ability to implement environmental policy. Many Federal facilities are currently in the process of negotiating interagency agreements with the EPA and/or host states. As these facilities are added to the NPL, many will be faced with the potential conflict of concurrent regulation by RCRA and CERCLA. Some of the issues that should be investigated include:

- How successful was the CERCLA interagency agreement process in resolving Federal and state jurisdictional issues regarding cleanup at DOE facilities?
- Was the dispute resolution process contained in interagency agreements successful in resolving disputes between DOE, EPA, and host states; or did Federal and state regulatory agencies utilize other regulatory mechanisms to ensure environmental compliance at DOE installations?
- As a result of the DOE environmental restoration prioritization process, did established cleanup schedules have to be renegotiated; and if so, did state and Federal agencies seek judicial relief?
- Were CERCLA Section 120 Interagency Agreements used as a vehicle to resolve jurisdictional issues involving radionuclides in the groundwater beneath DOE facilities?
- Did the need for NEPA documentation of remedial activities delay the cleanup schedule of individual DOE installations?

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