CHAPTER 6. RESOURCE COMMITMENTS

6.1 Introduction

Chapter 6.0 describes the unavoidable adverse impacts, short-term uses of environmental resources versus long-term productivity, and irreversible or irretrievable commitments of resources associated with safely managing spent nuclear fuel (SNF) at the Savannah River Site (SRS) for the period 1998 to 2035. This chapter also includes discussions about U.S. Department of Energy (DOE) waste minimization, pollution prevention, and energy conservation programs as they would relate to implementation of the proposed action.

6.2 Unavoidable Adverse Impacts

Implementing any of the alternatives considered in this environmental impact statement (EIS) for the management of SNF at SRS would result in minimal unavoidable adverse impacts to the human environment. Construction and operation of a Transfer and Storage Facility to implement the New Packaging Technology or the construction and operation of a Transfer, Storage, and Treatment Facility to implement the New Processing Technology would result in negligible adverse impacts to geologic resources, groundwater, traffic, and cultural resources as described in Chapter 4. All construction activities would occur within the boundary of a reactor or a chemical separations area in an already-developed industrial complex and would require approximately 15 acres.

Potential adverse impacts from construction could occur to surface water resources. However, as part of the required sediment and erosion control plan, storm water management and sediment control measures would minimize runoff from the construction site and potential discharges of silts, solids, and other contaminants to surface-water streams. There would be minimal adverse impacts to air resources from construction activities. Concentrations of pollutants emitted during construction activities would be at least an order of magnitude less than the South Carolina ambient air quality standards concentrations. Likewise, there would be minimal adverse impacts to the ecological resources of the area, primarily due to construction-related noises. Although noise levels would be relatively low outside the immediate area of construction, the combination of construction noise and human activity probably would displace small numbers of animals. These adverse impacts would be small, temporary (24 months or less), and localized. Construction would not disturb any threatened or endangered species, would not degrade any critical or sensitive habitat, and would not affect any jurisdictional wetlands.

Renovating an existing facility for the Transfer, Storage, and Treatment Facility could result in additional low-level waste generation, which could be considered a potential adverse impact. Renovation would require decontamination and removal of components and systems and subsequent construction inside a building, such a reactor building. Adverse impacts would include the generation of approximately 480 m^3 of low-level radioactive waste. This waste volume would have minimal impact on the Site's overall waste management capacity. Eventual decontamination and decommissioning (D&D) of any facility (either new and dedicated to SNF management or renovated to accommodate SNF management) used for the management of SNF would result in the generation of radioactive waste. Impacts of these D&D activities would be evaluated in subsequent National Environmental Policy Act (NEPA) actions.

Unavoidable construction worker radiation exposures would result from renovating an existing reactor facility to become the Transfer, Storage, and Treatment Facility. These occupational exposures (32 person-rem in a population of 54 construction workers) would be well below regulatory limits.

6.3 Relationship between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

The proposed locations for any new facility are all within developed industrial landscapes. Each of the proposed sites would encompass approximately 15 acres. The existing infrastructure (roads; power-, steam-, and waterlines; wastewater treatment facilities, etc.) within each of the areas is sufficient to support the proposed facilities.

Regardless of location, after the operational life of the project, DOE could decontaminate and decommission (D&D) the facility in accordance with applicable regulatory requirements and restore the area to a brown-field site that would be available for other industrial use. Appropriate NEPA reviews would be conducted prior to the initiation of any D&D action. In all likelihood, none of the sites would be restored to a natural terrestrial habitat.

The project-related uses of environmental resources for the duration of any of the proposed alternatives are characterized below.

- Over the life of the SNF management alternatives, groundwater would be used to meet sanitary and process water needs. After use and treatment, this water would be discharged into surface water streams. Depending on the site chosen and the technology implemented, over the short-term, the resulting increases in pollutant loadings would take advantage of the natural assimilative capacity of the receiving stream(s). However, these incremental pollutant loadings should not adversely affect either short- or long-term productivity of the aquatic ecosystem. These impacts would be assessed during the regulatory permitting process once an alternative has been selected.

- Regardless of location, air emissions associated with implementation of any of the technologies would add small amounts of radiological and nonradiological constituents to the air of the region. During the project's life, these emissions would result in an additional loading and exposure but would not impact SRS compliance with air quality or radiation exposure standards. There would be no significant residual environmental affects to long-term environmental productivity.

- The management and disposal of sanitary solid waste and non-recyclable radiological waste over the project's life would require energy and space at SRS treatment, storage, or disposal facilities (e.g., Three Rivers Sanitary Landfill, E-Area Vaults, Consolidated Incineration Facility). The land required to meet the solid waste needs would require a long-term commitment of terrestrial resources. Upon the facilities' closures, DOE could D&D them and restore them to brown field sites which could be available for future commercial or industrial development.

- Regardless of location, increased employment, expenditures, and tax revenues generated during the implementation of any of the alternatives would directly benefit the local, regional, and state economies over the short-term. Long-term economic productivity could be facilitated by local governments investing project-generated tax revenues into infrastructure and other required services.

6.4 Irreversible and Irretrievable Resource Commitments

Resources that would be irreversibly and irretrievably committed during the implementation of SNF management alternatives include those that cannot be recovered or recycled and those that are consumed or reduced to unrecoverable forms. The commitment of capital, energy, labor, and material during the implementation of SNF management alternatives would generally be irreversible.

Energy expended would be in the form of fuel for equipment and vehicles, electricity for facility operations, and human labor. Construction would generate nonrecyclable materials such as sanitary solid waste and construction debris. Operation of any proposed facility would generate nonrecyclable waste streams such as radiological and nonradiological solid wastes and some process wastewaters. However, certain materials (e.g., copper, stainless steel) used during construction and operation of the proposed facility could be recycled when the facility was D&Ded. Some construction materials, particularly from existing facilities (e.g., Receiving Basin for Offsite Fuel, L-Reactor Disassembly Area, F- and H-Separation Facilities) would not be salvageable due to radioactive contamination. Table 6-1 lists estimated requirements for concrete and steel for any new facility.

Table 6-2 lists the major materials that would be consumed as a result of process operations, primarily chemicals and other commercial products. Table 2-4 lists the corresponding management technologies that would use the facilities.

The implementation of the SNF management alternatives considered in this EIS, including the
EC No-Action Alternative, would require water, electricity, steam, and diesel fuel. Tables 4.1-15 through 4.1-18 list estimated amounts of these resources that would be consumed during the period of analysis; Section 4.1.1.5 describes the uses. Water would be obtained from onsite groundwater sources and steam from existing onsite sources. Electricity and diesel fuel would be purchased from commercial sources. These commodities are readily available and the amounts required would not have an appreciable impact on available supplies or capacities. From a materials and energy resource commitment perspective, Conventional Processing and the Electrometallurgical Treatment Technology option EC
would recover low enriched uranium, which is useable as commercial reactor fuel. None of the other alternatives would recover this resource.

6.5 Waste Minimization, Pollution Prevention, and Energy Conservation

6.5.1 WASTE MINIMIZATION AND POLLUTION PREVENTION

DOE has implemented an aggressive waste minimization and pollution prevention program at SRS at the sitewide level and for individual organizations and projects. As a result, significant reductions have been achieved in the amounts of wastes discharged into the environment and sent to landfills, resulting in significant cost savings.

To implement a waste minimization and pollution prevention program at the SNF management facilities, DOE would characterize waste streams and identify opportunities for reducing or eliminating them. Emphasis would be placed on minimizing the largest waste stream, low-level waste, through source reduction and recycling. Selected waste minimization practices could include:

- Process design changes to eliminate the potential for spills and to minimize contamination areas L1-5
- Decontamination of equipment to facilitate reuse
- Recycling metals and other usable materials, especially during the construction phase of the project
- Preventive maintenance to extend process equipment life
- Modular equipment designs to isolate potential failure elements to avoid changing out entire units.

Table 6-1. Estimated requirements for concrete and steel for stand-alone facilities.

Facility	Concrete (cubic yards)[a]	Steel (tons)[b]
Transfer and Storage Facility (including dry storage vaults)	11,000	600
Transfer, Storage, and Treatment Facility (construction of new facility)	20,000	1,800

a. To convert cubic yards to cubic meters, multiply by 0.764.
b. To convert tons to metric tons, multiply by 0.907.

Table 6-2. Major chemicals and other materials required for spent nuclear fuel management facilities.

Facility	Major material requirements (operation)
Receiving Basin for Offsite Fuel	Water treatment filters, deionizer resins
L-Reactor Disassembly Basin	Water treatment filters, deionizer resins
F or H Canyon	Nitric acid, gelatin, tributyl phosphate, n-paraffin, depleted uranium
Transfer and Storage Facility	Nuclear poison, helium, neutron absorbers, stainless steel (canisters), water treatment filters and deionizer resins (if receipt basin is used)
Melt and Dilute Treatment Facility	Depleted uranium, neutron poison, helium, stainless steel (canisters), glass formers (glass or ceramic frit, silicon dioxide)
Mechanical Dilution Treatment Facility	Depleted uranium, nuclear poison (e.g., borated steel), helium, stainless steel (canisters)
Vitrification Facility	Depleted uranium, glass or ceramic formers (e.g., silicon oxide), stainless steel (canisters), offgas treatment materials (filters, chemicals)
• Dissolve and Vitrify	• Nitric acid, boric acid
• Glass Material Oxidation and Dissolution System	• Boron oxide, lead dioxide (mostly reused in the process), carbon
• Plasma Arc	• Offgas treatment materials (filters, chemicals)
Electrometallurgical Treatment Facility	Depleted uranium; glass; silicon; lithium fluoride, potassium fluoride, and uranium fluoride electrolytes; aluminosilicate filters; waste separation materials (ion exchange media or chemical reduction/oxide precipitation chemicals)

L1-5
- Use of non-toxic or less toxic materials to prevent pollution and minimize hazardous and mixed waste streams

During construction, DOE would implement actions to control surface water runoff and construction debris and to prevent infiltration of contaminants into groundwater. The construction contractor would be selected, in part, based on prior pollution prevention practices.

6.5.2 ENERGY CONSERVATION

SRS has an active energy conservation and management program. Since the mid-1990s more than 40 onsite administrative buildings have undergone energy efficiency upgrades. Representative actions include the installation of energy-efficient light fixtures, the use of occupancy sensors in rooms, use of diode light sticks in exit signs, and the installation of insulating blankets around hot water heaters. Regardless of location, the incorporation of these types of energy-efficient technologies into facility de-sign, along with the implementation of process efficiencies and waste minimization concepts, would facilitate energy conservation by any of the SNF management alternatives.

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