DOE/EA-1062

**ENVIRONMENTAL ASSESSMENT
FOR THE
INDEPENDENT WASTE HANDLING
FACILITY, 211-F
AT THE
SAVANNAH RIVER SITE**

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**UNITED STATES DEPARTMENT OF ENERGY
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SAVANNAH RIVER SITE**

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1.0 INTRODUCTION

This Environmental Assessment (EA) has been prepared by the U.S. Department of Energy (DOE) to assess the potential environmental impacts associated with the modification of the Outside Facilities (211-F complex) to allow it to operate independently from the 221-F Canyon Facility. The 211-F complex depends on the 221-F Canyon for some of its processing needs for liquid waste.

2.0 PURPOSE AND NEED FOR ACTION

Currently, liquid Low Activity Waste (LAW) and liquid High Activity Waste (HAW) are generated from various process operational facilities/processes throughout the Savannah River Site (SRS) as depicted on Figure 2-1. Prior to storage in the F-Area tank farm, these wastes are neutralized and concentrated to minimize their volume.

The Waste Handling Facility (211-3F) at Building 211-F Complex (see Figure 2-2) is the only existing facility onsite equipped to receive acidic HAW for neutralization and volume reduction processing. Currently, Building 221-F Canyon (see Figure 2-2) houses the neutralization and evaporation facilities for HAW volume reduction and provides support services such as electric power and plant, process, and instrument air, waste transfer capabilities, etc., for 211-F operations. The future plan is to deactivate the 221-F building. DOE's purpose is to be able to process the LAW/HAW that will continue to be generated on site. DOE needs to establish an alternative liquid waste receipt and treatment capability to support site facilities with a continuing mission. The desire is for Building 211-F to provide the receipt and neutralization functions for LAW and HAW independent of 221-F Canyon.

The neutralization capability is required to be part of the Nuclear Materials Stabilization Programs (NMSP) facilities since the liquid waste generated by the various site facilities is acidic. In order for Waste Management to receive the waste streams, the solutions must be neutralized to meet Waste Management's acceptance criteria. The Waste Management system is caustic in nature to prevent corrosion and the subsequent potential failure of tanks and associated piping and hardware. Although, currently, the 211-F facility also provides volume reduction capability (211-F Canyon Lab Evaporator for HAW; 211-F General Purpose Evaporators for LAW) prior to sending the waste to the Tank Farm at the completion of the project, the continued reduction of waste solutions will cease. Waste Management's new Replacement High-Level Waste Evaporator (RHLWE) will be sufficient in capacity to receive 211-F's waste stream without reduction.

Because of the potential for large amounts of rain water to be collected in dikes and dams around F-Area, or in the event Waste Management has a capacity problem and can not receive the additional waste stream, the 211-F evaporator will be put into cold standby for this purpose rather than be decommissioned/decontaminated. It will serve as an emergency backup only if needed. The HAW evaporator, however, will be removed from service in total.

3.0 BACKGROUND

The F-Area Outside Facilities (OF-F) are located mainly in the area immediately to the east of 221-F Canyon. Although not enclosed, the area is referred to as the Building 211-F complex, or simply Building 211-F. It provides general support, principally to the separations processes in the 221-F Canyon.

The OF-F hosts a wide variety of processes, utilities, and services that are ancillary to the primary 200-F Area operations. These include chemical storage facilities, water handling facilities, segregated solvent facilities, and cold feed preparation facilities. In addition to the principal process functions noted above, there are a number of auxiliary structures, tanks, sumps, and ventilation systems in the 211-F complex.

The waste handling facility (211-3F) serves as the central location for the collection of Low-Level Waste (LLW) and is the only existing facility onsite equipped to receive, process, and then transfer the LLW to the tank farm for further processing/storage. Two types of low-level liquid waste, generated at various SRS facilities (see Table 3-1), are received at 211-3F facility. HAW and LAW are characterized on the bases of the level of radioactivity present. Both of these low-level wastes are processed for volume reduction and neutralization before they are sent to the tank farm for storage.

Table 3-1. Waste Generating Sources

Site Waste Generator	Volume, gallons/year (Maximum) LAW	Volume, gallons/year (Maximum) HAW
SRTC	126,000	55,000
Reactors	180,000	0
772-F & 772-1F (All 772-F & 772-1F waste is processed through the 221-F HAW evaporator. Therefore all waste is shown in the HAW column)	0*	260,000*
211-F sumps, tank dikes & overflows	670,000	0
E-Area Lysimeters	40,000	0
DWPF, Miscellaneous sources	5,000	0
Totals	1,021,000	315,000

*(Analytical Labs classifies waste as 160,000 LAW and 100,000 HAW)

Table taken from Functional Design Criteria M-FDC-F-00025

The 211-F receives waste from multiple sources, including Analytical Labs (772-F and 772-1F), Savannah River Technology Center (SRTC), Reactors, E-Area and Defense Waste Processing Facility (DWPF) (see Figure 2-1). The waste is transported via trucking or by underground piping. The 211-F waste handling facility provides a place where the LLW can be unloaded at 211-3F (see Figure 2-2) and placed into temporary holding tanks. The HAW is stored in the below grade tank vault while the LAW is held in a series of above ground tanks. The vault is ventilated to remove objectionable gases and the removed air is filtered through a High Efficiency Particulate Air (HEPA) filter system which is nearly forty years old. Upgrading the ventilation system is needed to assure continued safe operation. The LAW is neutralized and concentrated in the General Purpose (GP) evaporator located within the 211-F complex. The HAW is neutralized and concentrated in the lab waste evaporator located inside the 221-F Canyon. The overheads are sent to the Effluent Treatment Facility (ETF) and the concentrates are transferred to 241-F Tank Farm for storage and further processing for both the LAW and HAW.

The 776-A Liquid Waste Handling Facility plays a major role in the SRTC mission. Programs served by the SRTC laboratories and the associated liquid waste handling facility include, but are not limited to, the DWPF, ETF, F- and H-Area B-Lines, environmental

Figure 2-1. Location of the 211-F Complex and Building 776-6A, and the on-site routes that would be used in the transportation of materials to the subject facilities at the Savannah River Site, South Carolina.

Figure 2-2. Location of 221-F Canyon, 211-3F, and 211-F Complex in F-Area

FIGURE 3-1. Location of 776-6A Waste Unloading Facility at SRTC

restoration, and the future Health Physics and Environmental Monitoring laboratories in B-Area. The 776-A complex receives LAW and HAW from laboratories in SRTC and collects it for interim storage and characterization. Once it is characterized, the waste is transported from 776-6A (see Figure 3-1) via trailer to 211-3F unloading facility for processing in the 211-F waste handling facility.

In addition, most of the existing Structures, Systems and Components (SSC) for both the Building 776-6A Loading Facility and the Building 211-3F Unloading Facility are nearly 40 years old and are in need of upgrades to extend the design life of the facilities and to provide for improved personnel safety and to maintain radiation exposure As Low As Reasonable Achievable (ALARA).

Building 211-3F has two unloading bays, one for LAW and one for HAW. Currently, the entire east side of the building is open to the atmosphere. Thus it provides little protection to the environment in the event of a spill of the radioactive liquid and, since there is no ventilation system, filtration of the building air is not possible.

Building 776-6A has two loading bays, one for the LAW and one for the HAW. Although this building is enclosed, ventilation is through a substandard HEPA filtration system which is over 20 years old and in need of upgrade.

The largest potential for contamination of the environment lies with the loading/unloading of the HAW in Buildings 776-6A and 211-3F. The HAW transfer trailer, which weighs about 90,700 kg (200,000 lb), must be backed into the bays and positioned under the loading/unloading platform within the reach of the flexible transfer and vent hoses. The Building 211-3F HAW bay is about four inches wider than the wheels on the HAW trailer and requires great driving skill to back the trailer into the required position. Also, with the trailer in position in Building 776-6A, there is insufficient clearance for personnel access to the manually actuated transfer valves.

There is no provision for containing full trailer spills within Buildings 776-6A and 211-3F. The loading/unloading vent hoses are connected to the trailers with the waste transferred utilizing a steam jet. The trailers are disconnected following a period of air blows to ensure that draining of most of the liquid from the hoses is accomplished. Contamination of the trailers from the connecting/disconnecting procedure is common and decontamination times range from one shift to one week.

4.0 PROPOSED ACTION AND ALTERNATIVES

4.1 Proposed Action

The proposed action is to modify the 211-F complex by upgrading the facility in such a manner that it operates independently of the 221-F Canyon facility and no longer requires Canyon support for utilities or processing.

The modifications would include the following:

211-F, OF-F:

- Waste Unloading Facility (211-3F) - a truck bay that receives the Site's liquid wastes and transfers it to the temporary holding tanks within 211-F will be refurbished (enclosing the building and removing the shield wall) and upgraded with a ventilation system, a new unloading drip-free quick disconnect fittings, and a stainless steel lining to the containment basin for ease of spill cleanup, etc.

- **Underground Tank Vault Ventilation** - existing separate exhaust system with HEPA filters located north of 211-3F and used to ventilate the vault cells, will be refurbished/replaced.
- **General Purpose Evaporator System** - Because of the potential for heavy accumulations of rainwater in dikes and dams of F-Area, a bypass will be installed so that the tanks in this system can be utilized for storage. Their normal operation would be in a standby mode.
- **Water Handling System** - existing equipment which will be modified to provide maintenance and cleaning water for waste handling equipment.
- **Control Room (211-1F)** - monitors and controls the 211-F processes and will be the location for new control, alarm, and monitoring equipment from 221-F.
- **Chemical Cold Feed Storage Tanks** - receives bulk liquid chemical shipments for use in the canyon processes and will be modified to allow transfer of caustic for the new HAW neutralization process system.
- **Utilities** - electrical power, plant/instrument air supply, and process air supply will be de-coupled from F-Canyon and will be provided by a source independent of F-Canyon.
- **HAW Neutralization System** - a new system will be installed for neutralizing HAW stored in tanks located in a new below-grade vault or in overstrong, below-grade tankage.
- **Canyon Lab Waste Evaporator Piping** - will be reconfigured so that Operations will have an option to use either the existing Canyon Lab Waste Evaporator or the new HAW neutralization system. Only neutralization in the new HAW neutralization system will be utilized after project completion.

SRTC

- **Waste Loading Facility, 776-6A** - modifications include ventilation upgrades, Dismantling and Removal (D&R) activities, improved decontamination and containment (lining containment basin with stainless steel), upgraded video monitoring equipment, and changes to the loading platform, piping, and drip-free quick disconnect hose connections.

Studies performed by Waste Management, SRTC, Engineering and Construction Services Division (E&CSD) Systems Engineering and Nuclear Material Stabilization Programs Division (NMSPD) personnel indicated that the most cost effective and lowest technical risk option for handling of the site's HAW and LAW would be to implement necessary upgrades to continue the liquid waste handling operations at the 211-F facility (WSRC, 1994a) independent of the Canyon support. The objective of this proposed action is to provide these upgrades.

This approach utilizes installed waste management evaporator capacity and effectively treats forecast HAW/LAW volumes. Utilization of the 211-F operation will effectively ensure management of potentially increased wastes generated by Separations and Reactors D&D programs without the need for costly new facilities. This approach effectively addresses the following key issues:

- The site will continue to generate high and low activity radioactive liquid wastes currently being treated at the 211-F Area.
- The deactivation plans for building 221-F (to achieve standby status by the year 2000) will affect the 211-F area waste handling operations.

There are four key requirements that the proposed action shall fulfill:

1. The 211-F waste handling operations shall be modified to operate independently of the F-Canyon processes and services.
2. All upgrades to the facility shall be made so that the operating life of the facility is extended for a minimum of 25 years with normal preventive maintenance.
3. Provides neutralization capability for LAW and HAW waste streams in order to meet Waste Management's Waste Acceptance Criteria.
4. Upgrades shall be provided to the waste handling operations to improve safety and to increase its operational effectiveness with rigorous implementation of ALARA concepts.

The proposed action will not change the methods of operation of the waste unloading operation, however, it will provide an environmentally favorable unloading building and replacement of the ventilation system for the HAW storage tank containment.

The proposed action will not alter the evaporation process significantly, however, it will provide some remotely operated controls. In addition, the obsolete motor control equipment, which services the evaporation system, will be replaced with modern equipment.

The F-Area Outside Facilities (OF-F) is presently supplied with electricity for operation from Electrical Control Rooms located throughout F-Canyon. The proposed action will provide a new electrical transformer station to provide electricity for OF-F, independent of the Canyon sources. The estimated cost of the proposed action is \$15.3 million Total Project Cost (TPC).

4.2 Alternatives to the Proposed Action

The SRS currently processes HAW and LAW liquid radioactive waste generated in SRTC, reactors, and 772-F in the 221-F Canyon and the 211-F Outside facilities. The waste is received, concentrated, and neutralized and subsequently transferred to the F-Area Waste Tank Farm. With the current mission guidance to de-inventory and phase out the F-Canyon, as well as the 211-F processing operation, it is essential that replacement or modified processes be provided to handle the various SRS waste streams.

In accordance with NEPA regulations, DOE examined the following alternatives to the proposed action:

- No action, continue to process existing HAW and LAW in 221-F and 211-F until they are de-activated
- Solidification of Waste
- Replacement "Greenfield" Facility for 211-F

- Upgrade HDB8 Facility

4.2.1 No Action, Continue to Process Existing HAW/LAW in 221-F/211-F Until They are Deactivated

One alternative to the proposed action is to take no action. This would consist of SRS continuing to truck HAW/LAW to the existing F-Area facilities for processing until they are deactivated. Waste will continue to be generated and will require processing; therefore, it would be necessary for each facility to provide treatment and storage for their own waste. The facilities are not equipped to treat their own waste nor do they have the capacity to store the waste for an extended period. This would require additional tanks or processing facilities to be constructed to handle the waste. This is not a reasonable alternative due to the high cost of new treatment facilities and storage tanks.

4.2.2 Solidification of Waste

This option is based on the 1991 SRTC proposed design of a facility capable of processing liquid radioactive waste into a disposable solidified form. The initial study was proposed for only SRTC where the existing SRTC liquid waste collection facilities would be used as much as feasible, but would require a new facility to process the LAW and HAW liquid wastes. Similar facilities would have to be developed and constructed at the other waste generating sites such as 772-F lab.

The intent of this option would be to store the solidified waste in a Hazardous Waste, Mixed Waste (HWMW) vault, a new facility that has not been designed/constructed. The thrust of this project would be to eliminate the trucking of liquid waste across the site.

The technical basis of this alternative is to retrieve the radioactive and hazardous constituents from the liquid waste on a series of resin bed columns. The intent would be to have the waste stream pass through a series of these ion exchange columns which individually would be designed to remove heavy metals such as Mercury or Cobalt-60; remove organics such as Benzene; and to chelate elements such as: Uranium, Plutonium, Americium, Cesium, Lead and Chromium.

Several auxiliary systems would be required to service the main process. Additional Research and Development (R&D) would be needed to develop some of the processes. These additional systems include a Sodium Nitrate Wash System, Nitric Acid Eluting System, Adjustment System, a Bacteria Control System, a Grouting and Drumming Facility, various tanks and evaporators, filters, etc.

This is not a reasonable alternative because this would not totally eliminate trucking; for example, waste would still be trucked from reactors. There would be a long lead time of design and construction of the facility and the permitting could be burdensome due to high level treatment facility being constructed adjacent to the site boundaries. The cost of this project is estimated to be \$110 million TPC.

4.2.3 Replacement "Greenfield" Facility for 211-F

This option was evaluated to determine the impact of designing a state-of-the-art facility which will meet all the latest design standards. This facility would be a direct replacement for the existing 211-F facility following the conclusion of the de-inventory efforts of the 211-F and 221-F Facilities.

This facility would be located in F-Area south of the 221-F Canyon. It would consist of an unloading station, a "Hot" Cell with remote handling equipment and overhead crane for equipment removal through an airlock, HAW and LAW Evaporator Systems, HAW piping connections from the 772-F Analytical Lab, Chemical Storage Areas, associated holding/processing tanks, etc. It would also require an upgrade to the SRTC truck loading area to ensure compliance to DOE Orders.

Although this alternative provides improved environmental protection and an independent facility, thus eliminating the need for the 221-F/211-F facilities, the problem of trucking HAW across the site would still exist, and there would be long lead time for design and construction of the facility. The cost of the facility is estimated to be \$112 million TPC.

4.2.4 Upgrade HDB8 Facility

H-Area Diversion Box #8 (HDB8) is an existing facility under Waste Management's jurisdiction. It is part of the 241-100H Waste Transfer Facility located southwest of the H-Canyon and adjacent to Road "E". HDB8 is a diversion box with associated pumps used to transfer recycled waste between DWPF and the H-Area Tank Farm, wash water and Purex sludge between the F and H-Area Waste Tanks, and to transfer reconstituted salt, high heat waste, Purex sludge and recycled waste within the H-Area. It is the lowest part of the pipeline system; all connecting lines, except DWPF recycle waste line, drain to it.

The upgrades to this facility would include the addition of new storage and neutralization tanks, LAW and HAW evaporator systems, a new "hot" cell with remote handling equipment and overhead crane for equipment removal through an airlock, chemical storage areas, and upgrade of the unloading dock. This alternative would also require an upgrade to the SRTC truck loading area to ensure its compliance to DOE Orders, as well as to add a new loading facility at the 772-F Lab for transfer of its waste to a tanker truck for shipment to HDB8.

This option would improve environmental protection, eliminate the need for 221-F/211-F, consolidate waste collection, and not require any new transfer lines. However, the need for trucking of HAW would increase since 772-F does not have transfer lines to this facility and would also have to build a new loading area. Locating and constructing a facility in the HDB8 area is a major concern of practicality since the area surrounding the HDB8 is already very congested. The estimated cost of this project would be \$100 million TPC.

5.0 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

The SRS occupies an area of approximately 800 km² (300 mi²) in southwestern South Carolina (Figure 1-1). The site borders the Savannah River for about 27 km (17 mi) near Augusta, Georgia, and Aiken and Barnwell, South Carolina. SRS contains five nuclear production reactor areas, two chemical separations areas, waste processing, storage and disposal facilities, and various supporting facilities. The different facilities generating the waste to be processed by the separations facility are located at various locations around the site. The Final Supplemental Environmental Impact Statement for the Defense Waste Processing Facility (DOE, 1994a) and the most recent socioeconomic survey of the six-county SRS area of influence (NUS, 1992) contain additional information on SRS areas and facilities and the areas surrounding the SRS.

The primary consequence between continuing to use the 221-F Canyon and the 211-F facilities to process the LAW/HAW (no-action) and the proposed action is that the site's mission has changed and the need for the 221-F building is being eliminated. The processing requirements of the 221-F building can be accomplished on a much smaller scale which would also reduce the cost of maintenance.

5.1 Construction

The renovation or construction of 211-F liquid waste handling and 776-6F liquid waste loading stations will generate hazardous, radioactive, and mixed wastes to be disposed of onsite/offsite. Any airborne releases to the environment will be curtailed by the use of plastic huts and HEPA filtration systems, as appropriate.

All solid waste generated by the construction and operation of this facility shall be handled and disposed of in accordance with Westinghouse Savannah River Company (WSRC, 1994d) 1S Manual, SRS Waste Acceptance Criteria, and WSRC 3Q Manual, Environmental Compliance. Construction wastes will include approximately 380 m³ (500 yd³) of potentially contaminated soil that will be sent to the burial ground and approximately 1760 m³ (2300 yd³) of non-contaminated soil that can be used as backfill or sent to other landfill sites. Other wastes include removed cement-asbestos board siding and roofing, and a small amount of contaminated lead pellet and/or lead lining from the existing pipe encasement (a mixed waste, i.e., both hazardous and radioactive). Any waste not meeting WSRC 1S and WSRC 3Q criteria shall require pretreatment or treatment to achieve compliance for onsite disposal.

Radioactive and mixed waste shall be managed in accordance with DOE Order 5820.2A. Excess chemicals and unused raw material shall be managed in accordance with WSRC 3Q, Environmental Compliance Manual (ECM) 6.13, Rev. 0. Minimization and control of radioactive liquid wastes, control of radioactive drains and airborne radioactivity shall be in accordance with 5Q Manual, Chapter 4, Part 5, Revision 1.

Asbestos and material containing asbestos shall be removed in accordance with 40 CFR 763, South Carolina Department of Health and Environmental Control (SCDHEC) R.61-86-1 and WSRC 1S Manual. Any hazardous waste storage areas (for staging of contaminated lead solids) shall be satellite or 90 day storage areas and shall meet the requirements of WSRC 3Q Manual, Section ECM 6.9 or Section ECM 6.14, and South Carolina Hazardous Waste Management Regulations (SCHWMR) R.61-79.262.34.

The project shall ensure that all packaging and transportation requirements comply with WSRC 19Q, Transportation Safety Manual, dated 9/30/93.

5.2 Operations

The F-Area waste handling facilities are used for storage and transfer of high and low activity wastes primarily from the Metallurgical Building 235-F, the SRTC Waste Concentration Building 776-A, the Production Control Facilities - Building 772-F, and 100-Area sources (Dupont, 1986).

The F-Area waste handling facilities are located within the 211-F complex. The Independent Waste Handling Facility will not contribute additional waste over that presently generated by the current operations. Protection of the environment during operation will be assured because:

- The GP Evaporators/Lab Waste Evaporator will continue to be operated in accordance with written approved procedures which are proven to be environmentally favorable.
- The Waste Unloading facilities shall be improved to mitigate the release to the environment of any unfiltered gaseous or liquid effluent.
- No new waste disposal hazards are expected to be created by the proposed upgrades in this proposed action.
- Proposed modifications shall be in accordance with the SRS Lead Management Policy to minimize the creation of radioactive lead waste.

The environmental consequences of the waste handling facilities would be encompassed by the Outside Facility Operations scenario.

The primary purpose of the F-Area Outside Facilities is to provide bulk quantities of chemicals, some of which are hazardous, to other facilities in F-Area. Although they were not specifically designed to withstand severe external or natural phenomena events, DOE anticipates that the design of the facilities would limit potential consequences of accidents initiated by such events. Although most materials stored in the F-Area Outside Facilities are nonradioactive, some chemicals received from facilities such as the F-Area Canyon contain small amounts of radioactive material. The Outside Facilities are operational and continue to provide support to other facilities in F-Area, as needed. Table 5-1 (DOE, 1994b) summarizes the potential consequences associated with postulated radiological accidents for these facilities. Table 5-2 (DOE, 1994b) summarizes the risk of latent fatal cancers associated with the radiological accidents postulated for these facilities. Information generated from accident scenarios postulated for the F-Area Outside Facilities identify fatalities to involved workers, as a result of radiation exposure, would be unlikely. DOE anticipates that doses received from the accidents listed in Table 5-1 would be minimal. Although the likelihood for an involved worker fatality due to radiation exposure after a severe earthquake would be minimal, the earthquake itself could inflict significant injuries, including death, on involved workers. For example, involved workers could be injured from flying debris caused by the earthquake. For a tornado-initiated release, no worker injuries or exposures to workers resulting from material released due to the tornado, or injuries from the tornado itself, are likely. DOE bases this conclusion on the condition that workers would receive proper notification of severe weather conditions in the SRS area in accordance with emergency plans (WSRC, 1994c). This would enable workers to take the necessary precautions, such as placing the facility in a safe shutdown condition and taking shelter until the weather passed.

Although not a direct cause of the accident scenarios postulated for the F-Area Outside Facilities, DOE anticipates that workers would incur doses as a result of performing cleanup activities after a postulated accident. However, doses to individuals would be maintained within the exposure limits established for worker exposures from routine operations (DOE, 1994b).

The operation of the 776-6A loading station would not be changed from its current operating parameters. The addition of the stainless steel liner in the containment basins would, however, make it more environmentally safe in that, any spills would be contained and the potential for the ground or the concrete basin to become contaminated would be minimized.

Table 5-1. Postulated Radiological Events and Accidents for Full Operations at the F-Area Outside Facilities

Accident	Curies Released	Frequency (Per Year)	Uninvolved Worker ^a dose (rem)	MEI ^b dose (rem)	Offsite Population dose (person-rem)
Bounding Radiological Accidents					
1. Volatilization of ruthenium in the acid recovery system	2.78×10^{-1}	1.75×10^{-2}	4.41×10^{-3}	1.92×10^{-4}	1.17
2. Fire in vessels containing recovered segregated plutonium isotopes	9.19×10^{-5}	1.75×10^{-3}	1.97×10^{-4}	9.07×10^{-6}	5.34×10^{-2}
Additional Radiological Accidents Analyzed					
3. Transfer error of materials to the general-purpose evaporators	3.56×10^{-4c}	1.75×10^{-2}	1.83×10^{-5}	8.26×10^{-7}	4.92×10^{-3}
4. Overconcentration of solution in the acid recovery system	3.76×10^{-5}	1.75×10^{-2}	5.58×10^{-7}	2.43×10^{-8}	1.48×10^{-4}
5. External impact (i.e., truck collision) into vessels containing segregated uranium isotopes ^c	5.44×10^{-3c}	3.00×10^{-3}	1.23×10^{-5}	5.77×10^{-7}	3.57×10^{-3}
6. Inadvertent siphoning of concentrated solutions from the general-purpose evaporators	9.16×10^{-5c}	2.63×10^{-3}	4.70×10^{-6}	2.11×10^{-7}	1.26×10^{-6}
7. Severe earthquake ^d	1.48×10^1	2.00×10^{-4}	6.81×10^{-5}	4.62×10^{-5}	5.52×10^{-1}

a. The uninvolved worker is 640 meters (2,100 feet) from the release.

b. MEI = Maximally Exposed Offsite Individual.

c. The "curies released" values represent the maximum expected release for this type event, i.e., transfer errors, overflows, earthquake. When the initiating event frequency and these maximum releases are used to project risk, the risk value is often higher.

d. This accident involves both an airborne and liquid discharge to the environment that are not mitigated by sumps or containments. The doses presented for the MEI and offsite population consist of airborne exposures and exposures received from contaminated drinking water supplies. Because worker exposure to drinking water supplies at the Site can be restricted, the doses presented for uninvolved workers consist only of airborne exposures.

Table 5-2. Increased Risk of Latent Fatal Cancers from the Radiological Events and Accidents Postulated for Full Operations at the F-Outside Facilities

Accident	Initiating Event Frequency (per year)	Point estimate of increased risk of (latent fatal cancers/year) Offsite Population			
		Uninvolved Worker	MEI ^b	Latent Fatal Cancers (per year)	Latent Fatal Cancers
Bounding Radiological Accidents					
1. Volatilization of ruthenium in the acid recovery system	1.75x10 ⁻²	3.09x10 ⁻⁸	1.02x10 ⁻⁸	1.02x10 ⁻⁵	(5.85x10 ⁻⁴) ^c
2. Fire in vessels containing recovered segregated plutonium isotopes	1.75x10 ⁻³	1.38x10 ⁻¹⁰	7.94x10 ⁻¹²	4.67x10 ⁻⁸	(2.67x10 ⁻⁵) ^c
Additional Radiological Accidents Analyzed					
3. Transfer error of materials to the general-purpose evaporators	1.75x10 ⁻²	1.28x10 ⁻¹⁰	7.23x10 ⁻¹²	4.31x10 ⁻⁸	(2.46x10 ⁻⁶) ^c
4. Overconcentration of solution in the acid recovery system	1.75x10 ⁻²	3.91x10 ⁻¹²	2.13x10 ⁻¹³	1.30x10 ⁻⁹	(7.40x10 ⁻⁸) ^c
5. External impact (i.e., truck collision) into vessels containing segregated isotopes	3.00x10 ⁻³	1.48x10 ⁻¹¹	8.65x10 ⁻¹³	5.36x10 ⁻⁹	(1.79x10 ⁻⁶) ^c
6. Inadvertent siphoning of concentrated solutions from the general-purpose evaporators	2.63x10 ⁻³	4.94x10 ⁻¹²	2.77x10 ⁻¹³	1.66x10 ⁻⁹	(6.30x10 ⁻⁷) ^c
7. Severe earthquake	2.00x10 ⁻⁴	5.45x10 ⁻¹²	4.62x10 ⁻¹²	5.52x10 ⁻⁸	(2.76x10 ⁻⁴) ^c

- a. The point estimate of risk of latent fatal cancers per year is calculated by multiplying the accident consequences (i.e., dose) in Table 2 for each accident by the estimated frequency of the initiating event and the appropriate conversion factor defined by 10 CFR Part 20. For the uninvolved worker, the conversion factor equals 4.0×10^{-4} cancer per rem. For the public, the conversion factor equals 5.0×10^{-4} cancer per rem (for individuals) or 5.0×10^{-4} cancer per person-rem for populations.
- b. MEI = Maximally Exposed Offsite Individual.
- c. The total number of latent fatal cancers projected in the population from the accident if it occurred. These numbers are calculated by multiplying the accident consequences (i.e., dose) by the appropriate conversion factor (10 CFR Part 20).

5.3 Transportation Impacts

The transportation of the waste from SRTC 776-6A to 211-3F is a previously ongoing process that would not be altered by this proposed action. The probability of release of radionuclides during transport by trailer from 776-6A to 211-3F has been calculated as 3×10^{-9} for high-level wastes and 3.9×10^{-5} for low-level wastes (WSRC, 1992). These probabilities are sufficiently low and do not pose any great risk to the public or on-site worker.

5.4 Cumulative Impacts

The process phase of the proposed action would not change from the current operation. The construction phase, however, would generate waste to include potentially contaminated soil from excavation, removed cement-asbestos board siding and roofing, and a small amount of contaminated lead pellet and/or lead lining from the existing pipe encasement (a mixed waste, i.e., both hazardous and radioactive). The soil, 380 m^3 (500 yd^3), composed of mixed waste soils, pieces of concrete, low-activity waste and suspect soils is less than 0.7 percent of the total soil waste over the next 30 years (WSRC, 1994b). The remaining 1760 m^3 (2300 yd^3) can go for beneficial reuse (i.e., roads, backfill, etc.). The asbestos would be less than 12 m (40 ft) and would be placed in the Jasper County, South Carolina landfill. Radioactive and mixed waste shall be managed in accordance with DOE Order 5820.2A.

5.5 Other Impacts

5.5.1 Safeguards and Security

All additional safeguard and security measures required by the applicable DOE orders would be provided for the onsite facilities and transportation activities.

5.5.2 Emergency Planning

DOE has developed a series of emergency response plans with the cooperation of state county agencies to comply with DOE Order 5500 series emergency preparedness orders to respond to any onsite incidents at SRS.

6.0 REGULATORY AND PERMITTING PROVISION CONSIDERATIONS

DOE policy is to carry out its operations in compliance with all applicable federal, state, and local laws and regulations, as well as all DOE Orders. This section provides a discussion of the major regulatory permit programs that might be applicable to the proposed action.

6.1 National Environmental Policy Act of 1969, as Amended (42 USC 4321 et seq.)

This EA has been prepared in compliance with the NEPA of 1969, as amended, and the requirements of the Council of Environmental Quality Regulations for Implementing NEPA (40 CFR Parts 1500-1508), and DOE Regulations (10 CFR Part 1021), and DOE Order 5440.1E. NEPA, as amended, requires "all agencies of the Federal Government" to prepare a detailed statement on the potential environment effects of proposed "major Federal actions significantly affecting the quality of the human environment." This EA has been written to comply with NEPA and to assess the significance of the environmental

effects of making 211-F an independent facility from 221-F and the transportation impacts associated with transporting waste from 776-6A to the 211-F facility for processing.

6.2 Asbestos Regulations

The construction workers and any associated personnel dealing with any asbestos must be certified to the South Carolina Department of Health and Environmental Control (SCDHEC) Standard of Performance for Asbestos Abatement Operations 61-86.1 and Federal regulations Environmental Protection Agency (EPA) 40 CFR 61 Subpart M. If more than 80 m (260 linear ft) or 15 m² (160 ft²) of asbestos containing material are removed, a National Emission Standards for Hazardous Air Pollutants (NESHAP) asbestos permit must be obtained.

6.3 Clean Air Regulations

Airborne emissions of radionuclides from the facility will meet ALARA principles as defined in the WSRC 5Q, Radiological Control Manual. Normal operations within the facility will not cause an offsite exposure which violates the requirements of the 5Q Manual or DOE Order 5400.5, Radiation Protection of the Public and the Environment and the requirements of the Clean Air Act and amendments of 1990.

6.4 Codes of Federal Regulations (CFR)

29 CFR Part 1910, Occupational Safety and Health Standards
29 CFR 1910.95
29 CFR, Part 1910.134
29 CFR 1910.179
29 CFR 1910, Subpart H
29 CFR 1910.10001
29 CFR 1926.58
40 CFR 61 National Emissions Standards for Radionuclide Emissions From Department of Energy Facilities, 1989
40 CFR 763 Asbestos

6.5 DOE Orders

DOE Order 5400.1 General Environmental Protection Program Requirements Chg.1 (6/29/90)
DOE Order 5400.5 Radiation Protection of the Public and Environment
DOE Order 5480.X Transportation and Packaging
DOE Order 5480.4 Environmental Protection, Safety and Health Protection Standards, 1988
DOE Order 5480.7A Fire Protection, 02/17/93
DOE Order 5480.11 Radiological Protection for Occupational Workers (6/29/90)
DOE Order 5480.28 Natural Phenomenon Hazardous Mitigation
DOE Order 5820.2A Radioactive Waste Management
DOE Order 6430.1A General Design Criteria, dated 04/06/89
DOE Order 6540.1A
DOE/EH-0173T Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance
DOE-STD-1020-94 NPH Design and Evaluation Criteria for DOE Facilities, 04/94
DOE-STD-1021-93 Natural Phenomenon Hazards Performance Categorization Criteria for Structures, Systems and Components, 07/93

DOE-STD-1027-92 Hazard Categorization and Accident Analysis Techniques for
Compliance with DOE Order 5480.23 Nuclear SARs

6.6 State Regulations

SCLRCC R.72-300	Stormwater Management and Sediment Reduction Regulation (5/92)
SCDHEC R61-86-1	Standards for Performance of Asbestos Abatement Operations
SCHWMR 61-79.262.34	South Carolina Hazardous Waste Management Regulations
SCHWMR 61-79.264.193	South Carolina Hazardous Waste Management Regulations

7.0 REFERENCES

- DOE (Department of Energy), 1994a. **Final Supplemental Environmental Impact Statement, Defense Waste Processing Facility**, DOE/EIS-0082-S, Savannah River Operations Office, Savannah River Site, Aiken, South Carolina.
- DOE (Department of Energy), 1994b. **Final F-Canyon Plutonium Solutions Environmental Impact Statement**, DOE/EIS-0219, Savannah River Operations Office, Savannah River Site, Aiken, South Carolina.
- DOE (Department of Energy), 1995. **Draft Environmental Impact Statement for Waste Management at the Savannah River Site, Vol. I and II**, DOE/EIS-0217D, Savannah River Operations Office, Aiken, SC.
- DuPont (E.I. du Pont Nemours & Co.), 1986. **Safety Analysis - 200 Area Savannah River Plant, F-Area Outside Facility Operations**, DPSTSA-200-10, SUPP 10, Savannah River Plant, Aiken, S.C.
- NUS (Halliburton NUS Environmental Corporation), 1992. **Socioeconomic Characteristics of Selected Counties and Communities Adjacent to the Savannah River Site**, July 1992, Halliburton NUS Corporation, Aiken, South Carolina.
- WSRC (Westinghouse Savannah River Company), 1992. **Evaluation of Accident Risks in the Transportation of Hazardous Materials by Truck and Rail at the Savannah River Site (U)**, WSRC-RP-89-715, Revision 1, Aiken, South Carolina, September.
- WSRC (Westinghouse Savannah River Company), 1994a. **Technical Risk Assessment Report on 211-F Independent Waste Handling Facility Project S-5503 (U)**, December, 1994, WSRC-TR-94-0617, Westinghouse Savannah River Company, Aiken, SC.
- WSRC (Westinghouse Savannah River Company), 1994b. **Thirty-Year Solid Waste Generation Forecast at SRS**, Revision 0, July 1994, WSRC-RP-94-532, Westinghouse Savannah River Company, Aiken, SC.
- WSRC (Westinghouse Savannah River Company), 1994c. **Savannah River Site Emergency Plan, Manual 6Q**, Savannah River Site, Aiken, South Carolina, May.
- WSRC (Westinghouse Savannah River Company), 1994d. **SRS Waste Acceptance Criteria Manual, 1S Manual, WAC 3.07**, Revision 2, Westinghouse Savannah River Company, Aiken, South Carolina.

**Finding of No Significant Impact
for the
Independent Waste Handling Facility, 211-F
on the Savannah River Site**

RECEIVED

Agency: U.S. Department of Energy

OCT 30 1995

Action: Finding of No Significant Impact

OSTI

Summary: The Department of Energy (DOE) has prepared an environmental assessment (EA) (DOE/EA-1062) for the proposed independent waste handling facility, 211-F on the Savannah River Site (SRS), near Aiken, South Carolina. Based on the analyses in the EA, DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act (NEPA) of 1969. Therefore, the preparation of an environmental impact statement is not required, and DOE is issuing this Finding of No Significant Impact (FONSI).

Public Availability:

Copies of the EA and FONSI or further information on the DOE NEPA process are available from:

A. R. Grainger
Environmental Compliance Division
SR NEPA Compliance Officer
Savannah River Operations Office
P. O. Box 5031
Aiken, South Carolina 29804
Phone/Fax: (800) 242-8269
e-mail: nepa@barms036.b-r.com

Background: The 211-F Outside Facilities complex and the 776-A Liquid Waste Handling Facility receive both low activity and high activity waste (i.e., classified as low level waste) from various facilities on the SRS. The Outside Facilities complex provide general support to the separations processes in the 221-F Canyon Building.

The Unloading Facility (211-3F), a component of the Outside Facilities complex, serves as the central location for the collection of the low activity and high activity waste. Both wastes are characterized on the basis of the level of radioactivity present and processed for volume reduction and neutralization before they are sent to the tank farm for storage.

The low activity waste is neutralized and concentrated in the general purpose evaporator located within the 211-F Outside Facilities complex. The high activity waste is neutralized and concentrated in the lab waste evaporator located inside the 221-F Canyon Building. The overheads are sent to the Effluent Treatment Facility and the concentrates are transferred to the F-Area Tank Farm for storage and further processing for both the low activity and high activity waste.

The 776-A Liquid Waste Handling Facility receives low activity and high activity waste from laboratories in the Savannah River Technology Center and collects it for interim storage and characterization. Once it is characterized, the waste is transported from 776-6A Waste Loading Facility via trailer to 211-3F Unloading Facility for processing in the 211-F Outside Facilities complex.

Most of the existing structures, systems, and components for both the 776-6A and 211-3F facilities are nearly 40 years old. As such, they are in need of upgrades to extend the design life of the facilities and to provide for improved personnel safety and to maintain exposure as low as reasonably achievable.

Proposed Action: The proposed action would modify the 211-F Outside Facilities complex by upgrading the facility in such a manner that it operates independently of the 221-F Canyon Building and no longer requires the 221-F Canyon Building support for utilities or processing. The modifications would include items such as, enclosing the 211-3F building to prevent air escaping directly to the atmosphere, adding High Efficiency Particulate Air filters, installing or replacing air exhaust systems, lining the containment basin with stainless steel to contain any spills, adding a neutralization system, piping modifications, relocating control systems and instrument and process air systems. Modifications for the Waste Loading Facility (776-6A) would include ventilation upgrades, dismantling and removal activities, improved decontamination and containment (lining containment basin with stainless steel), upgraded video monitoring equipment, and changes to the loading platform, piping, and drip-free quick disconnect hose connections.

Alternatives: In addition to the proposed action, DOE considered the following alternatives: (1) No-Action (i.e., continue to process existing high and low activity waste in 221-F/211-F until they are deactivated), (2) solidification of waste, (3) provide a replacement "greenfield" facility for 211-F, and (4) upgrade the H-Area diversion box #8. The no-action alternative would fail to provide the continuing need to process and store the low and high activity waste. New facilities would have to be constructed in each area to handle their own waste, therefore being cost prohibitive. The solidification of waste alternative encompassed a new facility that was considered for the Savannah River Technology Center area only and would still require the other areas to treat their own waste, again being very expensive. The replacement "greenfield" facility for 211-F would be a state-of-the-art facility with improved environmental protection but the need for trucking of the high and low activity waste would not be eliminated. Therefore, there was no benefit from this alternative and the cost was still higher than the proposed alternative. The H-Area diversion box #8 is a diversion box with associated pumps used to transfer recycled waste between Defense Waste Processing Facility and the H-Area Tank Farm, wash water and Purex sludge between the F- and H-Area Waste Tanks, and to transfer reconstituted salt, high heat waste, Purex sludge and recycled waste within the H-Area. It is the lowest part of the pipeline system; all connecting lines, except the Defense Waste Processing Facility recycle waste line, drain to it. Modifications to the Savannah River Technology Center loading area and the addition of a new loading facility for the 772-F lab would be required and space is very limiting. The need for trucking the waste would still be required. This alternative is not feasible due to the space limitations and the cost of new facilities.

Environmental: The potential consequences of the proposed independent waste handling facility, 211-F Outside Facilities complex were assessed to determine whether there will be significant impact to water, air, and land resources; floodplains and wetlands; ecology and cultural resources; health and safety; and socioeconomic conditions; and transportation.

No impacts to ecological or cultural resources, or to the socioeconomic conditions in communities surrounding the SRS, are expected as a result of the proposed action. The 211-F Outside Facilities complex and the 776-6A Waste Loading building are existing facilities and the only socioeconomic impacts would be the continued employment of operational and maintenance personnel. Some construction work force would be required to perform the modification but would be taken from the existing personnel onsite. Being

that the facilities are in a previously developed and highly industrialized area, no endangered species, wetlands, cultural resources or other environmentally sensitive resources would be directly or indirectly impacted by the proposed action. The construction activities will generate some waste, such as soils, of which some will be reused as backfill and the contaminated soil will be disposed of in landfills or incinerated. Any airborne releases to the environment will be curtailed by the use of plastic huts and High Efficiency Particulate Air filtration systems, as appropriate. Any asbestos removed will be in accordance with the South Carolina Department of Health and Environmental Control and any radioactive and mixed waste shall be managed in accordance with DOE Order 5820.2A. All construction activities will be done in accordance with the Occupational Safety and Health Administration procedures.

SRS worker exposure to radiation during normal operation will not change by incorporation of the proposed action and the construction worker exposure will be controlled by established procedures that require doses be kept as low as reasonably achievable and limit any individual's dose in accordance with SRS radiological control practices.

Determination: Based on the information and analyses in the EA, DOE has determined that the proposed independent waste handling facility, 211-F at SRS does not constitute a major Federal action significantly affecting the quality of the human environment with the meaning of NEPA. Therefore, an environmental impact statement is not required and DOE is issuing this FONSI.

Signed in Aiken, South Carolina, this 23 day of August, 1995.

Mario P. Fiori
Manager
Savannah River Operations Office

DOE/EA - 1062

**ENVIRONMENTAL ASSESSMENT
FOR THE
INDEPENDENT WASTE HANDLING
FACILITY, 211-F
AT THE
SAVANNAH RIVER SITE**

AUGUST 1995

**UNITED STATES DEPARTMENT OF ENERGY
SAVANNAH RIVER OPERATIONS OFFICE
SAVANNAH RIVER SITE**