<table>
<thead>
<tr>
<th><strong>Project Name:</strong></th>
<th>SR-F-Canyon Deactivation-D&amp;D-R</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Name (Expanded):</strong></td>
<td>Savannah River ARRA F-Canyon Deactivation D&amp;D [Deactivation of portions of a former purex reprocessing facility to both eliminate unnecessary surveillance and maintenance and retain and support Safety Basis systems required for overall facility mothball status and for continued operations of selected portions for TRU Waste repackaging]</td>
</tr>
<tr>
<td><strong>Project Type:</strong></td>
<td>Building / Facility D&amp;D Project Type</td>
</tr>
<tr>
<td><strong>Building Type:</strong></td>
<td>B_Typ_2</td>
</tr>
<tr>
<td><strong>Project Type Detail:</strong></td>
<td>Generic Radiological Facility(ies)-Extensive Loose Contamination</td>
</tr>
<tr>
<td><strong>Supplementary Reference Documents:</strong></td>
<td>F-Canyon Deactivation [Completion Description Document]</td>
</tr>
</tbody>
</table>

**Site Context:**
All ARRA Projects are specific EM projects developed and executed between 2008 and 2011 in response to the American Reinvestment and Recovery Act. These projects were based on a total of 106 ARRA “Subprojects”, 77 managed by the SRS M&O Contractor (Savannah River Nuclear Solutions, LLC) and 39 managed by the Liquid Waste Program contractor (Savannah River Remediation, LLC), at a total cost of over $1.1B. The projects exist within larger ongoing site operations, depend on those larger elements for site services and support, and typically include costs for those services as indirect costs.

The historical Savannah River Site mission was to reprocess reactor core material to produce plutonium for nuclear weapons, enriched uranium for weapons and military and commercial use, and numerous specialty isotopes such as 238Pu for thermoelectric generators. It covers 300 square miles, and its ongoing mission is storage of weapons-grade plutonium, recovery of tritium from weapons, processing and downblending of enriched uranium materials, construction and operation of a mixed uranium-plutonium oxide nuclear reactor fuel production plant, remediation contamination due to past production activities, and management of wastes from both current processing and remediation activities.

The two major activities associated with the DOE-EM mission are the facility decommissioning, environmental cleanup, and transuranic and solid waste management performed by the M&O, and the vitrification/stabilization of high-level waste held in large below-ground tanks by the Liquid Waste Program contractor. The SRS EM ARRA scope has been divided into three ECAS Level 4 Parent Projects based on the SRS organizational and PBS groupings: Transuranic/Solid Waste Management (PBS SR-0011C and SR-0013), Area Completion Projects (PBS SR-0030 and SR-0040C), and Liquid Waste Program (SR-0014C).

**ECAS Level 4/Parent Project Context:**
The Transuranic/Solid Waste Management (SW) ARRA Parent Project grouping includes the ARRA ECAS projects shown in the list below. These projects are administered under the SRNS contract and include projects that support the waste management program (preparing F-Canyon to package TRU, consolidating waste management activities in a single location, and expanding landfill operations); are distinct WM operations (disposing of DUO and HWCTR waste); and the Small Arms Training Area remediation. The costs of disposing of the waste from each ARRA project was allocated back to that project as a “waste” indirect (Note: the SATA project carries it...
**Project Name:** SR-F-Canyon Deactivation-D&D-R

as a separate item under this Parent Project), and is not included in the SW Parent Project costs; additionally, there were several different ARRA activities conducted under PBS SR-0011C and PBS SR-0013 (e.g., the 315-M Curation Fac Mods) that were not included as ECAS Projects in the ECAS database.

- SR-F-Canyon Deactivation-D&D-R
- SR-DUO Disposition-WM-R
- SR-F-Canyon Mods & Enclosure Start-up-WM-R
- SR-HWCTR Rx Vessel & Steam Gen Disposal-WM-R
- SR-Trench Expansion-WM-R
- SR-Trench Operational Covers-WM-R
- SR-Waste Storage Consolidation-WM-R

### D&D Facility Data:

#### Facilities:

<table>
<thead>
<tr>
<th>Building</th>
<th>Title</th>
<th>Area (SF)</th>
<th>In-Service Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>221-F</td>
<td>Canyon Bldg</td>
<td>243,178</td>
<td>1954</td>
</tr>
</tbody>
</table>

**Construction Details:**
The 221-F building is a massive 6 story concrete structure. The canyon facility is 835 feet long, 122 feet wide and 66 feet high, designed for containment of a spent nuclear fuel reprocessing process. Since the project does not involve deactivation of decommissioning of the building structure, only the deactivation of selected systems, no additional information is provided.

**Facility Use:**
F Canyon was constructed in the early 1950s and began operation in 1954. The interior of the building resembles a canyon because the processing areas resemble a gorge in a deep valley between steeply vertical cliffs. So that worker exposure to radiation was minimized, work in the canyon, including maintenance, was remotely performed by shielded overhead bridge cranes. The thick, dense concrete walls that separated workers from the actual processing areas provided added protection.

F Canyon chemically dissolved aluminum-clad materials that were irradiated at SRS’s nuclear reactors and other test and research reactors so that plutonium-239 and uranium-238 could be recovered. During separations operations, nuclear materials were directly fed to chemical dissolvers. Plutonium and uranium were then separated from each other and from fission products. Waste was transferred to the site’s high-level waste storage tanks for eventual vitrification in the SRS Defense Waste Processing Facility.

In FB Line, which was constructed in the early 1960s to receive plutonium-239 nitrate solution produced in F Canyon and convert it to a solid form, the Pu-239 was recovered. Solutions were transferred from the canyon and concentrated in FB Line. Then, in subsequent operations, the plutonium was precipitated, filtered, dried and finally reduced to metal form, called a button, about the size of a hockey puck. Employees performed processing activities using equipment enclosed in gloveboxes, to protect them and operating areas from the radioactive material. Depleted U-238, in an oxide (powder) form, was recovered as a by-product; a large portion
remains stored at SRS. No new production of Pu-239 is needed because of the reduction in the nation’s nuclear weapons stockpile.

Both facilities were shut down after the Cold War. Then, in February 1995, the DOE decided to resume chemical separation operations in F Canyon to stabilize and manage most of the remaining inventory of plutonium-bearing materials at SRS. Most of the stabilization actions utilized the same chemical dissolving process. However, the DOE has committed that Pu-239 from stabilization actions will not be used for nuclear weapons purposes.

F Canyon and FB Line completed stabilization operations in March 2002. For nearly two years after, FB Line stabilized and packaged legacy nuclear materials for safe, long-term storage. This process involved packaging materials using a process in which stabilized plutonium is placed in rugged, welded stainless steel cans. After materials were stabilized and packaged, they were shipped to other site locations until the Mixed Oxide Fuel Fabrication Facility is ready. In February 2005, those operations were also completed.

Deactivation was commenced in 2002 and the initial phase of deactivation was completed in 2007. The original DPP was prepared with direct support from subject matter experts having deactivation experience at other DOE sites. The DPP development work was accomplished using a systematic technique employed at other DOE sites to specify desired endpoints. Each facility system and space was assigned a desired end point that was compare to the expected condition at the end of the applicable operating mission. Once this comparison was performed, a series of tasks were identified to deactivate that system or space. The scope of the deactivation effort was defined by these tasks. Deactivation of some support systems was suspended in 2007 in anticipation of future mission for F-Canyon. In 2008, DOE issued a letter, which allowed resumption of shutdown activities to minimize surveillance and maintenance costs while maintaining Safety Basis requirements and supporting TRU Waste Remediation. The DPP was revised to provide an update following resumption of Deactivation activities in 2009.

This project is identified as a Type 2 facility due to the modest scope of the project (the F-Canyon is a Class 2 Nuclear Facility). The project scope is modifications of select systems, many of which are non-radioactive and represent low-risk activities.

Processes causing contamination:
See above.

Contaminants of concern (including extent of contamination by major contaminant):

<table>
<thead>
<tr>
<th>Building</th>
<th>Chemical Hazard</th>
<th>Location/Extent</th>
<th>Radiological Hazard</th>
<th>Location/Extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building 221-F</td>
<td>Asbestos. Lead, hydraulic oils, and batteries</td>
<td>Multiple locations in support areas</td>
<td>Substantial contamination, principally fission products</td>
<td>Process areas; most of this is not relevant to this project</td>
</tr>
</tbody>
</table>

While the F-Canyon contains numerous hazards and source terms, the purpose of this project is to shut down support systems and reduce surveillance and maintenance requirements for those areas of the facility without ongoing work. As such there was little waste generation, little work with radioactive systems.
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**D&D Project Execution**

**Site WBS Organization within the ECAS Project Scope:**

The deactivation scope included F-Canyon, FB-Line, and several support facilities including complete shutdown and isolation of systems and services not required to support TRU Waste Remediation, H-Canyon Missions, or Safety Basis requirements; to reduce risk while providing a seamless transition from operations to a low-cost surveillance and maintenance configuration. The deactivation work was phased such that systems needed to support TRU Waste Remediation would remain until the waste repackaging is complete in F-Area. Systems and equipment deactivated include the following: chilled water systems, cooling tower and cooling water supply and return pumps, domestic water system, sanitary waste system, fire water and alarm system, steam and condensate system, 221-F breathing air system, instrument, plant, and process air systems, 221-F diesel generator, transformers, booster and center section supply fans, and elevators. There were no buildings deactivated for this PBS; only systems.

**Methods of execution:**

*Management:* The scope was planned, managed, and executed as a single element. Management included technical and project oversight, planning, project controls, and quality assurance.

*Regulatory:* The project was performed in accordance with the requirements of the SRS Federal Facility Agreement; deactivation as such is regulated by Doe under the AEA.

*Physical Approach:* The project activities were as follows:

- Preparation of design documents (safety analysis documents to support the changes had already been prepared)
- Deactivate chilled water systems, cooling tower and cooling water supply and return pumps, domestic water system, sanitary waste system, fire water and alarm system, steam and condensate system, 221-F breathing air system, instrument, plant, and process air systems, 221-F diesel generator, transformers, booster and center section supply fans, and elevators.
- Replace sand filter (294-F) roof
- Repair ventilation building (294-1F) roof

*Technologies:* Standard maintenance and construction techniques.

**Activities self-performed:**

- All management and key technical positions along with a portion of the technical staff
- Waste management and disposal
- Used significant professional services contracted (i.e., seconded) labor inter-mixed with prime contractor staff
- Physical maintenance/deactivation work

**Activities subcontracted:**

- Sand filter roof repair

**Issues that impacted the project:**

- None
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**Scope Growth:**  
No identified scope growth

**Notes Regarding Use of Data**  
- This was very limited work on a large, contaminated canyon building, involving only limited, typically uncontaminated mechanical and electrical systems.