



U.S. DEPARTMENT OF  
**ENERGY**



# Overview and Status Update of the Savannah River Site Building 235-F Risk Reduction Project

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*Citizens Advisory Board*

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# Purpose

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- To provide potential topics for the Nuclear Materials committee for use in development of their 2019 Work Plan.



# 2019 Nuclear Materials Work Plan topic

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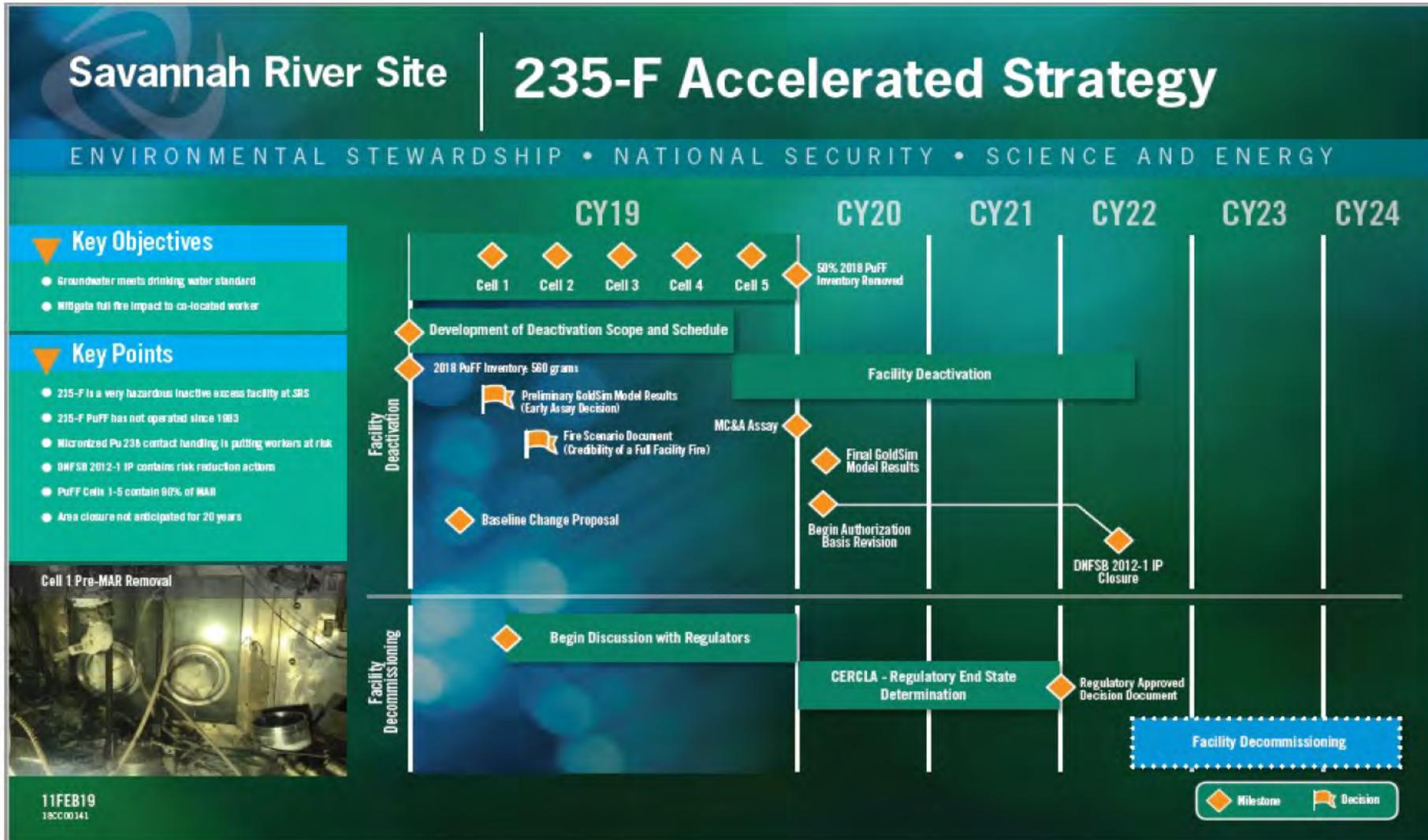
Work Plan Item: 235-F Deactivated State

Description: 235-F removal of Plutonium 238 is occurring to place this facility into a deactivated state.

Options exist for the final end state of this facility and will be provided by DOE EM in a briefing.

From a community perspective, provide a recommendation to EM SRS as to the option, from those presented or an alternate developed by the CAB, that would best serve the environmental concerns of the community

# 235-F Accelerated Strategy



# Panel Members

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Panel Members for 235-F presentations and discussion:

- Chris Bergren, Director, Environmental Compliance & Area Completion Project
- Verne Mooneyhan, Facility Manager, F and E- Areas
- Jeff Hasty, Project Manager, 235-F Risk Reduction
- Jack Musall, Design Authority Engineer, 235-F Facility
- Brian Hennessey, DOE Federal Facility Agreement Program Manager
- Randy Clendenning, DOE 235-F Program Manager

## Building 235-F

- Building 235-F was part of the original construction at the Savannah River Site (SRS) in the early 1950s.
- The facility is a blast-resistant, windowless, two-story, reinforced concrete structure about 222 feet long, 109 feet wide, and 28 feet high with walls 14 inches thick. It is located in SRS's F Area, near F Canyon.



Early Construction



Aerial Photograph

# Missions

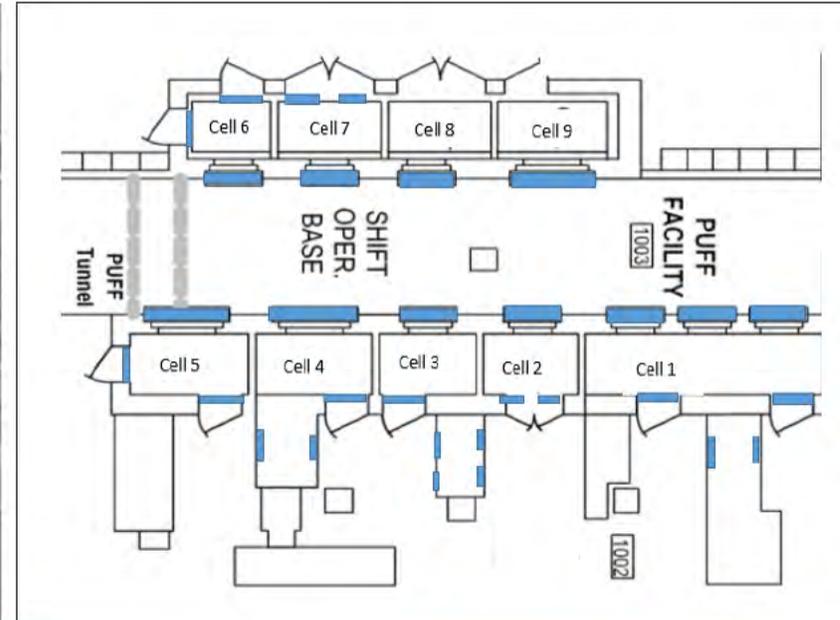
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It has had several production missions throughout its operational life:

- **Original mission was “C-Line”.** C-Line was to take Pu 239 metal and make triggers. However, the mission was cancelled before any equipment was installed. Following cancellation, the building was reconfigured for other missions.
- The first mission was the Actinide Billet Line (ABL). This line produced special billets containing Np-237 for irradiation in SRS reactors.
- The next mission was the Plutonium Experimental Facility (PEF) and the Plutonium Fuel Form (PuFF) Facility including the Metallography Laboratory (ML)
- **In the mid 1970’s the building was again reconfigured. ABL was truncated and** what is present day PuFF was built to include Cells 1 – 5 (east line), Cells 1 – 9 (west line), as well as, east and west maintenance rooms.
- All metallurgical processes within the building were shut down by 1990.
- The final mission was receipt, storage and disbursement of plutonium-bearing materials in support of SRS and the DOE complex. In 2006, the storage vaults for nuclear materials were emptied and the building was placed in a surveillance and maintenance mode.

# PuFF

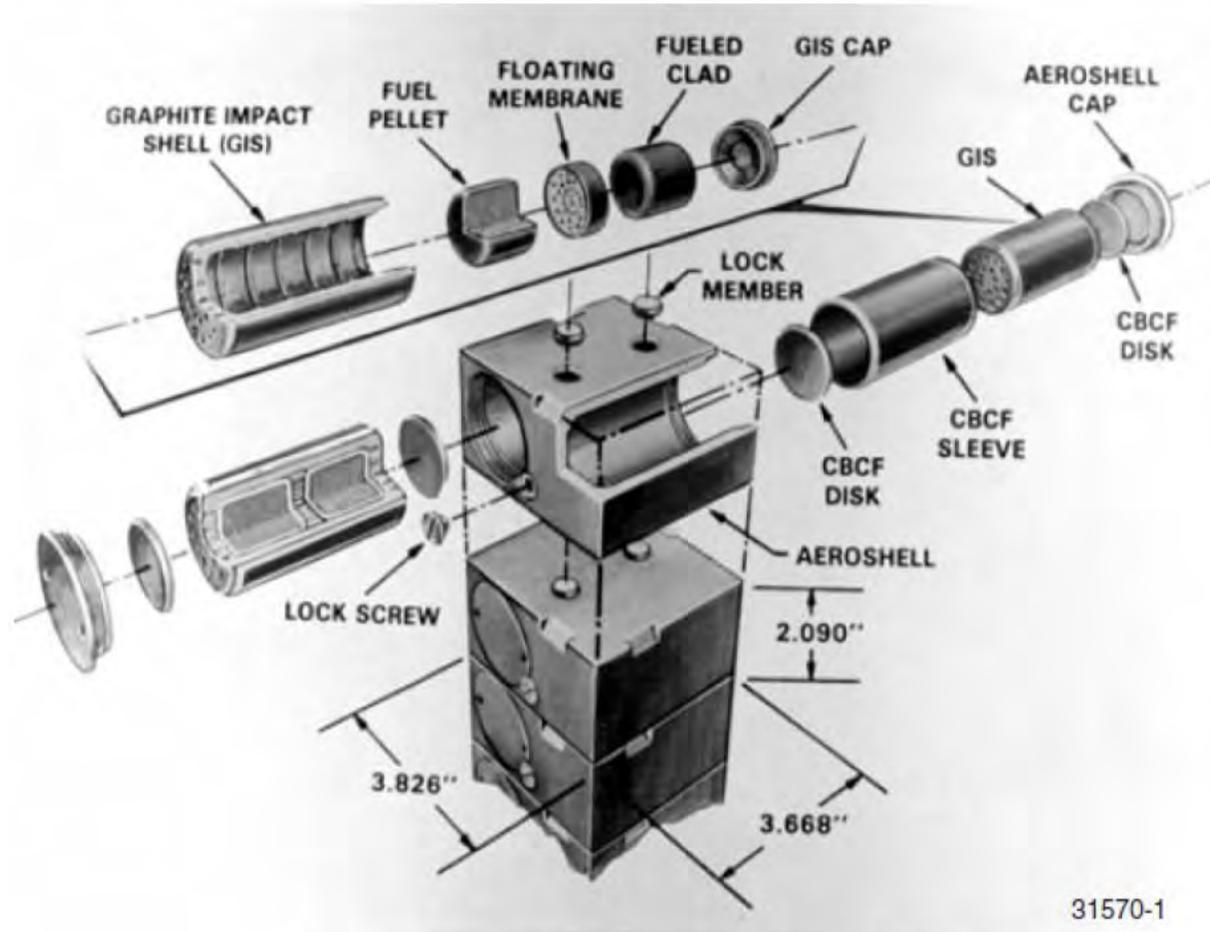
- The Np-237 billets from ABL were irradiated in SRS reactors to produce Pu-238. The reactor products were processed in H-Canyon/HB-Line and the Pu-238 separated, packaged and sent to PuFF.
- The Pu-238 was introduced into PuFF through the Cell 1 Wing Cabinet
- Processed through PuFF from Cell 1 to Cell 9. Emerged as an encapsulated pellet of Pu-238 for use in construction of Radioisotope Thermoelectric Generators (RTG).



# Products



# Products - continued



Assembly of SRS  $^{238}\text{PuO}_2$  pellets into General Purpose Heat Source module



Space Mission



Pu-238 Pellet

## Cells 1 and 2

- **Cells Function**

- Introduced Pu 238 into PuFF Cell Line
- Used Oxygen Exchange Furnace to enrich O-16 content
- Material ball milled to extremely fine particles
- Cold pressed to resize oxide particles
- Cells 1 through 5 maintained in Argon atmosphere



## Cell 3

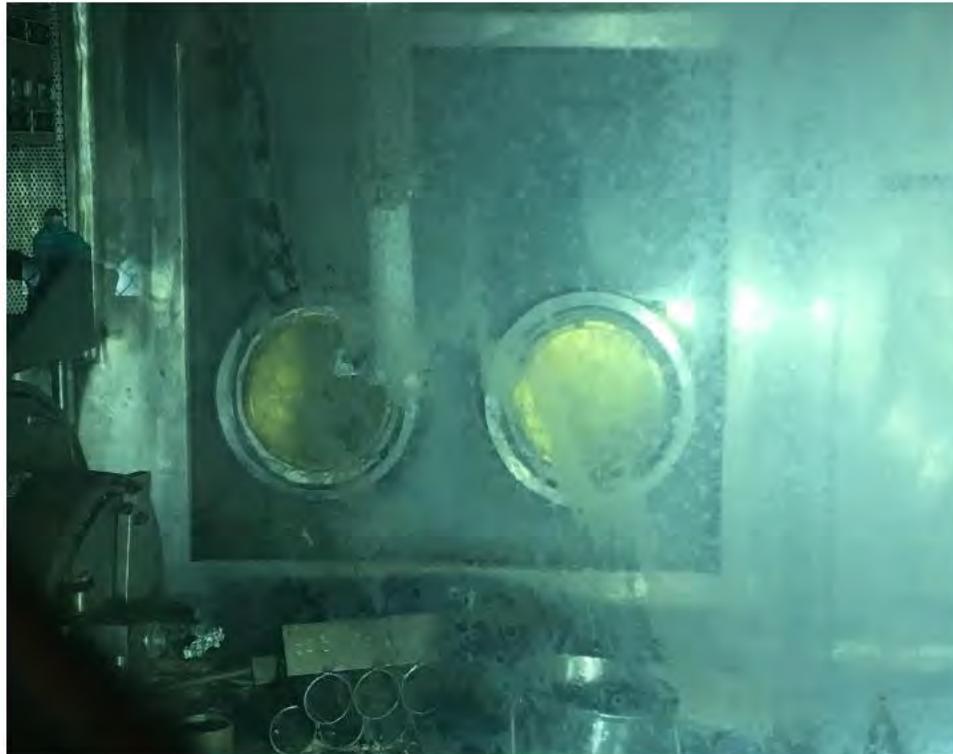
- **Cell Function**
  - No processing occurred in this cell



## Cell 4

- **Cell Function**

- Oxide particles high fired ( $1600^{\circ}\text{C}$ ) or low fired ( $1200^{\circ}\text{C}$ )
- Mixed 60/40 (low fire/high fire) and pressed into spheres/pellets
- 1978 to 1980, 250g spheres; 1980 forward, 150g pellet



## Cell 5

- **Cell Function**

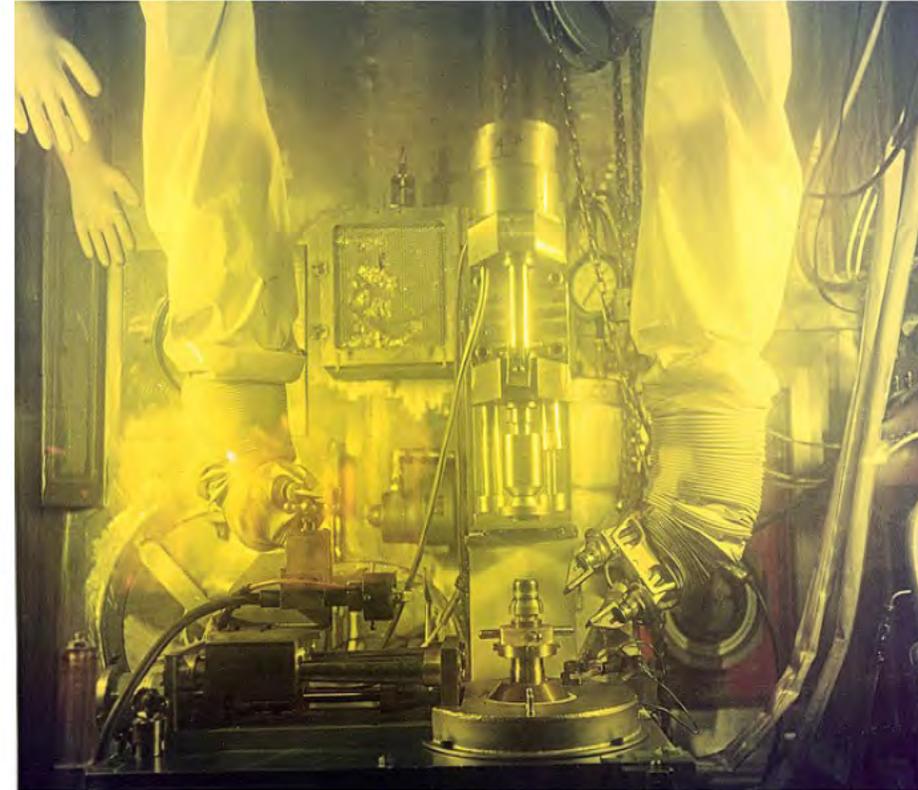
- Spheres/pellets transported to Cell 6 using an under-floor belt transfer device



## Cell 6

- **Cell Function**

- Operated with a Helium atmosphere during Tungsten Inert Gas welding
- Sphere/pellet was placed into an iridium metal shell and welded



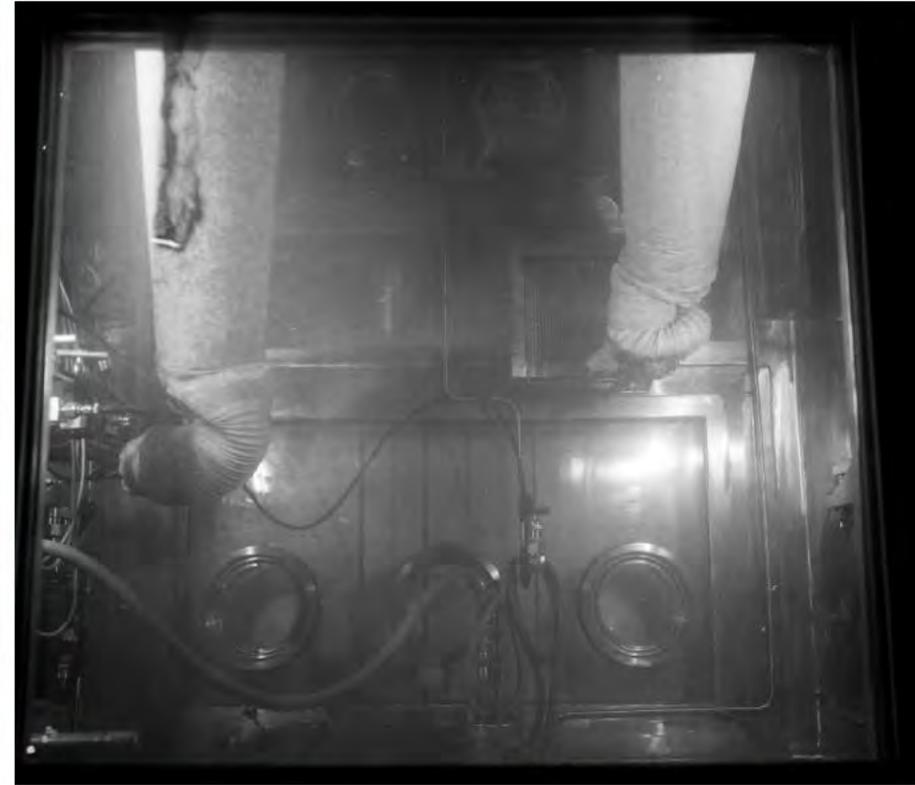
## Cell 7

- **Cell Function**
  - Primarily used to decontaminate encapsulated sphere/pellet



## Cell 8

- **Cell Function**
  - Primarily used to decontaminate encapsulated sphere/pellet



## Cell 9

- **Cell Function**

- Leak testing of encapsulated sphere/pellet
- Material exited PuFF process cell line via an air lock
- Subsequently placed into shipping containers



## QUESTIONS???

