Building 235-F Deactivation State Update –
2021 Work Plan Item

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Brief to SRS Citizens Advisory Board
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Purpose

1) Provide an update on the actions taken by DOE in the past year
2) Provide future activities regarding Building 235-F.
Building 235-F Facility Background

• Constructed in 1954
• Last used in 1980’s to produce fuel spheres and pellets out of Pu-238 to provide heat to electrically power long-term, deep-space missions, such as Galileo, Ulysses and Cassini.
• DOE accepted Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2012-1 on long term facility safety concerns.
• Developed Implementation Plan (IP) to address DNFSB concerns.
• Initiated risk reduction activities in 2012.
• Major risk reduction activities included:
  — electrically isolating circuits that were no longer needed,
  — removal of combustible,
  — installation of a fire detection and alarm system,
  — removal of the material at risk (legacy Plutonium from the process areas).
Past Years (FY2019-FY2020) Actions for 235-F

- Commenced Material at Risk (MAR) removal Pu-238 Oxide in May 2019
  - Used common nuclear industry techniques for MAR removal
  - Process required operators to be in multiple layers of protective clothing including air supplied suits
  - Majority of remaining material located in Cells 1&2 and wing cabinet

- Conducted Surveys on remaining MAR
  - Removal results showed less than 60% effectiveness

- Revised DNFSB 2012-1 Recommendation Implementation Plan (IP) to address remaining MAR and to demonstrate worker safety

- Created the Deactivation Project Plan for Bldg. 235-F

- Completed the revised IP actions in May 2020
Building 235-F Path Forward

• Prepare Building 235-F for Long Term Safe Storage via deactivation project
• Deactivation project started in FY 19 and will complete FY 22
• Deactivation project activities include:
  – Reconfigure/shutdown ventilation in Building 235-F (fans in 292-2F remain in operation)
  – Isolate all utilities/services to Building 235-F (water, steam, power, etc.)
  – Removing or fixing contamination outside process areas
  – Removing non-radiological hazardous from the facility (i.e., lead, process water, oils, etc.)

• Further inventory removal is not planned during deactivation
Building 235-F Final End State Preparations

- Developing End State of facility with SCDHEC and EPA
  - Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Process used for decommissioning
  - Alternatives analysis developed with the regulators to evaluate potential decommissioning end states. Four alternatives were evaluated:
    - No action
    - Grout process areas; engineered roof
    - Grout entire building; engineered roof
    - Total demolition & removal of the building; soil cover over foundation
  - Based on the risk to the workers, protectiveness, environmental impacts, and cost, the alternative chosen was grouting the process areas on the first and second floor and emplacement of an engineered roof.
Building 235-F Final End State Preparations - cont.

- A Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis (RSER/EE/CA) was developed through Core Team scoping, approved by DOE and submitted to SCDHEC and the EPA for review.
  - Comments are expected from the regulators in late November 2021.
  - Rev.1 will be submitted to the regulators for approval.
  - The RSER/EE/CA will be available for public comment in spring 2022.
  - After public comments have been considered, DOE will issue an Action Memorandum announcing the intended action for 235-F.
• P- and R-Reactors were decommissioned in place (2009-2012)
  – Some radiological contamination remained inside the structures
  – All access points into the facility were permanently sealed
  – Below-grade areas filled with grout
  – Eventual migration of contaminants from the degraded structure over time was modeled and evaluated for protectiveness of
    human health and the environment
• Reinforced, closed Building 235-F structure and grouted process areas will prevent worker or public
  exposure to the contaminants
• Computer modeling was performed to predict the movement of contaminants into the environment
  (groundwater) over a long period
  – Conservatively simulates the movement of contaminants after the structure deteriorates over time
  – Shows that the remaining plutonium-238 and neptunium-237 contamination inside the process areas within Building 235-F
    (and their radioactive decay products) will not exceed regulatory standards in groundwater at the boundary of F Area over a
    10,000-year period
235-F Final Planned End State

First Floor

Second Floor

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Summary

- DOE has conducted over eight years of risk reduction efforts for Building 235-F.

- Working to complete deactivation of Building 235-F in FY2022.

- Following the CERCLA process (RSER/EE/CA) to select final decommissioning end state for Building 235-F with regulators and public.

- Will continue to keep CAB apprised of facility progress.