Facility Decommissioning under the SRS Federal Facility Agreement

Process Overview and Program Status

Brian Hennessey
Federal Facility Agreement Program Manager, DOE-SR

Citizens Advisory Board

July 25, 2023

Acronyms

- CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act (one of the laws requiring cleanup of the Savannah River Site)
- D&D - Deactivation and Decommissioning
- D&R – Demolition and Removal
- DOE – The US Department of Energy – Savannah River
- DPFR – Decommissioning Project Final Report
- EE/CA – Engineering Evaluation/Cost Analysis
- EPA – Environmental Protection Agency
- FDE – Facility Decommissioning Evaluation
- FFA – *Federal Facility Agreement for the Savannah River Site (directs the comprehensive remediation of SRS)*
- RCRA – Resource Conservation and Recovery Act (another law requiring cleanup)
- SCDHEC – South Carolina Department of Health and Environmental Control

Purpose

- Provide information requested on facility decommissioning at SRS
  - "Decommissioning" – meaning and types (end states)
  - Regulatory framework and oversight
  - Status of facility decommissioning at SRS

- Meet Citizens Advisory Board Facilities Disposition and Site Remediation Committee Annual Work Plan Commitment

Background

- The FFA (1993) originally only listed sites of the known or potential release of hazardous substances; these require investigation and possibly response action by DOE
  - No requirements for buildings, unless they have had actual or potential releases to the environment

- 1995 Joint EPA-DOE *Policy on Decommissioning DOE Facilities Under CERCLA* endorsed the use of the Non-Time-Critical Removal Action
  - DOE is Lead Agency; EPA and SCDHEC have oversight
  - More streamlined decision-making process than CERCLA Remedial Action process
  - Provides public participation

- July 2003 *Memorandum of Agreement for Achieving an Accelerated Cleanup Vision*
  - Signed by DOE, EPA, and SCDHEC
  - Adopted the Area Completion framework for identifying all response actions needed within an SRS industrial area (waste units and facilities)
  - Incorporated a process for determining whether or not decommissioning of a facility requires CERCLA evaluation
    - *Graded approach, based on process knowledge, location, and waste management history*

Incorporation of Facility Decommissioning into the FFA

- Appendix K (D&D Facilities List) was first created and populated in 2006 with Environmental Magement facilities to be decommissioned
- Section XL, “Decommissioning Facilities,” was added in 2006 to describe screening process and disposition
  - Facilities (or remnants*) needing further evaluation for cleanup after D&D are added to Appendix C.4, and become part of an Area Operable Unit for later assessment
  - Facilities (or remnants) that require no further evaluation are added to Appendix K.2
    - *Most facilities decommissioned so far are on Appendix K.2*
- Appendices C (RCRA/CERCLA Units) and K (D&D Facilities) are updated and submitted annually for regulator approval

- * “Remnant”: what remains after decommissioning is finished
  - Examples: foundation slab

The Terms: “Deactivation,” “Decommissioning,” and “End State”

- **Deactivation:** the last operational step in which hazards are reduced and a facility is placed in a stable condition, protective of human health and the environment and safe for long-term storage with reduced surveillance and maintenance cost
- **Decommissioning:** the post-operational (end-of-life) step where residual hazards are permanently eliminated or reduced to a level protective of human health and the environment
- **End State:** the final configuration and condition of a facility at the conclusion of its decommissioning
  - Generally either:
    - *Demolition & Removal – facility is **removed**, either completely or to its foundation (slab), or*
    - *In Situ – much of the building’s exterior remains **in place** after it is placed in a stable, protective configuration that isolates the residual hazard from the environment*
      - Sometimes appropriate for robust, hardened (reinforced concrete) facilities when:
        - » Any remaining hazard can be isolated/contained within the structure to ensure protectiveness of human health and the environment
        - » Supported by risk assessment and fate & transport modeling of residual contaminants
        - » The benefit of D&R does not justify its much higher cost and risk
          - Risk to workers and the public can be significantly greater when the structure is demolished, and decommissioning waste must be handled, characterized, packaged, and transported for disposal
  - “Remnant”: what remains after decommissioning is finished

Demolition & Removal End State

- 232-1H Before and After D&D

In Situ End State

- 105-P Reactor *before* in situ decommissioning

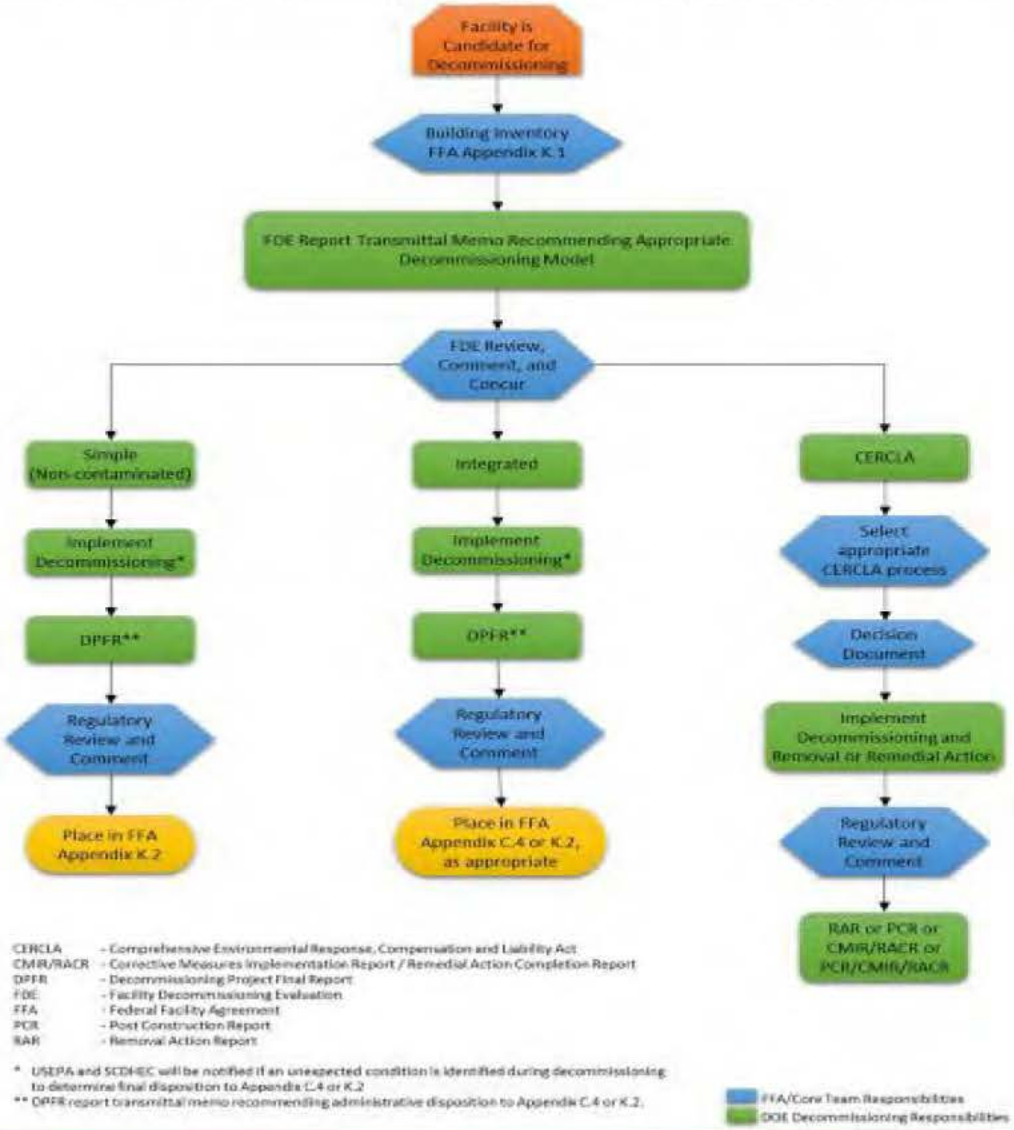
In Situ End State

- **105-P Reactor *after* in situ decommissioning**
  - Roof is inspected periodically using aerial drones to spot and spray any woody vegetation

SRS Graded Approach to Decommissioning

- Three regulatory models were created for use depending on the complexity and likelihood of contamination or a release
  1. Simple Model – "clean" facilities, no further evaluation is needed
  2. Integrated Sampling Model – characterization before and after D&D; "as-left" conditions evaluated during Area Completion (facility remnant is added to Appendix C.4) if necessary
  3. CERCLA Model – decommissioning performed as a CERCLA response action (non-time-critical removal action or remedial action), with the associated evaluations and public participation. Two types:
     - *Removal Action (*original recommendation in *1995 Joint EPA-DOE Policy)*
       - EE/CA (Engineering Evaluation/Cost Analysis) and Action Memorandum
       - Describe method and end state of decommissioning, and waste disposition
       - Takes approximately 9 months to complete evaluation and issue the decision
     - *Remedial Action*
       - Proposed Plan (for public comment) and Record of Decision issued
       - Takes 16 months or more to complete evaluation and issue the decision
     - Facility remnant included in Area Completion evaluation (Appendix C.4)
     - Examples – R-Area Reactor Building Complex, M-Area Production Area (313-M, 320-M, etc.), Heavy Water Components Test Reactor (B Area)

Decommissioning Planning – Three Models

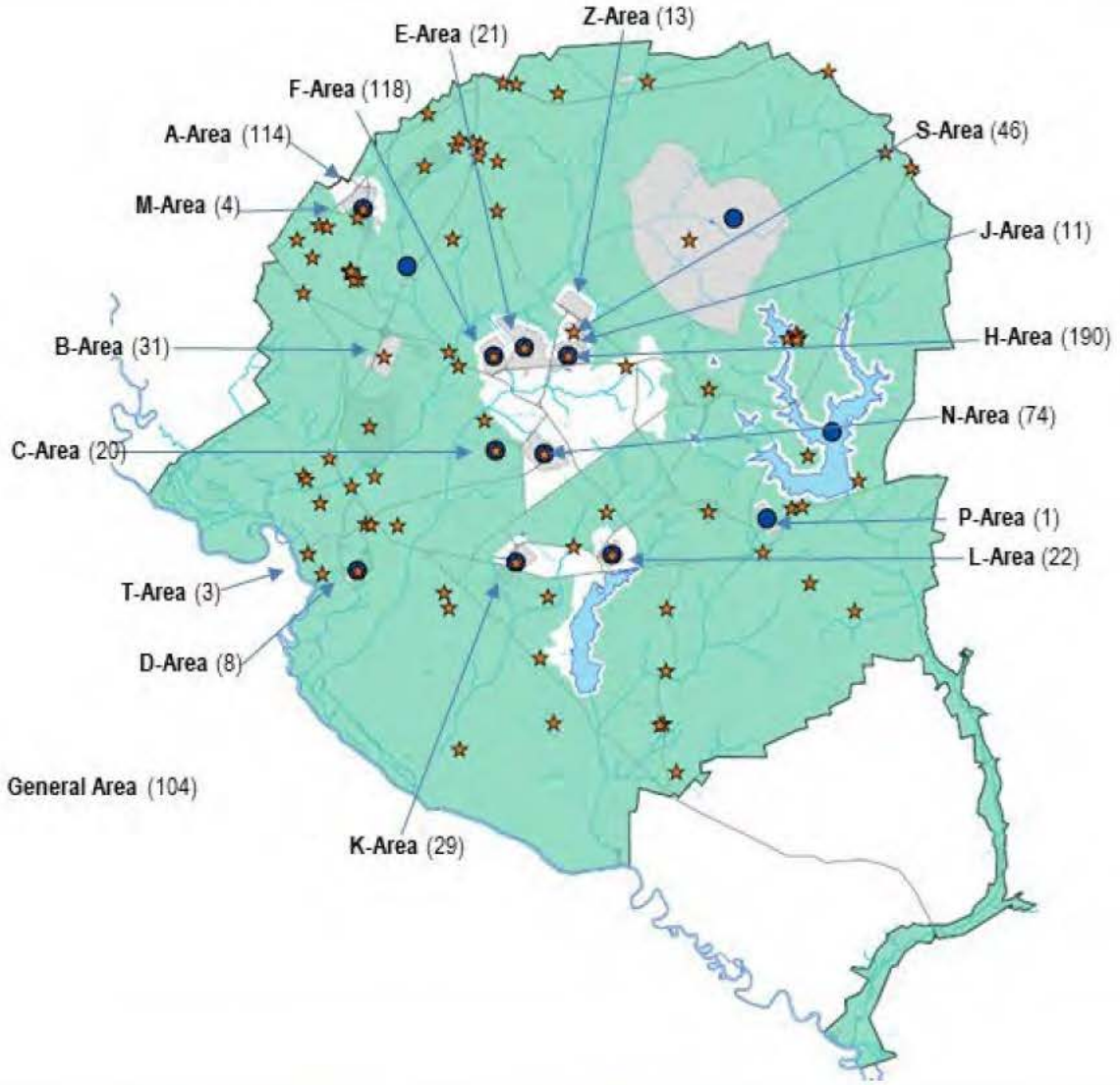


Facility Decommissioning Documentation

- Governed by the *Core Team Protocol for Review and Concurrence on Facility Decommissioning Evaluations (FDEs) and Decommissioning Project Final Reports (DPFRs)*

- Before Decommissioning – FDE
  - Describes facility, process history, existing data, recommendation of Decommissioning Model
  - EPA and SCDHEC concur on FDE
- After Decommissioning – DPFR
  - Describes the work performed, conditions left, and any data collected to verify end state condition
  - Proposes disposition (Appendix K.2 or C.4)
  - Regulator approval required
  - If the CERCLA model is used, that documentation makes a DPFR unnecessary:
    - *Removal Action Report, or*
    - *Post-Construction Report (for remedial action)*

Status of EM Facility Decommissioning at SRS



Performance Metric Facilites	Completed
Industrial	281
Nuclear	15
Radioactive	21
Total	317

Performance Metric Facilites	Remaining
Industrial	589
Nuclear	187
Radioactive	33
Total	809

Recent Decommissioning

- **D-Area Powerhouse Coal Handling System – Before & After D&D**

- **485-D Cooling Towers – Before & After D&D**

Current and Future Decommissioning

- **Highest priority: F-Area Material Storage Facility (235-F)**
  - CERCLA model used; DOE Action Memorandum issued in June 2022
    - *Preferred alternative: In situ D&D of First- & Second-Level Process Areas/Engineered Roof*
  - Planning has begun for decommissioning design and construction
  - 5-6 years anticipated for completion