



U.S. DEPARTMENT OF
ENERGY

OFFICE OF
**ENVIRONMENTAL
MANAGEMENT**

Calcine Retrieval Project

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DOE-Idaho Cleanup Project

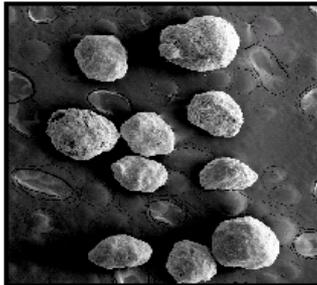
Feb. 23, 2017

Preliminary Retrieval Approach

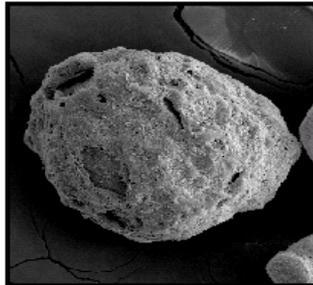
- We are in the early planning stages of a project designed to retrieve calcine from bin set 1 and transfer the material to bin set 6
- Bin set 1 would then be closed under the Resource Conservation and Recovery Act
- The project would help us make progress toward meeting the Settlement Agreement milestone of having calcine ready for disposal outside the State of Idaho by a target date of 12/31/2035

- Conversion of liquid, high-level waste to a solid by a high-temperature drying process
 - Product resembles dry laundry detergent
 - This was done for volume reduction – approximately 8:1
 - Operated from 1963 to 2000
- Currently 4,400 cubic meters of calcine is stored in 6 bin sets
 - Designed for safe storage for several hundred years
 - Stored under RCRA Part B Permit

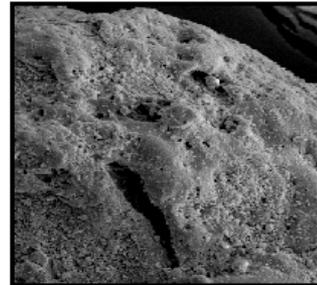
Calcine Bed Material 40x



Calcine Bed Material 150x



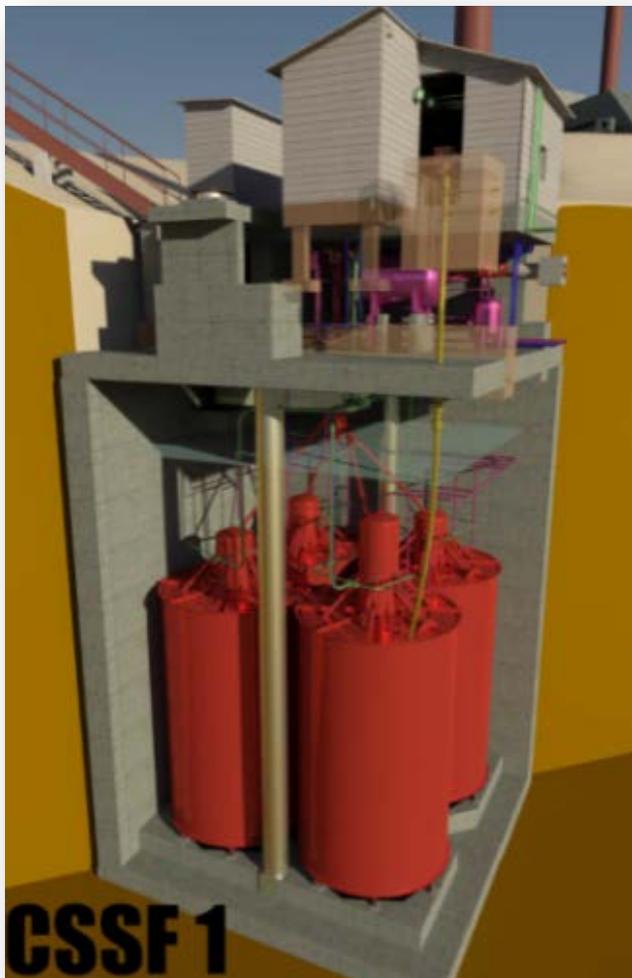
Calcine Bed Material 500x



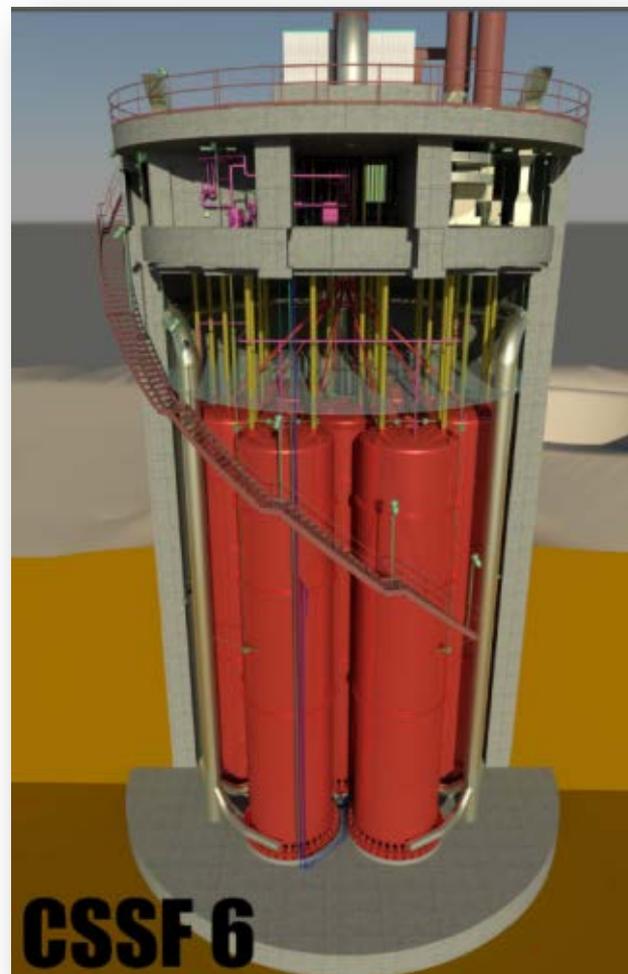
Calcine Solids Storage Facilities (CSSFs) aka the "Bin Sets"



Calcine Solids Storage Facilities (CSSFs)



Currently contains 220 cubic meters of calcine



Currently contains 713 cubic meters, which is about half full

Project Need

- Calcine Disposition Project is organized into two parts:
 - Retrieval
 - Processing
- Retrieval is the common element for all final processing options for calcine
 - We need to demonstrate the ability to safely retrieve and transfer calcine before progressing on treatment facility design

Project Tasks

- Prepare conceptual design and regulatory strategy
- Test retrieval and transfer concepts
- Prepare bin set 1 for calcine removal
- Construct retrieval and transport system
- Transfer calcine from bin set 1 to bin set 6
- D&D retrieval and transport system
- Close bin set 1 under RCRA

Timeline

- Complete design by FY-18
- Initiate fabrication/construction of retrieval equipment by FY-19
- Begin calcine retrieval/transfer by FY-20
- Complete transfer by FY-21
- Close bin set 1 by FY-22

Back Pocket Slides

Calcine Solids Storage Facilities (CSSFs)



CSSF #1



CSSF #2, 3, 4



CSSF #5, 6

- Design and construct processing system using the Integrated Waste Treatment Unit (IWTU) facility to the maximum extent practical
- Retrieve calcine from bin sets and process using hot isostatic pressing (HIP) technology
 - 4,400 m³ (155,000 ft³) or 5.5 million kg (12.2 million lbs) of calcine
- Package treated waste form in canisters
- Ship off-site or place canisters in interim storage pending off-site shipment for disposition

- Current Project TPC cost range is \$0.9 B to \$2.0 B
- Critical Decision-0 Approved April 17, 2007

Calcine Disposition Project Drivers

- Settlement Agreement - Calcine ready for disposal outside the State of Idaho by target date of 12/31/2035.
- Federal Facility Compliance Act Site Treatment Plan Milestones
 - Procure contracts for treatment facility by 9/30/2019
 - Initiate construction by 9/30/2020
 - Conduct system testing by 3/31/2023
 - Commence operations by 3/31/2024
- NEPA Record of Decision selected Hot Isostatic Press as treatment option (December 23, 2009) (Settlement Agreement requirement)
- RCRA Part B permit application for the HIP treatment process submitted to State of Idaho DEQ 11/27/2012 (Settlement Agreement requirement)

Regulatory path is very complicated:

3116 Activities:

- Performance Assessment/Composite Analysis Development
- 3116 Basis Document Development
- Waste Determination approval by Secretary of Energy
- Nuclear Regulatory Commission Long Term Monitoring Plan

Resource Conservation/Recovery Act (RCRA):

- Permit Revision, including RCRA Closure Plan

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA):

- General Decommission/Demolish Memo Addendum

DOE Order 435.1:

- Tier I Closure Plan
- Performance Assessment/Composite Analysis

National Environmental Policy Act:

- Complete NEPA Decision for Bin Set Closure

Six Proof-of-Concept Tests

1. CSSF 1 distributor/fill line clean-out

Development and fabrication of an apparatus and method for removing residual calcine from the CSSF 1 distribution and fill line network.

2. D&D Pipe crimping and removal

Evaluate methods for crimping CSSF-1 piping in order to safely remove the piping while containing residual calcine.

3. Riser installation

Development of an approach for installing bin group retrieval access risers.

4. Thermowell conversion

Development of an approach for removing the thermocouple wires from the thermowell pipes, cutting off the bottom thermowell cap, and installing the retrieval system platform.

5. Bottom-up retrieval testing

Test thermowell vacuum retrieval apparatus to define operating parameters and evaluate retrieval rate, flow characteristics and bin cleanliness.

6. Top-down residual calcine retrieval

Development of supporting equipment for clean-out of residual calcine.