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Citizens Advisory Board

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K-Area

Repurposed Reactor Facility at Savannah River Site for storage/disposition of Surplus Pu
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>CCO</td>
<td>Criticality Container Over-pack</td>
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<tr>
<td>DOE</td>
<td>Department of Energy</td>
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<tr>
<td>DE</td>
<td>Destructive examination</td>
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<tr>
<td>FGE</td>
<td>Fissile Gram Equivalent</td>
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<tr>
<td>KIS</td>
<td>K Interim Surveillance</td>
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<tr>
<td>LANL</td>
<td>Los Alamos National Laboratory</td>
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<tr>
<td>LLNL</td>
<td>Lawrence Livermore National Laboratory</td>
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<tr>
<td>MIS</td>
<td>Materials Identification and Surveillance</td>
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<tr>
<td>NDA</td>
<td>Non-destructive assay</td>
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<tr>
<td>NDE</td>
<td>Non-destructive examination</td>
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<tr>
<td>PSI</td>
<td>Pounds per square inch (gas pressure above atmospheric)</td>
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<tr>
<td>Pu</td>
<td>Plutonium</td>
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<tr>
<td>RFETS</td>
<td>Rocky Flats Environmental Technology Site</td>
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<td>SRS</td>
<td>Savannah River Site</td>
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<td>SRNL</td>
<td>Savannah River National Laboratory</td>
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<td>SWMF</td>
<td>Solid Waste Management Facility</td>
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<td>WIPP</td>
<td>Waste Isolation Pilot Plant</td>
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Pu Stabilization and Packaging for Storage

- 1994 Department decided to stabilize, package and store excess plutonium until final disposition

  - Robust oxide stabilization – at least 950 °C for two hours
  - Robust packaging – two welded, nested stainless steel containers
  - Requires surveillance program to assure there is no long term degradation of containers

- Plutonium stabilization and packaging began in late 2001
  - Rocky Flats Environmental Technology Site (RFETS)
  - Hanford Site
  - Los Alamos National Laboratory (LANL)
  - Lawrence Livermore National Laboratory (LLNL)
  - Savannah River Site (SRS)
Storage in K-Area

Type B - 9975 Plutonium Shipping container (~400 pounds)

3013 Container (~30 lbs.)

Convenience Container

Inner Container

Opened 3013 Container
3013 Surveillance Program

• Surveillance and Monitoring Program approved in 2003

• Materials Identification and Surveillance (MIS) Working Group provides guidance and performs the technical oversite for the program
  – Consists of technical experts from the plutonium processing sites and laboratories (SRS, Hanford, LANL, and LLNL)
  – Selects 3013 containers for Destructive Examination at SRS and evaluates the results
    • Containers selected are a combination of randomly selected containers and ones selected by the MIS based on Shelf-Life and surveillance results
    • 6 MT is composed of both Weapons Grade and Fuels Grade Pu with various impurities (e.g., salts and chlorides)

• Shelf-Life and corrosion tests
  – Containers of plutonium-bearing materials were selected that are representative of all of the different types of materials packaged
  – Tests bound the gas generation and corrosion that might occur in actual containers
3013 Surveillance Program (continued)

• Non-destructive examination (NDE) and destructive examination (DE) of stored 3013 containers are performed at SRS

• NDE started in 2005
  – Radiographic examination for possible pressurization
  – External examination of containers for any evidence of corrosion
  – NDE of the randomly selected containers was completed in FY2010

• DE started in 2007
  – Analyzes gas composition and measures gas pressure
  – Metallurgical examination of containers for evidence of corrosion
  – Chemical and physical analyses of the material
  – Examine 7 containers per year
  – Scheduled to complete randomly selected containers in FY2025
  – DE will continue as long as containers are stored at SRS

• Surveillance program has not identified any condition that would challenge the 50 year storage life

• Continue to perform DEs in K Area and Shelf-Life program at LANL to validate storage life
EM Pu Downblending is exactly the same process as the NNSA Dilute and Dispose Program.
Pictures of the process

KIS Glovebox

Blend Can

Pu Oxide

Bagged Blend Can in outer blend can

Blend Can bagged out of Glovebox
Criticality Control Over-pack (CCO)

- Each CCO can hold 2 outer Blend Cans
- Each Blend Can holds up to 150 grams of Pu fissile gram equivalents
SUMMARY

EM Lifecycle for Disposition of the 6 MT of Surplus Plutonium:
• Assumes the 6MT is dispositioned by FY2046 with all materials being shipped to WIPP
• Requires additional funding for additional shifts and oxidation capabilities

Collaboration with NNSA allows:
• Expedited downblending/dilute and dispose of Pu Oxide
• Establishment of WIPP characterization and storage capabilities within K-Area for more efficient operations