



Downblend Operations Improvement Initiatives - 2023

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Programs

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- The strategy for disposition of surplus fissile materials is to process and dispose in a manner that is proliferation resistant and prevents future reuse of the material in nuclear weapons.
- The dilute and dispose approach, also referred to as plutonium downblending, consists of blending plutonium oxide with a multicomponent adulterant, packaging for shipment, and disposing in a geologic repository.
- Dilute and dispose has been successfully demonstrated with disposition of plutonium-bearing residues at the Waste Isolation Pilot Plant (WIPP).
- Plutonium downblending is currently being utilized at the Savannah River Site (SRS) facilities to disposition surplus plutonium.
- The process involves many steps and requires collaboration with several organizations within the DOE Complex.
- Improvements to processes are aimed at improving efficiency.

Dilute and Dispose Process



Plutonium oxide (PuO_2) and Blend Can Kits are placed in a glovebox



DOE-STD-3013 containers are opened for PuO_2 blending



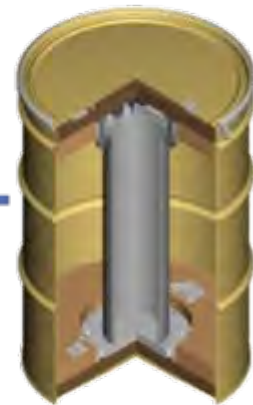
PuO_2 is added to adulterant in "blend can"



PuO_2 is blended with multicomponent adulterant



Following Characterization CCOs are loaded in TRUPACT-II for transport



DSP is loaded in Criticality Controlled Overpack (CCO) for Disposal at WIPP



DSP is packaged in Can/Bag/Can outside glovebox



ROC reduces radiation exposure for handling of Dilute Surplus Plutonium (DSP)

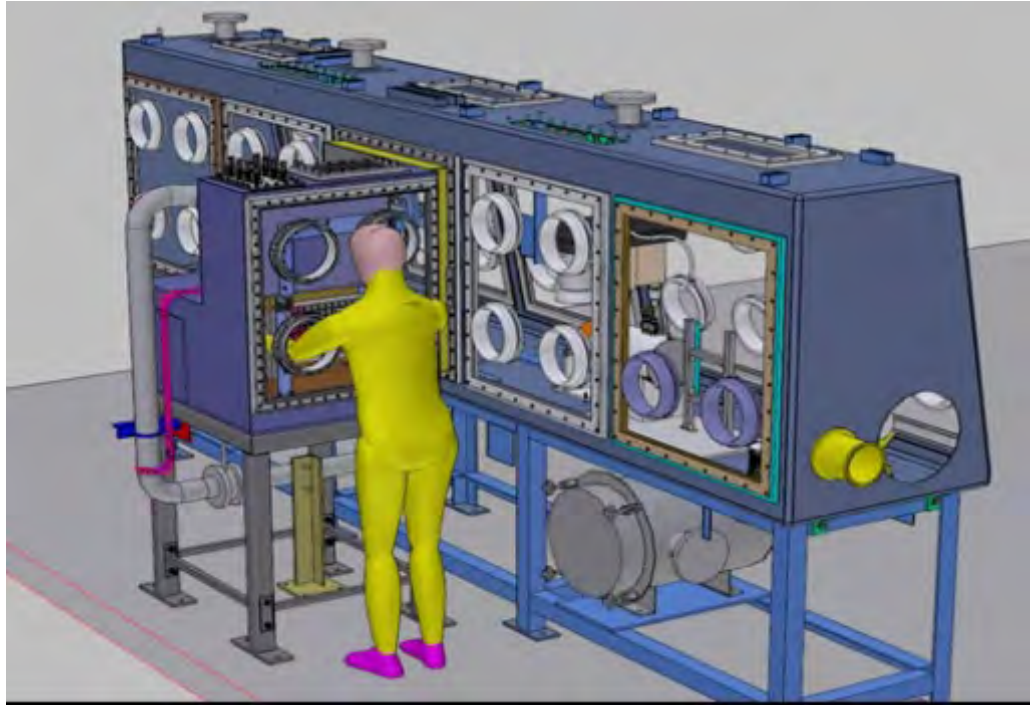


Lids are press-fit to close Robust Outer Container (ROC)

- Documented Safety Analysis (DSA) Revision to allow for multiple operations to occur at the same time



- Training of Operators
- Procedure Validation, anomaly resolution



- New Entry Control Facilities allow for more efficient entry/exit of personnel
- Increased capacity of personnel and materials

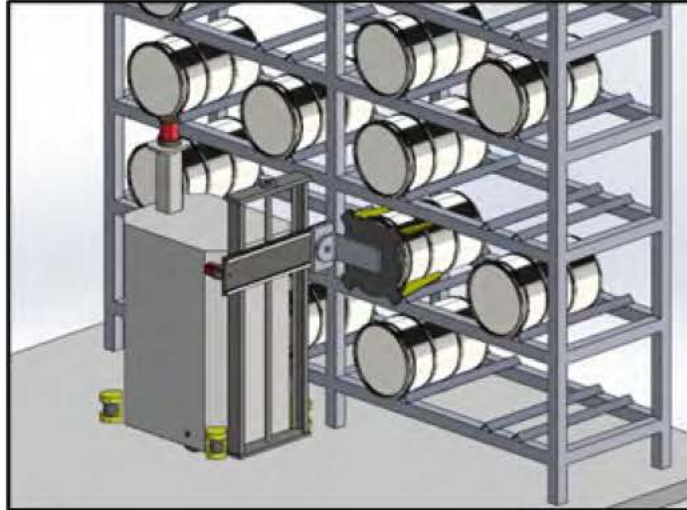






K-Area Aerial View

- Research and Development activities to evaluate the possibility of utilizing automation



Containers Used to Deliver Plutonium Oxide for Dilution



Containers Used to Dilute and Ship Plutonium Oxide



- WIPP receives shipments from DOE Complex sites around the United States
- SRS Shipments are scheduled through the Management and Operations Contractor at WIPP - Salado Isolation Mining Contractors (SIMCO)
- SPD Shipment activities are coordinated with Savannah River Site Solid Waste Staff
- Rolling eight-week schedule (updated each week)
- SPD Program plans for increased number of shipments as processing throughput increases
- Series of steps to prepare for each shipment
- Reviewing processes for efficiency



- Downblend operations and shipment of material to WIPP are underway.
- The processes associated with this work involve many steps and the collaboration of several organizations throughout the DOE Complex.
- Improvement initiatives, which make processing and shipping material more efficient, are being evaluated.



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