



U.S. DEPARTMENT OF  
**ENERGY**



# K-Area Pu Down Blending Overview and Update

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*Southern States Energy Board  
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# K-Area Complex



## Guiding Program Requirements

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- **Record of Decision (81 FR 19588, April 2016 ) to implement the dilute and dispose strategy to prepare up to 6 metric tons of non-pit surplus plutonium for disposal at the Waste Isolation Pilot Plant (WIPP) facility**
- **Amended Record of Decision (85 FR 53350) to implement the dilute and dispose strategy to prepare additional 7.1 metric tons of non-pit surplus plutonium for disposal at the WIPP facility**
  - AROD changes the disposition pathway for a portion of the 34 MT of surplus plutonium DOE/NNSA previously decided in 2003 to fabricate into mixed oxide fuel
- **All packaged waste required to meet the WIPP Waste Acceptance Criteria**
  - Packaged in Nuclear Regulatory Commission certified Criticality Control Overpacks (CCOs)
  - Must go through rigorous WIPP managed characterization/certification program (includes US EPA and State of New Mexico Environment Department requirements)
  - Meet WIPP mine/facility safety requirements
  - Must be shipped in NRC-certified TRUPACT-IIs

## K-Area Pu Program Overview

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- **Joint EM and NNSA mission**
- **Provides for the safe and secure storage of excess plutonium and other special nuclear materials and fulfills the U.S. commitment to international nonproliferation efforts**
- **Maintains testing outlined in DOE-Standard 3013 for safe storage of 3013 containers**
  - Surveillance and Monitoring Program approved in 2003
  - Technical experts from across the DOE complex select containers for Destructive Examination
  - Corrosion and Shelf-Life Testing
- **Provides for dilute and dispose of surplus Pu**
- **Provides characterize and ship surplus Pu to WIPP**





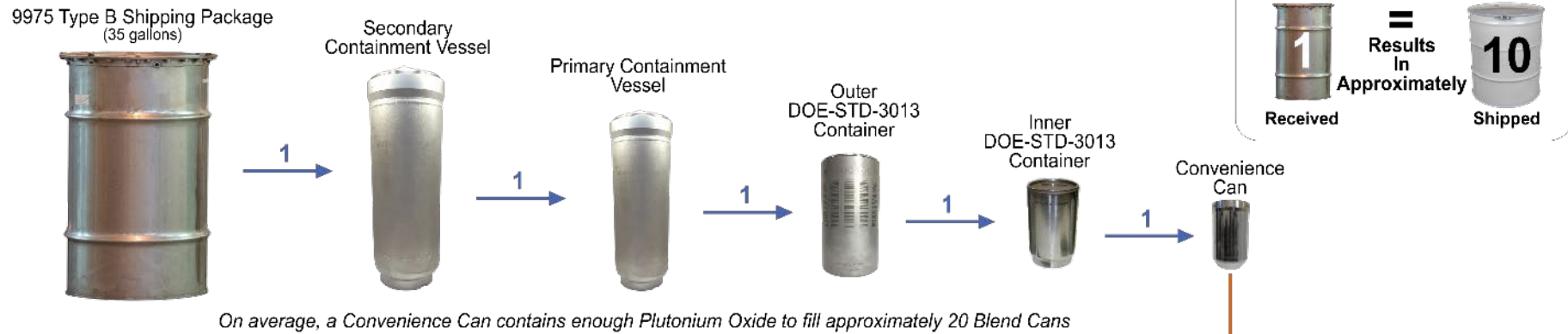
## K-Area Facility Timeline

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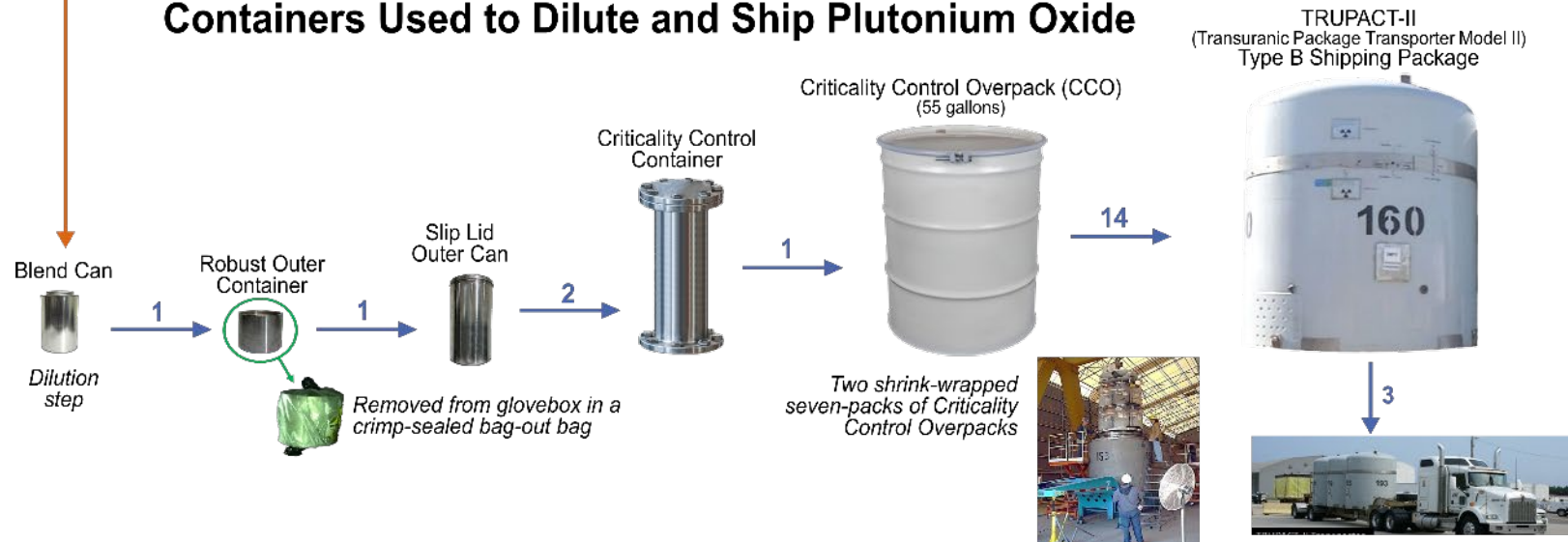
- **Plutonium Production Reactor (1954-1992)**
- **Converted into a surplus Plutonium repository (1997)**
- **Initiate small glovebox line (K-Area Interim Surveillance, aka KIS) to perform destructive evaluations of stored material (2007)**
- **Initiate limited Plutonium Downblend process in KIS (2016)**
- **Complete process optimization initiatives for the KIS glovebox (2020)**
- **Construct CCO Storage Pad and deploy WIPP characterization equipment (2021)**
- **CCO Pad begins operation & KIS glovebox transitions to 4-shift downblend processing (2021)**
- **Complete first shipment to WIPP (December 2022)**
- **Gain efficiencies in all areas of Pu disposition in K-Area (Post 2023)**
  - NNSA Project to add an additional three glovebox lines

# Dilute and Dispose Process

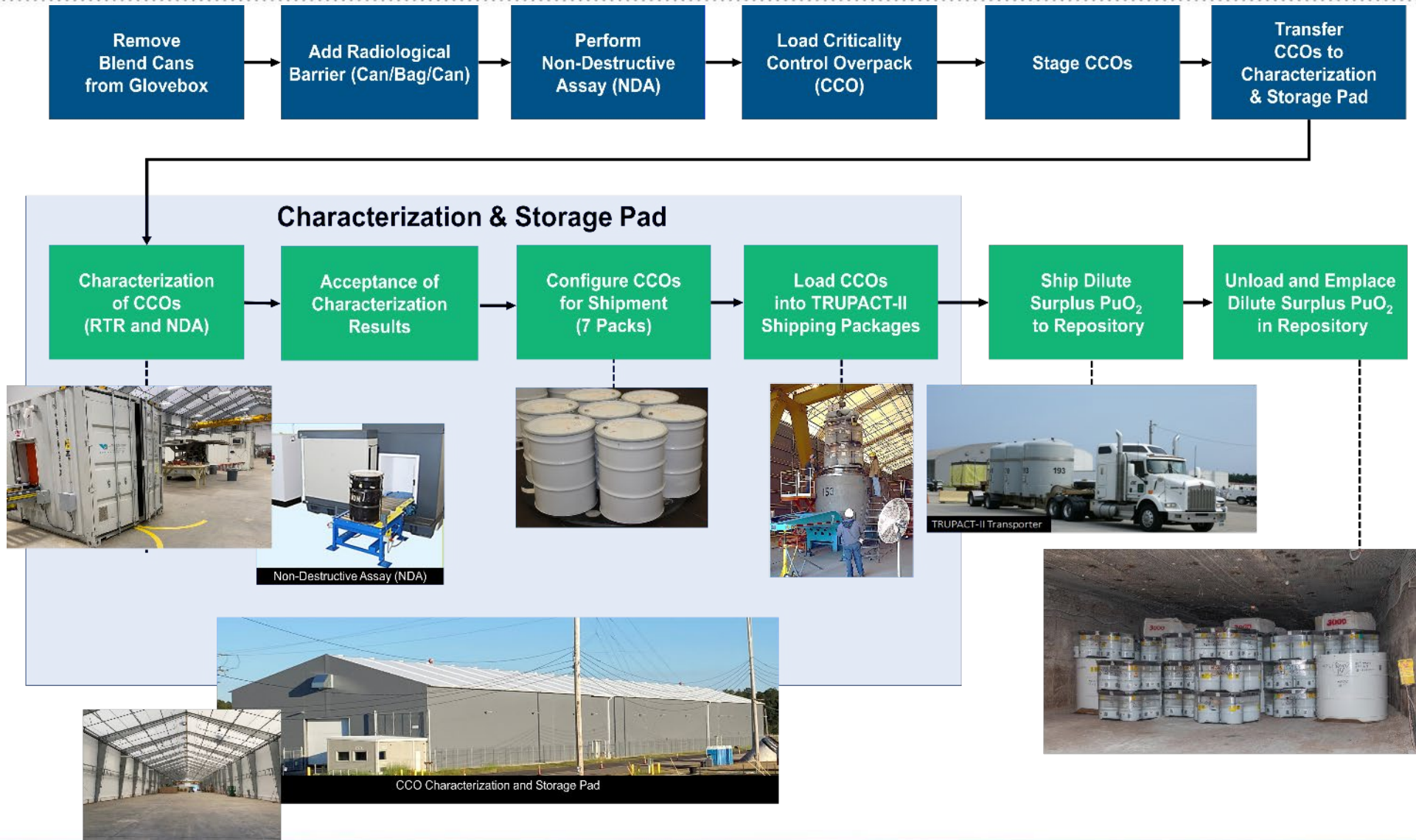
## Containers Used to Deliver Plutonium Oxide for Dilution



## Containers Used to Dilute and Ship Plutonium Oxide

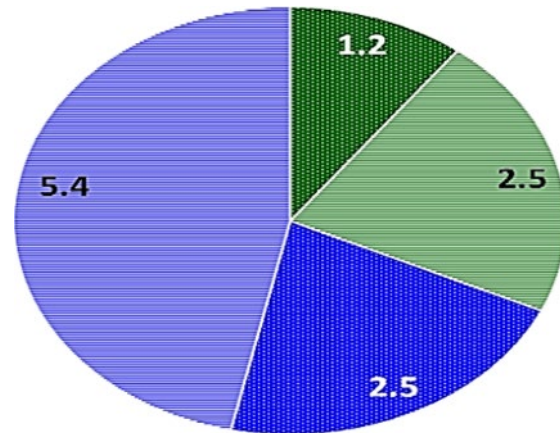


# Characterization Process



## Storage and Inventory Overview

- The total reconciled plutonium inventory in K-Area at the end of fiscal year 2019 was approximately 11.5 metric tons (MT)
  - Of which, ~9.5 MT remains after the successful completion of the 1 MT campaign of the material that was brought into the state of South Carolina since 2002



■ FG metal    ■ FG oxide  
 ■ WG metal    ■ WG oxide

## Plutonium Inventory Summary Information for SRS K-Area Facility

(Based on end of FY2019 reconciled inventory)

Material	Inventory (Kg)	Number of 3013s
WG Metal	2,500	1000
FG Metal	1,200	400
WG Oxide	5,400	2400
FG Oxide	2,500	1200
<b>Totals</b>	<b>11,500</b>	<b>5000</b>

Note: About 1/3 of inventory contains fuel grade plutonium (higher radiation dose and heat load) and 1/3 of inventory is metal requiring future oxidation.



## Progress to Date

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- **FY 2022:**
  - Downblended ninety-one 3013 containers
  - Completed WIPP certification for CCO characterization and shipping process in K-Area
  - Started characterization activities
- **FY 2023:**
  - Made first shipment to WIPP
    - *13 shipments completed*
  - Downblend one hundred and fourteen 3013 containers
- **Future:**
  - Add additional glove boxes
    - *NNSA project*
  - Increased downblend efficiency

## Summary/Take Aways

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- **Joint program between EM and NNSA**
- **Site's plutonium is safely stored and processed in K-area**
- **Department has made significant progress in recent years on surplus Pu disposition**
- **Long term success will be measured by program's ability to gain efficiencies in process**