K Area Overview/Update

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Nuclear Materials Committee
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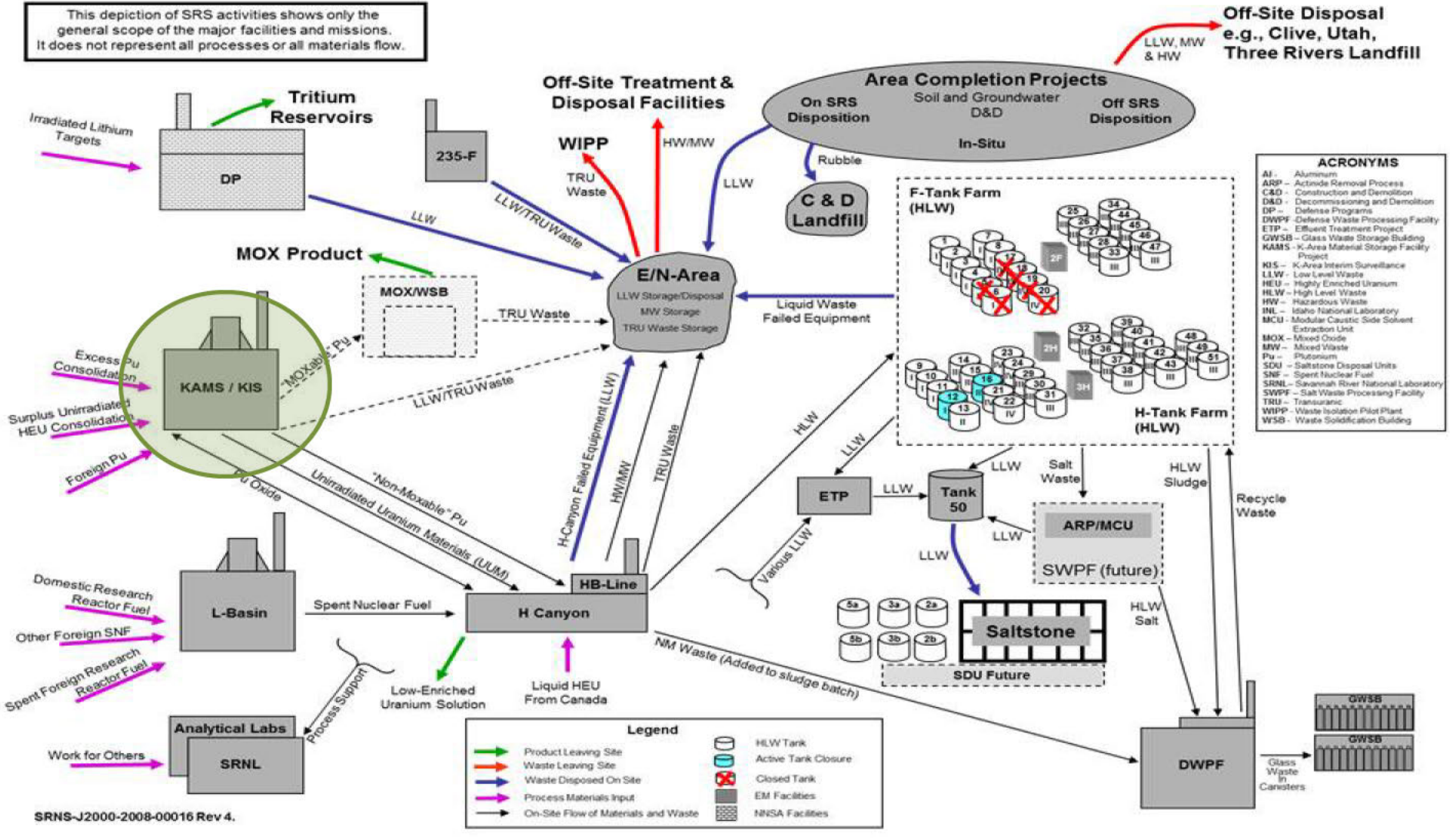
Purpose

- To provide information on K-Area and Plutonium storage which fulfills a 2015 Nuclear Materials Programs work plan item.

Savannah River Site
Waste and Material Flow Path

This depiction of SRS activities shows only the general scope of the major facilities and missions. It does not represent all processes or all materials flow.



SRNS-J2000-2008-00016 Rev 4.

Acronyms

DOE - Department of Energy

IAEA - International Atomic Energy Agency

LANL - Los Alamos National Laboratory

LLNL - Lawrence Livermore National Laboratory

Pu - Plutonium

RFETS - Rocky Flats Environmental Technology Site

SRS- Savannah River Site

Plutonium Consolidation

- 1998 Department decided to consolidate non-pit Plutonium (Pu) from various sites to the Savannah River Site (SRS)
  - Rocky Flats Environmental Technology Site (RFETS)
  - Hanford Site
  - Los Alamos National Laboratory (LANL)
  - Lawrence Livermore National Laboratory (LLNL)
- 1998 the Department decided to convert the K Reactor to a plutonium storage facility.
- 2001 Department approved the consolidation of only RFETS Pu to SRS
- 2007 Department approved the consolidation of remaining non-pit Pu to SRS
  - Hanford
  - LANL
  - LLNL

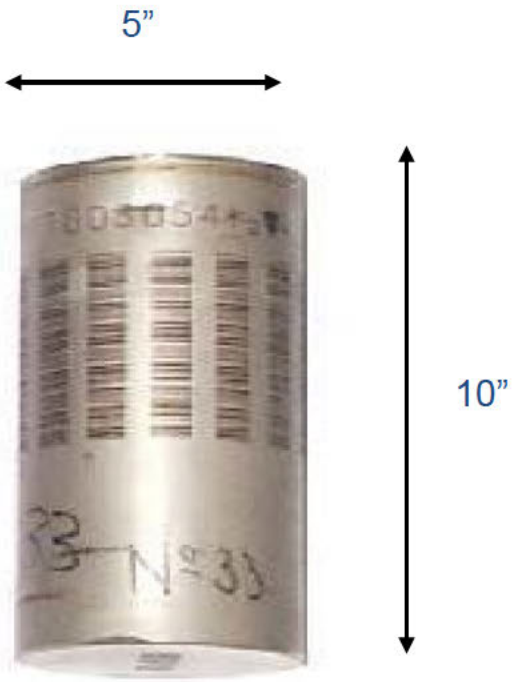
Pu Under Safeguards

- SRS has approximately 3 metric tons of Pu under International Atomic Energy Agency (IAEA) safeguards
  - RFETS and Hanford each had approximately 1 metric ton of Pu under IAEA safeguards prior to consolidation
  - This material was transferred to SRS and remains under IAEA safeguards
  - The Department placed an additional metric ton of Pu under IAEA safeguards

K Area Storage in 2000

K Area Storage

K Area Storage Configuration



3013 Container
(~30 lbs.)

9975 Shipping Container
(~400 lbs.)

Cross Sectional of 9975 Shipping Container

K Area Expansion

- In 2010 the Department initiated a project to expand the storage capacity of K Area.
- The decision to expand K Area capacity was made prior to any discussions concerning Mixed Oxide Fuel Fabrication project future.
- Phase I was completed and became operational in June 2012.
- Phase II was completed and became operational in December 2014.
- The expansion added an additional 2,500 storage positions.

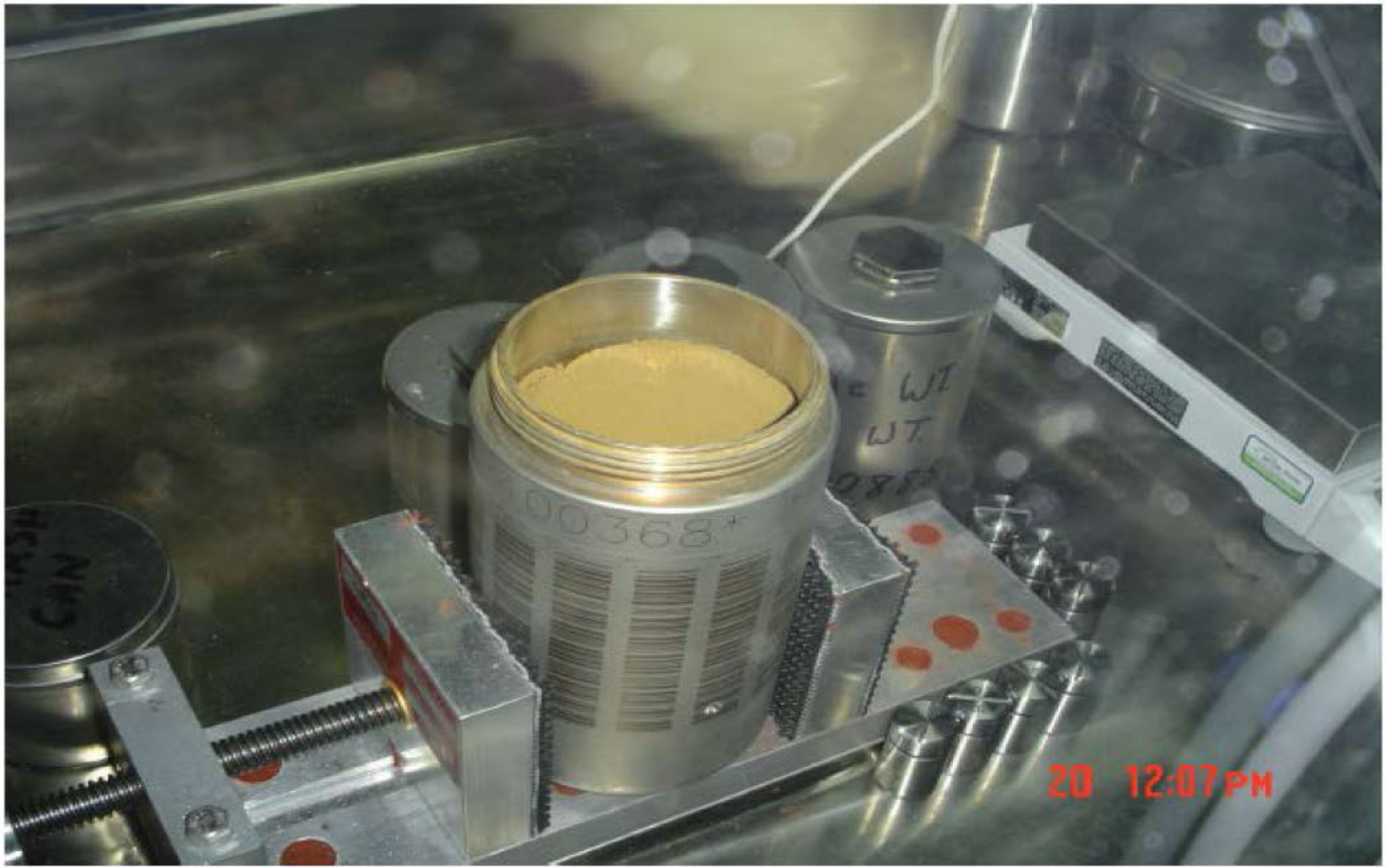
3013 Surveillance Program

- Surveillance and Monitoring program approved 2003
- Non Destructive Examination (NDE) looks for pressurization
  - »Began 3 years after packaging (2005)
  - » Performing ~ 40 per year
  - » Completed the NDE
- Destructive Examination (DE) looks for corrosion, gas analysis, and material characteristics
  - » Began 5 years after packaging (2007)
  - » Initially 15 DEs per year
  - » Currently performing 9 per year
  - Shelf Life Program being conducted at LANL on small scale and large scale samples. Have representative samples of all Pu in storage under 3013 program

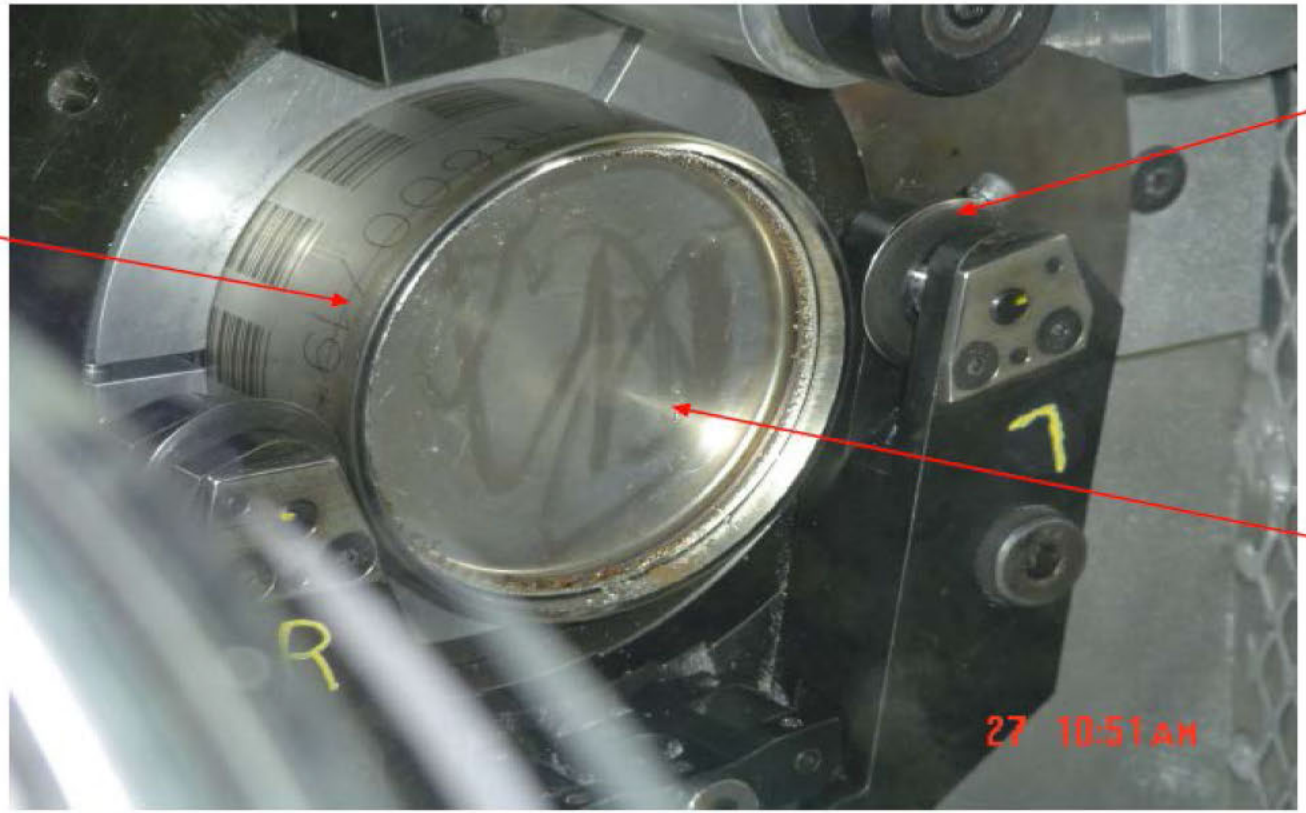
Glove Box Operations

- **Typical Glovebox operations**
  - Can puncture
  - Draw 2 gas samples
  - Can cutting of outer & inner cans
  - Package 3 oxide samples
  - Package & transfer samples to SRNL
  - Package & transfer remaining oxide to 910-B

Convenience Can with Pu Oxide



Sectioned 3013 Can Lids



Surveillance Material – Pu Oxide

Surveillance Results

- Maximum Pressure inside the 3013 container is less than 20 psi compared to 699 maximum theoretical pressure
- No flammable gas mixtures (hydrogen with no oxygen)
- Some corrosion seen on the convenience can, usually in the gas space or oxide can interface area
- Minimal corrosion in the inner can around the weld area
- Surveillance program has not identified any condition that would challenge the 50 year storage life
- Continue to perform Destructive examinations in K Area and shelf life program at LANL to validate storage life

Summary

- Pu is safely stored in K-Area
- SRS continues to evaluate storage conditions to ensure safe storage
- SRS has the experienced staff and facility to handle Pu