# DOE 3013 Container Program

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*Citizens Advisory Board*
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# Background

- **Following the end of the "Cold War" in 1989, need for plutonium product and scrap was sharply curtailed thus creating a surplus of material**
- **1994 Department decided to stabilize, package and store excess plutonium until final disposition**
- **1994 Department issued Standard DOE-STD-3013, "Stabilization, Packaging, and Storage of Plutonium-Bearing Materials"**
- **Plutonium stabilization and packaging began in late 2001**
  - Hanford Site
  - Lawrence Livermore National Laboratory (LLNL)
  - Los Alamos National Laboratory (LANL)
  - Rocky Flats Environmental Technology Site (RFETS)
  - Savannah River Site (SRS)

# Example of 3013 Container Configuration

Welded Outer Container – design the same for all sites

Welded Inner Container – design differs between packaging sites

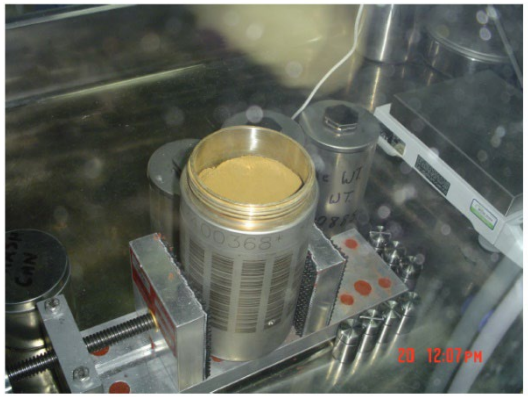
Vented Convenience Container – design differs between sites

# Additional 3013 Container Details

Storage in K-Area


3013 Container
(~30 lbs.)


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



Opened 3013 Container

## DOE-STD-3013 Overview

- **The original standard, issued in 1994, was based on decades of experience with short-term storage of plutonium and sought to avoid conditions that had led to previous container concerns**
  - Designed to be sufficient for 50-year storage
  - Sets limits on contents
  - Outer container design working pressure of 699 psig (about twenty times your average vehicle tire pressure)
  - Leak-tight after dropping from the distance of 30 ft. (rooftop of a two-story house)
- **Revised in 1996, 1999, 2000, 2004, 2012 and 2018 to incorporate lessons learned**
- **The 2024 revision is currently in the review process**
- **Over 5000 containers were packaged between 2001 and 2005**
- **Formal surveillance (monitoring) program began 2003**
  - Field work for current surveillance program completed in 2024
  - Laboratory evaluations of containers and oxide materials continue
  - Next Phase of field surveillance program is under development

# Integrated Surveillance Program (ISP)

- **One integrated program covers all Pu storage sites, not just SRS**
  - Initial ISP identified no credible failure mechanisms for stored metal and two potential mechanisms for oxide – pressurization and corrosion
  - Evaluates performance of containers vs. 50-year service life
  - Two parts of surveillance program are Shelf-life Testing and Field Surveillance
- **Shelf-Life Program**
  - Accelerated performance testing using both representative samples from the packaging sites as well as worst-case materials
  - Both small scale and full-scale units
- **Field Surveillance**
  - Both Non-Destructive and Destructive Examination of containers in storage inventory
  - Containers selected by both random sampling and engineering judgment
  - 162 Destructive Examinations and 152 Non-Destructive Examinations performed to date

# ISP Findings and Conclusions

- **Pressurization**
  - Maximum gas pressure is significantly lower than estimated
  - Any oxygen present in the gas phase decreases, so no flammable gas composition

- **Corrosion**
  - Corrosion rates decrease over time
  - Potential failure of inner containers due to stress corrosion cracking has not been eliminated
    - *A small number of containers have significant amounts of chloride salts present with elevated moisture*
    - *In those containers, some cracking has been observed (none through-wall)*
  - No outer container concerns have been observed

- **Surveillance program has not identified any stored materials that would challenge the 50-year storage life**

- **Next phase of surveillance program will continue with focus on destructive examination of chloride salt bearing stored materials**

- **Findings are used as feedback in the 3013 Standard revision process**

- **The 3013 Standard has provided a safe and secure program for the storage of surplus plutonium awaiting disposition.**