

Remote-Handled TRU Storage Challenges at Sandia National Laboratory

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Background

- **2013**
 - **37 parent containers of RH TRU required repackaging, certification and disposal to meet milestones**
- **2014**
 - **Project kickoff with WIPP certified VE and DTC operators at the AHCF in January**
 - **02/05/14 and 02/14/14, fire and radiological release at WIPP**



Background

- ***Consequently—Suspension of shipments***
- ***Length of suspension unknown***
- ***Original plan—package each parent container one to one***
- ***Required consolidation into fewer containers if possible***



Sandia Issues

- ***Nuclear storage facilities***
- ***RCRA permitted storage***
- ***Dose and shielding***
- ***Accountable material***
- ***Meeting FGE, decay heat, and PE-Ci requirements for wipp***



Limited Nuclear Storage Facilities

- ***Auxiliary Hot Cell Facility-Hazard Category 3***
 - ***High bay***
 - ***Mid bay***
- ***Sandia Pulsed Reactor-Hazard Category 2***
 - ***Storage***
- ***Bunkers-Previously Hazard Category 3***
 - ***Downgraded to radiological in December of 2014***



RCRA Storage

- ***AHCF—Nuclear facility and RCRA permitted, but only in the high bay***
- ***SPR—Nuclear facility but not RCRA permitted***
- ***Bunkers—RCRA permitted but only radiological facilities***



Criticality Safety and Material-at-Risk

- ***Criticality safety index (CSI) arrays set up***
- ***Calculations to determine CSI labels for each container before packaging***
- ***Based on load plans***
- ***Updated as load plans had to be modified***



CSI Array



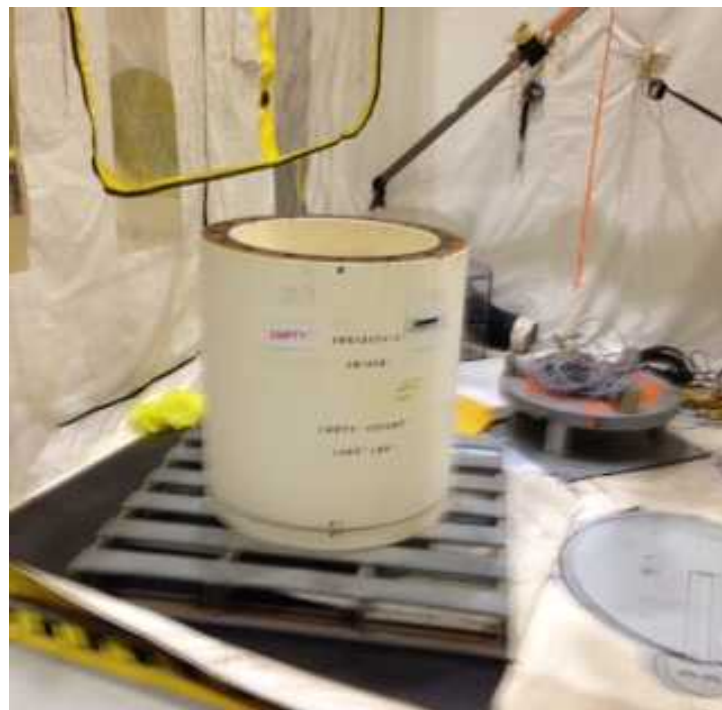


Dose and Shielding

- ***Only storage option was the high bay of the AHCF***
- ***The hot cell is located in the high bay***
- ***Required shielding for the 55-gallon drums***
 - ***Originally had three L110 shielded overpacks***
 - ***Two shorty casks—55 fits inside, but lid cannot be attached***
 - ***Ordered nine more shielded overpacks***



Casks





Accountable Material

- ***Majority of the material is accountable***
- ***Allowed use of MC&A data to determine scaling factors***
- ***Required loading 1 parent to 1 daughter, or multiple parents to one daughter, not load 1 parent to 2 daughters***
- ***Direct loaded large items; used shield pots from ANL for small pieces***



FGE, Decay Heat, and PE-Ci Requirements

- ***Sandia and WIPP staff used the MC&A data to develop load plans for each container***
- ***Each container would meet the FGE , decay heat, and PE-Ci limits***
- ***When modifications needed to be made, new calculations were performed***



Initial Technical Challenges and Solutions

- **1st challenge—Nuclear and RCRA storage**
 - **RCRA drums stored in the high bay**
 - **Non-RCRA drums stored in mid bay**

- **2nd challenge—dose and shielding**
 - **purchased additional shielded overpacks, final drum count 12 55-gallon drums, had 13 full size overpacks**

- **3rd challenge—Accountable material**
 - **met requirement, either 1 parent to 1 daughter or multiple parents to one daughter**



So What Is The Problem?

- **Generated 15 drums of Project Generated Waste (PGW), 9 were RH, 6 were CH**
 - **Only had one extra shielded container**
- **Dose-to-Curie results indicated three drums did not meet the FGE limits**
 - **Would have to be split**



New Challenges and Solutions

- ***Dose rates from many PGW drums were lower***
 - ***Ranged from 200 mrem/hr to 12.3 Rem/hr***
 - ***Shielded low dose PGW drums with the loaded shielded containers***
 - ***Low dose/non-RCRA stored in mid bay***

- ***FGE limit was 315, three drums required splitting***
 - ***SNL001502—contained 2 shield pots***
 - ***SNL001503—direct load***
 - ***SNL001604—direct load***



Splits

SNL001502—SNL001505 and SNL001506

**SNL001503—SNL001507, SNL001508, and
SNL001509**

**SNL001605—SNL001606, SNL001607, and
SNL001608**

SNL001505—SNL001510 and SNL001511

**SNL001510 and SNL001511—re-distributed the
material—SNL001512 and SNL001513**

“Initial 12 drums became 18”

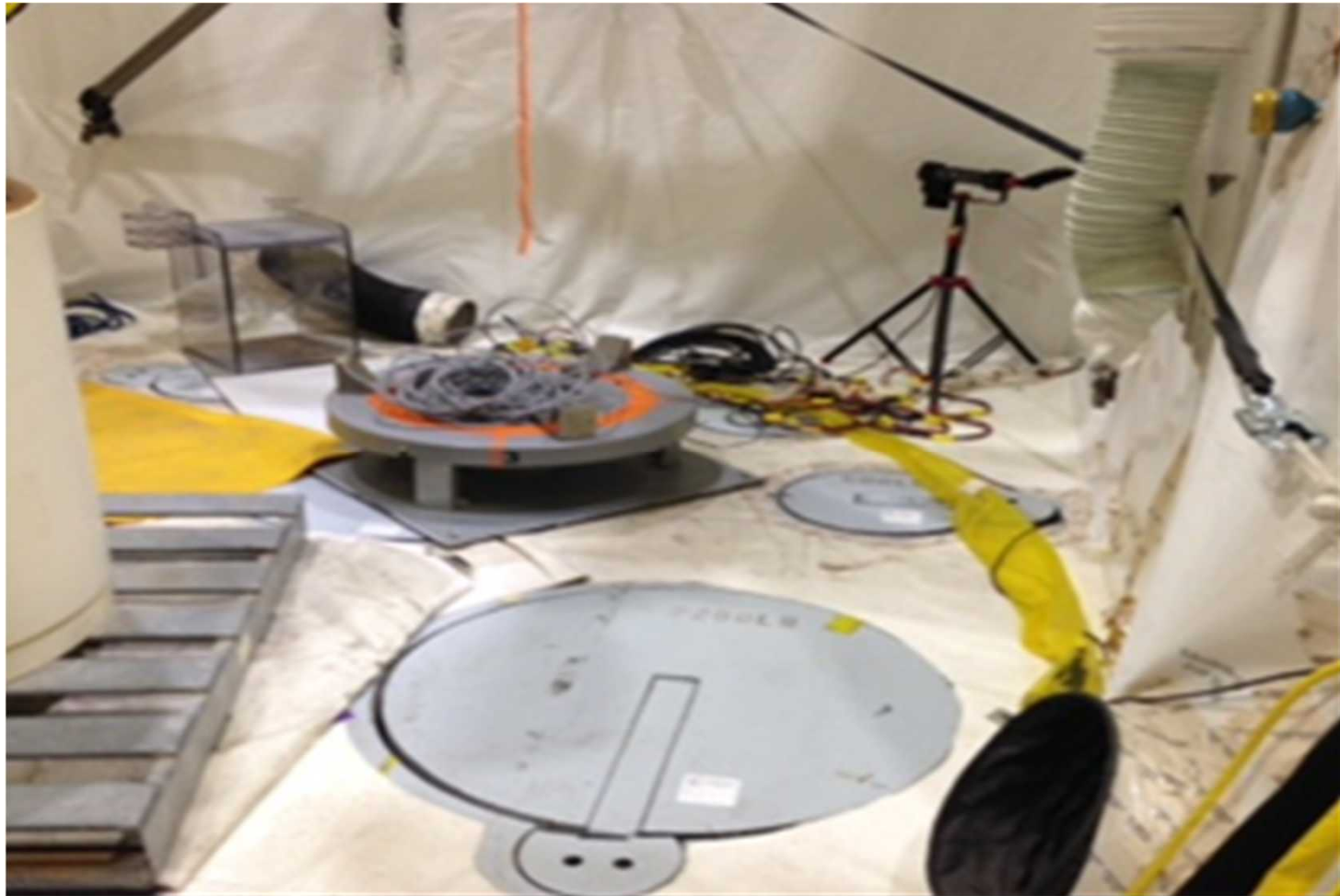


Accountable Material Storage

- **SNL001506**--in a shielded cask
- **SNL001606, SNL001607, SNL001608**—in a silo
- **SNL001507, SNL001508, SNL001509**—in a silo
- **SNL001512 and SNL001513**--in a 744



Sílos





Path Forward

- ***Negotiating contract extension with NWP***
- ***Interested in WIPP approved shielded containers***
- ***Two issues of concern***
 - ***Potential new transportation requirements***
 - ***Definition of the waste matrix***
- ***Waiting for WIPP to re-open***



Thanks

- **Coauthors—AHCF operators and manager**
- **TA-V Radiation Protection**
- **Nuclear Material Management Department**
- **NWP RH Manager, SPM, AKEs, Rad engineers**
- **VE and DTC operators from INL/ANL/LANL/SRS**