

Challenging Wastes Processed at the Advanced Mixed Waste Treatment Project



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IDAHO

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AMWTP Background

- **Constructed from Aug. 2000 to Dec. 2002**
- **Most of its waste was generated at the Rocky Flats Plant**
- **Waste inventory also included challenging materials with no treatment options**
 - Pyrophoric metals
 - Roaster oxides
 - High-activity wastes
 - Suspected remote-handled transuranic (TRU) wastes
 - Waste types that were difficult to characterize
 - Waste boxes that were too large for the boxlines



Waste disposal pad before AMWTP construction



Suspected roaster oxides



Suspected remote-handled transuranic waste

Background (cont'd)

- **Modifications to existing AMWTP facilities were required**
- **Additional facilities were utilized by Fluor Idaho for waste characterization, treatment, and repackaging**
- **New technologies were deployed (e.g., the In-Situ Object Counting System -- ISOCS)**
- **Heavy reliance on engineered controls to protect workers and the environment**



Inner Contamination Enclosure at AMWTP



Mound box resizing at Accelerated Retrieval Project VII



Hot cell at the Idaho Nuclear Technology and Engineering Center

Pyrophoric Metals

- **176 suspect waste drums of pyrophoric uranium metal fines**
 - 19 drums reacted
- **Facility permit modification and additional worker training were required**
- **Robotic equipment was used**
 - Combustibles were moved away from reaction by operators
- **Following reactions, waste material was placed in drums and crushed in supercompactor**



Pyrophoric waste reactions inside a boxline

Roaster Oxides

- **Roaster oxides consisted of roasted uranium metal fines**
- **214 suspected waste drums were identified**
- **ARP IX hadn't begun waste exhumation, so it was an ideal location**
- **Drums were placed into tray and raked to force reaction**
- **Following conditioning, the waste can be sent offsite for safe, permanent disposal**



ARP IX prior to waste exhumation



Roaster oxide conditioning

High-Activity Wastes

- **30 boxes identified as containing high-activity wastes**
- **One box had greater than 2,500 fissile gram equivalent (FGE) levels**
 - The average waste drum has an FGE equivalent of 30 or less
 - WIPP cannot accept drums containing more than 200 FGE of transuranics
- **Robotics used to dump material in metal trough and segregate into small amounts**
 - The segregated debris was then dropped through a port into an awaiting drum



A tank containing high FGE wastes



Port 16 allowed the processing of high FGE wastes in an amount of hours versus weeks

Suspected RH-TRU Wastes

- **27 suspected waste containers**
 - RH-TRU waste is defined as having an activity of 200 millirems per hour (or greater) on contact
 - The suspect material originally came from INL facilities and off-site generators
- **INTEC hot cell used to remotely open containers, characterize, segregate the CH- and RH-TRU components, and repackage the material**
 - RH-TRU waste was transported to a storage area at INTEC
 - CH-TRU waste was sent back to AMWTP for shipping to WIPP



Suspected RH-TRU waste

Waste Types That Were Difficult to Characterize

- **Affected more than 320 drums, boxes, and objects**
- **Crews deployed ISOCS technology**
- **Camera used to map gamma rays emanating from the containers**
- **The system determined specific isotopes and radioactive quantities**
- **Once characterized, waste was repackaged and prepared for shipping to WIPP**



ISOCS technology demonstration

Waste Boxes That Were Too Large for the Boxlines

- 74 large waste boxes were shipped from Ohio to Idaho
- Boxes contained gloveboxes, process components, and other industrial debris
- Many of the boxes contained plutonium-238
- Boxes were opened and size-reduced inside an ICE enclosure at AMWTP and the ARP VII facility
- Contents were transported to the AMWTP's boxlines for further size reduction with robotics
- Following repackaging, contents were crushed in supercompactor
- The drum "pucks" were placed in 100-gallon drums and shipped to WIPP for final disposal



Production glovebox

Summary

- **Challenging waste types forced crews to think of creative waste treatment solutions**
- **Repurposing existing facilities was a cost-effective alternative to constructing and permitting new buildings**
- **Crews often used simple tools for the job, such as a reciprocating saw**
- **The state of Idaho's willingness to work with RCRA permit modification requests and its issuances of Temporary Authorizations were instrumental to completing the work safely**

