U.S. DEPARTMENT OF ENERGY | OFFICE OF ENVIRONMENTAL MANAGEMENT

Environmental Management Cleanup Forum

LANL Legacy Cleanup

Transuranic Waste: Corrugated Metal Pipes

Presented by
Ellen Gammon
N3B Los Alamos, Director, TRU Waste Programs

October 26, 2022

ENVIRONMENTAL MANAGEMENT
SAFETY ❖ PERFORMANCE ❖ CLEANUP ❖ CLOSURE

N3B Los Alamos

Los Alamos Legacy Cleanup Contract

TRU waste trucks destined for WIPP in Carlsbad, NM

Transuranic Waste at LANL

Tonight's Focus: Corrugated Metal Pipes (CMP)

Definition: Transuranic (TRU)

Materials containing alpha-emitting radionuclides, with half-lives greater than twenty years and atomic numbers greater than 92, in concentrations greater than 100 nanocuries per gram of waste

TRU waste at Technical Area (TA) 54
Above Ground: In containers, stored in domes
Below Ground:

- Trenches A-D (710 containers)
- Shafts (10)
- Pit 9 (4,079 containers)
- Corrugated Metal Pipes (158)

CMP Work Scope: Retrieve, characterize, package and ship the waste for permanent disposal

Disposal Sites

- TRU waste: Waste Isolation Pilot Plant (WIPP), Carlsbad, New Mexico
- Low-level waste: commercial repositories

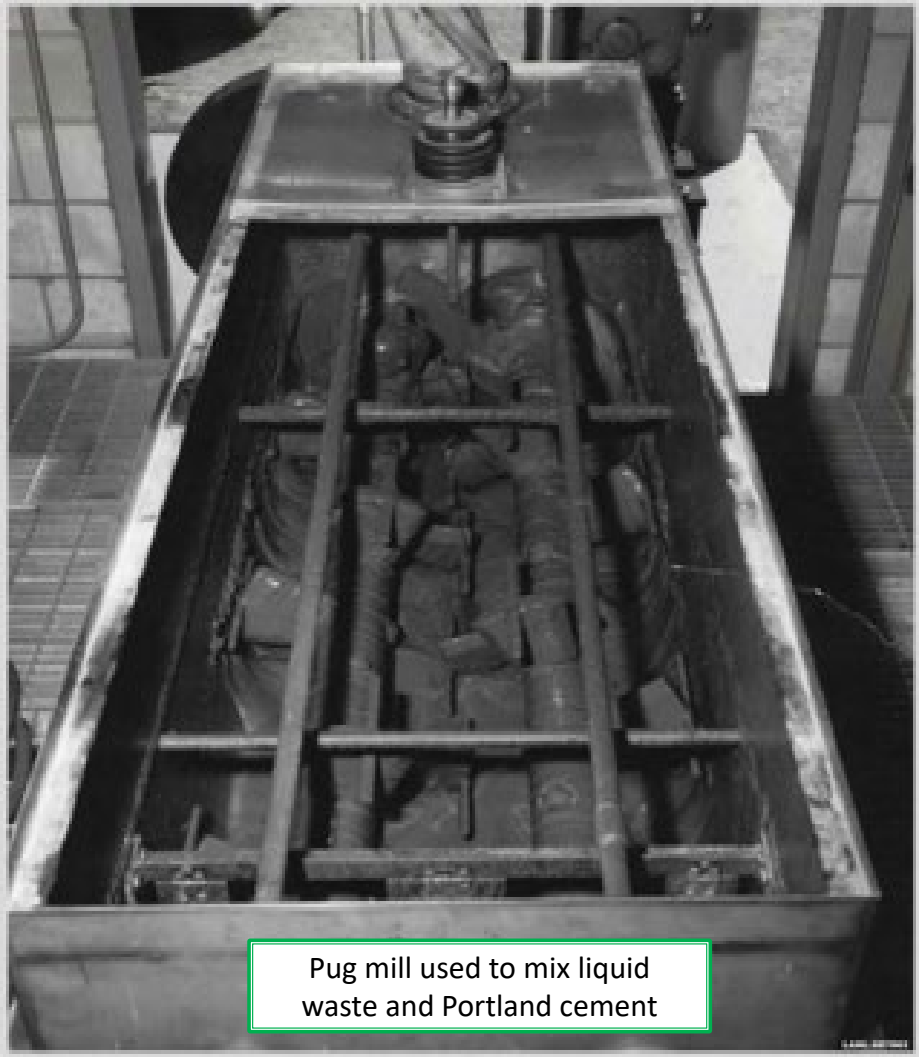
Origin of CMPs

Waste source: Technical Area (TA) 21 Radioactive Liquid Waste Treatment Facility (Building 21-257)

Creating CMPs:

- 1975-1978: Liquid waste from treatment facility mixed with Portland cement in a pug mill
- Cemented waste pumped into CMPs
- "Cold" end plug placed on both ends

Burial: 158 CMPs were buried vertically at TA-21; later moved to TA-54 and buried horizontally on top of Pit 29



Pug mill used to mix liquid waste and Portland cement

CMP: Facts & Steps

By the Numbers

158 – number of CMPs
30” x 34” – diameter of each CMP
10,000 to 14,000 pounds – CMP weight
4” to 59” – thickness of cold end plugs
5-6’ – depth of CMPs at Pit 29

Radioactive Elements

Americium
Plutonium
Uranium

97% of the radiological decay activity is from americium, a decay product of plutonium

Remediation Steps

1. Remove overburden soil
2. Retrieve CMP
3. Transport to Dome 375, staging initially on Pad 10
4. Segment CMP via a hydraulic shear
5. Package for shipment in Standard Waste Box
6. Ship to WIPP or low-level waste repository

First retrieval and shipment of underground waste under LANL Legacy Cleanup Contract

CMPs at TA-21

CMPs were emplaced vertically at TA-21 until 1986

1986: From TA-21 to TA-54

TA-21: 1986, CMPs were dug up, cleaned, decontaminated, wrapped in plastic & moved to TA-54

TA-54: 158 CMPs buried at the east end of Pit 29 above low-level radioactive waste

CMP Goals

1. Reduce TRU waste inventory
   - ✓ Dig up and ship off-site ~439 cubic meters of waste
2. Abate risk to workers, the community and the environment
   - ✓ Conduct the work safely, including protective gear, specialized equipment, radiological surveys, air monitoring, size reduction inside PermaCon
3. Dispose waste in the designated repositories
   - ✓ Ship TRU waste to WIPP; low level waste to other disposal sites

Retrieval is part of the comprehensive, long-term strategy to remove below-ground waste, ship waste to off-site disposal sites, and reduce waste inventory

CMP Retrieval: Remove Overburden Soil

CMPs are covered by soil, plywood and plastic

Radiation Scan

After Removing the Plywood

Preparing IP-1 Bag

CMPs are placed in an IP-1 bag prior to transfer to Pad 10

Worker Safety

Transfer to Pad 10

Packaged CMPs are staged outside at Pad 10 prior to size reduction inside Dome 375 (Photo: mock-up exercise)

Dome 375: CMP Size Reduction Operations

Dome 375 PermaCon Activities

- Loading: CMPs are loaded into a hydraulic shear using a 10-ton electric hoist mounted on a gantry and pipe rollers
- Cutting: Inside the hydraulic shear, each CMP is cut into five equal lengths (four cuts)
- Shipping: CMP segments are placed in Standard Waste Box (SWB) for characterization, certification, shipment and disposal

PermaCon

An engineered structure designed to prevent release of contamination to the outside environment

Project will require at least 790 SWBs

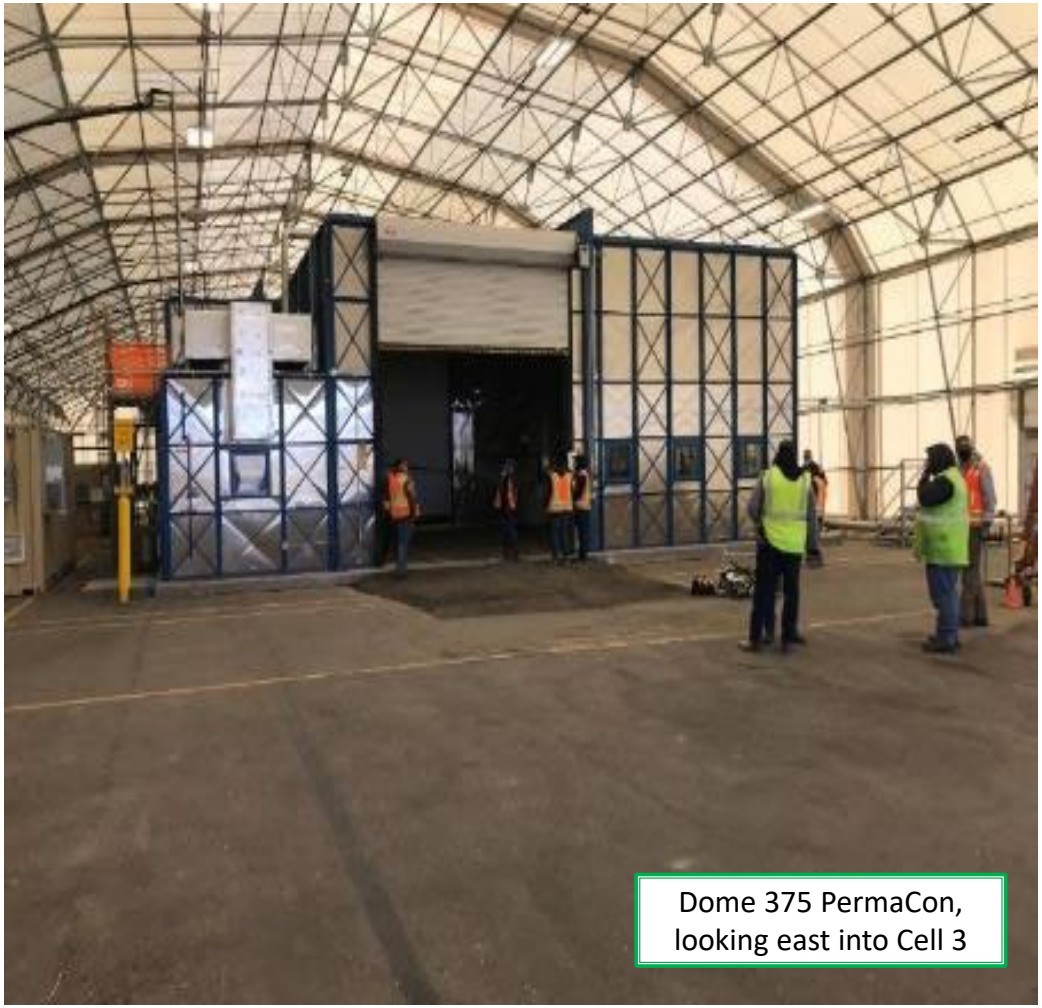
Because of cold end plugs, up to 40% of SWB containers will likely be reclassified as low-level radioactive waste

Dome 375: Radiological Controls

SHIP WASTE OFF-SITE

Protecting Workers & the Environment

- Work inside the PermaCon
- Four primary HEPA filter ventilation units
- A ventilation contamination enclosure is placed over the CMP during shearing



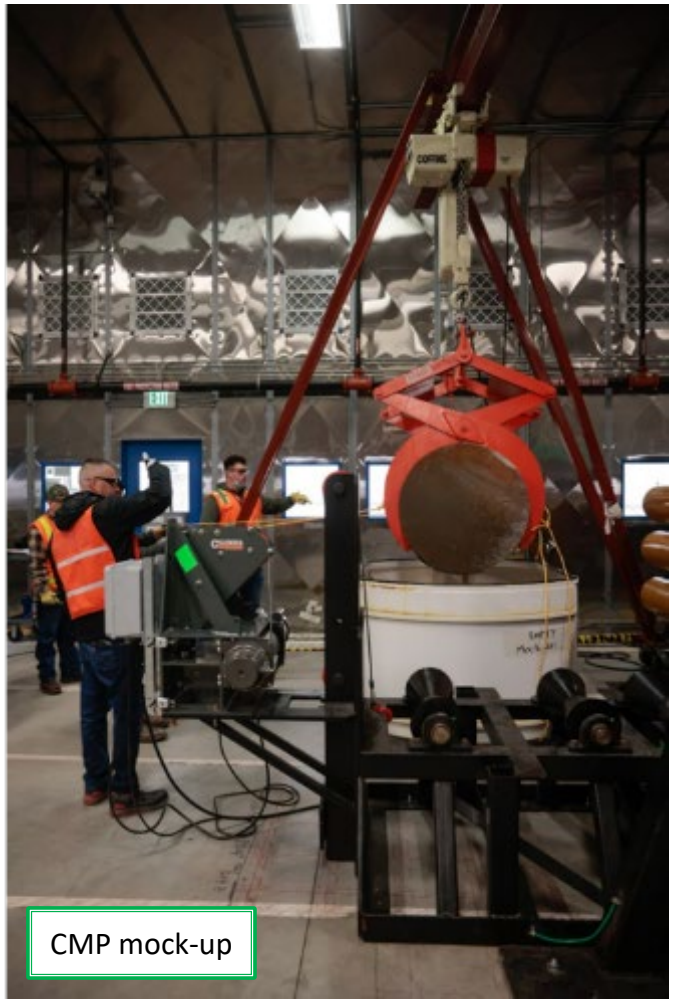
Dome 375 PermaCon, looking east into Cell 3

CMP Shear Ventilation Contamination Enclosure

CMP mock-up

CMP Cutting & Loading Operations

CMP mock-up



CMP mock-up