



U.S. DEPARTMENT OF  
**ENERGY**

OFFICE OF  
**ENVIRONMENTAL  
MANAGEMENT**

# Integrated Waste Treatment Unit

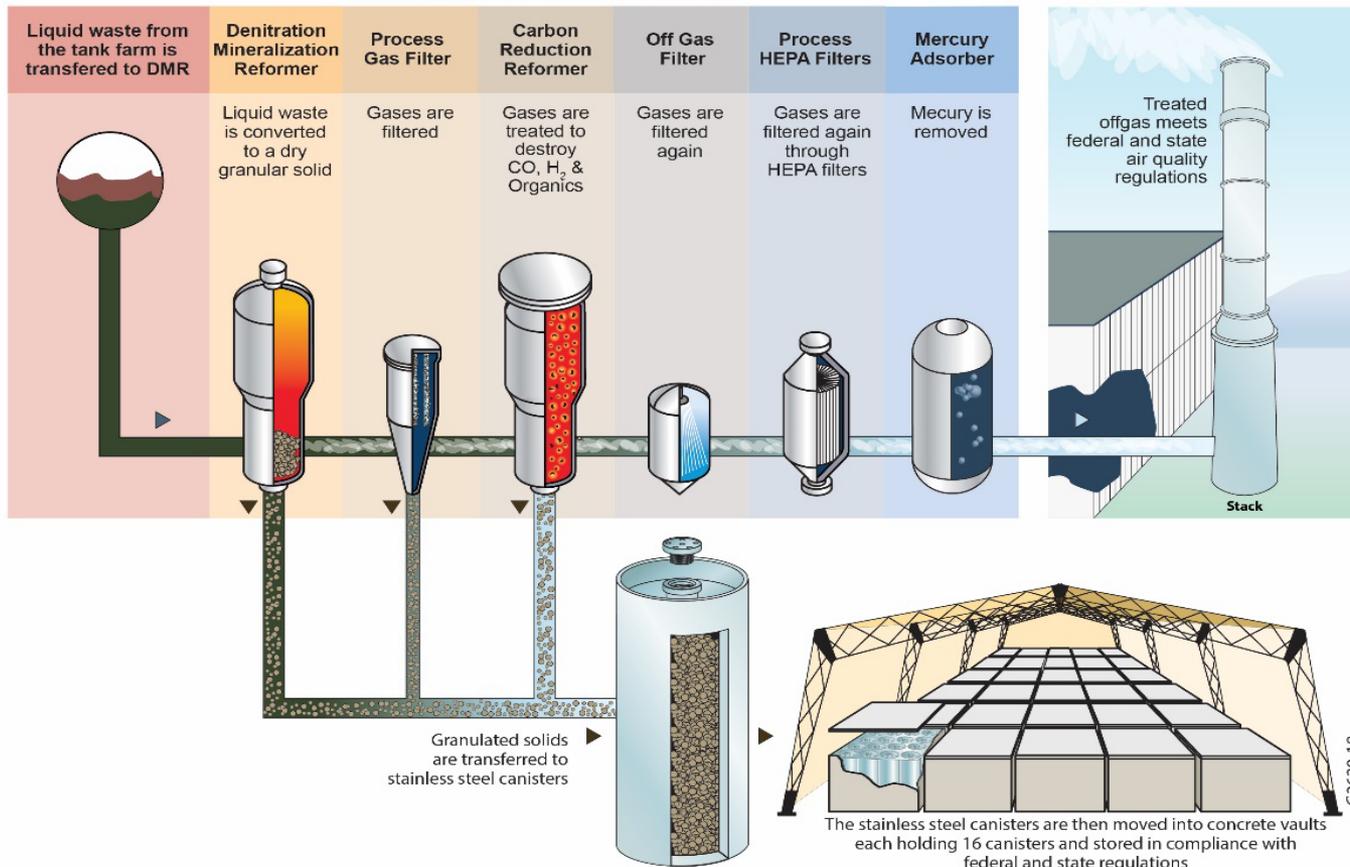
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# IWTU Background

- There are about 900,000 gallons of liquid radioactive waste stored in three stainless steel underground tanks at the Idaho Nuclear Technology and Engineering Center.
- The Integrated Waste Treatment Unit (IWTU) was constructed to treat, package and store the waste.

IWTU Treatment Process Overview



# IWTU Overview

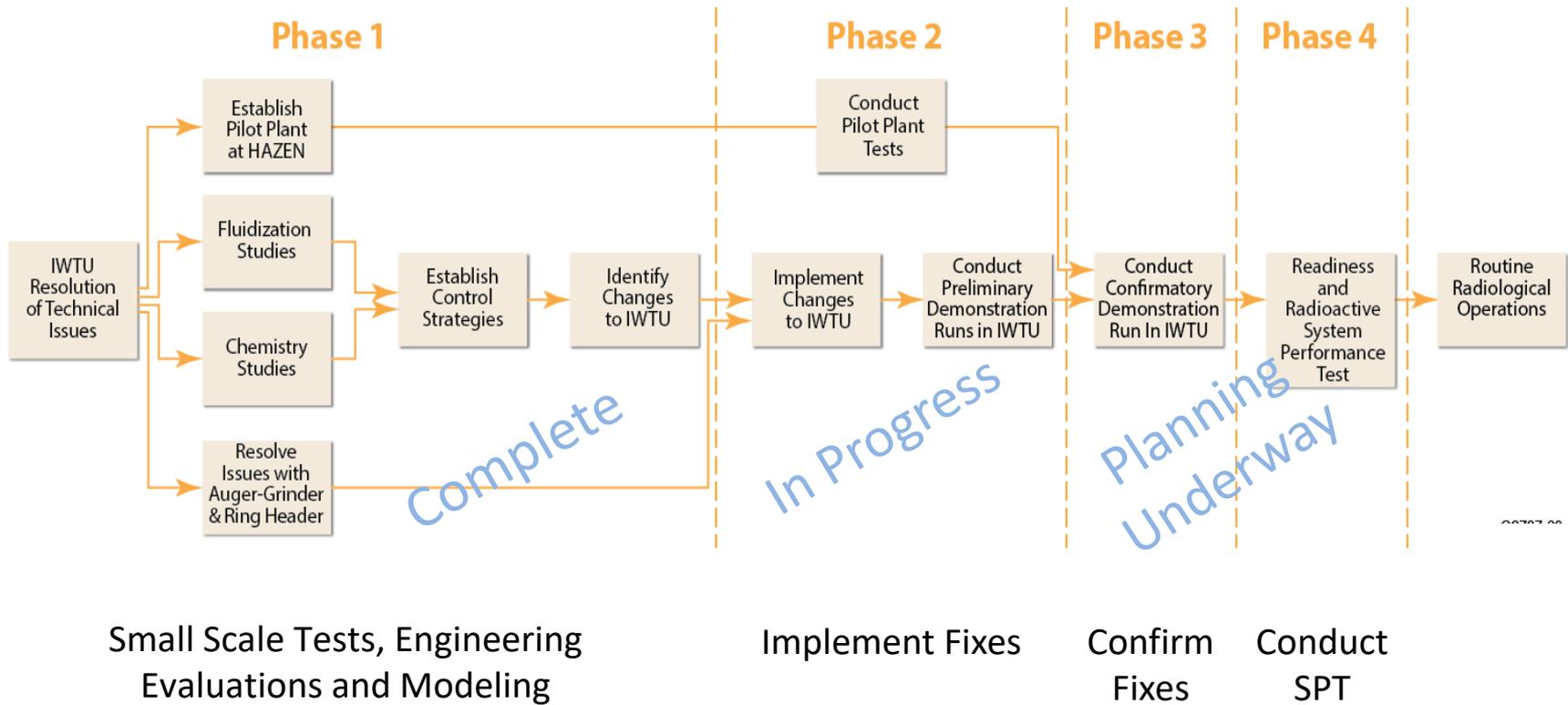
- The process will convert Sodium Bearing Waste (SBW) into a solid, granular, carbonate product for on-site storage pending final disposition.
- Construction was completed in late 2011, initial heat-up occurred in June 2012



- Process instabilities and equipment problems identified during non-radiological testing have delayed the transition to radiological operations.
- Modified Denitration Mineralization Reformer (DMR) performed well during a recent 30 day demonstration run using simulated waste.
- Currently in a maintenance outage to address the buildup of material on the Process Gas Filter (PGF) elements.

# Approach to Address Remaining Issues

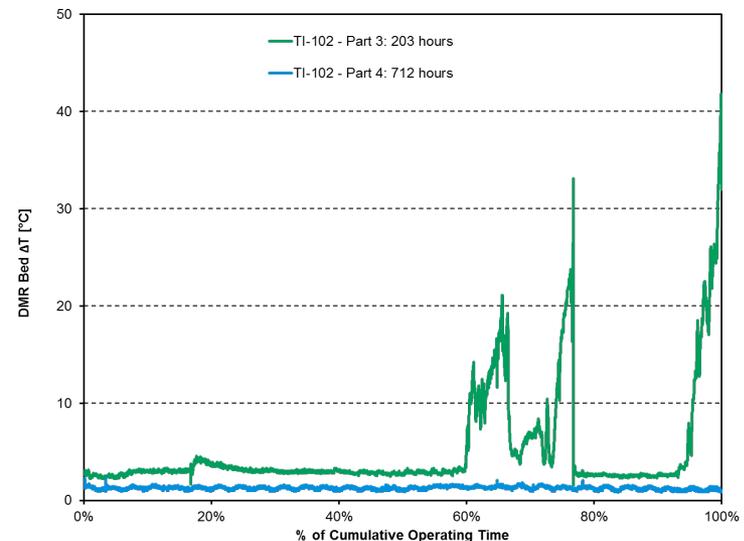
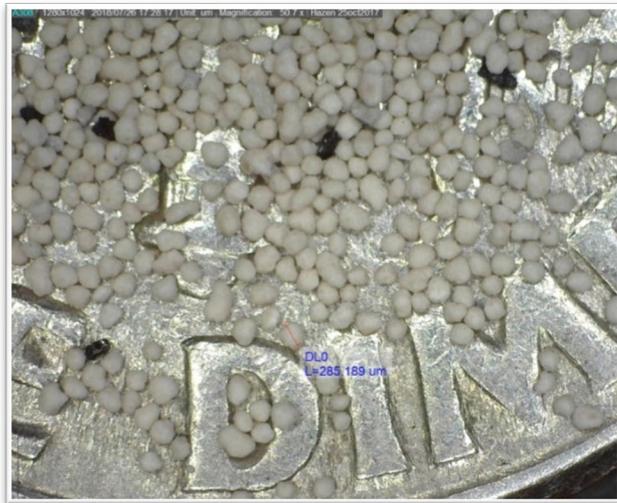
- Fluor Idaho has established a systematic, mechanistic based approach involving 4 phases to address issues with the IWTU
- Phase 2 Demonstration Run - Simulant Run 2 - completed, preparing for Simulant Run 3



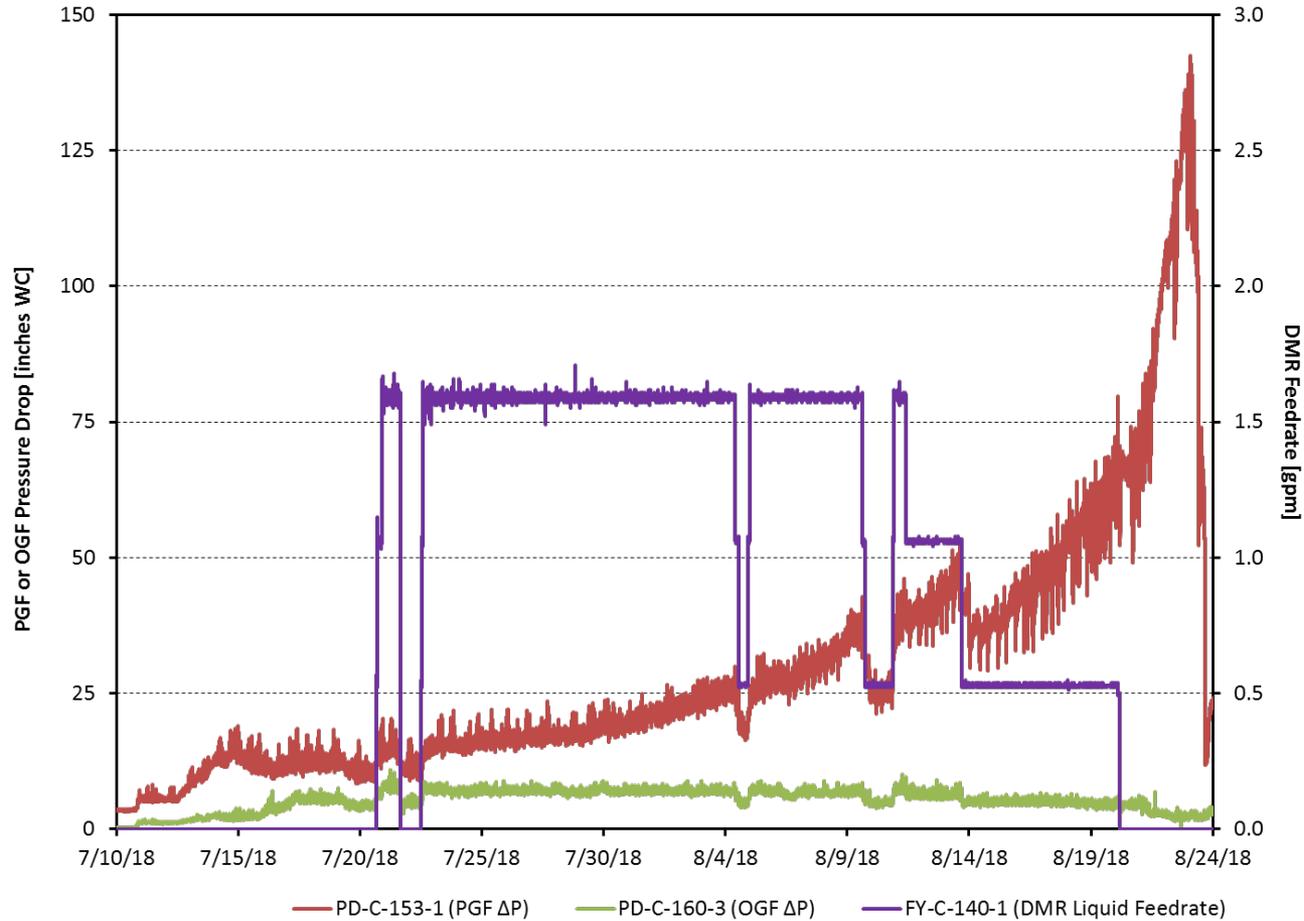
# Simulant Run 2 Results

## Primary and secondary test objectives met

- ✓ Demonstrated reliable DMR fluidization – unmitigated success  
DMR bed differential temperatures ranged from 1 – 1.6 C°
- ✓ Processed over 53,000 gallons of simulant over 30 days  
Feed on-line efficiency >95%
- ✓ Excellent control of DMR bed particle size – ranging 190 – 250  $\mu$
- ✓ Sample system modifications were successful
- ✓ Auger-Grinder continued to function well  
Product transfer rates improved



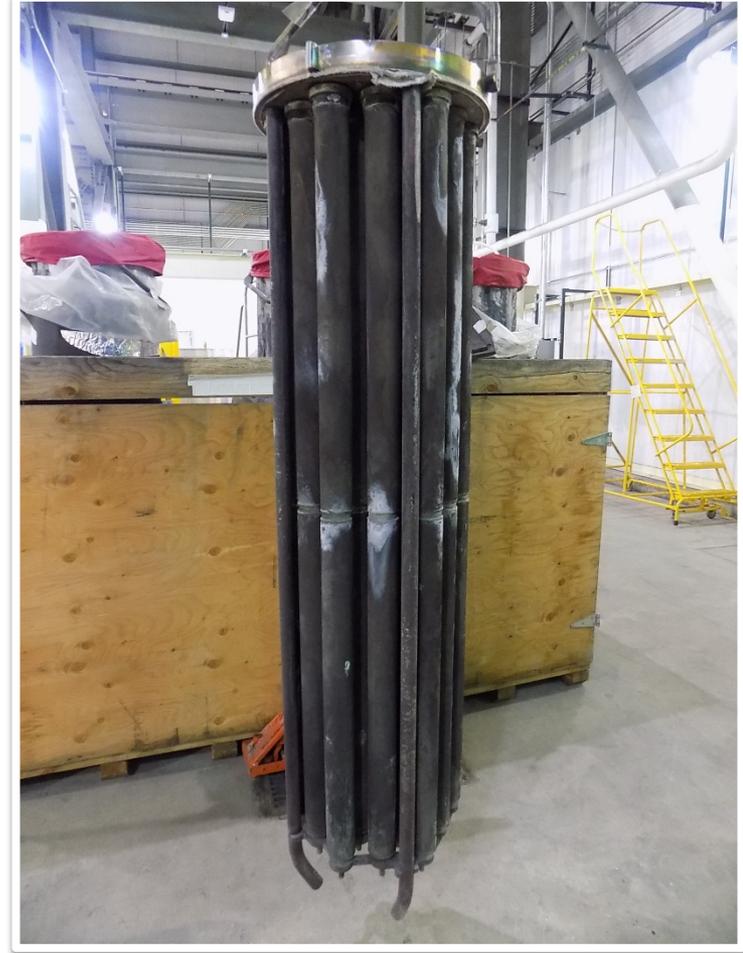
# Process Gas Filter Performance



# Process Gas Filter Performance cont'd



PGF Bundle being removed from housing



PGF Bundle after initial cleaning

- **Resolve Process Gas Filter performance**
  - Complete onsite and offsite analysis and testing
  - Clean and replace filters
  - Implement operational changes as needed
- **Conduct Simulant Run 3**
  - Verify satisfactory plant operations during long term operations at baseline conditions, and at or near boundary conditions
  - Anticipate 50 day period of simulated waste feed on
- **Finalize Plan for Phases 3 and 4**
  - Outage J – Additional plant modifications and equipment maintenance
  - Confirmatory Run – “Shakedown” of Outage J Mods and establish carbonate bed using Simulant
  - System Performance Test – EPA/DEQ oversight, establish Permit conditions using Tank Waste