



Integrated Waste Treatment Unit

Kevin O'Neill

Idaho Cleanup Project

June 20, 2019



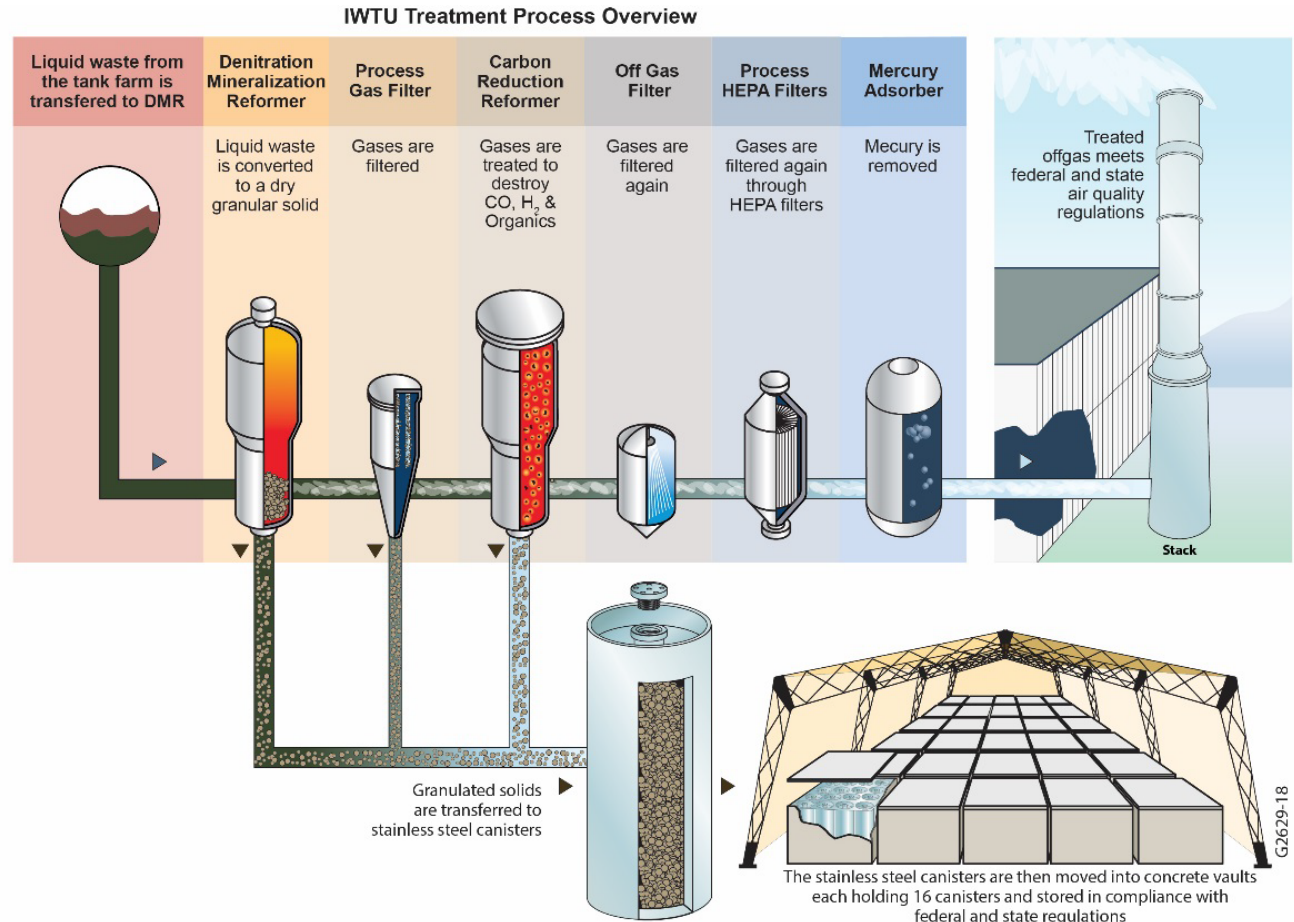
EM *Environmental Management*

safety ❖ performance ❖ cleanup ❖ closure

Idaho Cleanup Project

IWTU Mission

- 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.



EM Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

Idaho Cleanup Project

IWTU Overview

- The process will convert liquid 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.
- Simulant Run 3 – Completed May 31, 2019 – Demonstrated sustained operation of the Denitration Mineralization Reformer (DMR) under varied conditions.
- Currently in a planned outage (Outage J) to conduct inspections, maintenance, and facility modifications.
- Pilot Plant testing of alternative Process Gas Filter (PGF) filter elements conducted at Hazen Research, Inc.



Simulant Run 3

- Sustained operations on simulated waste for 50 days
 - Processed over 63,000 gallons of simulant
 - Completed 14/14 Test Conditions
 - Process controls proved effective
 - No major equipment malfunctions or failures
- Verified satisfactory performance at baseline and boundary conditions (DMR)
 - Feed Rate: 0.53 gpm – 2.0 gpm
 - Temperature: 630° - 660°C
 - Bed Height: 50" – 65"
 - Particle Size: 200μ - 450μ
 - Hydrogen Concentration: 3.% - 5.5%
- Tested various PGF Blowback procedures
- System Performance Test dry-run
- Test results data analysis ongoing
- Overall, Simulant Run 3 was very successful



Process Gas Filter Testing

Simulant Run 3 – Coated Inconel Filters

Hazen Research - Full Bundle Tests

- Pall - SiC ceramic with outer membrane
- Refractron - monolithic SiC
- Porvair - FeCralloy sintered fiber membrane
- Refractron - SiC ceramic with outer membrane



Pall SiC with membrane



Refractron monolithic SiC



IWTU PGF filters – Sim Run 2



Upcoming Activities

- Complete Review of Demonstration Run 3 Results
 - Engineering data analysis and reporting
 - Technical Review Group feedback
- Complete Follow-on Outage
 - Outage J – Additional plant modifications and equipment maintenance
 - Upgrade Cell, Vessel, and Canister De-con capability
 - Resolve Process Gas Filter performance issues
 - Select new filter type
 - Modify system as needed to accommodate new filters
- Conduct Confirmatory Run
 - Verify Outage J Modifications and conduct a Contractor Readiness Assessment in preparation for radioactive waste operations
- Conduct System Performance Test
 - DEQ oversight – establish final permit conditions using tank waste

