



# *Idaho Cleanup Project*

## *Integrated Waste Treatment Unit*

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Facility and Materials Disposition

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# IWTU Mission

- IWTU is a Hazard Category 2 nuclear facility designed and constructed to treat approximately 850,000 gallons of highly radioactive liquid tank waste (sodium bearing waste – SBW) using the fluidized bed steam reforming process
  - General waste description:
    - 850,000 gallons of acidic waste
    - Waste is contained in 3 stainless steel tanks within concrete vaults (WM-187, -188, -189)
    - Tank 187 includes the majority of solids (36-in heel)
- The process will convert liquid SBW into a solid, granular, carbonate product for on-site storage pending final disposition



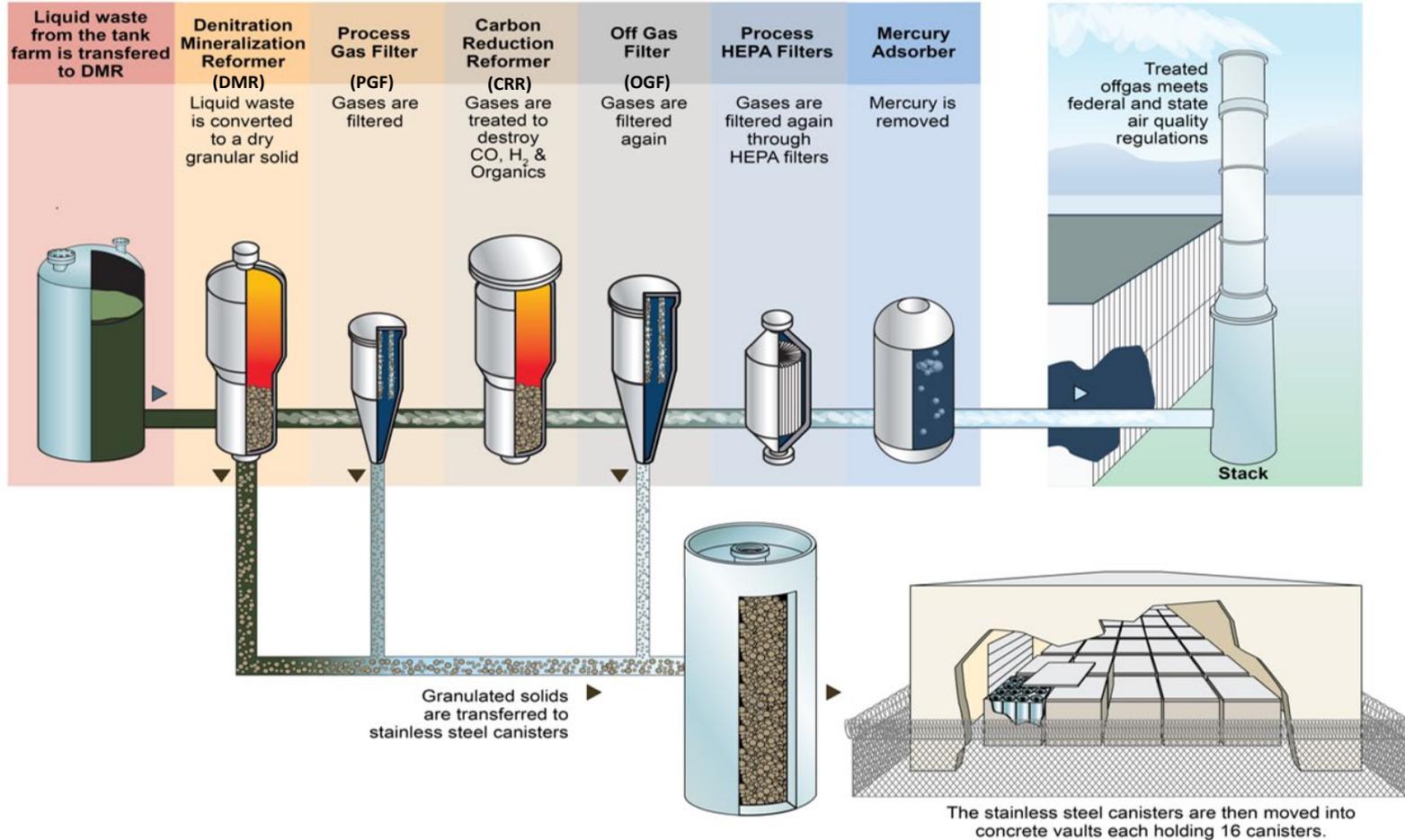
Treated SBW simulant product



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# IWTU Process Flow



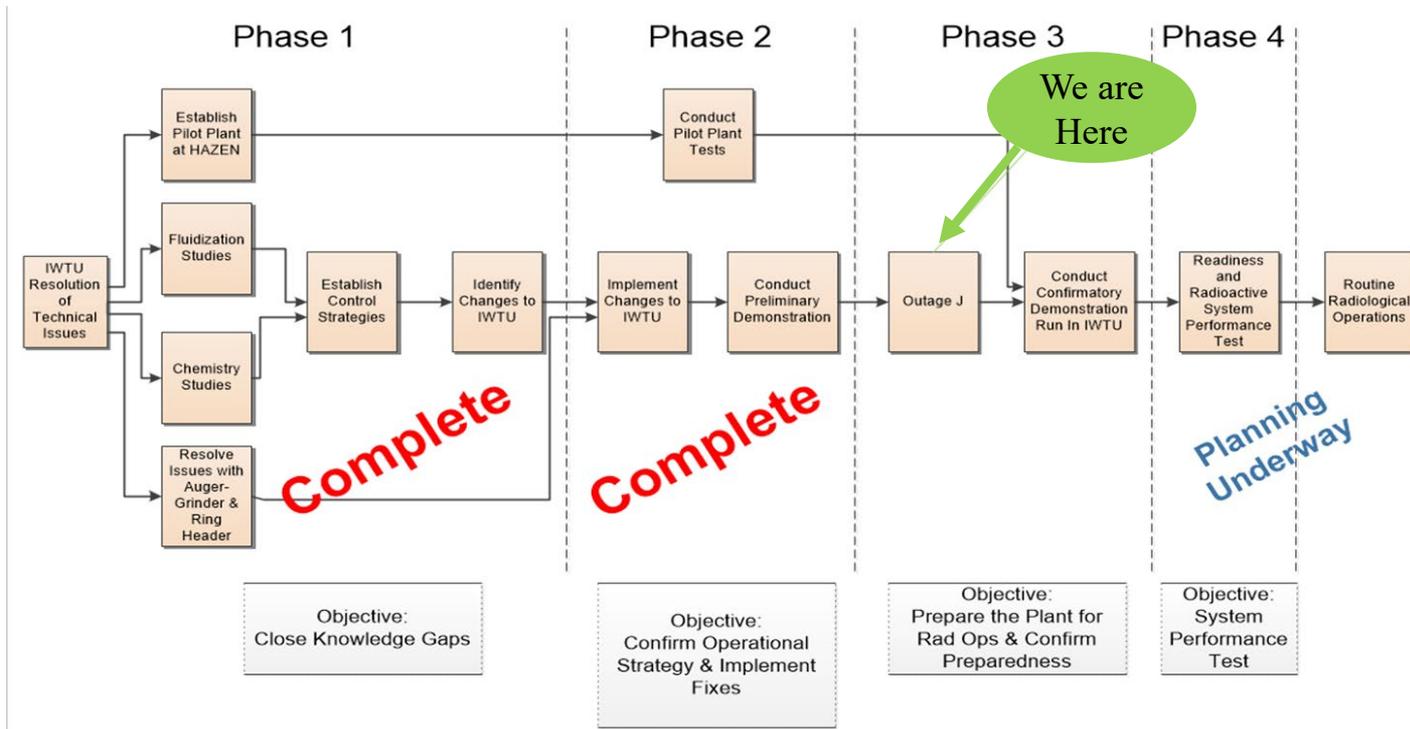
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# IWTU Phased Approach

- A four phased approach to achieve radiological operations
- Each phase scope of work negotiated separately due to the discrete nature of the work and builds upon previous phase results



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# IWTU COVID Impact Summary

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- DOE issued partial stop work on March 25<sup>th</sup>; allowed Essential Mission Critical Operations only
  - Limited field work where social distancing could be maintained
- Transitioned to Phase 1 on May 4<sup>th</sup>
  - Allowed high priority, low risk work with required social distancing
  - Use of mask when social distancing could not be maintained
- Began transition to Phase 2 in early June & completed on July 3<sup>rd</sup>
  - Continued with deliberate and methodical approach to allow additional field work with additional controls in place
  - Implemented shift work for operations, radiation protection and support organizations
  - Allow vendors to come on-site under COVID-19 protocols
  - Plan to implement sliding shift work for construction crews
- Outage J completion has slipped several months due to COVID impacts which will delay the start of radiological operations



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# Major Outage J Activities

- Finalize Process Gas Filter (PGF) design
- Optimization for Sustained Radiological Operations
  - Wet/Dry Decontamination System modifications
  - Can Fill Canister Decontamination System modifications
  - Contamination Control facility modifications
- Operability Improvements



Wet Decon System Skid Installation



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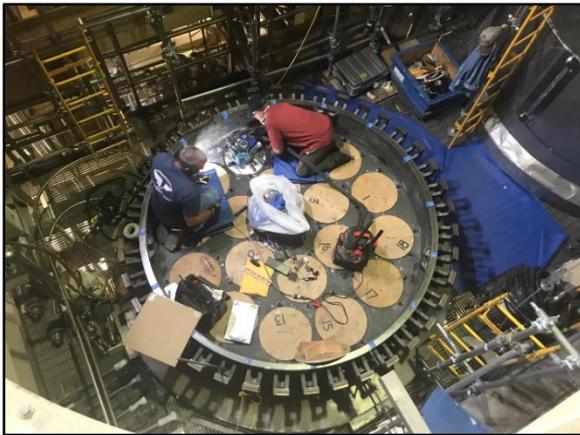
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# Process Gas Filter (PGF)

- Design and planning are complete
- Sufficient material on hand to assemble a full set of PGF bundles
- Field Work
  - Completed back pulse accumulator upsizing
  - Completed measurements and modifications to the PGF tubesheet
  - Started fabrication of bundle structures and support stands



Filter bundle being fabricated



Vendor modifying PGF tubesheet



Upsized PGF accumulator

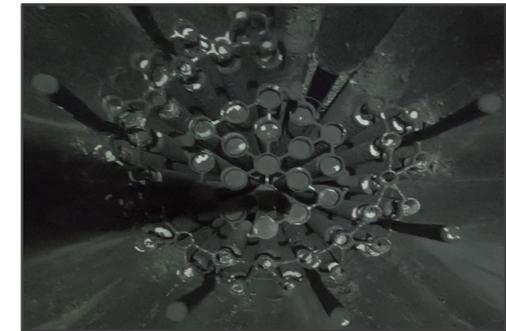
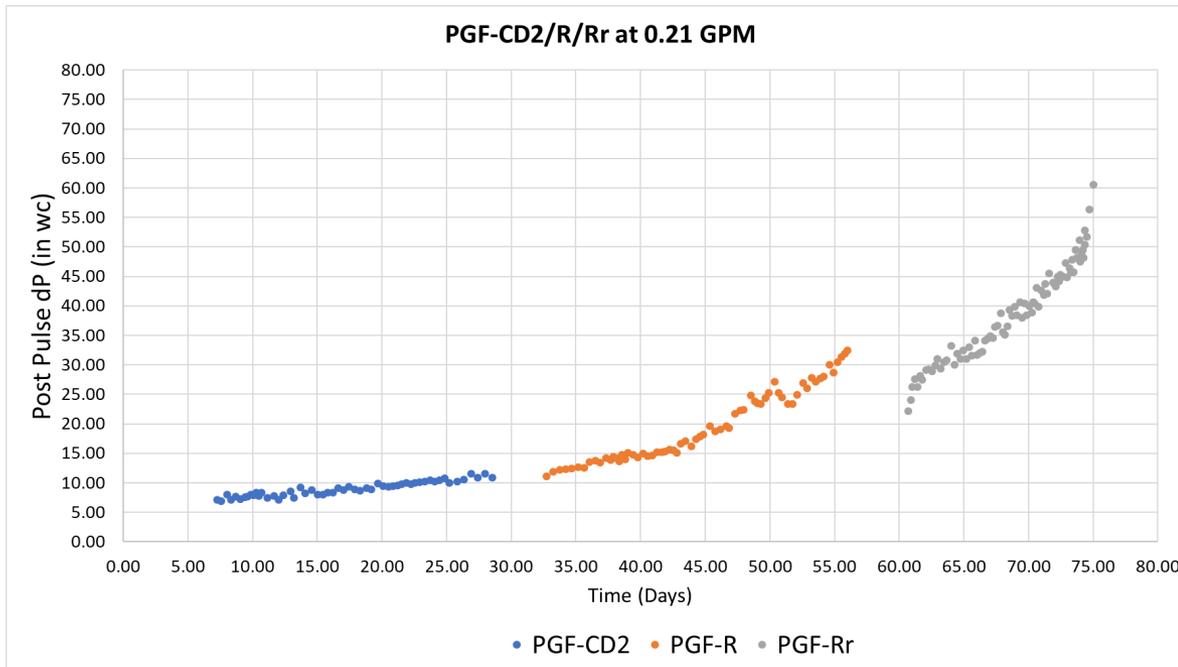


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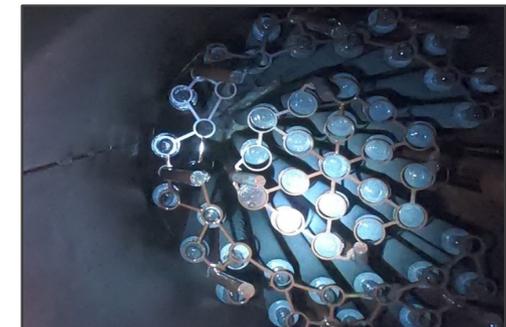
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# PGF Status – Hazen Pilot Plant Testing

- Completed three long term runs to assess filter bundle performance
  - Baseline run with virgin elements & fuses (CD-2)
  - Initial run following in-situ decon (CD-R)
  - Final run following another in-situ decon to “failure” (CD-Rr)
- Conducted inspection and differential pressure (dP) testing



Filter bundles before in-situ decon



Filter bundles after in-situ decon



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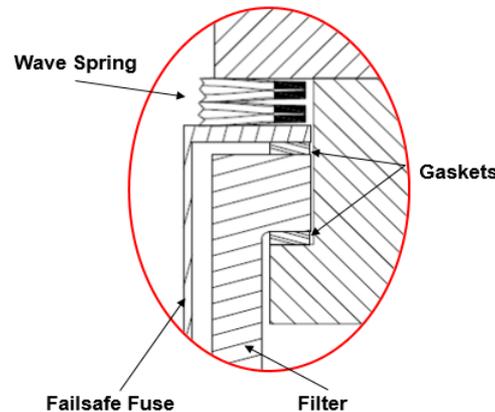
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# PGF Status – Hazen Pilot Plant Testing Results

- Fuses installed in the filter elements corrode faster than expected
- Corrosion causes fuses to become clogged with byproducts resulting in increased pressure drop and reduces effectiveness of back pulses
- Anticipated service life for IWTU PGF would be ~80 days (~160,000 gals of SBW) before filter changeout would be required



Virgin filter bundles



Filter bundles after 80 days



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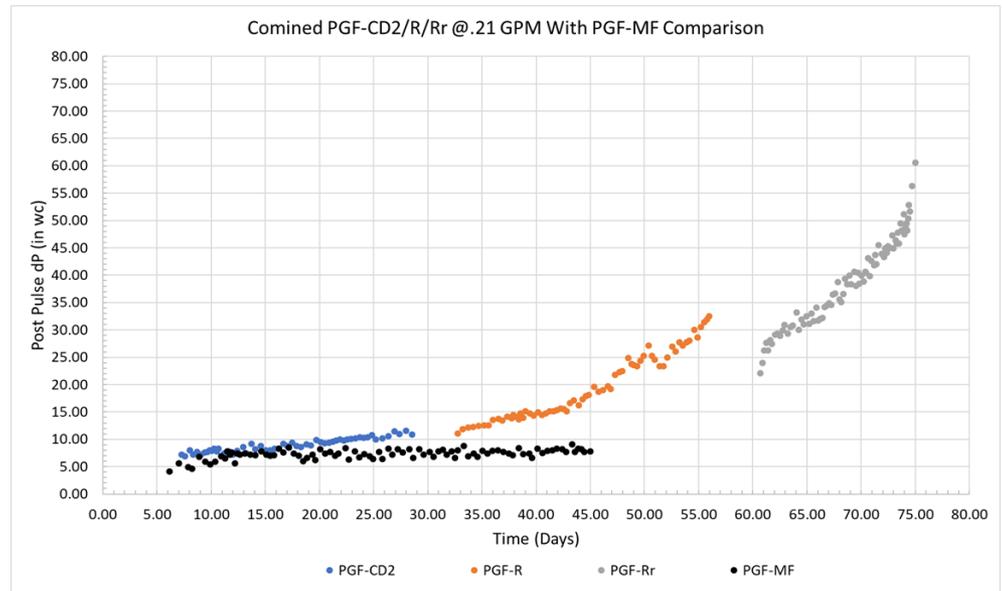
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# PGF Fuse Path Forward

- Evaluated multiple options to resolve fuse corrosion issue
- Project opted to truncate and bypass fuses
  - Lowest collective dose to workers
  - Lowest technical risk
  - Reduced time to radiological operations
- Completed another long-term test run at Hazen to evaluate performance with modified fuses and achieved exceptional results (PGF-MF)



Truncated fuses in background  
Perforated and drilled out fuses in foreground



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# Radiological Control Modifications

- Canister decontamination system
  - Canister surveying and cleaning will utilize robot suction and wiping prior to removal from can fill cell and emplacement in storage vaults
- Vessel decontamination system (wet & dry)
  - Reduces source term prior to maintenance of process vessels and piping
  - Dry decon transfer solids from vessels to product receiver cooler and placed into canisters
  - Wet decon system collects and size reduces nitric “wash” from process vessels
- Contamination Control
  - Series of modifications to reduce likelihood of contamination spread



Robotic arm being moved into Can Fill Cell



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# Canister Decontamination System Status

- Design and planning complete
- Field work largely paused from March through July due to constrained working space within fill cells
- Delayed final post-installation system performance test



Canister decon electrical panels



Robotic arm installed in Can Fill Cell 1



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# Wet and Dry Decontamination System Status

- Design and planning largely complete
  - Finalizing design and procurement of specialized canisters for product receiver decon
- Field installation of the wet & dry decon systems continues
  - Wet decon skid installed in process cell; continue with vessel connections, pressure tests and control system tie-ins
  - Completed installation of auxiliary blower; installation of hard piping for dry vacuum system largely complete
  - Continue installation of vessel decon manifolds & piping



Torquing components on Wet Decon Skid

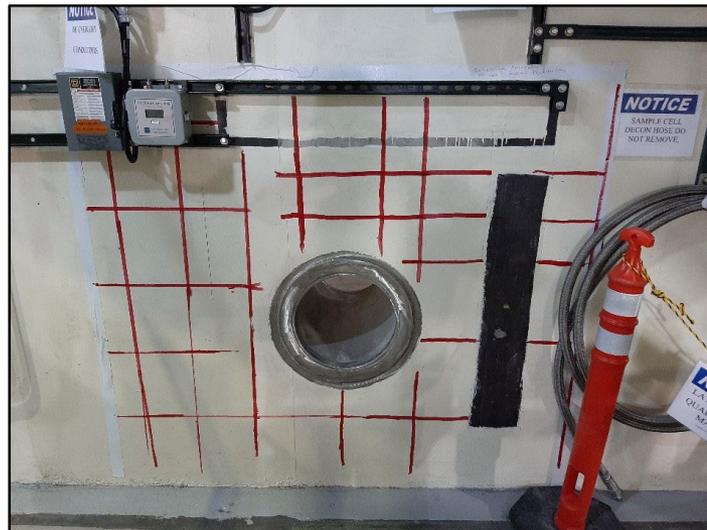


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# Contamination Control

- Completed designs
  - Canister Fill Cell HVAC
  - Vault Loading HVAC & manway
  - Can fill tube improvement
  - Can fill vacuum hood
- Completed interference removal for Vault Loading Cell modifications



Preparations for manway installation to the Vault Loading Cell



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# Project Path Forward Summary

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- Continue with Outage J activities – completion delayed due to COVID
- Perform readiness assessment activities
- Conduct Confirmatory Run
  - Verify Outage J modifications and preparedness for radioactive waste operations
- Conduct final plant outage
  - Inspect PGF filter bundles to verify conditions
  - Conduct integrated test of dry decon system
- Conduct System Performance Test
  - Initiate test with blended (simulant & SBW) feed to verify rad conditions
  - Establish final permit conditions using 100% tank waste
  - High level of confidence that the plant will meet the mission need



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