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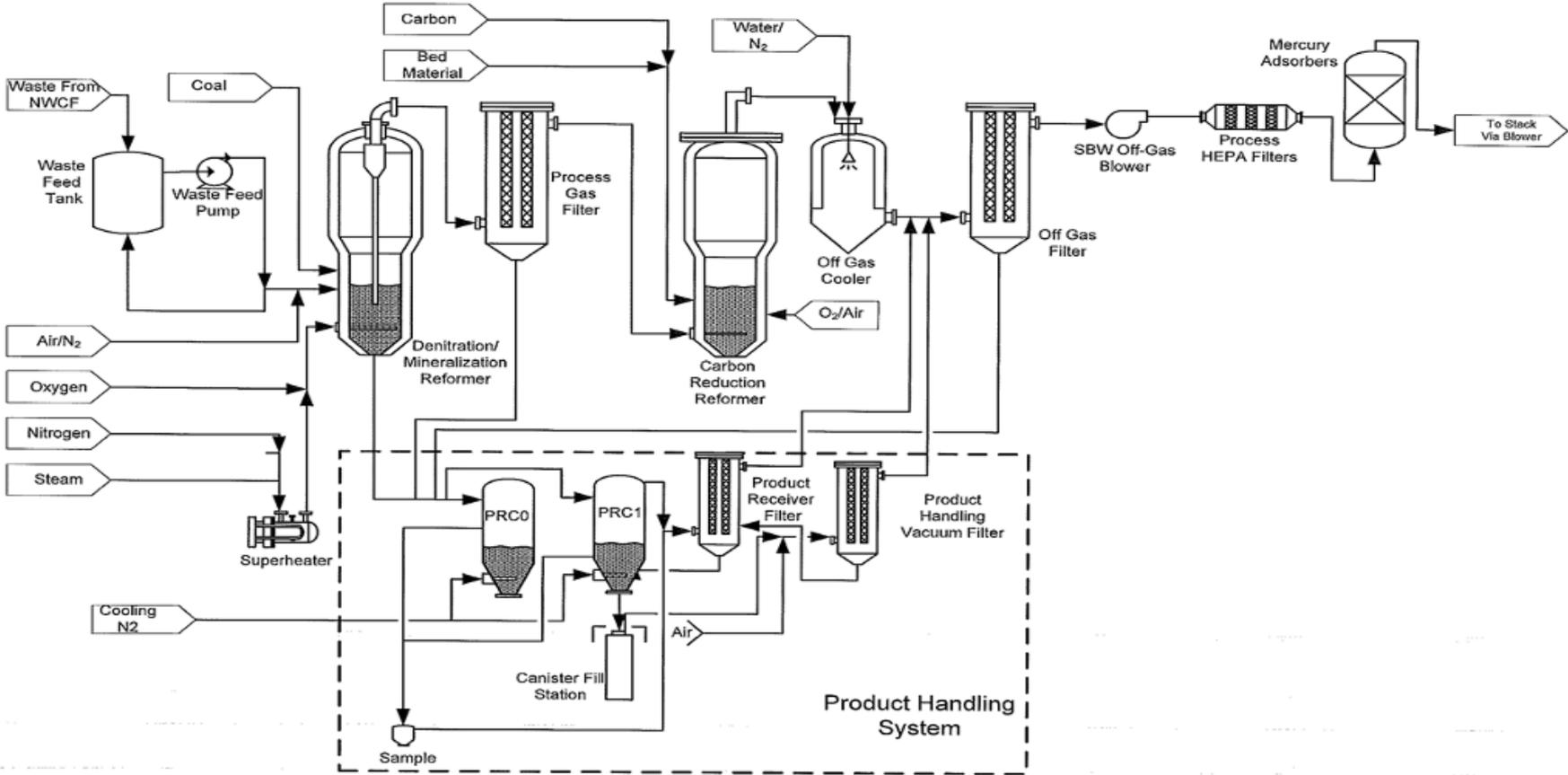
*Integrated Waste Treatment Unit  
Citizens Advisory Board Presentation  
September 19<sup>th</sup>, 2012*

Shawn Hill  
IWTU Operations Activity Manager



**EM** *Environmental Management*

# Integrated Waste Treatment Unit Process



**EM** Environmental Management

# Facility and Process Description

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(refer to separately provided process flow diagram)

- **New Hazard Category 2 Nuclear Facility:**
  - Process Building with reinforced concrete process cells inside a structural steel building, along with a Product Storage Building
- **Steam Reforming Process:**
  - First of its kind, full scale steam reforming process; reformer vessels use superheated steam and nitrogen gas, along with coal and coke, to convert acidic radioactive liquid waste to solid carbonate particles
- **Reformer Vessels:**
  - Denitration Mineralization Reformer (DMR)
  - Carbon Reduction Reformer (CRR)
- **Process Filters:**
  - Off-Gas Vessel Filters: Process Gas Filter (PGF) and Off-Gas Filter (OGF)
  - Product Filters: Product Receiver Filter (PRF) and Product Handling Vacuum Filter (PHVF)
  - Process Off-Gas High Efficiency Particulate Air (HEPA) Filters



# Event Description

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- Late May 2012--IWTU plant heat-up began as part of the post-CD-4 startup testing program
- June 9, 2012--PGF filter D/P spikes, causing filter bundles to lift; contractor continued operations—convinced filter bundles re-seated, based on process parameters, without investigation; DOE management was not informed and was unaware of the June 9 event
- June 16, 2012—
  - OGF filter bundles lift
  - Coal fines and bed material are released from the OGF
  - Process HEPA filters load up and fail
  - Coal fines and bed material are released from the stack



Off-Gas Filter Photo—Top of Filter Bundle Tubesheet, Post-Event



# Event Investigation

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- June 25 thru July 6, 2012—Event investigation team conducted reviews, led by H. Handfinger, URS
- August 2, 2012—Report issued; causes:
  - **Direct Cause:**
    - OGF filter bundle lift due to excessive wood-based charcoal fines carryover, blinding the OGF filters, allowing solids to pass through the OGF to the HEPA filters, causing their loading and breach
  - **Root Causes:**
    - Lack of adequate technical direction on expected operating envelope, parameters, and indications
    - Design deficiencies
    - Inadequate oversight and management systems (technical inquisitiveness)



# Facility Recovery—*Modifications*

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## Facility Modifications Include:

- Process filter bundle restraints to prevent lifting
- Product Receiver Filter and Product Handling Vacuum Filter pressure reliefs
- Process filter fuse removal
- Carbon Reduction Reformer modification to inject oxygen lower in vessel
- Install process off-gas High Efficiency Particulate Air Filter pre-filter differential pressure transmitters (allows Rapid Shutdown System trip)
- Evaluate and modify the Rapid Shutdown System alarm and trip strategy



# Path Forward

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- HAZOP and Collective Significance Review September 2012
- Integrated Corrective Action Plan to DOE September 14, 2012
- Process System Modifications Completed November 2012
- Readiness Determination for Recovery Phase December 2012
- Heat-up and Testing Begins January 2013
- Radioactive Waste Processing Begins April 2013



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Questions?



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