Sodium-Bearing Waste Treatment Project
Savannah River/Hanford/Idaho
Technical Exchange

Joel Case, DOE Idaho Operations Office
SBW Treatment Project - Federal Project Director
(casejt@id.doe.gov, 208-520-4181)

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Purpose, Description, and Scope

PROJECT DESCRIPTION AND SCOPE:

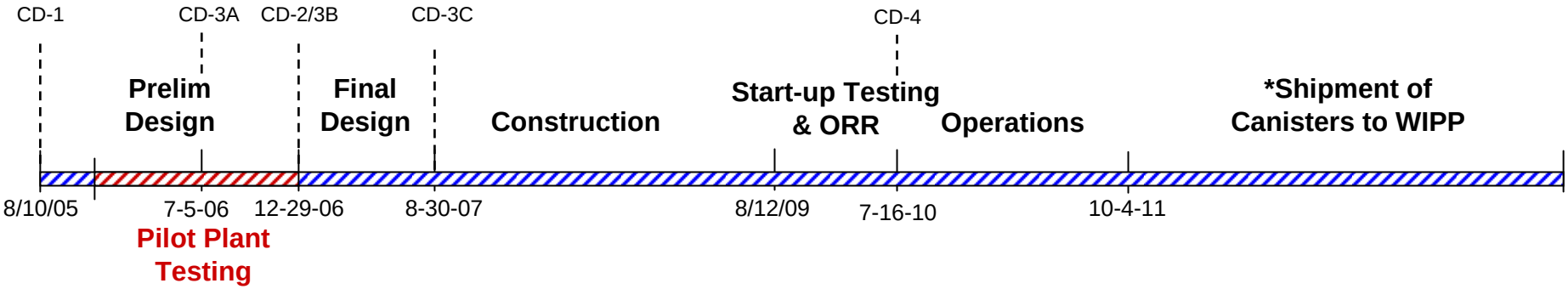
- Project mission is to provide treatment of approximately 900,000 gallons of Sodium-Bearing Waste (SBW) stored at the Idaho Tank Farm Facility to a stable waste form for disposition at the Waste Isolation Pilot Plant (WIPP)
- Project scope within the Idaho Cleanup Project (ICP) contract awarded to CH2M♦WG, LLC (CWI) on March 23, 2005 – SBW Treatment is the critical path ICP project
- Project Performance Baseline is $461.6 M (80% confidence level) with July 2010 Start of Operations

SBW Project History

- Spent nuclear fuel processing discontinued at INTEC in 1991, HLW ceased to be generated.
- Liquid, mixed transuranic waste/SBW has continued to accumulate in the TFF tanks from NWCF operations, decontamination, and other activities.
- Activities associated with the Idaho High-Level Waste and Facilities Disposition EIS (DOE/EIS-0287) evaluated over one hundred SBW treatment options. The FEIS narrowed the field to five technologies:
  - 1) Direct Vitrification,
  - 2) Cesium Ion Exchange with a grout waste form,
  - 3) Calcination with Maximum Achievable Control Technology upgrades,
  - 4) Direct Evaporation, and
  - 5) Steam Reforming.
- CH2M WG Idaho proposed steam reforming as the treatment technology for SBW and was awarded the ICP contract in 2005. The treatment technology decision was finalized by issuance of the EIS (December 2005).

INTEC SBW Project Treatment Plant Location

Sodium-Bearing Waste Project Baseline Plan



***Pending approval by New Mexico Environment Department (NMED)**

Pilot Plan Testing

- Located at Hazen Research Inc. in Golden, CO
- One-tenth scale 15-inch diameter DMR pilot scale system
- Pilot Plant:
  - Demonstrated long-term, integrated operation of SBW processing system
  - Confirmed process chemistry and material flows
  - Confirmed technical parameters for system design and operation
  - Gathered emissions data for environmental permitting
  - Produced granular product for solids handling and packaging equipment demonstration
  - Confirmed solid product data for requesting WIPP transportation and disposal
  - Validated Hazard/Safety Analysis
- Testing always took longer than planned
- Communications with Key stakeholder critical project success

Project Risks

Pilot Plant Installation at Hazen

Mockup and Prototype Testing

- Canister Decon and Smearing
  - Determine window size and placement
  - Select appropriate MSM and demonstrate swipe tools
  - Evaluate canister positioning and cell layout
  - Testing completed, report issued
  - Able to use existing shield windows and manipulator inventory from storage
- Small Scale material handling tests using Hazen carbonate product
  - Test of canister fill, product pump and vacuum transfer of filter contents
  - First phase testing complete, additional test for carbonate retrieval scheduled

Mockup and Prototype Testing (cont.)

- Waste Feed Injector Testing
  - Test DMR Waste Feed Injector thermal performance and abrasion resistance, ensure adequate nozzle cooling
- DMR Full-Scale Prototype Auger-Grinder with Coal Separator
  - Test at DMR operating temperatures to determine erosion of the screen, grinder and pickup hopper
  - Demonstrate Coal Separator performance to minimize coal in final product
- Demonstrate solids densification in RH-TRU canister to optimize canister fill design

Mockup and Prototype Testing (cont.)

- Vendor Testing prior to shipment of equipment
  - Canister handling and filling systems
  - Remote filter replacement
  - Off-gas Cooler demonstration
  - CRR/DMR Solids Feeder Lock-Hopper
- Integrated Product Packaging and Solids Transfer Test
  - Remove solids from mockup DMR (600°C) using production grinder and coal separator
  - Transfer solids from DMR and PGF to PRC
  - Transfer fines from PRF to PRC using batch transfer
  - Fill RH-TRU canister from the PRC through full-scale fillport

Mockup and Prototype Testing (cont.)

- Remote Maintenance Mockup Tests
  - DMR Remote Maintenance Features and tooling
  - OGF/PGF Filter Replacement
  - PGF Upper Head Remote Operations and tooling

Project Status

- Pilot Plant (1/10th scale) carbonate testing program conducted December 2005 through June 2006. Final Test Report issued August 2006
- Pilot Plant mineralized form testing program completed in December 2006
- Start of Construction approved in August 2007
- Mock-up and Factory Acceptance Testing proceeding in parallel with Construction
  - Technology Risks
    - Packaging and handling systems
    - Welding of exotic metals
    - Scaling inside reformer

Drilling Operations (November 2006)

Prior to Excavation (March 2007)

During Excavation (May 2007)

During Construction (October 2007)