Waste Treatment Plant Project

WTP Nuclear Safety Status

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OFFICE OF RIVER PROTECTION
United States Department of Energy

BECHTEL Bechtel National, Inc.

AECOM

Protecting the environment and the public
Clean up of legacy waste dates back decades

Product of plutonium production for
WWII Manhattan Project and Cold War

56 million gallons radioactive waste

- 149 single-shell tanks built 1943-1964
- 28 double-shell tanks built 1968-1986
- About 60 tanks presumed to have leaked up to 1 million gallons

WTP will have four nuclear facilities

Low-Activity Waste Vitrification Facility

Turn low-activity waste into glass in two 300-ton melters

- Waste and Glass Mixture Heated to 2100 degrees F
- Poured into 4-ft diameter, 7-ft high containers weighing 7 tons
- Produce over 1000 cannisters a year

- 330 feet x 240 feet x 90 feet tall
- 28,500 cubic yards concrete
- 6,200 tons structural steel
- 103,000 feet piping
- 840,000 feet electrical cable
- 945,000 pounds heating and ventilation ductwork

Analytical Laboratory
Ensure glass meets regulatory requirements

Expected to analyze approximately 3,000 WTP process samples each year

- 320 feet x 180 feet x 45 feet tall
- 12,000 cubic yards concrete
- 1,800 tons structural steel
- 35,000 feet piping
- 172,000 feet electrical cable
- 314,500 pounds heating and ventilation ductwork

- Will provide sampling of direct feed low-activity waste and glass product
- Less than HC-3 Nuclear Facility to support DFLAW, but HC-3 PDSA (HLW/PT Operations).

Balance of Facilities

Vast infrastructure to support operations

- Steam plant
- Chiller compressor facility
- Electrical substation & switchgear
- Water treatment facility
- Glass-forming material storage
- Emergency power facility
- Cooling tower
- Underground waste transfer systems
- Effluent Management Facility

Will provide the infrastructure needed to produce low-activity glass

LAW Hazards

- Rad – Consequences to all receptors (Public, CLW, FW) are “Low”
- NO_x - (Co-mingled with Rad)
- Process Waste (NaOH-like, Co-mingled with Rad)
- NaOH – (Cold Chemical)
- Ammonia – (Cold Chemical, PSM quantities in BOF)
- Mercury – (Separated from process waste, no rad)
- CO_2 – (Cold Chemical, hazard is been eliminated from process)

- All consequences of chemical hazards are limited to FW and CLW with the exception of mercury storage which has a public consequence of concern.

STD-1228 and CSMP Implementation

	STD-3009-94 CN3	STD-1228 with CSMP Implmentation
DSA Page Count	1789	621
TSR Page Count	604	36
PrHA Page Count	4891	4672
Safety-Significant SSCs	68 (26 interlocks)	0
SACs	20	2

No controls were eliminated, but reclassified as "Chemical Safety"

LAW Safety Basis Status

- DSA/TSR Rev. 4 Currently in DOE Review
  - Updates necessary to support Commissioning
  - Incorporation of Revised Waste Acceptance Criteria Approach
  - Close out of Planned Design and Operational Safety Improvements
  - Incorporation of Revised Criticality Safety Evaluation
  - Incorporation of Key-DiD Approach
- Chemical Safety Management Program
  - Chemical Safety Management Program Description approved by DOE on 01/23/2020
  - Included all program requirements and list of Chemical Safety designated controls and safety functions
  - Uses existing LAW PrHA as base hazard analysis
  - Additional Hazard Analyses developed for chemical hazards outside the scope of the DSA (i.e., BOF Anhydrous Ammonia)
  - Will be revised for consistency with Rev. 4 of the DSA.

Key LAW Milestones

- Turnover of All Systems to Plant Management Currently Being Completed
- Start Full Cold Commissioning (Loss of Power Test) October 2021
- Melter 1 Heat-Up December 2021
- DOE ORR Complete December 2022
- Hot Commissioning Start January 2023

HLW Facility Status

- Currently at 60% Design for Most Major Systems, mechanical handling systems at pre-90%
- Pre-Treat Feed Design Configuration - Decision on Direct Feed High-Level Waste forecast in 2021, however a decision on PTF is not expected near term
- PDSA and PrHA being updated as systems progress through 60% Design
- Procurement Resumption Forecast in 2023
- Construction Resumption Forecast in 2024