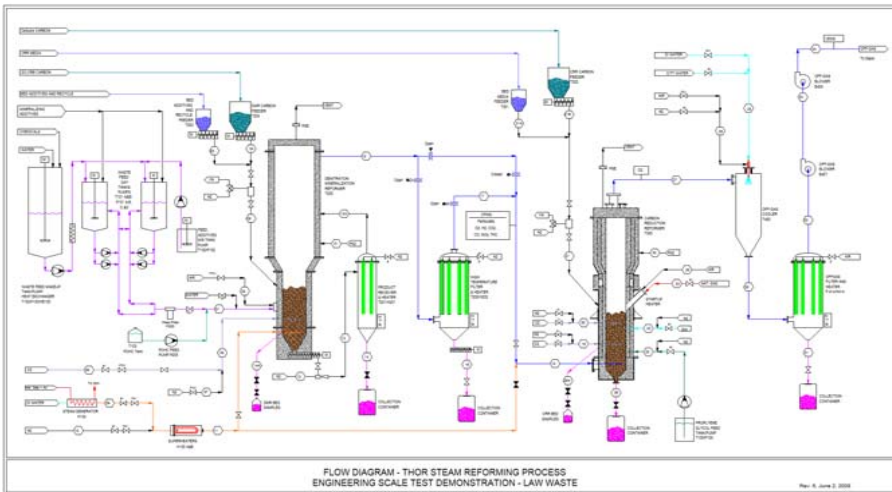


Advanced Remediation Technologies Project: THOR Fluidized Bed Steam Reforming of Hanford Waste

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HAZEN FACILITY ESTD EQUIPMENT



HANFORD CHALLENGES

In 1996, DOE-ORP initiated a project to design, build, and commission the Hanford Tank Waste Treatment and Immobilization Plant (WTP) to treat 53 million gallons of waste, containing 190 million curies of radiation in 177 tanks. The WTP will separate wastes into a small-volume, high-level waste (HLW) fraction and a large-volume, low-activity waste (LAW) fraction. In the overall site waste balance, challenges remain:

- LAW waste, to be disposed of on site, contains listed and characteristic hazardous waste constituents
- Hanford wastes are corrosive with high pH and contain arsenic, barium, cadmium, cesium, iodine, lead, mercury, selenium, silver, and technetium as well as organic constituents
- State and federal regulations preclude the waste from land disposal without treatment
- Recycle waste (liquid waste from WTP's vitrification operations) include concentrations of Cl, F, Tc, SO4 making processing and disposal problematic

PROJECT PHASES

- Engineering Scale Technology Demonstration (ESTD) using LAW and LAW recycle waste simulant at Hazen Research in Golden, CO
- Radioactive BSR test using simulated LAW or LAW Recycle at Savannah River National Laboratory (SRNL)

OVERALL SCOPE

- Conduct parametric scoping tests to identify optimum process conditions and simulant to clay ratios
- Conduct an extended production run of simulated LAW and LAW Recycle to demonstrate long term system operability and generate product for monolith testing
- Produce waste product monoliths using various binders and waste loadings, and select best performers
- Demonstrate capability to process simulated LAW and LAW Recycle into a final monolithic waste product

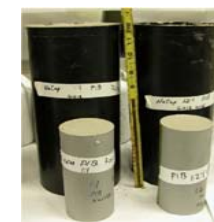
TARGETED APPLICATIONS

- LAW Stream at the Hanford Site
- LAW Recycle (LAWR) streams from WTP melters

PROJECT PROGRESS TO DATE

- Demonstrated long-term steady-state pilot plant operation of the integrated fluidized bed steam reforming process with LAW and LAWR simulants
- Confirmed with ESTD results that the final process off-gas complies with applicable environmental regulations in pilot plant operations
- Confirmed that DMR process chemistry and product quality are consistent with that observed during previous mineralizing pilot plant and ESTD operations

CURRENT PROJECT WORK IN PROGRESS



Characterization and durability testing of LAW and LAWR monolith product.



Bench Scale Reformer (BSR) at SRNL is being used to demonstrate on a laboratory scale the processing of radioactive simulated LAW or LAW Recycle.