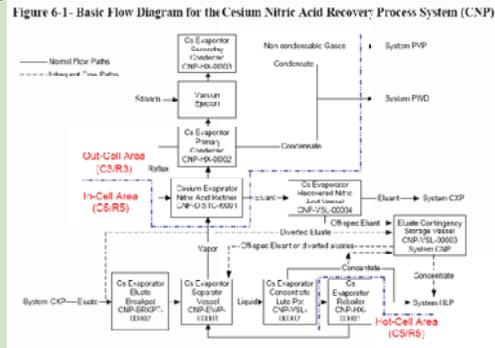


Technology Readiness Assessment Summary

United States Department of Energy Office of Environmental Management (DOE-EM)

Waste Treatment and Immobilization Plant (WTP) Pretreatment Facility

Why DOE-EM Did This Review



Block Diagram of Cesium Nitric Acid Recovery

DOE is constructing a Waste Treatment and Immobilization Plant (WTP) at Hanford to treat the site's tank wastes. The WTP is composed of several facilities including a Pretreatment Facility. The purpose of this assessment was to identify the critical technology elements (CTEs) in the Pretreatment Facility and determine if these are sufficiently mature to be incorporated into the final WTP design.

What the TRA Team Found

The assessment team identified the following nine CTEs, along with each element's Technology Readiness Level (TRL) for the Pretreatment Facility:

- Cs Nitric Acid Recovery Process System (TRL=3)
- Cs Ion Exchange Process System (TRL=5)
- Waste Feed Evap Process System (TRL=4)
- Treated LAW Evap Process System (TRL=4)
- Ultrafiltration Process System (TRL=3)
- Pulse Jet Mixer System (TRL=4)
- Waste Feed Receipt Process System (TRL=4)
- HLW Lag Storage (TRL=4)
- Plant Wash and Disposal System (TRL=4)

The assessment team concluded that several CTEs required maturity prior to continued design.

What the TRA Team Recommended

The assessment team generated an extensive list of recommendations. The following are the "major" recommendations; (the team also supplied 12 "supplemental" recommendations):

- Discontinue design of the Cesium Nitric Acid Recovery Process (CNP) until: (1) a reassessment of the design and operational requirements is completed, (2) the engineering specification is revised to reflect operational conditions, and (3) the technology concept is demonstrated through integrated prototypic testing.
- Testing the CNP prior to installation in the black cell using representative feed compositions to verify the process control concept and the ability to control and monitor the composition of the nitric acid product, and to demonstrate the Cs decontamination factor of 5 million and the ability to decontaminate the demister pads.
- Discontinue design of the H₂ venting subsystem of the Cs ion exchanger until testing is completed.
- Evaluate the adequacy of feed vessel CXP-VSL-00001 design considering the anticipated issues with precipitation of solids in the feed.
- Complete testing of the Ultrafiltration Process (UFP) system prior to final design using actual wastes in laboratory tests and with stimulants at engineering-scale tests.
- Continue evaluation of vertical equipment arrangement for UFP filter elements.
- Establish clear, quantitative, and documented mixing requirements for all Pulse Jet Mixer (PJM) vessels in the Pretreatment as well as HLW Vitrification Facility.
- Complete demonstration testing of PJMs, identify and implement any design changes.

To view the full TRA reports, please visit this web site:
<http://www.em.doe.gov/Pages/ExternalTechReviews.aspx>

TRA Summary: August 2011

The objective of a Technology Readiness Assessment (TRA) is to determine the maturity of certain key technologies, identified as Critical Technology Elements (CTEs), using a systematic, metric-based process and to evaluate the readiness of these technologies for insertion into a project design.



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