Savannah River Site
Tank 48H Treatment Demonstration

Client:
Washington Savannah River Company LLC

Location:
Golden, CO

Scope:
Engineering scale demonstration of the treatment of Tank 48H waste

Duration:
2006-2007

Contract Type:
Cost Plus Fixed Fee

Contract Value:
US$7 million

Project Description:

An in-tank precipitation process (ITP) was developed at the Savannah River Site (SRS) to remove Cs-137 from high-level waste supernates. During this process, monosodium titanate and sodium tetraphenylborate (NaTPB) were added to the supernate to adsorb Sr/Pu and precipitate Cs as cesium tetraphenylborate, respectively. In 1995, the first complete batch was processed in Tank 48H. During this processing, excessive decomposition of the tetraphenylborate (TPB) species caused the process to be stopped. In 1998, due to safety concerns, the ITP process was abandoned. To make space in the SRS tank farm, the waste remaining in the tank (~240,000 gal) must be processed. Washington Savannah River Company (WSRC) intends to vitrify this waste in the Defense Waste Processing Facility (DWPF). Before vitrification, the Tank 48H waste must be treated to decompose the TPB and decomposition by-products to minimize the impacts of these species on the DWPF process.

WSRC has selected fluidized bed steam reforming (FBSR) as the technology to eliminate these species prior to vitrification. WSRC has contracted with TTT to demonstrate the processing of a non-radioactive simulant representative of the Tank 48H waste using the THOR® FBSR process. This demonstration is being performed using TTT's Engineering Scale Technology Demonstration (ESTD) pilot plant located at the Hazen Research facility in Golden, CO.

THOR Treatment Technologies

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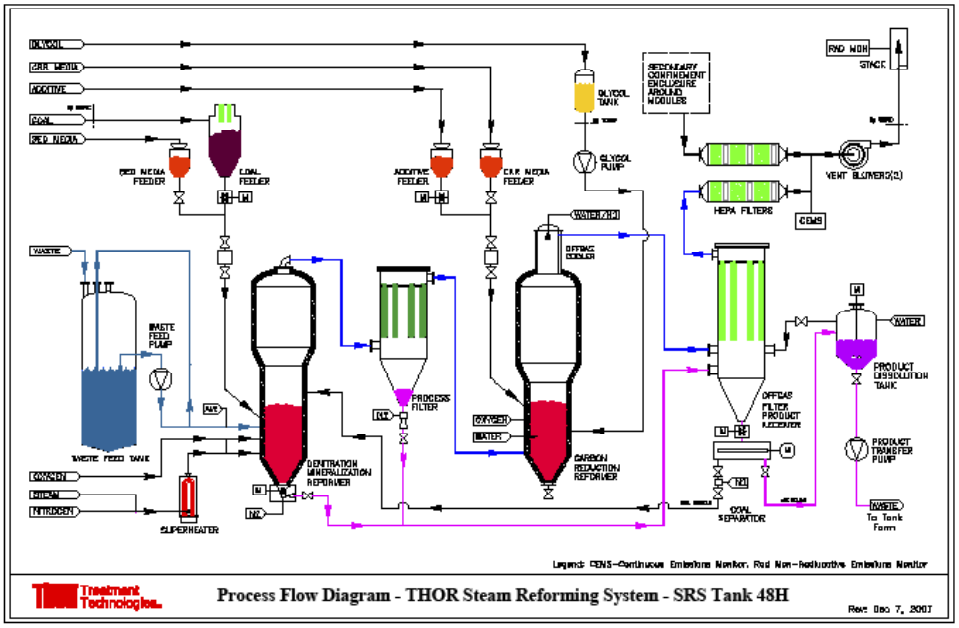

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21st Century cost effective thermal treatment for nuclear, hazardous, and other problematic wastes.

Unique Challenges

The Tank 48H material must be processed to reduce the concentrations of nitrate, nitrite, and organic species to levels that will permit final treatment in DWPF. This must be done in a manner that does not generate secondary waste streams.

Project Accomplishments

In two operating campaigns, the ESTD successfully demonstrated the treatment of ~68,500 lbs of Tank 48H simulant by producing ~14,000 lbs of granular solid product in ~600 hours of operation. Results from this project:

- Demonstrated the capability of the integrated THOR® FBSR process to convert Tank 48H simulant into a carbonate-based product suitable for final treatment in DWPF
- Demonstrated that gaseous emissions meet MACT and other environmental standards
- Confirmed operational, engineering, and design parameters critical for a full-scale FBSR Tank 48H waste processing facility
- Provided the necessary information to support a Critical Decision Point 1 (CD-1) process down-selection

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