

## Advanced Remediation Technologies (ARTs) Hanford Waste Treatment

Client:  
**DOE**  
(U.S. Department of Energy)

Location:  
**Richland, WA and  
Golden, CO**

Scope:  
**Demonstration at bench  
and engineering scale of  
the treatment of Hanford  
LAW and LAW vitrification  
recycle streams**

Duration:  
**2007-2009**

Contract Type:  
**Cost Plus Fixed Fee**

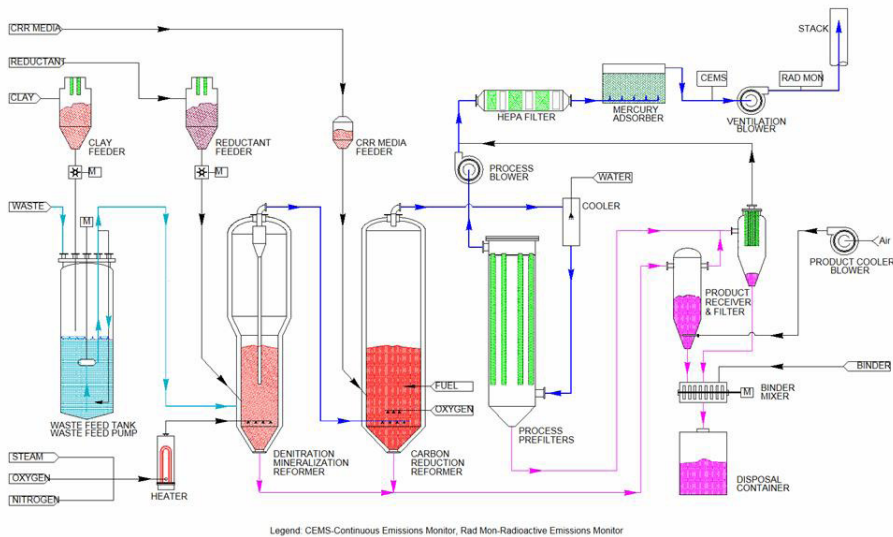
Contract Value:  
**US\$7.7 million**

### **Project Description:**

In September 2007 THOR Treatment Technologies (TTT) was awarded a contract through the DOE ARTs program to demonstrate fluidized bed steam reforming (FBSR) treatment of Hanford Low Activity Waste (LAW). This contract represents Phase II of the ARTs program. Previous pilot tests performed using the THOR® FBSR process indicated that the final mineralized product has leach resistant characteristics that are as good as or better than borosilicate glass. Phase I of the ARTs program summarized these test findings and identified process and regulatory gaps that need to be addressed prior to full deployment of the technology at the Hanford site. Closure of these gaps is the scope of work for ARTs Phase II.

In February 2008, TTT was directed to also demonstrate treatment of the Hanford Tank Waste Treatment and Immobilization Plant (WTP) Secondary Waste (recycle) stream (WTP SW). TTT demonstrated treatment of LAW and WTP SW simulants using the Engineering Scale Technology Demonstration (ESTD) pilot plant in 2008.

**THOR** Treatment  
Technologies



# THOR Treatment Technologies

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

## Unique Challenges

Our main challenges in this project include:

- Validate that LAW and WTP SW mineralized waste products have disposal performance characteristics that are greater than or equal to borosilicate glass
- Confirm that gas emissions meet Washington state air permitting standards
- Demonstrate immobilization of technetium, cesium, halides and sulfate into a waste form suitable for onsite disposal

## Project Accomplishments

In a single testing campaign, the ESTD successfully demonstrated treatment of ~1,200 gallons of LAW simulant and ~1,200 gallons of WTP SW simulant by producing ~12,000 lbs of granular solid product in ~204 hours of operation. Results from the demonstration include:

- Demonstrated production of a mineralized waste form with disposal characteristics equal to or superior to borosilicate glass
- Demonstrated gas emissions meet Maximum Achievable Control Technology (MACT) and other regulatory standards
- Demonstrated the production of a successful monolithic waste form with a variety of binders, positive compressive strengths and PCT test results

Next step will demonstrate bench-scale treatment of radioactive material.

