

Proof-of-Principle Summary Test Report

ASTD Return-On-Investment Project



United States Department of Energy
Office of Environmental Management
Fact Sheet

Proof-of-Principle Testing: Nochar® AcidBond® Technology Solidifies Hanford Tank Waste

Summary

Supported by an ASTD ROI project to deploy Nochar polymer technology, Nochar's AcidBond has successfully solidified a simulant of Envelope A waste from the Hanford Tanks. Solidification of the pH 14 liquid occurred within minutes. Initial test results show excellent chromate and nitrate / nitrite retention.



Description of Testing

The Hanford Tanks Project is examining ways to accelerate the processing of the multitude of tank wastes and reduce the total cost. One approach is to use commercial technologies to stabilize the Low Activity Waste for on-site disposal.

Nochar's AcidBond has stabilized extremely low and high pH aqueous liquids in non-nuclear industries outside of DOE. As a result of this ASTD project, AcidBond is being used now at Rocky Flats and Los Alamos to solidify TRU acids at pH of 0-2.

CHG Hanford agreed to help Nochar conduct proof-of-principle testing by arranging for the Savannah River Technology Center to prepare and send to Nochar a tank simulant at about pH 14.2. Nochar mixed the simulant and AcidBond acrylic polymers at a 1:1 ratio by weight, and the liquid solidified within a few minutes. With a mixture of polymers and additives, a metals TCLP analysis showed a phenomenal reduction in Chromium from a CrO₄ level of 1,392 mg / L to only 0.14 mg / L for Cr.

An additional test to measure nitrate / nitrite retention showed only 240 mg / kg of nitrate / nitrogen leached per 24-hour period, compared with nitrate / nitrite levels in the simulant of 128,000 mg / L.



Next Steps

It is suggested that the Hanford Tanks Project:

1. Review the proof-of-principle test data and data from other DOE sites that tested Nochar
2. Determine which specific waste streams would be suitable targets
3. Conduct testing with those waste streams and Nochar polymers

Proof-of-Principle Testing of Nochar

| Test | Initial Value in Simulant | Test Results |
|--|----------------------------------|-------------------|
| Chromate Retention | 1,392 mg / L of CrO ₄ | 0.14 mg / L of Cr |
| Nitrogen Retention, leached after 24 hrs | 128,000 mg / L | 240 mg / L |

Projected Values

| Parameter | Projected Value |
|---|--------------------|
| Waste Volume Increase, % | 20 – 80 % |
| Cost of Polymer Product, \$ / gallon of Waste | \$20 – 40 / gallon |

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