

U.S. DEPARTMENT OF ENERGY CLOSURE SITES EXPERIENCE CONTINUED SUCCESS USING NOCHAR'S POLYMERS

MOUND, OHIO

The Mound site in Miamisburg, Ohio continues to expand the deployment of Nochar® polymers in their accelerated effort to close the site by 2006. The bulking and solidification of high-curie tritiated oil using Nochar's N990 Petrobond® polymer has moved to consistent production mode. The Nevada Test Site (NTS) has approved the waste profile that will now allow the packaging, transport and burial of this waste stream. The vacuum pump oil is first bulked into 100-liter tanks, then remotely pumped into high-density liners containing N990. This process requires no mixing and greatly reduces worker exposure (ALARA) during the operation.

Oils, acids, aqueous sludges, glycols and other liquid wastes are being solidified in buildings that will be dismantled during the closure process. The site also continues to use the Nochar Vial cutter to process scintillation vials and solidify the contents in a Nochar blend for burial at Envirocare, UT.

ROCKY FLATS, COLORADO

In October, 2001 Rocky Flats personnel completed the solidification of approximately 500 gallons of TRU contaminated waste oil. The waste stream was contaminated with various organic solvents, including carbon tetrachloride and trichloroethylene, creating the potential for hydrogen gas or flammable organic gasses to be generated by the treated waste. Volatile Organic Carbon and Gas Generation Testing has proven successful to date. Once final testing is complete, the solidified material is scheduled for

shipment to the Waste Isolation Pilot Plant (WIPP) in early 2003. The site is currently solidifying cerium nitrate and other waste acids and oils as the site moves toward closure in 2006.

WCS, ANDREWS, TEXAS

A lead test engineer from Mound is working with personnel at Waste Control Specialists (WCS) to solidify waste pump oil contaminated with high levels of tritium. A total of 59 drums was solidified a number of years ago with vermiculite which only works as a surface collection adsorbent. Over time the oils have severely leached from the material. Nochar's N990 is now being called on to re-solidify all 59 drums for burial at NTS. WCS is currently completing equipment installation to handle this high-curie waste. Operations are scheduled to begin by the end of this calendar year.

AECL WHITESHELL LABS, CANADA

Stored at the Whiteshell Laboratories in Manitoba, Canada, were 12,000 liters of radioactively contaminated organic liquid, made up of a mixture of used WR-1 reactor coolant (Monsanto HD-40 oil), xylene rinse solution, dielectric (EDM) fluid, vacuum pump oil and water. The drums showed evidence of leakage and the effects of long term storage conditions, having been subjected to long term freeze-thaw cycles as a result of the local climate. They even showed severe drum swelling. Prior to the Nochar deployment, AECL was having difficulty in obtaining a suitable transportation container for off-site incineration. On-site incineration in a new facility was prohibitively expensive.

With help from a DOE EM-50 project to deploy Nochar polymer technology, samples of this liquid were successfully solidified using Nochar in May 2001. The Canadian regulatory authority granted Whiteshell permission to solidify the entire 12,000 liters and the project was completed in June 2002. Based on the success of this project, another order of Nochar polymers was used to solidify miscellaneous lab chemicals also.

The Nochar solidification provided a long-term storage solution instead of incineration and saved AECL an estimated \$250,000. This project achieved a 910% savings over established baseline projected costs.

INTERNATIONAL APPLICATIONS

Nochar and its international partner, Pacific World Trade, Inc have been active in international markets for the last two years. Nochar's technology has been tested or evaluated in the following countries: United Kingdom, France, Russia, Holland, Czech Republic, Romania, Japan, China, Korea, Mexico, Brazil and the United Kingdom.

Currently Slovenia (Krsko) is a user of Nochar polymers for the solidification of oils and solvents for eventual incineration. Also, Nochar safety booms are available for emergency spills.

In Russia, extensive testing has been underway with the Klopın Radium Institute in St. Petersburg for the past 18 months. Solidification projects are expected to

begin in early 2003 at various Ministry of Atomic Energy sites

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DESCRIPTION OF NOCHAR TECHNOLOGY

Nochar PetroBond technology is a high technology 3rd generation elastomeric polymer produced by Nochar Inc. of Indianapolis, Indiana. Using extensive experience in major commercial oil spills, Nochar has designed a product for use in the nuclear environment that will absorb organics, solvents and other hydrocarbons with a mixture of polymers that can address specific characteristics of a variety of waste liquids. PetroBond bonds the organic liquid into a hard or sponge rubber-like material.

Nochar PetroBond is non-toxic, non-hazardous, non-corrosive and non-biodegradable. It produces no heat during the solidification process. It is incinerable to less than 0.02 % ash, thereby allowing for final incineration at a later date. It has a demonstrated absorbent capacity of up to 15:1 (ratio of oil to agent by weight), with minimal volume increase. It has been tested to 40 MRad gamma exposure with limited evidence of radiological degradation, and as a single step process, requires no mixing. Nochar's comparable aqueous solidifying agent has absorbent capacity up to 85:1 (ratio of water to agent using AcidBond®), also with negligible volume increase.

Toxicity Characteristics Leaching Procedure (TCLP) analysis of Nochar solidified oil shows effective results in almost every application to date.

NOCHAR SUCCESSES AT OTHER DOE FACILITIES

- Ashtabula, Ohio: rad contaminated compressor oil/water mixture, kerosene tri-butyl phosphate, other LLRW organic liquids were stabilized and buried.
- Sandia, New Mexico: mixed waste, multi-phase oil and vacuum pump oil were stabilized.
- Princeton, New Jersey: tritiated pump oil was stabilized.
- Savannah River Site, South Carolina: radioactively contaminated Purex solution was solidified. Many tests, including radiation, pressure and thermal stability, accelerated aging, vibration, were successfully completed. Further tests are planned.
- Los Alamos, New Mexico: surrogates of TRU contaminated TCE, TRU acids, LLW tritiated pump oil and other LLW liquids were solidified. Further tests are being conducted on actual TRU and LLW.
- Envirocare, Utah: Solidification of motor oil and anti-freeze were demonstrated.
- Hanford, Washington: several rad contaminated lubricants, cutting oil and a water-organic mixture at Pacific Northwest Labs were solidified. Further application is planned. In addition, testing of high level tank waste with surrogate samples at pH >14 has been performed. All tests were successful and discussions are ongoing concerning Nochar's participation in this enormous project.
- BWXT Division, Lynchburg, Virginia: Acids, oils, radioactive water with filter media were solidified. The site plans to use Nochar polymers in their future operations.
- Oak Ridge ORNL: one complete waste stream (5 gallons) of vacuum pump oil with uranium, tritium and mercury was solidified for disposal with Nochar and SAMMS.
- Oak Ridge Y-12: a sample of aceto-nitrile (methyl cyanide) was solidified. Y-12 is developing an alternative to TSCA incineration.