

## **ALARA SUCCESS WITH LIQUID WASTE SOLIDIFICATION, STABILIZATION AND MINIMIZATION USING NOCHAR™ POLYMER TECHNOLOGY**

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### **ABSTRACT**

With a stronger emphasis on decommissioning of nuclear weapons facilities in the U.S. DOE complex, as well as continuing waste issues facing nuclear power plant operators, a critical need has developed for a proven technology to deal with enormous liquid hazardous waste issues. While many new technologies are on the horizon and under development, few have offered immediate solutions. Nochar's polymers have demonstrated in testing and application at multiple DOE sites and at nuclear sites around the world, that it can create stabilized waste forms that offer safer and better ALARA control of waste solidification, transportation and disposal. Nochar's state-of-the-art polymers are a proven answer to present day needs that will allow immediate burial site disposal, above ground depository use for "safe store" applications, and stabilization and immobilization plans for safe transport or incineration at a later date under optimum ALARA conditions.

Nochar's first nuclear testing and application within the nuclear complex took place at the Mound Site in Miamisburg, Ohio. Testing and solidification of tritium oil at the Mound Site led to Nochar's Petrobond becoming the baseline technology for the entire tritium oil inventory, which was solidified and shipped to Nevada Test Site (NTS). Due to the high curie content of the oil, the entire inventory of tritium oil was solidified remotely without mixing, exceeding the sites ALARA standards for this waste stream.

At Rocky Flats in Colorado, Nochar polymers were successfully tested and implemented for solidification of all TRU liquids both organic and aqueous. Solidified TRU waste at Rocky Flats met all criteria and approvals for burial at the Waste Isolation Pilot Plant (WIPP). Nochar polymers became the baseline technology for TRU liquids and saved the site an estimated \$10,000,000 in cost savings over other available options.

Nochar's Petrobond™ was successfully tested on Purex waste (kerosene/TBP) at Savannah River Site In South Carolina for long-term durability including gamma radiation at 89 mega rad. In October of 2004, Nochar began the solidification of 30,000 gallons of Purex at the Waste Control Specialists facility in Andrews, Texas. Due to the success of this project, Savannah River is anticipating utilizing Nochar technology on numerous waste streams.

Other sites within the DOE complex such as Hanford, Washington and INEEL, Idaho are considering the implementation of Nochar polymers for a wide range of waste streams including LLW, TRU and LLMW. These waste streams and others are being pushed forward, due to the efficiency and strong ALARA controls which Nochar polymers offer.

Nochar's solidification technology is backed up by an extensive array of testing on radioactive waste, which includes the following:

**TCLP, radiation testing (gamma), durability testing, Liquid release tests, compression testing, VOC**

**Head space, gas generation tests, elevated temperature testing, Iodine 129 tests, headspace gas tests, UV tests, paint filter tests, vibration testing, toxicity testing, incineration testing, and % carbon and % hydrogen Tests**

The above litany of testing represents a fraction of testing conducted by the U.S. government and others concerning the use of Nochar polymers in the nuclear sector. International testing for radioactive waste in Europe and Asia represents an even more extensive list, making the Nochar product line among the most tested and proven solidification technologies in the world.

In Russia, Nochar representatives have been working with the Khlopin Radium Institute in St. Petersburg for the past three years, testing over (60) different waste streams. Officials from Khlopin have co-written several white papers concerning the use of Nochar products. Another presentation is planned for WM 05 in Tucson in February.

The Chinese government has approved the use of Nochar products for the solidification or problem radioactive waste streams including Purex waste, which should begin production in 2005.

In France, the government approval agency, Centraco, has cleared the use of Nochar polymers for solidification and incineration of radioactive power plant waste after extensive testing. Production of problem organic waste with polymer should begin in 2005.

The following is a partial list of additional countries, which are either testing or using Nochar polymers in the solidification of radioactive waste:

**Japan:** represented by ATOX, power plant waste including tritium and low level waste have been tested and are being considered for future solidification projects.

**England:** Nochar representatives are working with the British Nuclear Group for solidification and burial of Transuranic Waste, which has been a major problem for them in the past.

**Slovenia:** Currently using Nochar for solidifying low-level waste.

**Romania:** Has just completed certification of Nochar technology for use.

**Australia:** Testing polymers on radioactive power plant waste.

**Canada:** Completed solidification of 12,000 liters of radioactive coolant oil with Nochar polymer blends at Whiteshell Laboratories. Also working with officials at Chalk River and Ontario Hydro.

Additional countries are currently investigating the use of Nochar technology for use in solidifying problem radioactive waste streams.