

# RPM News

## ▲ Remedial Project Manager News ▲

“COMMUNICATING NAVY INSTALLATION RESTORATION PROGRAM NEWS AND INFORMATION AMONG ALL PARTICIPANTS”

### In This Issue

ITRC is a Great Example of “One Cleanup Program” at Work ..... 2

Updated Metals Bioavailability Guidance Documents ..... 4

New Sediment-Related Navy Guidance Documents ..... 4

Latest ITRC Product Focuses on Lead-Contaminated Soils ..... 5

Converting Contaminated Soil From A Problem Into A Useful Product ..... 6

CAMU Avoids Cost, Reduces Liability, and Saves Time ..... 8

## The Last Printed Edition of RPM News



# Converting Contaminated Soil From A Problem Into A Useful Product

## Introduction

The Naval Facilities Engineering Command (NAVFAC) is currently working with Encapco Technologies, LLC to test their patented emulsion stabilization technology at several sites for the treatment of soils impacted by heavy metals, explosive compounds, radionuclides, and other contaminants. After implementation of the Encapco process, the treated soil is ready for recycling and reuse as a valuable construction material for road base, covers, berms, or fill. Typical processing costs are \$40 to \$65 per ton and the treated material has a potential recycled value of \$10 per ton.

The objectives of NAVFAC's on-going demonstration program are to evaluate the implementability of the Encapco

soil stabilization technology, to document the cost and performance of the technology, and to obtain regulatory support for the overall treatment approach and product reuse options.

## Technology Description

Encapco's stabilization method can be implemented either ex situ or in situ. This physical-chemical treatment technology for the cleanup of contaminated soil was patented in 1999 under U.S. Patent No. 5,968,245 and is licensed by Encapco Technologies, LLC. It involves mixing contaminated soil into an asphalt or tall oil pitch (TOP) emulsion that is chemically enhanced to bind and stabilize the target contaminants. A typical emulsion formulation is provided in Table 1.

Material	Volume
Tall Oil Pitch or Asphalt	50%
Non-ionic Surfactant	2%
Water	42%
Acid- Proprietary	6%

Table 1. Typical Emulsion Formulation

During the Encapco process, chelating and/or precipitating agents are added into the asphalt emulsion to promote chemical bonding of the target contaminants. As the asphalt emulsion coalesces, cures, and solidifies, the contaminants in the soil are both chemically stabilized and physically encapsulated. The overall treatment objective is to minimize contaminant leaching, while retaining the overall adhesiveness, durability, and water-resistance of the final asphalt base product.

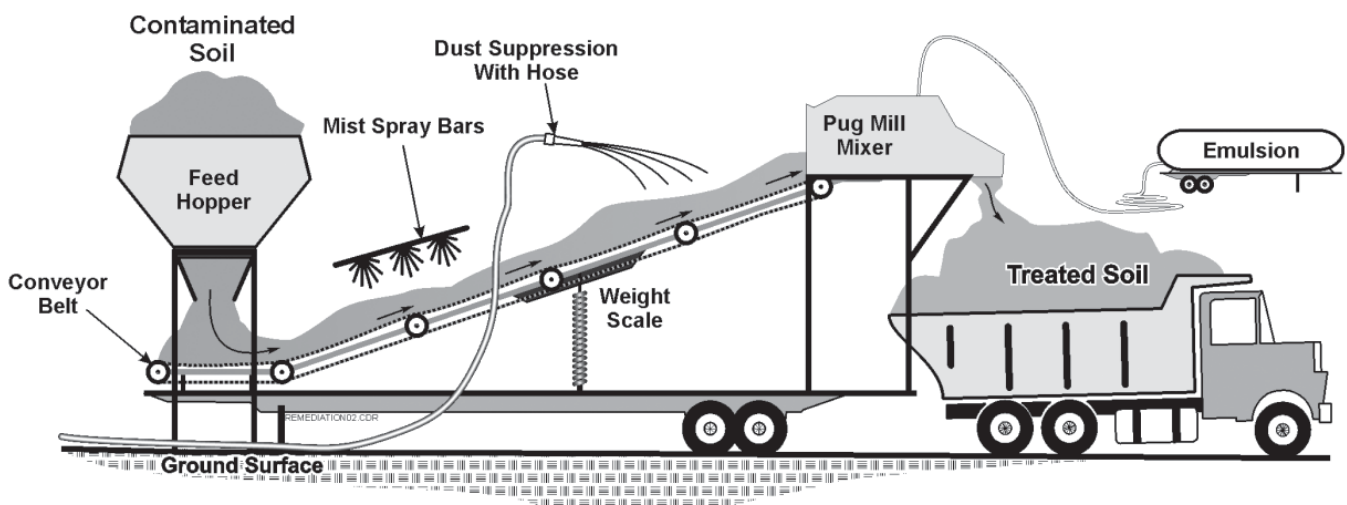


Figure 1. Schematic of Encapco treatment technology.



Figure 2. Lead ingots stacked within fenced area.

The equipment involved in the ex situ treatment process is readily available (see Figure 1). A feed hopper is used for storage of excavated soil and a tanker truck is used to hold the asphalt or TOP emulsion. A pug mill mixer is then used to blend and thoroughly mix the soil and emulsion prior to placement into a dump truck. An array of mist spray bars and hoses are used for dust control. After treatment, the final product is a stabilized and encapsulated soil that can then be used for road base, covers, berms, fill, or other purposes.

**Field Demonstrations**

Treatability testing of the Encapco stabilization method is underway at several sites in preparation for fieldwork to be conducted this summer.

In the past, the Encapco process has been successfully used to treat soils contaminated with heavy metals, especially lead. This will be verified at

the Naval Support Activity (NSA) in Mechanicsburg, Pennsylvania. For the past 50 years, NSA Mechanicsburg has served as a repository for 90,000 tons of lead and zinc ingots (see Figure 2). Although the storage areas were fenced, the ingots were kept in the open on bare ground. This practice left the ingots exposed to decades of weather, resulting in contamination of the surrounding soil. The ingots are scheduled for sale and removal from the site, so soil in the former storage areas must be addressed. The Navy determined that only shallow soils within the storage areas were impacted with lead and that no impact had occurred to groundwater quality. Treatability tests are in progress and fieldwork is expected to begin this summer.

The Ammunitions Burning Ground (ABG) at the Naval Surface Warfare Center (NSWC) in Crane, Indiana was selected as the demonstration site for

the treatment of explosive compounds. Several explosives were detected in site soils including HMX, RDX, TNB, TNT, 2,4-DNT, 2,6 DNT, 2A-DNT, and 4A-DNT. The soil collected for the treatability study contained lead up to 686 mg/kg and was spiked with explosive compounds at 2,000 mg/kg. Based on initial treatability results shown in Table 2, the reduction in the Toxicity Characteristics Leaching Procedure (TCLP) of RDX, TNB, and TNT ranged from 96% to 99%. Fieldwork at this site is expected to begin later in 2003.

Compound	Untreated TCLP (mg/L)	Treated TCLP (mg/L)
RDX	1.50	0.0056
TNB	0.11	0.0042
TNT	4.99	0.0034

Table 2. Initial Encapco Treatability Test Results

The Encapco process is also being tested on radionuclide contaminated sites at two Department of Defense (DOD) facilities in New Mexico and Arizona and one Department of Energy (DOE) facility in Nevada. The radionuclides targeted for treatment include plutonium (Pu), americium (Am), thorium (Th), and depleted uranium (DU). The objectives are to achieve dust and erosion control to reduce off-site migration of these radionuclides. The initial results from the treatability tests are expected later in the summer of 2003.

*For more information, contact:*

*Naval Facilities Engineering Service Center (NFESC)  
(805) 982-6586*