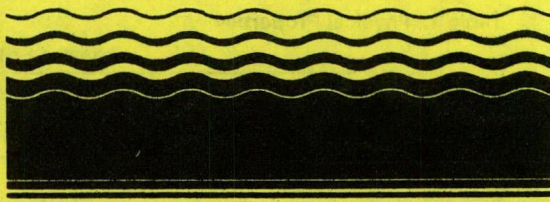




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TECHNOLOGY EVALUATION



## Demonstration Bulletin

### Solidification/Stabilization Process

#### Hazcon, Inc.

**TECHNOLOGY DESCRIPTION:** The solidification/stabilization technology mixes hazardous wastes, cement, water and an additive called Chloranan. Chloranan, a nontoxic chemical, encapsulates organic molecules, rendering them ineffective in retarding or inhibiting solidification. This treatment technology immobilizes the contaminants from soils by binding them into a concrete-like, leach-resistant mass.

After contaminated soil is excavated and screened out for oversized material, it is fed to a mobile field blending unit to treat the wastes (Figure 1). The unit

The treated output is the contaminants bound by encapsulation into a hardened, concrete-like mass. For the treatment of large volumes of waste, larger blending systems are also available.

**WASTE APPLICABILITY:** This technology is intended for soils and sludges contaminated by organic compounds, heavy metals, oil and grease.

**DEMONSTRATION RESULTS:** This solidification technique developed by HAZCON, Inc. was demonstrated at a former oil reprocessing plant in Douglassville, Pennsylvania. Soils in the area were contaminated with oil and grease, volatile and semi-volatile organics, PCBs, and heavy metals. Results from physical testing of the solidified wastes were very good with unconfined compressive strengths ranging from 220 to 1570 psi. Durability test results were also good showing no physical strength changes after 12 wet/dry and freeze/thaw cycles. Permeability in the treated waste was low while the porosity was moderate. TCLP Leaching tests, however, indicated that only lead was immobilized by the process. When samples containing semi-volatile organics and oil and grease were ground up and subjected to the TCLP procedure, they leached from the treated soil blocks in nearly the same concentrations as from the untreated soil. A portion of the results are shown on Tables 1 and 2.

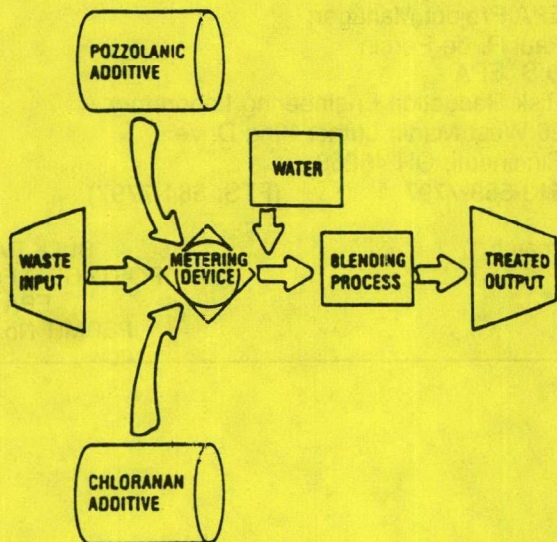


Figure 1. Solidification/stabilization process diagram.

consists of soil and cement holding bins, a Chloranan feed tank and a blending auger to mix the waste and pozzolanic materials (portland cement, fly ash or kiln dust). Then water is added as necessary, and the resultant slurry is allowed to harden before disposal.

- The demonstration was held from October 12 to October 16, 1987.
- The process successfully:
  - immobilized lead
  - solidified high-organic (25%) waste containing oil and grease
- Volatile organics were primarily released to the air during mixing with the stabilizer.



**Table 1. Physical Properties**

Sample	Untreated Soil			28-day Cores		
	Oil and Grease (%)	Bulk Density g/ml	Permeability, cm/sec	Bulk Density, g/ml	Permeability cm/sec	UCS* psi
1	1.0	1.23	$5.7 \times 10^{-1}$	1.95	$1.8 \times 10^{-9}$	1110
2	16.5	1.40	$1.8 \times 10^{-3}$	1.61	$4.0 \times 10^{-9}$	520
3	25.3	1.60	Impermeable	1.51	$8.4 \times 10^{-9}$	220
4	4.3	1.68	$2.0 \times 10^{-2}$	1.84	$4.5 \times 10^{-9}$	940
5	4.5	1.73	$7.7 \times 10^{-2}$	2.07	$5.0 \times 10^{-10}$	1570
6	7.8	1.59	$1.5 \times 10^{-5}$	1.70	$2.2 \times 10^{-9}$	890

\*Unconfined compressive strength.

**Table 2. Chemical Properties**

Sample	Leachate Concentrations, mg/l					
	Untreated Soil			28-Day Cores		
	VOC*	BNA*	Lead	VOC*	BNA*	Lead
1	0.92	ND*	1.5	0.38	ND*	0.007
2	0.02	1.02	31.8	0.06	1.45	0.005
3	1.03	2.81	17.9	0.72	2.79	0.400
4	5.10	0.01	27.7	0.37	0.10	0.050
5	1.10	0.01	22.4	0.84	0.11	0.011
6	0.06	0.01	52.6	0.11	0.73	0.051

VOC - Volatile organic carbon.

BNA - Base neutral/acid extractable.

ND - Not determined.

- Good physical properties (i.e., low permeability, high unconfined compressive strength, resistance to weathering) were developed in the treated waste.
- TCLP results for semi-volatiles and oil and grease were essentially the same for treated and untreated samples, in the low ppm range.
- High volume increases accompany the treatment process (approximately 100 percent)

A Demonstration Report and an Applications Analysis Report describing the complete demonstration will be available in the Spring of 1989.

#### FOR FURTHER INFORMATION:

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