

SITE Technology Profile - Demonstration Program
November 1994 - Ongoing Project

EET, INC.

(Extraction of Polychlorinated Biphenyls from Porous Surfaces Using the TECHXTRACT Process)

TECHNOLOGY DESCRIPTION:

The TECHXTRACT process employs proprietary chemical formulations in successive steps to remove polychlorinated biphenyls (PCB), toxic hydrocarbons, heavy metals, and radionuclides from the subsurface of porous materials such as concrete, brick, steel, and wood. Each formulation consists of chemicals from up to 14 separate chemical groups, and can be specifically tailored to each contaminated site.

The process is performed in multiple cycles, and each cycle includes three stages: surface preparation, extraction, and rinsing. Each stage employs a specific chemical mix.

The surface preparation step uses a solution that contains buffered organic and inorganic acids, sequestering agents, wetting agents, and special hydrotrope chemicals. The extraction formula includes macro- and microemulsifiers in addition to electrolyte, flotation, wetting, and sequestering agents. The rinsing formula is pH-balanced and contains wetting and complexing agents. Emulsifiers in all the formulations help eliminate fugitive releases of volatile organic compounds or other vapors.

The formulation in each stage is sprayed on the contaminated surface as a fine mist and worked into the surface with a stiff bristle brush or floor scrubber. The chemicals are allowed to penetrate into the subsurface, and are then rinsed or vacuumed from the surface with a high-efficiency particulate air-filtered barrel-vacuum. No major capital equipment is required.

Contaminant levels can be reduced from 60 to 90 percent per cycle. One cycle can take up to 24 hours. The total number of cycles is determined from initial contaminant concentrations and final concentration target levels.

WASTE APPLICABILITY:

The TECHXTRACT process is designed to treat porous solid materials contaminated with PCBs; toxic hydrocarbons; heavy metals, including lead and arsenic; and radionuclides. By extracting the contaminants from the surface, the materials can be left in place, reused, or recycled. After treatment, the contaminants are concentrated in a small volume of liquid waste.

In commercial applications, the process has reduced PCB concentrations from 1,000,000 micrograms per one hundred square centimeters ($\mu\text{g}/100 \text{ cm}^2$), to concentrations less than $0.2 \mu\text{g}/100 \text{ cm}^2$.

TECHXTRACT has been used on concrete floors, walls, and ceilings, tools and machine parts, internal piping, valves, and lead shielding. TECHXTRACT has removed lead, arsenic, technetium, uranium, cesium, tritium, and thorium.

STATUS:

This technology was accepted into the SITE Demonstration Program in summer 1994, with an expected demonstration date of December 1994. The demonstration should verify PCB extraction depth from concrete surfaces and quantify contaminant removal from the subsurface.

The technology has been used in over 200 successful decontamination projects for the U.S. Department of Energy, U.S. Department of Defense, electric utility industry, heavy manufacturing industry, steel industry, aluminum industry, and other applications. Further research is underway to apply the technology on soil, gravel, and other loose material. Additional research is planned to remove or concentrate metals in the extracted liquids.

FOR FURTHER INFORMATION:

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