

Baking Contaminated Soil

Thermal Desorption Unit Solves PCB Problem

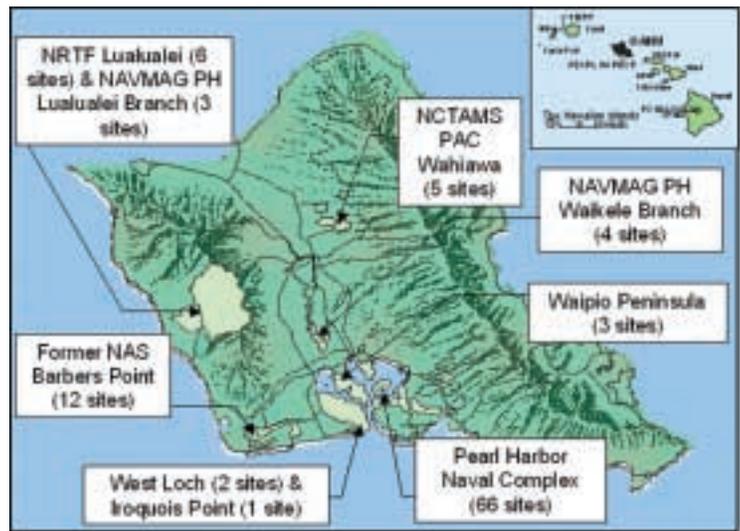
On 21 November 2003, the Navy began treating soil contaminated with polychlorinated biphenyls (PCB) using a technologically advanced Thermal Desorption Unit. This unit safely removes PCBs from the soil, thereby allowing the treated soil to be safely returned to the ground.

The Environmental Restoration Division of the Naval Facilities Engineering Command's Pacific Division (PACDIV) is known for their innovative approach to environmental engineering problems. The Thermal Desorption Unit at the former Barbers Point Naval Air Station at Kalaheo, HI is another example of PACDIV's commitment to innovation.

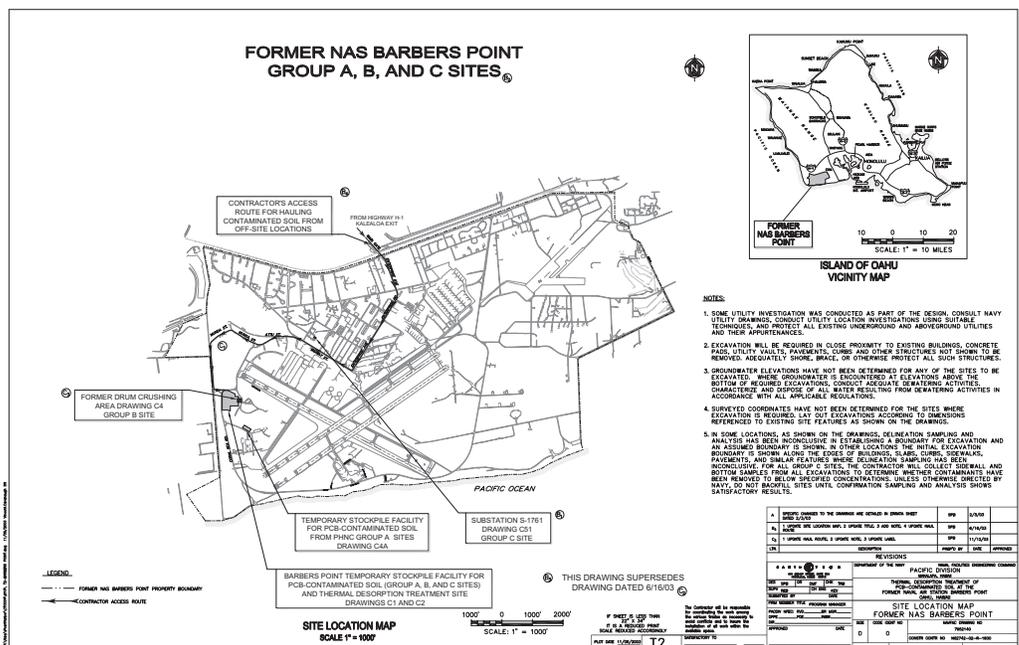
This process involves heating soil to a high temperature, filtering out the separated contaminants, then collecting the contaminants for disposal at an Environmental Protection Agency (EPA)-approved landfill on the mainland.

An Innovative Process

The soil contaminated with PCBs travels up a 60-foot long conveyor belt and is dropped into three large drums where it is heated to approximately



Island of Oahu: Total number of sites in this project.





LEFT: After treatment, clean soil is sent via conveyor to a tent where it is stockpiled awaiting transportation.



RIGHT: The back of the Thermal Desorption Unit. For every 100 tons of contaminated soil that is treated, 99 tons come back clean and sterile. The treated soil is sent back to be reused on the base where it originated.

900 degrees for about 35 minutes. At this temperature, the PCBs separate from the soil as vapor then are cooled and liquefied again as sludge. The clean, sterile soil that once was contaminated is stockpiled on site for transport back to the Navy bases where it originated. The resultant sludge is then run through a water-processing unit that separates the PCBs for disposal. For every 100 tons of soil that is treated, 99 tons come back clean and ready for reuse.

An estimated 26,306 cubic yards of PCB-contaminated soil from 100 transformer sites at various Navy installations on Oahu are planned for treatment. Currently, soil from 21 sites and over 5,600 cubic yards have been excavated and is awaiting processing in the unit. Seventy-nine other transformer sites from other Navy bases will be excavated in the next few months, and the contaminated soil will be transported to Barbers Point for treatment.

Prior to 1977, PCBs were frequently used in electrical transformers. These transformers were phased out after being found to have potentially harmful effects on humans and the environment. Since then, transformers containing PCBs have been removed or replaced but years of use resulted in the release of PCBs into the soil.

Conducting cleanup of the PCB-contaminated soil presented unique challenges because Hawaii does not have treatment or disposal facilities suitable to accept wastes generated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

PACDIV environmental engineers conducted a comprehensive evaluation of both on-site and off-site alternatives including excavation and shipment of the soil to an EPA-approved facility on the mainland.

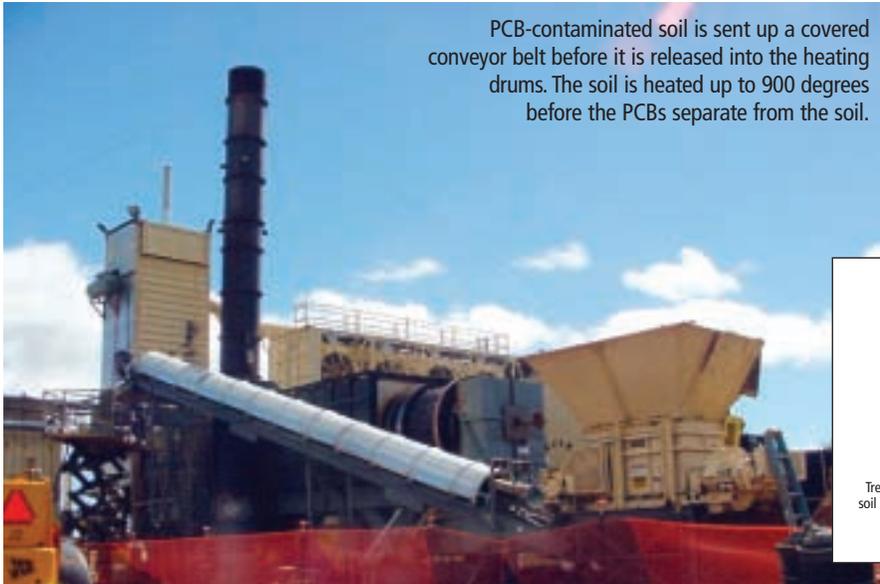
Find the Right Solution for the Problem

In September 2000, an engineering evaluation/cost analysis (EE/CA) was completed, which evaluated treatment and disposal options for the contaminated soils. The objective of treatment or disposal is to provide long-term protection of the environment and reduce human health and ecological risks.

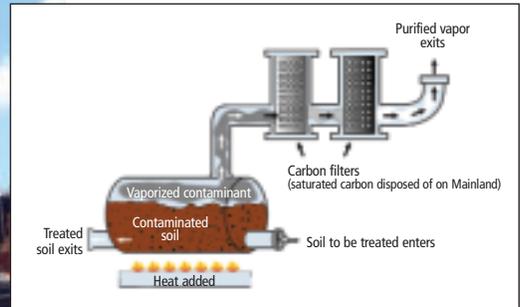
Part of the EE/CA was to identify an appropriate treatment alternative, reduce contaminant concentrations to established cleanup levels, and allow for the reuse of the clean soil at island Navy bases. "The engineering report recommended a mobile thermal desorption unit," explained Janice Fukumoto, environmental engineer and PACDIV project manager. "The evaluation recommended that the soils be consolidated at one site for treatment and that the treatment site should be on Navy retained property at the former NAS Barbers Point."

Treatment options that were evaluated involved equipment and manpower mobilization from the U.S. mainland and off-island disposal options that ranged from \$700 to \$1,000 per cubic yard of soil. "The use of the thermal desorption unit on Navy-retained land at Barbers Point will

For every 100 tons of soil that is treated, 99 tons come back clean and ready for reuse.



PCB-contaminated soil is sent up a covered conveyor belt before it is released into the heating drums. The soil is heated up to 900 degrees before the PCBs separate from the soil.



Basic process for Indirect Thermal Desorption.

result in approximately \$10 million of cost avoidance,” Fukumoto added.

Once the desorption unit was determined to be the most cost-effective solution, while also meeting the goal of transferring clean soil back to a majority of the sites, PACDIV engineers and contractors conducted an evaluation of the logistics, routes and requirements of transporting the soil to the Kalaeloa site for treatment. “Close coordination with the State of Hawaii Health and Transportation departments and the EPA was a must,” said Fukumoto. “And we made sure we briefed the communities during the EE/CA process.”

Restoration Advisory Board (RAB) meetings were held on a quarterly basis. The main goal of the meetings was to solicit input about the plan from interested community members throughout the cleanup process. RAB members include: the EPA; State of Hawaii Department of Health; City and County of Honolulu Planning Department; and community associations, including neighborhood boards and environmental groups.

No Impact From Noise, Lighting or Smell

The project site is isolated and located far enough from surrounding communities that project engineers expect no impact from noise, lighting or smell.

“There will be continuous, 24/7 operations at the treatment site,” remarked Brian Lamont, senior project manager for Environmental Chemical Corporation of Burlington, CA, PACDIV’s contractor for the project.

“However, the site is isolated and the only emission from the treatment unit itself is water vapor and carbon dioxide, so smell will not be an issue,” he added. The nearest housing area is located (on the former Naval Base) over half a mile away.

Transporting the Soil

Transportation of the soil is in strict compliance with the State’s Department of Transportation (DOT) regulations. All trucks and drivers must meet the DOT requirements. The project has been coordinated with the EPA and the

State Department of Health from planning through implementation. “The Navy’s contract is very stringent on the issues regarding transport and treatment of the soil,” Lamont explained. “During transport and treatment, strict dust control measures will be implemented and dust monitoring stations have been set up at strategic locations around the treatment facility.”

It’s the first time the unit is being used in Hawaii. The \$8.3 million project is scheduled to take approximately four to five months to complete. The tentative completion date for the treatment process is June 2004. ⚓

CONTACT

Janice Fukumoto
Naval Facilities Engineering Command
Pacific Division
808-471-9186, x-257
janice.fukumoto@navy.mil