

# Impact Area Groundwater Study Program

## TECHNOLOGY INFORMATION SHEET THERMAL DESORPTION

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This information sheet provides details on Thermal Desorption, a technology that will be used in the Impact Area Groundwater Study Program's ongoing cleanup of contaminated soils at Camp Edwards on the Massachusetts Military Reservation (MMR).

The Thermal Desorption system will be used at Camp Edwards to remove explosives chemicals, organics and the oxidizer perchlorate from contaminated soil.

Approvals from the U.S. Environmental Protection Agency and the Massachusetts Department of Environmental Protection, who oversee the program regulatory agencies and will be obtained prior to the start of treatment. The required state air quality permit also will be obtained prior to system startup. Quality assurance measures, including sampling activities will be conducted throughout the Thermal Desorption system's operation.

### What is Thermal Desorption?

Thermal Desorption is a process used to remove contaminants from the soil. Temperatures between 500 to 1,100 degrees Fahrenheit (°F) are used to physically separate moisture and contaminants from the soil. The exhaust created by this process is collected by an air pollution control system and heated to temperatures of approximately 2000°F to destroy the contaminants. The exhaust is then filtered to remove any remaining dust particles from the air stream.

Cleaned soil and air are discharged from the treatment system. Tests on the soil treated by Thermal Desorption systems typically show a reduction in contamination to below detectable concentrations. Soil not treated to acceptable levels is returned to the system and retreated to achieve required cleanup parameters.

### Proven Process

The Thermal Desorption system has been proven to successfully treat soil contaminated by explosives chemicals similar to those found at Camp Edwards. In a similar use at the Kansas Army Ammunition Plant, the Thermal Desorption system removed explosives chemicals, including RDX, HMX and TNT to levels below what can be detected by approved U.S. Environmental Protection Agency (EPA) laboratory methods. Similar results were seen at the Iowa Army Ammunition Plant.



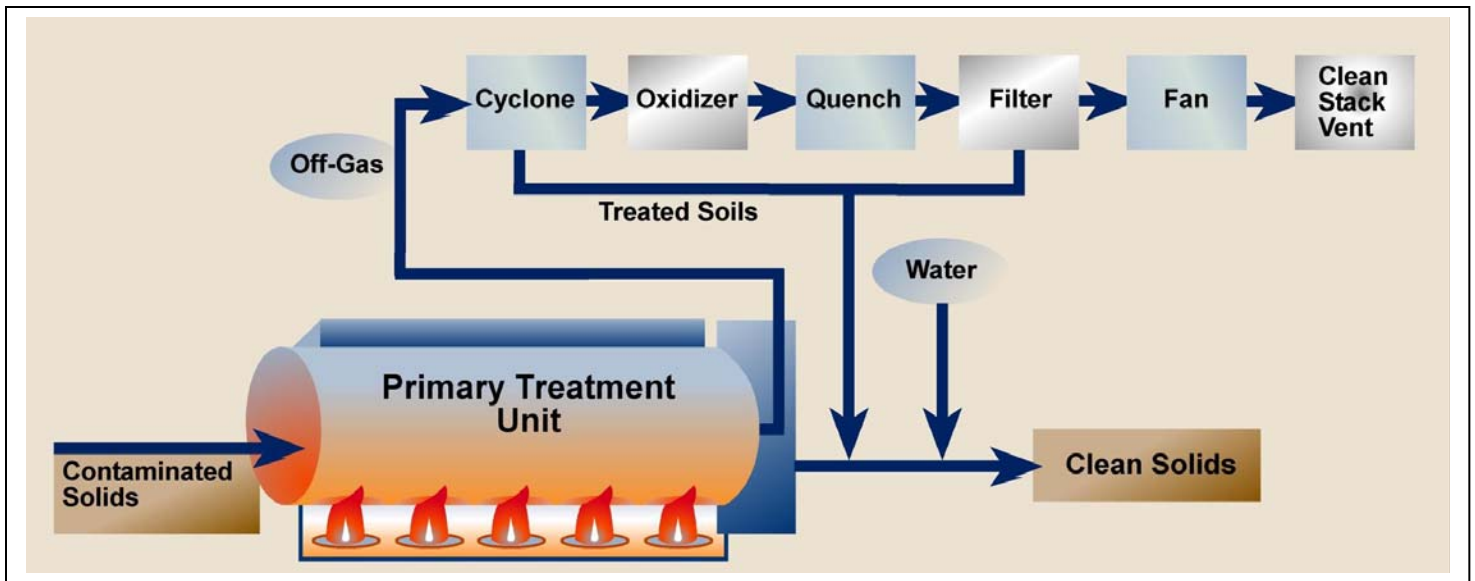
Thermal desorption unit at Demolition Area 1



### Treatability Study for Camp Edwards

To address soil contamination at Camp Edwards, a Treatability Study was conducted to determine the ability of the Thermal Desorption system to remove perchlorate from soil. Perchlorate is a water-soluble salt, used as an oxidizer in munitions and solid fuels for rockets and missiles. It also is used in fireworks, safety flares, airbags and other items. It has been found in soil and groundwater at Camp Edwards.

The study conclusively verified that Thermal Desorption successfully treated perchlorate to levels below what can be detected using approved EPA laboratory methods.



## How It Works

The Thermal Desorption system uses heat to separate contaminants from the soil and then thermally destroys them.

Once rocks and other debris are removed, the soil is fed into the **primary treatment unit**. Inside this rotating drum, soil is heated to between 500 and 1,100°F (775°F is the optimum temperature for soils at Camp Edwards.) These temperatures dry the soil, burn off any organic material and drive off contaminants from the soil, so that they are caught in the exhaust or **off-gas**. The continuous tumbling ensures all of the soil is exposed to the heat for the appropriate time period.

While contaminants are captured in the off-gas, treated soil is discharged from the primary treatment unit and rehydrated with clean water to reduce the soil temperature and control dust emissions.

Treatment of the contaminants continues as the off-gas flows through the air pollution control system. As it spins through the **cyclone**, the soil particles caught in the off-gas are removed before the off-gas moves into the **thermal oxidizer**. Using temperatures of up to 2,000°F the oxidizer destroys any remaining contaminants, transforming them into nitrogen, water and carbon dioxide.

In the **quench** or cooling chamber, clean water is used to cool the off-gas to a temperature that can be handled by the filtering system.

The air pollution control system then uses air filters to pull any remaining treated particles of soil out of the air. A sonic pulse is used to periodically disengage the collected particles from the filter and deposit them in the treated soil stream. The filtered off-gas is then discharged.

An air permit, issued by the Massachusetts Department of Environmental Protection will ensure all emissions I meet state requirements.

Discharged soil is sampled to confirm that treatment is effective. Once sample results confirm that cleanup goals have been met, soil cleaned through this process can be used for fill in site restoration.

**The Impact Area Groundwater Study Program**, which is managed by the U.S. Army Environmental Center, is conducting an investigation and cleanup of groundwater contamination and its sources at Camp Edwards. Working under U.S. Environmental Protection Agency administrative orders and the substantive cleanup standards of the Massachusetts Contingency Plan, the Massachusetts Department of Environmental Protection regulations for environmental investigation and cleanup, the Impact Area Groundwater Study Program is committed to investigating and cleaning up contamination in soil and groundwater on, or emanating from, the base.

## For More Information

Please visit the Impact Area Groundwater Study Program Web site:

[www.groundwaterprogram.org](http://www.groundwaterprogram.org)

Information repositories have been established in the public libraries in Bourne, Falmouth, Mashpee and Sandwich. The repositories are updated regularly to ensure that all necessary documents associated with the cleanup program are available to the public.

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