Ex Situ Soil Vapor Extraction and VOC Treatment, Douglasville, Georgia
Process Description

1. ***Excavation***
   OHM excavated a total of 1,504 cubic yards of contaminated soil within a constructive vapor containment building. Eighteen-inch flex ducts under negative air pressure recovered vapors for thermal oxidation.

2. ***Screening***
   As soil was excavated, it was loaded into the powerscreen hopper to eliminate oversized material and condition the soil, exposing more surface area to increase off-gas potential.

3. ***Stockpiling and Soil Vapor Extraction***
   Most vapor collection occurred in the stockpile area where horizontal vapor extraction legs (slotted 4-inch PVC well screen) extended into the soil pile and connected to the extraction system manifold.

4. ***Off-Gas Monitoring***
   A stringent, continuous air monitoring program using a photoionization detector, combustible gas indicator explosimeter/0_2 meter, and CO detector supplemented the automated air monitoring systems.

5. ***Particulate Removal***
   Collected vapors from the building atmosphere, excavation area, powerscreen, and vapor extraction system were transferred to the baghouse for particulate removal prior to thermal oxidation.

6. ***Thermal Treatment***
   VOC destruction occurred at a 99% efficiency rate in the regenerative thermal oxidation unit, exceeding the USEPA and State of Georgia requirement of 95% efficiency.

7. ***Stack Emissions Monitoring***
   OHM operated two systems for ambient air monitoring to gauge stack gas emissions and ensure the safety of nearby residents.

8. ***Airflow Measurement***
   To determine VOC extraction recovery rates and system performance, OHM's operators took periodic airflow readings at a series of sampling ports in the headers exiting the building.

9. ***Additional Steps, Not Pictured***
   Backfill of excavations; full TCLP, metals, volatiles, and pesticides analyses of stockpiled soils; disposal of soil in a nonhazardous industrial landfill; removal of the vapor containment building; site revegetation/restoration; and demobilization of personnel and equipment from the site were the final steps in this year-long project.

OHM Corporation

OHM Corporation specializes in on-site remediation of hazardous wastes and toxic substances. Since 1969, OHM has completed over 16,000 projects. The company is a leader in developing and applying on-site treatment technologies.

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Ex Situ Soil Vapor Extraction and VOC Treatment Project, USEPA Basket Creek Surface Impoundment, Douglasville, Georgia

Project Description

The Basket Creek Site consisted of a 1-acre surface impoundment that had been used for the illegal disposal of liquid refinery waste. Tankers were off-loaded and drums emptied into the pond for approximately 1 year, after which the impoundment was burned and covered. OHM Remediation Services Corp. (OHM), under contract with the USEPA, was tasked with excavating the contaminated material using volatile organic compound (VOC) emissions controls and performing treatment to render the emissions and soils nonhazardous.

Sampling and analysis of impoundment soils identified the presence of halogenated and nonhalogenated organic contaminants within the percent concentration range and a variety of heavy metals.

Based on investigation results, OHM conducted value engineering analyses, technology evaluations, and benchscale testing that culminated in the development of a remediation plan that incorporated proven technologies in an innovative approach. The plan involved controlled soil excavation and enhanced soil conditioning, ex situ soil vapor extraction, and VOC vapor treatment.

OHM's design incorporated regenerative thermal oxidation technology to achieve the required destruction efficiency while adapting to changing VOC vapor waste-stream concentrations. The system operated on negative pressure, eliminating the potential for a positive system leak to the surrounding environment. The Basket Creek project represented the first time this proven industrial technology was applied to a hazardous waste site remediation project.

The high levels of VOCs in the impoundment soils required extensive emission controls to protect area residents:

- A 7,200-square-foot negative-pressure vapor-containment building over the excavation area
- Area-of-excavation size limitation
- Operation of a negative-pressure screen hood at the excavation area and shaker screen and an extraction well system and pile cover at the soil stockpile
- Use of a baghouse to remove particulate contaminants (i.e., heavy metals)
- Collection and treatment of vapors in the regenerative thermal oxidation unit

After 3 months of excavation and treatment activity, over 72,000 pounds of VOCs had been recovered and treated. Soil samples collected from the stockpile indicated that ex situ vapor extraction had sufficiently removed VOCs to reclassify the soil as nonhazardous.

Technology Description

The sequence of operations involved sweeping air across the excavation surface area to collect vapors from the excavation face. OHM transferred the excavated soil to a shaker screen where debris larger than 2 inches in diameter was removed, and soils were conditioned to expose more surface area and enhance vapor extraction potential within the stockpile.

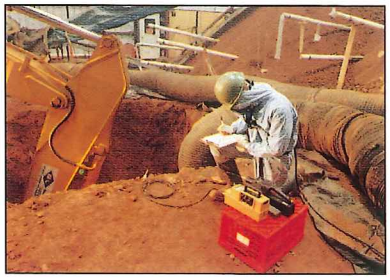
From the screening operation, the soil was conveyed to the soil stockpile/ex situ vapor extraction system. This component of the remediation process provided a low-cost, low-profile means to remove VOCs from the soil.

The vapor extraction system consisted of three independent well fields/vacuum recovery units. The well fields provided a channel through which vapors were pulled from the interior of the stockpile via the vacuum pumps and transported to the regenerative thermal oxidizer for destruction.

System Performance Monitoring

Process information monitored throughout the project included:

- Airflow rates
- Operating vacuum of extraction wells



- Concentrations of total hydrocarbons and specific constituents
- Continuous VOC concentrations at the process flow inlet to the thermal oxidizer and the discharge stack
- Continuous LEL readings of duct work and process system air

Each of the three well fields was monitored by gas chromatography on site to determine VOC concentrations. OHM used the information generated to manipulate the well fields to optimize vapor extraction and maximize the system's destruction and fuel efficiencies.

Health and Safety Program

This project presented several unique health and safety issues:

- Waste containing high levels of solvents and metals
- Potentially explosive atmosphere inside excavation building
- Residential area close to the site

Measures to address these issues involved extensive monitoring, warning, and alarm systems. Duplicate continuous total hydrocarbon monitoring systems for percent of LEL tracked the building atmosphere from 8 remote locations in real time. This equipment was electronically tied into the system controls through a series of interlocks. Locations upstream and downstream of the thermal oxidizer were monitored continuously for air quality and stack gas emissions.

OHM installed a closed-circuit tv/video system through which all operations within the process building/hot zone were monitored. Personnel at the on-site command post thus had access to both visual and audio communications with the crew working inside the building.

OHM's safety record on the project was exemplary; no reportable injuries occurred during the two months of full-time work in Level B protection.

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