

Soil Remediation and the Environment

By Savannah Cooper Sep 19, 2013

Soil contamination—also known as soil pollution—is caused by the presence of manmade chemicals in the natural soil environment. It is often caused by some form of industrial activity, agricultural chemicals or the improper disposal of waste. The most common chemicals involved in soil pollution are petroleum hydrocarbons, pesticides and lead and other heavy metals. Soil contamination can also happen as a result of underground storage tanks rupturing or the leaching of waste from landfills. Mining, fertilizer application, oil and fuel dumping and a multitude of other environmental issues can also cause pollution of the soil.

The biggest concern associated with soil contamination is the harm it can cause to human health. There are significant health risks involved with direct contact with contaminated soil, the vapors from the contaminants and even secondary contamination of water supplies.

The U.S. Environmental Protection Agency (EPA) and other agencies regulate the levels of contamination in order to protect the environment. Superfund is the common name for the Comprehensive Environmental Response, Compensation, and Liability Act that was passed in 1980 to deal with abandoned hazardous waste sites. Through Superfund, the EPA finds those responsible for the contamination—known as potentially responsible parties (PRP)—and requires them to clean up the polluted soil or pay the cost of cleanup. The penalties for failure to clean up the contamination vary, but the law authorizes the EPA to seek up to \$37,500 for each day of non-compliance (EPA Superfund Compliance and Penalties, www.epa.gov).

In 2013 a North Carolina waste oil services company ended up in federal court after failing to comply with regulations concerning used oil contaminated by polychlorinated biphenyls (PCBs). Their unlawful handling of the materials caused widespread contamination, and as a result, the company had to pay restitution in the amount of \$19 million (U.S. Department of Justice press release, 15 July 2013).

A solution to the problem of soil contamination is soil remediation. Soil remediation is a way of purifying and revitalizing the soil. It is the process of removing contaminants in order to protect both the health of the population and the environment. In short, the goal of the process is to restore the soil to its natural, pollution-free state.

Traditionally, there are three main soil remediation technologies: soil washing, bioremediation and thermal desorption.

Soil washing is a process that uses surfactants and water to remove contaminants from the soil. The process involves either dissolving or suspending pollutants in the wash solution and separates the soil by particle size (Center for Public Environmental Oversight, www.cpeo.org). Bioremediation involves the use of living microorganisms, such as bacteria and fungi, to break

down organic pollutants in the soil. In thermal desorption, heat is used to increase the volatility of contaminants, so that they can be separated from the solid material. The contaminants are then either collected or destroyed.

Thermal desorption is the most proven and successful technology used for hydrocarbon contamination, and typically direct fired plants have been used for low levels of contamination.

Lately, indirect fired units are more commonly used because of their versatility and their ability to recapture the hydrocarbons.

A typical thermal desorption unit consists of two main processes. In the first, contaminated solids are heated to the boiling point of the contaminants. The volatilized contaminants are then pumped to the second part of the process, where the vapor is either destroyed by a thermal oxidizer or condensed in a vapor recovery unit (VRU).

Worldwide Recycling Equipment Sales, LLC has a new indirect fired plant, the Vulcan IDR 8440. This thermal desorption unit consists of a 40' x 7' CORETEN or Stainless Steel drum with combustion chamber and burners as the primary thermal desorption unit (PTU). The Vulcan IDR 8440 comes equipped with a material feed system, material discharge system and vapor recovery system.

The unit's vapor recovery system features a quench scrubber, air-cooled heat exchanger, shell and tube heat exchanger, oil-water separator, knock-out pot and oxidizer. The vapor recovery system recovers vaporized hydrocarbons from the primary thermal desorption unit. The heat from the oxidizer can be circulated back to the combustion chamber on the PTU, where it can be used as a fuel source to supplement the burners and reduce the overall operating cost of the unit. The system can recover up to 100MMBtu per hour of energy for reuse as fuel, power and other beneficial purposes to reduce the total operating cost of the unit and improve total return from projects.

Thermal soil remediation is an efficient, environmentally beneficial process. This operation eliminates contamination in the soil in an efficient manner every time. Because the soil can be reused after it is cleaned and purified, it is diverted from landfills, saving valuable space. Through soil remediation, hazardous chemicals and hydrocarbons are removed from the earth, protecting the health of the environment and the population.

For more information on the Vulcan IDR 8440 or other soil remediation equipment, contact Worldwide Recycling Equipment Sales, LLC at (660) 263-7575 or wwrequip@wwrequip.com. View our complete inventory online at www.wwrequip.com.



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