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CHOOSING THE BEST METHOD FOR SOIL REMEDIATION

(Denver, Colo.) -- How do you clean dirt? Unusual as this may sound, this question will be asked more often in the future. As technology continues to expand, new methods are created for soil remediation. Today, there are as many different companies as there are types of technology. One of the best options in terms of managing future liability, time constraints and cost-effectiveness is Soil Recycling Technologies (SRTI).

Today, three primary categories of soil remediation exist: thermal, biological and physical. Each technology has advantages and disadvantages which will determine the most appropriate method for a particular site.

Thermal treatments utilize heat to remove contaminants from the soil. SRTI uses a thermal treatment known as Low Temperature Thermal Desorption (LTTD) to remediate soil. The LTTD process heats the soil from 450^{o} to 750^{o} Fahrenheit in a rotary kiln enabling the petroleum to volatilize and become supplemental burner fuel. The LTTD process has four advantages over other technologies:

1. LTTD achieves a 99 percent extraction efficiency rate for the removal of all petroleum contaminants.
2. LTTD is a cost-effective, one-time process.
3. LTTD permanently remediates the soil and eliminates future potential liability.
4. LTTD does not endanger the soil structure allowing reuse of the soil.

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The primary disadvantage of LTTD is that it is not suitable for waste streams contaminated with heavy hydrocarbons or for remediation of highly contaminated soils. Generally, however, this does not affect remediation of soils contaminated with gasoline, diesel jet fuel and kerosene which are commonly associated with Underground Storage Tanks (USTs).

Incineration is a second type of thermal treatment. Incineration uses a high temperature (usually greater than 1000^{o} Fahrenheit) to combust organic wastes. The advantage of the process is that a large range of contaminants can be remediated, including solid, liquid and gaseous phase contaminants. The primary drawback to incineration is its cost and the fact that none of the contaminated material can be reused after incineration. In fact, the residual ash sometimes has to be landfilled. It also is more difficult to obtain permits because of the negative public perception of incineration.

Biotreatment, or bioremediation, uses microorganisms in the soil to degrade contaminants. One example of this technology is land treatment. In land treatment, the contaminated soil is spread in a thin layer and either tilled into existing soil or placed upon an impermeable liner. During treatment, nutrients, water and oxygen are added to enable the microorganisms to work at their optimal level. The soil is tilled periodically to enhance degradation of the hydrocarbons.

The advantage of bioremediation is its ease of installation and operation. In addition, bioremediation may be more cost effective for certain sites. Disadvantages of the process include:

1. It requires a large open area of land not often found in cities.
2. There can be air emission problems from volatilization of the hydrocarbons.

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3. The process is temperature sensitive and is not effective in cold climates.
4. The contaminants must be biodegradable and must not be toxic to the microorganisms.
5. Several applications of microorganisms may be required to remove the contaminants thus increasing the cost of the process.

The third category of remediation is physical treatment. Physical treatments do not destroy or chemically alter the contaminant. As the name indicates, physical treatment uses natural forces such as gravity, the effect of vapor pressure and differences in densities to separate and/or concentrate the contaminant. Some examples of physical treatments include vapor extraction, soil washing, air sparging and attrition scrubbing.

There are several drawbacks to physical treatment. The system's effectiveness can be highly variable due to the physical properties of the site, soil and contaminant.

A final option for the generator is to landfill the contaminated soil. However, informed generators do not consider landfilling a viable choice because of on-going environmental liability. Government regulations such as CERCLA can require owners who contribute contaminated soils to a landfill to be financially responsible for all remediation costs of the landfill if it leaks, regardless of the volume of material which they delivered to the landfill. In any event, landfilling is a storage technology and does not result in any treatment of the contaminants. Landfilling just transfers the contaminants from one site to another.

Each soil remediation problem is unique and requires thought and research into the different available options. Where cost-effectiveness, time constraints and elimination of future liability are important issues, LTTD is the best remediation process available.

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Soil Recycling Technologies (SRTI), based in Denver, Colorado, provides soil remediation services through a network of facilities across the country. SRTI uses the Low Temperature Thermal Desorption (LTTD) method and provides owners a cost-effective means of eliminating future environmental liability.

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