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PETROLEUM CONTAMINATED SOIL TREATMENT TECHNOLOGIES

The first steps in determining the appropriate remediation technology are to; establish the quantity of impacted soil, determine the characteristics of the soil, identify the type of contamination and the level (concentration) of the contaminants, and explore each project's unique characteristics. Equally important criteria for evaluation are regulatory approval and economics. If engineering studies have been performed we request a copy of those studies, including any soil boring logs and laboratory analysis. In the absence of this level of detail, WCD can arrange for that work to be performed. With this information WCD will perform a cost benefit analysis and compare technology costs against excavation, disposal and backfill options. WCD Consultants has experience with all of the soil treatment technologies listed below:

1. **Low Temperature Thermal Desorption (On/Offsite)** The contaminated soil matrix is raised to a temperature to which contaminants are removed from the soil into an air stream. The air stream entrain contaminants are then captured or destroyed via several means. Recovery of the TPH can be accomplished via condensation or an absorption technique. The most common destruction techniques of the entrained TPH are direct oxidation or catalytic oxidation.
2. **Thermally Enhance Soil Vapor Extraction (SVE)** This technology involves installation of extraction wells into the contaminant zone and vacuum extraction of the petroleum hydrocarbons into a recovery or oxidation system. Soil Vapor Extraction (SVE) can be enhanced via several in-situ heating techniques to include steam injection, conduction heating and radio frequency heating.
3. **In-Situ Thermal Destruction (ISTD)** This technology employs direct heating of a contaminant matrix usually referred to as Six Phase Heating to volatilize and destroy the contaminant emplace. This technique is usually employed in conjunction with a vapor extraction system for removal of the volatilized contaminants which are not destroyed. ISTD operates at temperatures as high as 1500°F.
4. **In-Situ Chemical Oxidation:** In-Situ Chemical Oxidation involves the injection of a chemical oxidant into a contaminant matrix to degrade the petroleum hydrocarbon contaminant. The most commonly used oxidants are permanganate, ozone, peroxide and persulfate.
5. **Excavation and On-Site Treatment (Soil Washing):** A surfactant is used to separate the petroleum hydrocarbon from the soil matrix in this treatment approach. Contaminant removal in the 85% to 95% range is usually achievable. This technique can result in a liquid waste stream, i.e. an oily emulsion which require offsite disposal.
6. **Bioremediation:** This technique can be employed in-situ as well as ex-situ. Excavation of the contaminated soil matrix and treatment with petroleum degrading bacteria is usually more effective than injection of bacteria directly into the soil matrix. Treatment in a pile (heaped) environment affords better treatment and oxygen control resulting in reduction of treatment time and improved overall effectiveness.