SOIL REMEDIATION BY USING HEATED SOIL VAPOR EXTRACTION TECHNOLOGY

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Heated Soil Vapor Extraction (HSVE) is a technology that has been used successfully to clean up subsurface soils at sites containing chlorinated solvents and petroleum hydrocarbons. The costs have been extremely high due to the large amount of energy required to volatilize high molecular weight PAH compounds present in the soil matrix. One remediation contractor states that hydrocarbons are oxidized in situ by achieving temperatures in the >1000 F range near the heaters. A critical question is whether the volatile portion of MGP hydrocarbons (VOCs) can be stripped out at lower temperatures such that the remaining contaminants will be unavailable for transport or subsequent dissolution into the groundwater. Soil remediation by heated soil vapor extraction system is a relatively new technology developed by JJI along with the University of Wisconsin-Milwaukee. The areas around chemical companies or waste disposal sites have been seriously contaminated from the chemicals and other polluting materials that are disposed off. The process developed by JJI, consists of a heater/boiler that pump and circulates hot oil through a pipeline that is enclosed in a larger-diameter pipe. This extraction pipe is vertically installed within the contaminated soil up to a certain depth and is welded at the bottom and capped at the top. The number of heat source pipes and the extraction wells depends on the type of soil, the type of pollutants, moisture content of the soil and the size of the area to be cleaned. The heat source heats the soil, which is transported in the interior part of the soil by means of conduction and convection. This heating of soil results in vaporization of the gases, which are then driven out of the soil by the extraction well. The extraction well consists of the blower which would suck the vaporized gases out of the system. In our present study we concentrated on modeling one Heated Soil Vapor Extraction System and predicting the behavior of different chemicals in the saturated and unsaturated zone of the soil. This analysis uses the species transport and discrete phase modeling to predict the behavior of different chemicals when it is heated and driven out by the sucking well. Our previous studies had removed higher boiling compounds such as Napthalene etc., to non-detect level. Thus, the current technology is very promising to remove most of the chemicals compounds; thus can remove these high boiling compounds from the saturated zone. Gas Chromatogrphy (GC) is utilized in monitoring the relative concentration changes over the extraction period. Gas Chromatography-Mass Spectrometry (GC-MS) assists in the identification of extracted components. The experimental research and simulation study are currently being conducted at the University of Wisconsin-Milwaukee. The results will be presented at the conference.