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THERMALLY ENHANCED REMEDIATION

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ABSTRACT: Due to operating costs, engineering design includes efficient re-use of energy required for remediation system operation. A soil vapor extraction (SVE) system was installed at the Santa Fe County Judicial Complex property in Santa Fe, New Mexico, for removal of free-phase gasoline and reduction of concentrations of volatile constituents adsorbed to soils in the unsaturated (vadose) zone. Prior to discharge to the atmosphere, extracted vapors were passed through a treatment system that consisted of high temperature thermal oxidation. Heat generated during this process was re-used through injection of 400-degree Fahrenheit fresh air into the subsurface. Hot air injection accomplished two goals: 1) thermally enhanced volatilization of contaminants in the subsurface and 2) in situ oxidation of contaminants through natural biological processes. Principles of thermodynamics related to mass and heat transfer were utilized to design the injection system. Six pairs of temperature sensors were installed to spatially evaluate subsurface temperature fluctuations. To provide baseline data, sensors were installed nine months prior to initiation of the hot air injection system and have been collecting data continuously. This talk covers the method of design, remediation equipment, and a graphical presentation of the temperature sensor data. Mass flow and spatial relationships between the sensors and injection sources are discussed. Correlations between ambient temperature and effects from operation of the remediation system will also be discussed.

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