Optimization of Existing Soil Vapor Extraction and Pump and Treat Systems using In-situ Hydraulic Fracturing

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Soil Vapor Extraction (SVE) for vadose zone remediation and Pump and Treat (P&T) remedial systems for groundwater remediation and hydraulic control have been used for well over a decade. Sometimes, remediation proceeds on time and budget. However, in some cases the treatment equipment does not perform as well as planned. To reduce the annual costs of operation and maintenance of these systems and to hasten site remediation and closure, enhancements have been developed to optimize existing remediation systems.

Jetting technology provides hydraulic fracturing at pressures often exceeding 5,000 psi significantly increasing permeability both vertically and laterally. One form of jetting, the Remediation Injection Process (RIP®), is an updated and more powerful, jetting delivery system. To best control hydraulic fracturing, close spacing is recommended, depending on subsurface conditions. Once the fracturing has occurred, contaminant removal and subsurface flow generally increase as new subsurface pathways have been installed for contaminant withdrawal. The fracturing liquids can also be used to efficiently implement, or augment, a variety of environmental remediation processes including chemical oxidation, bioremediation, pH adjustment and metals stabilization. Jetting is performed using probe mounted lances or hand-held lances. Radius of influence around injection ports has been documented to exceed 10 feet. Propants such as sand can also be used.

Jetting technology can be used to enhance SVE and P&T systems and target limited access areas such as underneath slabs, railways, and buildings, around tanks, pipelines and subsurface utilities; and into hillsides, where the SVE and P&T systems may need optimization. The flexibility and accuracy of this injection delivery system provides enhancement to an already existing remediation system. In addition, hot spots can be effectively targeted with this technology. By optimizing existing remediation systems, jetting technology can provide appreciable savings in cost and time when implemented on a site having traditional remediation technologies such as SVE and P&T.

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