

**A MULTI-PHASE EXTRACTION AND BIOREMEDIATION APPROACH DESIGNED TO RAPIDLY
REMEDiate A GASOLINE PLUME AND PREVENT CONCENTRATION REBOUND**

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A multi-phase extraction system (MPE) was designed to rapidly remove a gasoline free-phase product (product) plume followed by a bioremediation polishing phase to treat remaining hydrocarbons. Chemical data and field parameters will be presented that provide evidence that hydrocarbons have been removed from both the groundwater and soil matrix. Only when we can demonstrate hydrocarbons have been removed from the smear zone soil matrix (source of concentration rebound), can we be sure that concentration rebound will be limited.

Phase I included operating a MPE system to remove a product plume (7 acres) measuring up to 2 feet thick. A liquid-ring pump connected to four separate extraction legs was used to generate a high vacuum to preferentially extract product and high dissolved concentrations in groundwater and vadose zone. This eliminated the need for 14 groundwater pumps and soil vapor extraction equipment. Phase II included 18 months of in situ oxidative bioremediation to destroy the remaining dissolved-phase hydrocarbons in the groundwater and smear zone soil matrix.

More than 30,000 pounds of petroleum has been physically removed, and an additional 3,100 pounds (typical source of concentration rebound) has been biologically oxidized through March 2011.

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