

ENVIRONMENTAL FRACTURING APPLICATIONS



FRACTURE-ENHANCED BIOREMEDIATION OF BENZENE IN SOIL AND GROUNDWATER

... the efficient application of soil fracturing provided the owner with a non-disruptive remedial solution and a cost savings of over \$190,000 compared to soil excavation.

PROBLEM

Residual levels of benzene exceeded soil and groundwater criteria at a general store and gas bar. Excavation was too cost-prohibitive and disruptive. Conventional *in situ* clean-up options were limited due to heavy clays underlying the site.

OBJECTIVE

- to provide the site owner with a cost-effective remedial solution.

FIELD PROGRAM

Soil fracturing followed by soil bioventing and groundwater treatment using slow release peroxide granules was implemented. A total of 4 boreholes were advanced in two contaminant "hot spots". Twelve fractures containing 16 tonnes of sand were initiated at borehole depths of 3 to 5 metres in a single day. Fractures extended 5 metres from each fracture well.

TECHNICAL EVALUATION

Soil fracturing resulted in the following performance enhancements:

- two orders of magnitude increase in bulk hydraulic conductivity;
- enhanced diffusion of oxygen through fracture network and improved aerobic degradation of benzene to within acceptable criteria in soils and groundwater.

Initiating fractures in gasoline - impacted silty clay soils near fuel pumps.



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