

**RECENT DEVELOPMENTS IN SULFATE DRIVEN
BIO-OXIDATION OF PETROLEUM HYDROCARBONS**

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The use of anaerobic bio-oxidation for stimulated in-situ biodegradation of petroleum hydrocarbons and other constituents of concern in groundwater is increasingly becoming a demonstrated, viable, and effective method of enhanced remediation. Results from recent full scale field work will be presented on the utilization of sulfate from gypsum native to a fractured bed rock mineral matrix, stimulation via the addition of gypsum in soils, and evidence for utilization of sulfate derived from native barite. At a site in Brazil sulfate driven anaerobic bio-oxidation using sulfate contained in molasses appears to be degrading BTEX hydrocarbons as well as chloroform. The extensive data available for the gypsum driven systems show typical benzene half life's in the range of 100 days. In some instances iron reduction may also be a minor ancillary degradation pathway. Within the petroleum production and refining infrastructure there are instances where abundant anthropogenic sulfate is present with free phase or high concentrations of dissolved phase hydrocarbons. In those instances the factor limiting the hydrocarbon biodegradation dynamics is control of microbial inhibiting hydrogen sulfide generated from sulfate reduction. Results from an initial bench scale evaluation of the use of iron salts for that sulfide control will also be discussed.

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