

In-Situ Bioremediation of Petroleum Hydrocarbons in a Hotspot Well in Northern California

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Platform Presentation

After source removal has occurred on petroleum hydrocarbon sites, which typically involves the removal or remediation of highly impacted soil and free product, a variety of technologies can be used to treat the residual contamination. Site closure requests are frequently denied by regulatory agencies due to one or two wells with high dissolved concentrations of hydrocarbons, while the remaining wells are below the action levels.

The site, located in northern California, contained a former underground storage tank. After tank abandonment, one monitoring well out of four remained impacted and was an obstacle to obtaining regulatory site closure. Concentrations of TPH-g and benzene prior to installing a passive enhanced bioremediation system were 4,200, µg/L and 290 µg/L, respectively. The other three wells were below the laboratory reporting limits for all analytes.

The limiting factor is usually dissolved oxygen (DO) for an aerobic bioremediation system. The iSOC[®] system diffuses oxygen at 15 cc/minute with a radius of influence of 10 to 15 feet. One iSOC device was placed in the hot well. Prior to installation, the hot well was anaerobic. Nitrate and sulfate concentrations were depleted compared with background levels in nearby wells. Since the iSOC has been installed, DO levels have increased from 0.4 mg/L to 24.9 mg/L and the ferrous iron/total iron ratio decreased 76% to 18%. Specific hydrocarbon degraders and total heterotrophs have increased by an order of magnitude since the introduction of the dissolved oxygen in the hot well. The hot well was sampled three and six months after the installation of the iSOC system, and concentrations of TPH-g and BTEX compounds were all below laboratory reporting limits.

NOTES:

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