

**Title:** In-Situ Bioremediation of MTBE in Groundwater  
Using Propane Oxidizing Bacteria (POB)  
NCBC-44-00 (Rev. 12/00)

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**Abstract:**

Methyl tertiary-butyl ether (MTBE), a common fuel oxygenate, is a chemical of concern at gasoline and other fuel (e.g., jet fuel) contaminated sites. It poses unique remediation challenges due to its high mobility and low natural degradation potential. Namely, it migrates farther and faster relative to gasoline compounds benzene, toluene, ethyl benzene, and xylene (BTEX), the other hazardous compounds typically found at such sites. The goal of this demonstration is to show the viability of stimulating propane-oxidizing bacteria (POB) to degrade MTBE.

To apply this technology, a site-specific system is designed and installed to inject propane (or sometimes propanol or butanol) and an oxygen source into the subsurface. The addition of these substrates promotes the growth of POB and the production of the enzyme propane monooxygenase which catalyzes the destruction of MTBE and tertiary butyl alcohol (TBA), which is a daughter product of MTBE. If necessary, exogenous POB can be used to seed the aquifer to ensure activity or speed the treatment process.

Because the MTBE plume at Port Hueneme, California is located in a sandy aquifer, it is expected that an oxygen /propane sparging system will be the most appropriate means for conducting this biostimulation demonstration. The effort will involve the design, construction, and operation of a sparging system through which propane and oxygen are added at intervals to create a bioactive MTBE treatment zone within the aquifer. Once a population of propane/MTBE degraders is established in-situ, propane additions will be decreased to maintenance levels.

From late 1984 to early 1985, approximately 10,800 gallons of gasoline leaked from two storage tanks and piping under the Naval Exchange (NEX) gas station at the Naval Base Ventura County Port Hueneme Site (NBVC). Since 1985, the Navy has taken actions to prevent any further damage to the environment from the leaks. The MTBE remediation technologies demonstrated at NBVC Port Hueneme Site are part of the overall strategy in the NEX Plume Management plan for containment and control of the plume to prevent any further damage to the environment.

**Results/Conclusions:** Ongoing project

**Publications:** None