

**Title:** Natural Attenuation of MTBE in Ground Water Under Methanogenic Conditions  
NCBC-46-00

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**Co-PI's/Affiliations:**

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**Abstract:**

Current data indicates that methyl-tertiary-butyl ether (MTBE), a common fuel oxygenate used to reduce carbon monoxide (CO) emissions and boost octane, is relatively persistent once released into groundwater resources. Due to the structure of the molecule, MTBE poses unique remediation challenges relative to benzene, toluene, ethyl benzene and isomers of xylene (BTEX compounds), the other hazardous compounds typically found at gasoline and other fuel (e.g., jet fuel) contaminated sites. MTBE can be degraded over a residence time of several months to a few years if oxygen is available.

Methane formation occurs during the decomposition of diverse substrates found in fuel hydrocarbons. Methane production is carried out by a highly specialized group of obligate anaerobic organisms; the methanogenic bacteria. Methanogenesis from organic carbon is virtually always a process carried out by a mixture of bacteria, none of which can perform the complete process alone. Non-methanogenic bacteria ferment the substances to either acetate or hydrogen and carbon dioxide. These waste products can be used by the methanogenic bacteria. This demonstration will focus on the role methanogenic bacteria play in the biodegradation of MTBE.

This study will document the relationship between oxygen and methane in the natural attenuation of MTBE.

Flow paths in the MTBE NEX Service Station plume will be characterized using 10 wells, each with 2-ft screens, to determine the true availability of dissolved oxygen and the true accumulation of methane. The rate of MTBE degradation will be determined and compared to the supply of oxygen and accumulation of methane.

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