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***Degradation of Synthetic-Based Drilling Mud Base Fluids by Gulf of Mexico
Sediments Final Report***

[OCS Study MMS 2006-028](#)

The Minerals Management Service (MMS), Gulf of Mexico OCS Region, announces the availability of a new study report, *Degradation of Synthetic-Based Drilling Mud Base Fluids by Gulf of Mexico Sediments: Final Report*.

Synthetic-based drilling fluids (SBF) are used in Gulf of Mexico deep-sea drilling operations and cuttings coated with SBF are discharged in accordance with permit requirements including requirements for biodegradation to limit environmental impact. This study takes a closer look into SBF biodegradation processes including the impact of water depth, identification of the microbial populations at work, the influence of Gulf of Mexico sediments with varying histories of prior exposure, and the range of expected biodegradation rates. The findings of this study provide greater detail on the microbial degradation of SBF in sediments under deep-sea conditions.

The study concluded that there are cold-tolerant, anaerobic microorganisms that can degrade the surrogate SBF components in sediments. Sulfate was determined to be the major electron acceptor involved in the process. Although analyses of the microbial ecology of the sediment were not as useful as had been hoped because of interference of natural sediment components with the methods used for analyses, the results showed an increase in the number of sulfate-reducing bacteria present in sediments that had been exposed previously to SBF or incubated in the presence of SBF surrogates. The anaerobic incubations revealed that the removal of surrogate SBF could be described using a first order k value of $-0.05 \pm 0.01 \text{ week}^{-1}$ to $-0.22 \pm 0.02 \text{ week}^{-1}$. A lag time for removal was predicted to be between 0 and 28 weeks. The degradation kinetics did not seem to be dependent upon pressure. A spreadsheet-based model was developed to determine rate of SBF removal from sediments.

This report is available only in compact disc format from the Minerals Management Service, Gulf of Mexico OCS Region, at a charge of \$15.00, by referencing OCS Study MMS 2006-028. The report may be downloaded from the MMS website through the [Environmental Studies Program Information System \(ESPIS\)](#). You will be able to obtain this report also from the

National Technical Information Service in the near future. Here are the addresses. You may also inspect copies at selected Federal Depository Libraries.

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MMS Main Website: www.mms.gov
Gulf of Mexico Website: www.gomr.mms.gov

*****MMS: Securing Ocean Energy & Economic Value for America*****