

Technical Announcement

MMS

U. S. Department of the Interior
Minerals Management Service
Gulf of Mexico OCS Region

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Mixtures of Metals and Polynuclear Aromatic Hydrocarbons May Elicit Complex, Nonadditive Toxicological Interactions

OCS Study MMS 2007-019

The Minerals Management Service (MMS), Gulf of Mexico OCS Region, announces the availability of a new study report, *Mixtures of Metals and Polynuclear Aromatic Hydrocarbons May Elicit Complex, Nonadditive Toxicological Interactions*.

Studies suggest that metal-PAH interactions may be common among benthic copepods and that strong nonadditive effects observed in binary mixtures may be moderated in more diverse contaminant mixtures. Acute and sublethal mixture toxicology of the contaminants cadmium (Cd), mercury (Hg), lead (Pb), fluoranthene, and phenanthrene was investigated by using two species of meiobenthic harpacticoid copepod, *Schizopera knabeni* and *Amphiascoides atopus*. Contaminant effects were delineated using toxic unit methodology and factorial experiments.

Adult *S. knabeni* were tolerant of exposures to the individual contaminants. When *S. knabeni* were exposed to the metals mixture, Cd-induced lethality was reduced, suggesting an antagonism among the metals. When exposed to a mixture of Cd, Hg, Pb, and phenanthrene, a greater than additive response was demonstrated. A Cd-phenanthrene synergism was observed in both sediment and aqueous exposures. Grazing-rate bioassays suggest a response-additive sublethal toxicology between metals and phenanthrene. Experiments with *A. atopus* revealed that phenanthrene and fluoranthene are synergistic with Cd.

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 2007-019. 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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