

BOEMRE ENVIRONMENTAL STUDIES PROGRAM: Ongoing Studies

Region: Pacific OCS Region

Planning Area(s): Southern California

Title: Fate, Volume and Chemistry of Natural Seeps in the Santa Barbara Channel/Southern Santa Maria Basin

BOEMRE Information Need(s) to be Addressed: Recent reliable estimates of the volume of oil emitted daily from natural seeps directly under or near producing OCS platforms are lacking. The most reliable estimates are 35 years old, and in light of the recent dramatic visible increase in seepage since the December 2004 storms, and newly discovered seepage areas, more accurate data are required. As the public largely attributes this oil erroneously to offshore production spills, it is critical for the program to have a scientifically based estimate of the daily natural oil seepage and be able to differentiate produced vs. natural sources of oil reliably. We can then determine the origin of beached oil, and determine if Federal platforms are contributing to the overall tar on local beaches and to assess the possible role that any oil spills from platforms play in the natural ecology of the region.

Total BOEMRE Cost: \$200,000

Period of Performance: 2006-2011

Conducting Organization: USGS Pacific Coastal and Marine Science Center and the University of California, Santa Barbara

Principal Investigator: Thomas Lorenson USGS; Ira Leifer, UCSB

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Description:

Background: Historically, a number of efforts have looked at the prolific natural seepage of oil off Coal Oil Point. BOEMRE (formerly MMS) is completing two efforts, a UCSB CMI study of the transport of oil to the surface by seep gas bubbles, and a USGS/BOEMRE joint study which has developed a reliable chemical method of distinguishing between oil from produced wells and that from natural seeps in the same region. These two studies have made several important findings. The first study has refined a field technique to estimate the flux of seep oil and gas. The latter study has refined the fingerprinting process to enable differentiation of the highly similar Monterey oil from OCS production and adjacent natural seeps.

These studies made two important additional discoveries which highlight the need to update the seep volume estimates. The BOEMRE/USGS pilot study mapped large new areas of seepage in the western Santa Barbara Channel which are undocumented, and collected numerous samples for fingerprinting. Additionally, UC Santa Barbara scientists, while conducting the BOEMRE transport study, observed a doubling of seepage both in terms of volume and numbers of seeps in the Coal Oil Point area since the December 2004 storms off

California. These observations need to be groundtruthed and the volumes quantified for the entire area. BOEMRE intends that the proposed effort would be a collaborative effort among experts at USGS and the University of California, each providing specialized expertise.

Objectives: The purpose of the study is to: 1) Estimate the current oil (and gas) seepage occurring adjacent to OCS operations in the Santa Barbara Channel and Southern Santa Maria Basin, 2) Complete a shared Federal/State fingerprinting library of oil samples from natural and produced sources, including the remaining OCS platforms in the Pacific Region 3) Determine the fate of oil originating from prolific seeps in the Santa Barbara Channel/Santa Maria Basin, 4) Provide for opportunistic fingerprinting of oil sources from spills or large natural events.

Methods: To estimate the seepage, mapping of seeps in unmapped areas would be completed—two significant areas were mapped in the pilot BOEMRE/USGS study at Point Conception and Gaviota using sniffer surveys, hazards and ROV. These techniques, along with the evaluation of aerial photos, would be used to map seep areas. Once larger seep areas are located, new sonar surveys would be conducted, calibrated by direct flux buoy measurements, for comparison with previous sonar surveys in the mid-1990s. Determination of oil to gas ratios from collected seabed and sea surface samples for the major seepage areas, along with flux data will allow estimation of total oil emissions. Deployment of Acoustic Doppler Current Profiler equipment on the ocean floor at the location of a couple of identified consistent seepages will allow for an estimation of the fate of the oil to be made. That, along with aerial photos, historic Scripps oceanographic data and nearshore CODAR data will provide the ability to determine the fate of seeped oil. For the fingerprinting, USGS has developed a fingerprinting protocol that has proven effective in distinguishing between natural seep and produced Monterey Formation oils. The State is also adopting this approach so that their labs can compare results.

Current Status: Report is being finalized.

Final Report Due: February 2011

Publications Completed: None at this time.

Affiliated WWW Sites: <http://pubs.usgs.gov/of/2009/1225/#content>

Revised Date: March 4, 2011