BOEM ENVIRONMENTAL STUDIES PROGRAM: Ongoing Studies

Region: Alaska

Planning Area(s): Beaufort Sea, Chukchi Sea, Cook Inlet

Title: Physical and Chemical Analyses of Crude and Refined Oils: Laboratory and Mesoscale Oil Weathering (AK-14-02)

BOEM Information Need(s) to be Addressed: The Alaska OCS Region uses an oil weathering model (OWM) to provide NEPA analysts with a common, quantitative set of spill weathering parameters. Weathering of spilled oil and persistence of its most toxic components vary depending on the specific characteristics of the oil. Currently, NEPA analysts in the Alaska OCS Region must make assumptions about these processes because only a small subset of oil samples specific to the Alaska OCS and North Slope have been analyzed for use in the SINTEF OWM. In particular, the addition of new low-sulfur marine diesel fuels to the library would be especially useful information for analysts to use in upcoming NEPA assessments.

Total Cost: $580,511   **Period of Performance:** FY 2014-2016

Conducting Organization: SEA Consulting Group

BOEM Contact: Dr. Heather Crowley

Description:
Background: The rate of oil dispersion into the water column calculated by the OWM is used to estimate whether State and Federal water quality standards and criteria would be exceeded by a spill, over what area and for how long. The model calculates the area covered by a spill, an important parameter for estimating effects, but the OSRA does not. The model also calculates the persistence of the lighter, but most toxic components of the oil slick. This calculation allows analysts to directly estimate persistence of toxicity, rather than assume for proposes of analysis that these toxic components persist over the first three days of a spill. Because the size of a spill affects its weathering, the model helps distinguish between effects of large (≥1,000 bbl) and small (<1,000 bbl) spills. The *in situ* viscosity and degree of emulsification provided by the model are used in assessing the mitigation by and effectiveness of oil-spill countermeasures such as mechanical recovery, dispersant, and in-situ burning.

This proposed research will be informed by results from the study "Validation of the Two Models Developed to Predict the Window of Opportunity for Dispersant Use in the Gulf of Mexico" conducted by the Bureau of Safety and Environmental Enforcement's Technology Assessment and Research Program. That project aims to validate and improve two correlation models that were developed to estimate the window of opportunity for successful chemical dispersant use in the Gulf of Mexico (GOM). That project will also evaluate the sensitivity of the models to various oil weathering parameters.

<u>Objectives</u>: This study will provide weathering characteristics of representative Alaskan OCS crude and marine fuel oils to expand upon the existing SINTEF oil weathering model library of oil compositions.

<u>Methods</u>: Conduct lab and mesoscale oil weathering on 3 Alaskan crude oils (Alpine, Kuparuk, and Northstar) and up to 3 refined oils (ultra-low-sulfur diesel, marine gas-oil, and wide-range distillate)

Current Status: Ongoing

Final Report Due: September 2016

Publications Completed:
SEA Consulting Group and SINTEF. 2015. Physical and Chemical Analyses of Crude and Refined Oils; Laboratory and Mesoscale Oil Weathering: Testing Results for Oil Samples: Alpine, ADO, and MGO. Prepared under BOEM Contract No. M14 PC00012.
SEA Consulting Group and SINTEF. 2016. Physical and Chemical Analyses of Crude and Refined Oils; Laboratory and Mesoscale Oil Weathering: Testing Results for Oil Samples: Kuparuk, Northstar and Wide Range Gasoil (WRG). Prepared under BOEM Contract No. M14 PC00012.

Affiliated WWW Sites: http://www.boem.gov/akstudies/

Revised Date: August 2016

ESPIS: Environmental Studies Program Information System
All *completed* ESP studies can be found here: http://www.data.boem.gov/homepg/data_center/other/espis/espisfront.asp