

MMS ENVIRONMENTAL STUDIES PROGRAM: ONGOING STUDIES

Region: Alaska

Planning Areas: Beaufort and Chukchi Seas

Title: Updates to the Fault Tree Approach to Oil Spill Occurrence Estimators for the Chukchi and Beaufort Sea Planning Areas (AK-05-x12)

MMS Information Needs to be Addressed: The Oil-Spill-Risk Analysis (OSRA) is a cornerstone to regional EISs, environmental assessments, and oil-spill-contingency planning. Oil-spill issues constitute a significant portion of public comments submitted on sale or development EISs in the Alaska OCS Region. This study is necessary to incorporate fault-tree spill occurrence estimators into NEPA analyses for Beaufort Sea and Chukchi Sea oil and gas lease sales or development in the MMS 2007-2012, 5-Year Plan.

Total Cost: \$223,000

Period of Performance: FY 2005-2010

Conducting Organization: Bercha Group

MMS Contact: [Chief, Alaska Environmental Studies Section](#)

Description:

Background The OCS spill occurrence rates used in MMS NEPA analyses are based on historical platform and pipeline crude oil spill rates, almost entirely from the Gulf of Mexico OCS. For the Alaska OCS Region Arctic planning areas, the MMS has recently incorporated a fault-tree approach which incorporates (1) differences in oil spill occurrence factors between the Arctic and Gulf of Mexico OCS and (2) Arctic-specific factors. The first MMS-sponsored fault-tree study was finished in 2002. The second, ongoing, fault-tree study *Alternative Oil Spill Estimators for the Beaufort and Chukchi Seas* primarily implements the MMS Scientific Committee recommendations to improve the fault tree application and statistics for Beaufort Sea spill occurrence rates. This second study is scheduled for completion in late 2005.

Objectives To provide:

1. An updated fault tree spill occurrence rates and confidence intervals for NEPA analyses for Chukchi and Beaufort OCS Lease Sales or for oil and gas developments during the contract period of performance.
2. A PC program to provide MMS analysts the ability to calculate spill occurrence rates and confidence intervals subsequent to contract period of performance.

Methods

1. Review and assimilate oil spill occurrence data and geohazard data from alternative sources and locations as needed.
2. Use updated Gulf of Mexico OCS historical data together with its measures of spill size and frequency variance and setup the Monte Carlo fault tree model to run with these measures of variance.

3. Update the Chukchi Sea fault-tree analysis used in the MMS-sponsored study finished in 2002 incorporating the MMS Scientific Committee recommendations and a new MMS exploration and development scenario. Generate life-of-field occurrence indicators.
4. Update the Beaufort Sea fault-tree analysis from the ongoing *Alternative Oil Spill Estimators for the Beaufort and Chukchi Seas* study to match a new MMS exploration and development scenario. Generate life-of-field occurrence indicators.
5. During the period of performance, provide up to two additional Chukchi Sea and up to two additional Beaufort Sea updated fault-tree analyses based on updated MMS exploration and development scenarios.
6. During the period of performance, provide up to two additional fault-tree analyses for Beaufort and/or Chukchi Seas for site-specific oil and gas development taking into account site-specific geohazards. Generate life-of-field occurrence indicators.
7. Develop a PC program, manual, and training necessary to provide MMS analysts the ability to calculate spill occurrence rates and confidence intervals from updated exploration and development scenarios for Chukchi and Beaufort Seas oil and gas lease sales subsequent to contract period of performance.
8. Provide professional support to MMS in regard to statistical issues of occurrence rates and estimator(s) related to this study and its results.

Current Status:

The contractor is working on three tasks: update of the Gulf of Mexico spill data and rates, a multi-sale fault tree for Chukchi Sea Lease Sales and a multi-sale fault tree for Beaufort Sea Lease Sales.

Final Report Due: September 2010

Publications Completed:

Bercha, F. G. 2006. *Alternative Oil Spill Occurrence Estimators and Their Variability for the Chukchi Sea - Fault Tree Method*. MMS OCS Study 2006-033. Prepared by Bercha Group, Calgary, Alberta, for MMS Alaska OCS Region, Anchorage, AK.

Affiliated WWW Sites: <http://www.berchagroup.com/>
<http://www.mms.gov/alaska/>

Revised Date: March 2008