

Environmental Studies Program: Studies Development Plan | FY 2024–2025

Field	Study Information
Title	National Outer Continental Shelf (OCS) Oil Spill Occurrence Rates
Administered by	Office of Environmental Programs
BOEM Contact(s)	Jeff Ji (jeff.ji@boem.gov)
Procurement Type(s)	Contract
Performance Period	FY 2024–2025
Final Report Due	TBD
Date Revised	May 10, 2023
Problem	OCS petroleum hydrocarbon spill data for analyses—including the number, volume, and rate of such petroleum hydrocarbon spills—is needed to support the assessment of potential impacts under the National Environmental Policy Act (NEPA).
Intervention	Updated OCS petroleum hydrocarbon spill data will be collected into a systematic collation of data for mathematical analyses.
Comparison	A suite of objective statistical methodologies will provide estimates of petroleum hydrocarbon spill rates to use in oil spill risk analysis (OSRA), offshore environmental costs model (OECM) and NEPA analyses.
Outcome	This study will deliver National estimates of the occurrence of OCS oil spills for a range of spill volume size classes.
Context	All OCS planning areas.

BOEM Information Need(s): The Bureau of Ocean Energy Management (BOEM) needs up-to-date quantifications of spill occurrence for the OCS to perform oil spill risk analysis (OSRA). OCS oil spill occurrence rates are essential for analyzing potential oil spills and their impacts in NEPA documents and oil spill response plans. The general trend is that these spill rates have been decreasing over the past decades (ABS Consulting, 2016). To reflect the progress of the technology and the improvement of safety regulations, it is critical to calculate the spill rates using the most recent 15-years of available data. The previous study (ABS Consulting, 2016) used the data between 2000-2014. This proposed study will use the data between 2010-2024 and replace two thirds (10 years out of the 15 years) of the data from the previous study.

Background: The OSRA model, developed in 1975 by the Department of the Interior (DOI), is a tool that evaluates large offshore oil spill risks. This model is used to develop probabilistic estimates of oil spill occurrence and contact. A realistic, objective methodology for estimating oil spill occurrence rates is required for the model’s application. This study will provide rates that can be applied or adjusted for each OCS region. OSRA results are used in preparation of NEPA documents such as Environmental Impact Statements (EISs) and Environmental Assessments (EAs) that inform the leasing process and subsequent environmental oversight. Spill rates and median spill volumes are also used in NEPA oil spill scenarios, including cumulative scenarios. BOEM’s Offshore Environmental Cost Model (OECM) also needs the spill rate information.

Currently, the Bureau of Safety & Environmental Enforcement (BSEE) maintains OCS spill data related to oil and gas activities on the OCS. BSEE receives these data from operators, who are required to submit offshore incident reports to the agency for various safety and environmental events, including spills of chemicals or crude oil ([30 Code of Federal Regulations \[CFR\] 250.187](#), [30 CFR 254.46](#), and [BSEE Notice to Lessees \[NTL\] 2019-N05](#)). Spills may include crude or refined petroleum, drilling fluids, other chemicals, or mixtures thereof. BOEM uses these spill data and derived spill rates to assess and disclose oil spill risks to help inform leasing and plan decisions. The BSEE spill data and BOEM analyses have also been used to support BSEE responsibilities, principally oil spill response planning, drilling permitting, and rulemaking. Both bureaus have an interest in ensuring oil spill data and spill rate analyses are updated regularly. Since 1975, a series of spill rate analyses have been conducted by BOEM or its predecessors (e.g., Anderson et al., 2012), where spill rates were determined in terms of the volume of oil produced or handled. The most recent by ABS Consulting, Inc. (2016) collated data through as late as 2015. The ABS studies collated data through 2021 but are not designed to analyze National OCS spill rates (ABS Consulting, 2018; <https://marinecadastre.gov/epis/#!/search/study/100250>; ABS Consulting, 2021, https://epis.boem.gov/final%20reports/BOEM_2021-065.pdf). This study proposes to Nationally update OCS spill data and spill rate analyses through calendar year 2024 (1964–2024).

Objectives: The overarching goal of this study is to update oil spill rate data for OCS platforms and pipelines, as well as spill rates from 1) U.S. and worldwide tankers and 2) U.S. barges. Having updated oil spill and oil spill occurrence rate data and their uncertainty is critically important to analyze the potential risk and consequence of OCS oil spills, investigate causal factors contributing to the occurrence, size, or frequency of oil spills, enhance oil spill response planning, and target future regulatory reform to better manage risk.

Specific objectives are:

- Examination of historical spill occurrences and of volume of oil handled
- Analysis of other potential exposure variables and casual factors
- Estimate spill occurrence rates and normalize these rates 1) based on number of spills per volume handled and 2) other relevant exposure variables
- Complete OCS spill rate trend analyses
- Estimate median and mean spill volumes for a range of spill size classes
- Estimate uncertainty metrics such as confidence intervals
- Prepare reports that presents the data and methods used, data analyses, and significance of findings

Methods: The investigators will update National OCS oil spill occurrence estimates previously calculated for OCS (ABS Consulting Inc., 2016). They will collect, examine, and reconcile crude and refined oil spill records and cleanup reports for the OCS for spills ≥ 1 bbl from industry, U.S. Coast Guard (USCG), Environmental Protection Agency (EPA), U.S. Department of the Interior (DOI), BOEM, BSEE, U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration (USDOT, PHMSA), state (e.g., Alaska Department of Environmental Conservation [ADEC]), and other datasets through 2022. The investigators will also calculate accident frequencies for small spills and perform appropriate statistical analyses, including trend analysis. Results will be collated into an electronic database in a standard format.

Specific Research Question(s): What are the OCS spill rates, median volumes, and mean volumes for small and large spills and their uncertainty?

Current Status: N/A

Publications Completed: N/A

Affiliated WWW Sites: N/A

References:

Anderson CM, Mayes M, LaBelle RP. 2012. Update of occurrence rates for offshore oil spills. Herndon (VA): U.S. Department of the Interior Bureau of Ocean Energy Management. 76 p. Report No.: OCS Report 2012-069.

ABS Consulting, Inc. 2016. 2016 Update of occurrence rates for offshore oil spills. 95 p.

ABS Consulting, Inc. 2018. US Outer Continental Shelf oil spill statistics. Anchorage (AK): U.S. Department of the Interior Bureau of Ocean Energy Management. 44 p. Report No.: OCS Study BOEM 2018-006.

ABSG Consulting, Inc. 2021. Alternative oil spill occurrence estimators for determining rates for the Atlantic Outer Continental Shelf. Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. 97 p. Report No.: OCS Study BOEM 2021-065.