Date: December 15, 2020

BSEE Funding Source or Author's Division: Oil Spill Preparedness Division
Response Research Branch
45600 Woodland Road
Sterling, VA 20166

Title: Evaluation of Bureau of Safety and Environmental Enforcement (BSEE) Report: Computational Fluid Dynamics (CFD) Model for Predicting Wellhead Oil-Burning Efficiency at Bench and Intermediate Scales: Interim Report for Oil Spill Response Research (OSRR) Project 1063 (June 2020)

Working Title: 1063 Interim Final Report

Subject and Purpose: The subject of this study is a model to predict wellhead oil-burning efficiency at the bench and intermediate scales. This study developed an experimentally validated model at the bench and intermediate scales to predict wellhead oil-burning efficiencies.

The Bureau of Safety and Environmental Enforcement (BSEE), within the Department of the Interior (DOI), is charged with the responsibility to permit, oversee and enforce the laws and regulations associated with the development of energy (oil and natural gas) resources on the Outer Continental Shelf (OCS). BSEE's Oil Spill Preparedness Division (OSPD) is responsible for developing and administering regulations (30 CRF 254) for the oversight of the oil and gas industry's preparedness to contain, recover and remove oil discharges from offshore facilities operating seaward of the coastline.

As part of the permitting process for offshore oil and gas development and production in federal waters, BSEE must certify that operators are prepared to respond in the event of a loss of well control and a "worst case" release. BSEE is currently reviewing an independent operator's proposal to use wellhead burning to mitigate the effects of a potential well blowout from a gravel island in federal waters off the north slope of Alaska. As part of this review process, BSEE contracted with the U.S. Naval Research Laboratory (NRL) to conduct a scientific research program. The program's primary objective is to develop a computational fluid dynamics (CFD) model of wellhead burning validated with experimental data at multiple scales (OSRR Project 1063). This independent peer review will evaluate and assess the 1063 Interim Final Report.

Impact of Dissemination: This study is considered by BSEE to be a highly influential scientific assessment. This study's findings may have a direct bearing on the use of intentional wellhead ignition as a potential oil spill response method in the event of loss of well control. The results of this report might influence the need for revisions to 30 CFR 254 for recognition of intentional wellhead ignition as a potential spill mitigation countermeasure similar to the *in situ* burning and chemical dispersants appendices in the regulations established in 30 CFR 254.27 and 254.28.

Timing of Review: November 2020 – November 2021. A review period with a total peer review process of not more than 12 months is desired for this project.

Manner of Review, Selection of Reviewers, and Nomination Process: BSEE will commission the National Academies of Sciences, Engineering, and Medicine to conduct the peer review of this research product consistent with the guidance laid out in the Office of Management and Budget's (OMB) "Final Information Quality Bulletin for Peer Review" (December 2004). The selected peer reviewers should possess an optimum level of expertise across the spectrum of issues, balance and independence while minimizing any potential conflicts of interest.

The Contractor will use a structured process to select peer reviewers who are independent (i.e., not involved with the report under review, nor employed by any company that contributed to the report as a subcontractor or main contractor), objective, unbiased, and with significant expertise in the subject matter. At least half of the selected peer reviewers should be from outside of the oil and gas industry such as academia, researchers, or the oil spill response community.

As a whole, the panel of reviewers should have expertise in the following areas:

- Petroleum Engineering
- Wellhead ignition
- Advanced CFD modeling
- Two-phase wellbore flow
- Spray formation, atomization, especially from films
- Droplet convection, agglomeration, and evaporation
- High-speed, compressible flow behavior, including shock formation
- Shock-droplet interaction
- Multi-component spray evaporation and combustion
- Crude oil droplet combustion
- Large-scale spray or gas plume combustion
- Turbulent jet flow

Expected Number of Reviewers: ten to twelve (10-12) reviewers, plus contractor oversight, and writing personnel

- Reviewers may be selected from Academia, Industry, State and the U.S. Federal Government. The peer review panel should not include multiple reviewers from the same affiliation and will strive to include various perspectives on the issue considered.
- All potential reviewers will be fully vetted for any real or apparent conflict of interest and the Contractor will provide appropriate documentation to verify that the reviewers are free of any conflict of interest.

Opportunity for Public Comment:
To provide public involvement in this peer-review process, BSEE is announcing and inviting written public comments on the scientific and technical merit of the interim OSRR 1063 report. The interim OSRR 1063 report is available on BSEE's OSRR website located at:

https://www.bsee.gov/what-we-do/research/oil-spill-preparedness/oil-spill-response-research

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