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DEPARTMENT OF THE INTERIOR

Bureau of Safety and Environmental Enforcement

[Docket ID BSEE-2020-0015; 21XE8370SD//EEGG600000//ED1OS0000.ERD000]

Notice of Public Comment Period

AGENCY: Bureau of Safety and Environmental Enforcement (BSEE), Interior.

ACTION: Notice of Public Comment Period.

SUMMARY: The U.S. Department of the Interior (DOI), Bureau of Safety and Environmental Enforcement (BSEE) is conducting an independent external peer review of a recent study titled, *OSRR 1063: 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* (July 30, 2020). This peer review will aid BSEE gather input from the scientific community on the technical methodologies and results in this interim final report. Background information on BSEE's Oil Spill Response Research (OSRR) 1063 study is provided in the "SUPPLEMENTARY INFORMATION" section below. Information regarding BSEE's peer-review process is available at: https://www.bsee.gov/what-we-do/research/peer review.

DATES: Interested persons are invited to submit comments on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**.

ADDRESSES: Send your comments on this notice by either of the following methods listed below:

- Electronically go to http://www.regulations.gov. In the Search box, enter BSEE-2020-0015 then click search. Follow the instructions to submit public comments and view all related materials. We will post all comments.

Written comments should be submitted on or before **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN FEDERAL REGISTER]**. Relevant public comments within the BSEE Charge for the scope of this peer review (outline below) and directly addressing the scientific and technical issues in BSEE's 13 Charge Questions (outlined below) will be provided to the peer reviewers. BSEE may not be able to fully consider comments submitted after **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

Submit your comments, identified by name, contact (phone, and/or email) by one of the following methods:

- Mail: Karen N. Stone, Program Manager

  U.S. Department of the Interior

  Bureau of Safety and Environmental Enforcement

  Oil Spill Preparedness Division

  Response Research Branch

  45600 Woodland Road

  VAE-OSPD

  Sterling, VA 20166

Email: karen.stone@bsee.gov

Do not submit information considered to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute to BSEE electronically through email. Please contact the BSEE staff listed under the "FOR FURTHER INFORMATION CONTACT" section for special instructions before submitting comments considered to be CBI or otherwise protected.

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

FOR FURTHER INFORMATION CONTACT: Karen N. Stone, Program Manager

U.S. Department of the Interior

Bureau of Safety and Environmental Enforcement

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45600 Woodland Road

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Email address: karen.stone@bsee.gov

SUPPLEMENTARY INFORMATION:

BSEE Charge for the Scope of this Peer Review

In order to focus the peer-review process effectively on the 13 Charge Questions, BSEE has carefully defined the scope of this peer review for the Interim report of the BSEE Study titled, *OSRR 1063: 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* (July 30, 2020). Written comments should stay within the BSEE Scope defined below.

The scope of this peer review focuses only on the scientific and technical merit of the assumptions, inputs, methodologies, modeling with experimental validation, and results for the

BSEE study titled, *OSRR 1063: BSEE Report: Computational Fluid Dynamics (CFD) Model for Predicting Wellhead Oil-Burning Efficiency at Bench and Intermediate Scales: Interim Report* (July 30, 2020). This peer review is scientific and technical in nature and includes reviewing the methods, assumptions, data quality, the strengths of any inferences made, and the overall strengths and limitations of the study. The peer-review scope includes the material, fabrication, computations, testing, engineering factors, modeling with experimental validation, results, and final recommendations generated from the OSRR 1063 study.

The following are considered Out-of-Scope for this peer review and will not be considered during this peer-review process:

- General comments related to intentional wellhead ignition as a primary response method, because this peer review is focused only on the methods and approach for predicting wellhead burn efficiency at the bench and intermediate scales.
- Comments on, or suggestions for, alternate modeling methods to predict wellhead burn efficiencies except for comments on any omissions or errors identified in the specific methods used for modeling and experimental validations of the model in the OSRR 1063 study referenced above because this peer review focuses on the research already completed for this OSRR 1063 study.
- Comments related to BSEE policies, decisions, or current or proposed BSEE regulations.

Public comments should focus on the scientific and technical merit of the OSRR 1063 study and be organized under BSEE's 13 Charge Questions.

BSEE Charge Questions

1. Were the objectives of the study clearly defined? If not, what are your recommendations for improving the description of this study's objectives?

2. Were the assumptions regarding wellhead conditions and two-phase wellbore flow (including film thickness and instability, liquid entrainment, and droplet diameter and its influence on wellhead ejection behavior) adequately characterized? Were there any apparent strengths, weaknesses, omissions, or errors? Provide an explanation for your answers.

3. Was the physical model for multi-phase flow adequately developed to capture the liquid droplet phase and the gas-phase flow field? Were the soot and radiation models adequately characterized? Were Lagrangian droplet dynamics and thermophysics adequately incorporated into the model? Were there any apparent strengths, weaknesses, omissions, or errors? Provide an explanation for your answers.

4. Does the droplet injection model adequately simulate realistic diameters and velocities of two-phase, high-speed flows that would occur during a wellhead blowout event? Were there any apparent strengths, weaknesses, omissions, or errors? Provide an explanation for your answers.

5. Does the validation process capture the controlling physical properties to a sufficient level of accuracy, including transport and boundary conditions at the bench- and intermediate-scales for both gas-phase and two-phase turbulent spray? Were there any apparent strengths, weaknesses, omissions, or errors? Provide an explanation for your answers.

6. Were the phase doppler anemometry and diffuse back-light illumination imaging diagnostic methods (6.1.1 and 6.1.2 below) for the droplet behavior measurements appropriately designed, clearly described, and adequate to capture droplet behavior for the Gas Phase and Two-Phase Spray Flame? Were there any apparent strengths, weaknesses, omissions, or errors? Provide an explanation for your answers.

    6.1.1. Phase Doppler Anemometry

    6.1.2. Diffuse Back-Illumination Imaging

7. Were the diagnostic methods (7.1.1 and 7.1.2 below) for the temperature measurements appropriately designed, clearly described, and adequate to capture temperature for the Gas Phase and Two-Phase Spray Flame? Were there any apparent strengths, weaknesses, omissions, or errors? Provide an explanation for your answers.

    7.1.1. Coherent Anti-Stokes Raman Spectrometry-based Thermometry (CARS)

    7.1.2. 3-Color High-Speed Pyrometry

8. Do the results adequately characterize evidence of the droplet characteristics, including droplet breakup, the droplet size (diameter), droplet speed, and the duration of a droplet in fire (bench- and intermediate-scales)? Does the research product accurately expand predictions of droplet diameters beyond current limited validated ranges? Were there any apparent strengths, weaknesses, omissions, or errors? Provide an explanation for your answers.

9. Does the research product accurately characterize the impact of two-phase flow regimes (bubble, slug, and churn) on the effluent plume (bench- and intermediate-scales)? Were there any apparent strengths, weaknesses, omissions, or errors? Provide an explanation for your answers.

10. Does the research product adequately address how the wellbore flow would influence the ejected spray plume behavior, which directly influences how the oil and gas burns and how much will either fall back to the surface or remain vapor? Were there any apparent strengths, weaknesses, omissions, or errors? Explain your answers.

11. Does the research product accurately predict the length of fire plume, location of flame anchoring, height of flame, width/angle, expansion, etc.? Were there any apparent strengths, weaknesses, omissions, or errors? Explain your answers.

12. Does the research product determine the primary mechanism driving burn efficiency?

13. Were the conclusions based on the OSRR 1063 study findings in the report logical and appropriate based on the results? What other conclusions related to the study were made and are appropriate? Are there any additional study findings or conclusions that could be drawn from the study? Provide an explanation for your answers.

Background on OSRR 1063 Study

BSEE oversees oil spill planning and preparedness for oil and gas exploration, development, and production facilities in both state and Federal offshore waters of the United States. BSEE's Oil Spill Preparedness Division (OSPD) is responsible for promulgating regulations pursuant to BSEE's delegated authority under the Clean Water Act, as amended by the Oil Pollution Act of 1990 (33 U.S.C. 1321), and implementing those regulations (30 CFR part 254).

To receive the necessary approvals under 30 CFR part 254, operators of oil and gas facilities operating seaward of the coastline must demonstrate that they are prepared to respond to a loss of well control event and a "worst case" discharge release (30 CFR 254.26; 254.51-.53). For decades, intentional wellhead ignition has been viewed as a possible source control method for well-head blowouts in ice-bound environments. BSEE is researching this response method to better understand its efficiencies and limitations in the North Slope area of Alaska. As part of this review process, BSEE contracted the U.S. Naval Research Laboratory (NRL) to first conduct a review of an interested party's report and related scientific literature and provide preliminary technical guidance on the feasibility of wellhead burning as a mitigation method. The review suggests scientific evidence is lacking to fully support claims that wellhead burning would be highly efficient and would result in little to no unburned oil fallout for the proposed project. BSEE then contracted NRL to conduct a scientific research project. The research project's primary objective was to develop a CFD model of wellhead burning validated with experimental data at multiple scales. BSEE is seeking an independent peer review of the interim final NRL report for this research program titled *OSRR 1063: BSEE Report: CFD Model for Predicting*

Wellhead Oil-Burning Efficiency at Bench and Intermediate Scales: Interim Report (July 30, 2020).

BSEE considers this study to be a highly influential scientific assessment.

Scott A. Angelle
Director, Bureau of Safety and Environmental Enforcement

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