DOE-ID NEPA CX DETERMINATION

CX Posting No.: DOE-ID-18-036

SECTION A. Project Title: Validation of pressure relaxation coefficients in RELAP-7 seven-equation model – George Washington University

SECTION B. Project Description

George Washington University, in collaboration with the University of Michigan, proposes to acquire validation data of non-equilibrium processes to validate the Seven-Equation model in RELAP-7 (which represents quasi-one-dimensional gas-liquid flows for problems with varying cross-sectional areas) by: (1) Measuring velocity and pressure in each phase and the interface as well as return to equilibrium in fast transients with high-speed non-intrusive laser diagnostics in canonical experiments; (2) Complementing experimental data with a multiscale computational approach, including a 3D proprietary direct numerical solver; and (3) Validating RELAP-7 with a combination of experimental data and first-principle simulations. This will be accomplished by the use of molecular-based non-intrusive optical diagnostics. Additionally, a laser absorption spectroscopic technique will be further advanced to measure pressure in the gas phase.

SECTION C. Environmental Aspects / Potential Sources of Impact

The university has procedures in place to handle any waste that will be generated through this project. The action would not create additional environmental impacts above those already permitted at the university.

SECTION D. Determine the Level of Environmental Review (or Documentation) and Reference(s): Identify the applicable categorical exclusion from 10 CFR 1021, Appendix B, give the appropriate justification, and the approval date.

Note: For Categorical Exclusions (CXs) the proposed action must not: 1) threaten a violation of applicable statutory, regulatory, or permit requirements for environmental, safety, and health, including requirements of DOE orders; 2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities; 3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; 4) adversely affect environmentally sensitive resources. In addition, no extraordinary circumstances related to the proposal exist which would affect the significance of the action, and the action is not "connected" nor "related" (40 CFR 1508.25(a)(1) and (2), respectively) to other actions with potentially or cumulatively significant impacts.

References: B3.6 Siting, construction, modification, operation, and decommissioning of facilities for small-scale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial development.

Justification: The activity consists of university-scale research activities aimed at evaluating non-equilibrium multiphase flows.

Is the project funded by the American Recovery and Reinvestment Act of 2009 (Recovery Act) ☐ Yes ☒ No

Approved by Jason Sturm, DOE-ID NEPA Compliance Officer on 08/02/2018