DOE-ID NEPA CX DETERMINATION

CX Posting No.: DOE-ID-17-035

SECTION A. Project Title: High Resolution Temperature and Flow Measurements in Wire-Wrapped Fuel Assemblies – Texas A&M University

SECTION B. Project Description

Pennsylvania State University proposes to develop high spatial and temporal resolution temperature and flow datasets in a wire-wrapped rod bundle geometry, targeting the validation of Nek5000. The proposed experimental work will include concurrent measurement of:

☐ Three-dimensional velocity fields within exterior (near wall) and interior sub-channels to obtain the first and second order flow statistics

☐ Wall and fluid temperatures at selected sub-channels

☐ Time-dependent wall shear and pressure (dynamic)

The experimental procedure intends to combine advanced imaging techniques (the 3D Time-Resolved Particle Image Velocimetry (3DTR-PIV), and the Matched Index of Refraction (MIR) to perform high spatial and temporal resolution measurements of the flow structure within the bundle. The data will be also complemented with Laser Doppler Velocimetry (LDV) measurements. Laser Induced Fluorescence (LIF) technique will be combined with the use of optical fiber to measure walls and fluid temperature fields. The investigators propose to conduct experiments using an existing experimental loop which was designed, constructed, and operated under a previous DOE project.

SECTION C. Environmental Aspects / Potential Sources of Impact

Texas A&M 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 aimed at collecting data on the use of wire-wrapped rod bundles.

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 06/29/2017