DOE-ID NEPA CX DETERMINATION

CX Posting No.: DOE-ID-13-075

SECTION A. Project Title: Compact Heat Exchanger Design and Testing for Advanced Nuclear Reactors and Advanced Power Cycles – The Ohio State University

SECTION B. Project Description

The Ohio State University proposes to investigate optimal heat exchanger designs as intermediate heat exchangers (IHXs)/recuperators for small modular reactors and other advanced reactors that use the s-CO_2 Brayton power cycle. Objectives include:

1. Engineer optimized printed-circuit heat exchanger (PCHE) for liquid salt to s-CO2, helium to s-CO2, sodium to s-CO2, and liquid salt to helium working fluids under various IHX/recuperator conditions
2. Experimentally investigate thermal performance, thermal stress, deflection, and failure mechanism of PCHEs during various transients
3. Study diffusion bonding parameters for several high-temperature alloys and examine post-test material integrity of the PCHEs, including the bond-line corrosion effect.

SECTION C. Environmental Aspects / Potential Sources of Impact

The research would involve demonstrating hydraulic performance in IHXs/recuperators. The action would not create additional environmental impacts above those already occurring 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 evaluating hydraulic performance in IHXs/recuperators for research purposes.

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

Approved by Jason Sturm, DOE-ID Deputy NEPA Compliance Officer on 11/25/2013