

**SECTION A. Project Title: Thermal Hydraulic & Structural Testing and Modeling of Compact diffusion-bonded heat exchanges for Supercritical CO2 Brayton Cycles****SECTION B. Project Description**

The primary focus of this research proposal would be on validating and verifying the structural integrity of continuous channel –type PCHEs such as the Heatric zig/zag or Marbond (otherwise known as Shimtec) continuous micro-channel heat exchanger opposed to fin-type geometries. The proposed research utilizes experimental and numerical framework to provide the technical basis for the development of ASME BPVC Section III, Division 5 Code Case for the proposed diffusion bonded heat exchangers in nuclear systems. Experimental pressurization and thermal stressing of PCHE sections will be used to verify the numerical modeling methods. Crack initiation and propagation through the PCHE designs will also be investigated by studying tensile test samples to understand the limitations of the diffusion bond due to possible imperfections.

**SECTION C. Environmental Aspects / Potential Sources of Impact**

Georgia Institute of Technology 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 proposed action consists of small scale research activities.

Approved by Jack Depperschmidt, DOE-ID NEPA Compliance Officer on 07/01/2016