

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: Multiaxial Failure Envelopes and Uncertainty Quantification of Nuclear Grade SiCf/SiC Woven Ceramic Matrix Tubular Composites – University of Florida

SECTION B. Project Description

The University of Florida proposes to determine the constitutive relations and multiaxial failure envelopes of nuclear-grade continuous silicon fiber (SiCf) and SiC matrix woven tubular composites. 2D and 3D woven composites with two different weave architectures will be manufactured and tested under a variety of loading configurations to develop multiaxial failure criteria. A recently developed Direct Micromechanics Method (DMM) will be used for analyzing the failure behavior of SiCf/SiC ceramic composites and establish a phenomenological multiaxial failure criterion for generalized complex loading conditions. The failure envelopes will be validated at static and dynamic strain rates and multiple temperatures.

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: This activity consists of university-scale research activities aimed at evaluating the failure envelopes of nuclear grade composite tubes.

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