DOE-ID NEPA CX DETERMINATION

CX Posting No.: DOE-ID-18-031

SECTION A. Project Title: High-Temperature Nanostructured Thermoelectric Materials and Devices for In-pile Power Harvesting – University of Notre Dame

SECTION B. Project Description

The University of Notre Dame, in collaboration with Northwestern University, and Idaho National Laboratory (INL), proposes to investigate the in-pile performance of high-efficiency nanostructured bulk thermoelectric materials, and to develop radiation-resistant thermoelectric materials and devices for in-pile power harvesting and sensing. The project will fabricate high-performance nanostructured bulk thermoelectric materials and devices and study their in-pile performance and the irradiation effect on material properties and device performance. Project objectives include: 1) fabricate and optimize nanostructured bulk thermoelectric materials, 2) design, fabricate, and test high-temperature nanostructured bulk thermoelectric devices, and 3) study in-pile performances and irradiation effects on nanostructured thermoelectric materials and devices.

SECTION C. Environmental Aspects / Potential Sources of Impact

The project will use radioactive material to perform irradiation experiments at the NSUF facility (INL). All the irradiation experiments will be performed at INL. The INL facility staff will be responsible for monitoring, handling, and disposal of the radioactive material following existing standard operating procedures. The project will not generate any radioactive waste. All hazardous materials will be handled and disposed according to existing standard operating procedures and waste profile forms. Chemical and hazardous waste will be generated only at laboratory scales. 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 research aimed at investigating nanostructured thermoelectric materials for using in a nuclear reactor.

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 07/18/2018