

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: Integrated Silicon/Chalcogenide Glass Hybrid Plasmonic Sensor for Monitoring of Temperature in Nuclear Facilities – Boise State University

SECTION B. Project Description

Boise State University, in collaboration Idaho National Laboratory, proposes research and development of new *real time*, reusable and reversible sensor concepts for cohesive temperature monitoring using integration of photonic properties of radiation hard optical waveguides and the phase change properties of chalcogenide glasses (ChG). These sensors will be suitable for the monitoring of components with temperatures up to 500°C, although with specific adjustments of the composition of the material, these sensors can become useful for metallic or ceramic SFR reactors where the cladding temperature can reaches 650°C. Additionally, a photonic system for data collection will be developed.

SECTION C. Environmental Aspects / Potential Sources of Impact

Chemical Use/Storage - Limited amounts of chemicals will be used and stored in the laboratory. These chemicals are necessary for dissolution of the chalcogenide glasses and formation of inks based on them, as well as mixing of the powdered chalcogenide glasses for creation of powder based inks. The amount of each individual chemical will not exceed 300 ml. The PI's laboratory has the necessary storage capabilities – two fume hoods for work with chemicals and two separate under the hood cabinets for corrosives and solvents.

Chemical Waste Disposal - Boise State University has a well-developed program for waste disposal, by which the generated wastes are collected from their storage places once an amount of 250 ml is generated.

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 investigating sensors for monitoring temperature in nuclear facilities.

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 07/25/2017