

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: In-pile Thermal Conductivity Characterization with Time Resolved Raman– Iowa State University of Science and Technology

SECTION B. Project Description

Iowa State University of Science and Technology proposes to study thermal conductivity to understand the behavior predict the performance of the nuclear fuel system at a microstructural level. Objectives include:

1. Develop a novel time resolved Raman technology for a direct measurement of fuel and cladding thermal conductivity.
2. Validate and improve the technology development by measuring ceramic materials germane to the nuclear industry.
3. Conduct instrumentation development to integrate optical fiber into a sensing system for eventual in-pile measurement.

SECTION C. Environmental Aspects / Potential Sources of Impact

Radioactive Material Use – Depleted uranium oxide will be used for thermal conductivity measurement to test the accuracy and capability of the technology to be developed. Our measurement will only need a very small quantity, a few mm in size. The Office of Environmental Health and Safety of Iowa State University will oversee the use and handling of the sample.

Chemical Use/Storage – Low quantity of chemicals, like ethanol, will be used in the project for sample surface cleaning and preparation before thermal conductivity measurement. The ethanol will be stored in specified bottles. The safety rules set by the Office of Environmental Health and Safety Of Iowa State University will be followed.

Chemical Waste Disposal – Waste chemicals will be stored in bottles. They will be picked up by the Office of Environmental Health and Safety for disposal.

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 thermal conductivity for research purposes.

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

Approved by Jack Depperschmidt, DOE-ID NEPA Compliance Officer on 11/18/2013