

SECTION A. Project Title: A Science Based Approach for Selecting Dopants in FCCI-Resistant Metallic Fuel Systems**SECTION B. Project Description**

The goal of this project is to identify minor alloying additions (dopants) for minimizing or eliminating the effect of fuel cladding chemical interactions (FCCI) in fast reactor metallic fuels. The proposed program combines the following research tasks: i) Selection of dopant elements based on using electronic structure calculated thermokinetic and bonding parameters of dopant-lanthanide, dopant-matrix and dopant-lanthanide-point defect systems; ii) fuel-dopant-lanthanide fabrication casting; iii) perform diffusion-couple experiments; iv) microstructure and compositional characterization of the annealed diffusion couple experiments; v) incorporation of computational code in results in NEAMS-based fuel performance code.

SECTION C. Environmental Aspects / Potential Sources of Impact

The University of Idaho and the Idaho National Laboratory (INL) has procedures in place to handle radioactive material and any waste that will be generated through this project. The action would not create additional environmental impacts above those already permitted at the university or the INL.

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 project consists of a small scale research project on improved fuel cladding for fast reactor metallic fuels using depleted uranium.

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