DOE-ID NEPA CX DETERMINATION

CX Posting No.: DOE-ID-13-059

SECTION A. Project Title: Multiphase Nanocrystalline Ceramic Concept for Nuclear Fuel– University of California, Irvine

SECTION B. Project Description

The University of California, Irvine, in collaboration with the University of California, San Diego, University of Tennessee, and Los Alamos National Laboratory, proposes to explore the use of nanoparticles and nanostructured materials to create improved materials that can extend the service life for nuclear fuel. Work at UC-Irvine will include development of multiphase ceramics, microstructural analysis by advanced electron microscopy and diffraction techniques, characterization of creep and thermal shock, and modeling. UC-San Diego will be responsible for fabrication of multiphase nanocrystalline ceramic materials using spark plasma synthesis and novel nanoparticle synthesis techniques. U. of Tennessee will be responsible for diffraction studies and radiation-induced modification studies using ion beam irradiations. Los Alamos National Laboratory will be responsible for characterization of thermal properties and nuclear fuel design.

SECTION C. Environmental Aspects / Potential Sources of Impact

Chemical Use/Storage / Chemical Waste Disposal – Several gallons of chemicals will be used, primarily phosphoric acid and alcohols that will generate waste. All chemicals are stored safely in approved cabinets. Waste is handled with strict protocols at UC Irvine by the Environmental Health and Safety office that removes waste and ensures proper disposal per state and federal guidelines.

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: B3.15 Siting, construction, modification, operation, and decommissioning of facilities for indoor small-scale research and development projects and small-scale pilot projects using nanoscale materials in accordance with applicable requirements (such as engineering, worker safety, procedural, and administrative regulations) necessary to ensure the containment of any hazardous materials. Construction and modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible).

Justification: The activity consists of evaluating nanoparticles and nanostructured ceramics 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 11/19/2013