DOE-ID NEPA CX DETERMINATION

CX Posting No.: DOE-ID-18-053

SECTION A. Project Title: Development of Nuclear Hybrid Energy Systems: Temperature Amplification through Chemical Heat Pumps for Industrial Applications – University of Idaho

SECTION B. Project Description

The University of Idaho, in collaboration with Oregon State University (OSU) and Idaho National Laboratory, proposes to develop and demonstrate (through modeling and experimental investigations) temperature amplification capabilities of a chemical heat pump system that can be coupled to a conventional light water reactor, or a near term small modular reactor. Specific objectives include (1) developing an integrated system model comprised of coupled sub-models for individual components of the system, (2) conducting experimental investigations on the system components to verify and validate the theoretical model, and obtain data and system parameters for scale-up and design, and (3) demonstrating the technical feasibility of the proposed concept through experimental investigations on a bench scale integrated system.

SECTION C. Environmental Aspects / Potential Sources of Impact

Hazardous Waste Generation and Chemical Use/Storage/Waste Disposal – The project involves experimental work using chemicals such as CaO, $Ca(OH)_2$, LiBr, etc. All investigations will be conducted on laboratory bench scale. Laboratory chemical reagents will be used in the experiments generating small quantities (1-2 kg/yr) of chemical waste, some of which may be categorized as hazardous. Waste will be handled according to the policies and procedures of the University of Idaho, administered through the ES&H unit of Public Safety and Security Department of the University. Chemical handling, storage, and waste disposal procedures at OSU will follow policies and procedures established by OSU ES&H.

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 investigation chemical heat pump systems.

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 08/03/2018