DOE-ID NEPA CX DETERMINATION

CX Posting No.: DOE-ID-17-023

SECTION A. Project Title: Influence of Dissolved Salts and Impurities in Seawater on Heat Transfer Degradation and Fluid Flow Through Fuel Channels Debris Bed – Kansas State University

SECTION B. Project Description

Kansas State University proposes to construct an experimental facility that will enable boiling-heat transfer experiments using raw water with a contaminant, such as salt, present at varying concentrations. Radioactive salts are ideally suited as the contaminant analog because they can be produced from neutron irradiation using the MARK-II TRIGA reactor at the university. Radiation detectors at the university can then measure the deposition rates of the radioactive salts by measuring changes in counts over time at different spatial locations. The university facility also features neutron and x-ray imaging systems to measure local void fraction and a Rayleigh backscatter-based fiber optic temperature measurement system. Boiling experiments will be conducted in both an annular core with an immersion heater and an inductively-heated debris bed. The experiments will cover the range of geometries, flow conditions, and contaminant levels needed to highlight the critical physics under investigation.

SECTION C. Environmental Aspects / Potential Sources of Impact

Radioactive Material Use – Na-24 with a total maximum activity level of 1 micro-Ci for each experiment will be used. This is a reactor created isotope, thus a person authorized by the University Radiation Safety Committee will receive the isotope. Experiments are planned in the neutron beam port, and because the neutron flux level is 10^8 n/cm^2/s, no activity is anticipated as a result of the experiments.

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 the influence of dissolved salts and impurities in seawater on heat transfer degradation and fluid flow.

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 6/28/2017