

# DOE-ID NEPA CX DETERMINATION

**SECTION A. Project Title: Formation of Zeolites Responsible for Waste Glass Rate Acceleration: An Experimental and Computational Study for Understanding Thermodynamic and Kinetic Processes – University of Houston**

**SECTION B. Project Description**

The University of Houston, in collaboration with Pacific Northwest National Laboratory and the University of Pittsburgh, proposes to examine zeolite formation and methods to impede their growth to prevent the advent of Stage III (least understood stage) behavior. The project will (1) examine the kinetics of zeolite formation at low temperatures relevant to geological repositories; (2) investigate glass dissolution in the presence of zeolite seeds at low temperatures and over a range of pH using a variety of glass compositions to understand the effect of glass and zeolite composition on the rate and probability of Stage III resumption, and (3) identify new methods to impede Stage III glass dissolution via the introduction of alkali and alkaline earth metals that can either function as structure breakers that reduce the rate of zeolite growth, or as structure-directing agents that promote the formation of different zeolites. It is anticipated these findings will aid in the design of new glass formulations and the selection of geological repository sites.

**SECTION C. Environmental Aspects / Potential Sources of Impact**

The university has procedures in place to handle any waste that will be generated through this project. The action would not create additional environmental impacts above those already permitted at the university.

**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: This activity consists of university-scale research activities designed to better understand the degradation processes for waste forms that could be generated in advanced nuclear fuel cycles.

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 08/13/2018