

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: Optimizing Melt Processed Phosphate Glass Waste Forms via Composition-Property-Structure Correlations – Clemson University

SECTION B. Project Description

Clemson University proposes to study composition-property-structure correlations of phosphate glasses to optimize current generation of waste forms, pushing the limit of salt loading while targeting high chemical durability and ease of processing with existing melter technologies. Glass waste forms are currently used to stabilize legacy high-level waste materials. Salt cations can be immobilized in a phosphate glass form, but the material generally has a low chemical durability due to a hydrophylic functional group within the glass network structure. The project is intended to develop and optimize highly durable and easily processable phosphate-based glass waste forms to immobilize dehalogenated salt streams by tailoring the composition of the glass with intermediate oxides. The processing approach will use a technology of melt processing in air atmospheres, similar to that developed for borosilicate nuclear waste glasses.

SECTION C. Environmental Aspects / Potential Sources of Impact

Chemical Use/Storage / Chemical Waste Disposal / Hazardous Waste Generation – Chemical acquisition and storage will be necessary to perform project experiments. The chemicals have been used in previous experiments and appropriate labeling, storage, and safety procedures are already implemented. All chemical disposal will be in accordance with university policy set by the Clemson University Office of Research Safety.

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 an investigation to reduce the uncertainty in strategies for sequestration of radionuclide-bearing wastes.

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 7/30/2020