

# DOE-ID NEPA CX DETERMINATION

**SECTION A. Project Title: Phase Separation and Crystallization of Complex Borosilicate Melts for Glass-Ceramic Waste Forms – Missouri University of Science and Technology**

**SECTION B. Project Description**

Missouri S&T proposes to develop an understanding of the microstructural evolution of the complex borosilicate glass ceramics and will apply this understanding to predict the effects of compositional modifications on microstructural development and glass-ceramic properties to help engineer optimized waste-loaded glass-ceramic materials. The two main components of the research are 1) mechanistic description of the formation and growth of chemically stable crystals in borosilicate melts and 2) Effects of composition on microstructural development and properties.

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

Chemical Use/Storage / Chemical Waste Disposal – Chemicals will be purchased to fabricate the glass-ceramic materials that are central to this proposal. Chemical quantities will range from grams (minor components) to kilograms (major components). The chemicals will be powders and will be handled, used, and disposed of following procedures established by the Environmental Health and Safety organization at Missouri S&T.

**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 microstructural evolution of the complex borosilicate glass-ceramics.

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 06/17/2015