

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: The Role of Temperature on Non-Darcian Flows in Engineered Clay Barriers – Virginia Tech

SECTION B. Project Description

Virginia Tech, in collaboration with Sandia National Laboratory, proposes to (1) develop a predictive continuum-scale flow model to facilitate experimental data interpretation and provide mechanistic insights into the role of temperature on non-Darcian flows in low-permeability engineered clay barriers; (2) conduct experiments over a wide range of temperatures to unravel the role of temperature on the threshold gradient of non-Darcian flow in both saturated and unsaturated bentonite (Aim R2); and (3) use molecular dynamics (MD) simulations to obtain fundamental understanding of non-Darcian flow and its dependence on temperature and mineral-water interfacial chemistry (Aim R3).

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: The activity consists of university-scale research activities aimed at improving the fundamental understanding and scientific knowledge, with respect to the temperature dependence, of threshold gradient in non-Darcian flows.

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 08/14/2018