

**SECTION A. Project Title: An Integrated Multiscale Experimental-Numerical Analysis on Reconsolidation of Salt-Clay Mixture for Disposal of Heat-Generating Waste – Columbia University****SECTION B. Project Description**

Columbia University, in collaboration with Sandia National Laboratory, proposes to improve the understanding of the thermal-hydrological-mechanical-chemical (THMC) coupling effect on the reconsolidation of granular salt-clay mixture used for the seal systems of shafts and drifts in salt repositories. The experimental component will include microstructural investigation and macroscopic tests on a reconsolidated salt-clay mixture.

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

**Chemical Use/Storage** – Chemicals will be used in the preparation/cleaning of samples, and in generation of brines to flow through the samples during testing. The chemicals used include solders, epoxies, potassium and chloride salts and clays, quantities will be low, approximately 5 lbs of solids and 15 gallons of liquid per year. All are designated as Standard Industrial Hazards, and are controlled under the Engineered Safety processes in the Geomechanics laboratory at Sandia National Laboratory (SNL).

**Chemical Waste Disposal** – Disposal of chemical waste will be handled through the SNL waste disposal group with the Waste Description and Disposal request. Quantities will be approximately 5 lbs of solids and 15 gallons of liquid per years.

**Hazardous Waste Generation** – It may be necessary to jacket samples in lead sheets in order to test them at high pressures and temperatures. After removal of the jacket, the lead and components contaminated with lead will constitute hazardous waste. The risks will be controlled with existing lead use controls in place in the SNL Geomechanics Engineered Safety processes. Quantities could be as high as 75 lb of lead per year depending on the number of tests run. Lead is recycled at SNL through a lead bank.

**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 on salt-clay mixtures used in salt repositories.

Approved by Jack Depperschmidt, DOE-ID NEPA Compliance Officer on 06/30/2016