

SECTION A. Project Title: Identifying, Predicting, and Preventing Localized Corrosion in Kr-85 Storage Canisters – The University of Virginia

SECTION B. Project Description

The University of Virginia, in collaboration with Pacific Northwest National Laboratory (PNNL), proposes to elucidate the controlling mechanisms of the extensive corrosion within the Kr storage canisters. Three key issues associated with the role of Rb in the localized corrosion processes will be resolved: 1) to investigate the chemical species that were, or could have been present in the container to determine the likelihood that Rb was present in the metallic or ionic state; 2) to investigate the nature of the interaction between metallic Rb and steel and 3) to investigate the corrosion of steel in the presence of Rb⁺ ions and other likely species in the presence of water.

SECTION C. Environmental Aspects / Potential Sources of Impact

Chemical Use/Storage / Chemical Waste Disposal – Rubidium, a stable isotope formed from the beta or the beta/gamma decay of krypton-85, will be used. Approximately 150 ml of waste will be generated per electrochemical test that is performed. Approximately seven tests will be performed for an approximate total of 1L of waste generated. The University of Virginia’s Office of Environmental Health & Safety (EHS) oversees chemical storage and usage of chemicals and chemical waste. All waste disposal is handled by the EHS.

Radioactive Material Use/Radioactive Waste Generation – PNNL will perform all radiological work associated with the project and dispose of any waste produced. PNNL has full work controls, including radiological work procedures, routinely utilized at the lab. The irradiation work on the project will be performed at the Radiological Exposure and Metrology Calibration and Standards Laboratory, a facility with capabilities and work controls required for materials irradiation.

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 role of Rb in the corrosion process of Kr storage canisters.

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 08/28/2017