

SECTION A. Project Title: High-Temperature Molten Salt Irradiation and Examination Capability for the Penn State Breazeale Reactor – Pennsylvania State University**SECTION B. Project Description**

The Pennsylvania State University proposes to build and install a permanent, high-temperature, molten salt neutron irradiation and post-irradiation analysis capability at the Penn State Breazeale Reactor (PSBR) to provide a comprehensive national resource for neutron/radiation assisted corrosion, off-gas, and other applicable testing of candidate materials for molten salt reactors (MSRs) at the university research reactor scale. The equipment requested to build this Molten Salt Irradiation and Examination Facility include: (1) the design and construction of a heated, molten salt irradiation test apparatus, (2) the construction and installation of a permanent dry tube fixture in the PSBR pool for the apparatus, and (3) the purchase and installation of a mass spectrometer in the PSBR hot cells to analyze gases from the salt experiments. The proposed Molten Salt Irradiation and Examination Facility will be housed at the Penn State Radiation Science and Engineering Center (RSEC), which also houses the PSBR. The proposed reactor infrastructure improvements will contribute heavily to both the research and development and education efforts within the Penn State nuclear engineering community and the molten salt community at large and will support a significant portion of the current DOE-NE mission and could be a valuable addition to Nuclear Science User Facilities (NSUF) resources.

SECTION C. Environmental Aspects / Potential Sources of Impact

All radioactive material use, radioactive waste generation, and mixed (radioactive and hazardous) waste generation will be in accordance with the regulatory limits defined by Penn State's radioactive materials licenses (Nuclear Regulatory Commission License R-2, Pennsylvania Department of Environmental Protection License 100, and Nuclear Regulatory Commission Special Nuclear Material License 95). All work will also be in accordance with the prescribed University procedures, as outlined in various University Isotope Committee (UIC) authorizations held by the PSBR, the PI, or both. Following standard procedures, prior to any waste generation, all planned activities will include a waste generation estimate to ensure that all radioactive wastes created have a viable and affordable disposal pathway. Penn State's Radiation Protection Office will be involved with all planned work.

All chemical use and disposal, including hazardous chemicals, will be done with the assistance of the Penn State Environmental Health and Safety (EHS) office and the EHS chemical safety representative. As with radioactive waste, a viable disposal option will be evaluated prior to waste generation.

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). For purposes of this category, "demonstration actions" means actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial deployment. Demonstration actions frequently follow research and development and pilot projects that are directed at establishing proof of concept.

B1.31 Installation or relocation and operation of machinery and equipment (including, but not limited to, laboratory equipment, electronic hardware, manufacturing machinery, maintenance equipment, and health and safety equipment), provided that uses of the installed or relocated items are consistent with the general missions of the receiving structure. Covered actions include modifications to an existing building, within or contiguous to a previously disturbed or developed area, that are necessary for equipment installation and relocation. Such modifications would not appreciably increase the footprint or height of the existing building or have the potential to cause significant changes to the type and magnitude of environmental impacts.

Justification: The activity consists of design, construction, purchase, and installation of infrastructure upgrades and equipment resulting in the completion of the Molten Salt Irradiation and Examination Facility.

DOE-ID NEPA CX DETERMINATION

Is the project funded by the American Recovery and Reinvestment Act of 2009 (Recovery Act) Yes No

Approved by Jason Anderson, DOE-ID NEPA Compliance Officer, on 07/23/2021.