

SECTION A. Project Title: Solving Critical Challenges to Enable the Xe-100 Pebble Bed Advanced Reactor Concept – X Energy, LLC**SECTION B. Project Description**

X Energy, in collaboration with BWXT Nuclear Energy, Inc. (BWXT), Oak Ridge National Laboratory (ORNL), Idaho National Laboratory (INL), and Oregon State University (OSU), proposes to leverage prior and current DOE programs and previous Xe-100 design investments to further key pebble-bed high temperature gas-cooled reactor (HTGR) component design, pebble fuel manufacturing development, and NRC licensing. The proposed project has three main tasks: 1) furthering the reactor design through analysis and test, 2) demonstrating fuel development/manufacturing feasibility, and 3) NRC engagement toward addressing licensing needs.

SECTION C. Environmental Aspects / Potential Sources of Impact

Radioactive Material Use – The activities to implement the project will take place at a number of locations throughout the period of performance. As part of these activities, BWXT, ORNL and INL will handle and utilize low enriched uranium (LEU). Each of these facilities is authorized to handle LEU and the amount of LEU to be used for this project (~3kg LEU total as required split amongst the three facilities) is within each site’s respective authorizations.

Radioactive Waste Generation – The activities to implement the project will take place at a number of locations throughout the period of performance. As part of these activities, BWXT, ORNL, and INL will generate radioactive waste. Each of these facilities is experienced in handling and is authorized to handle radioactive waste. The amount of waste generated at each site is expected to be in gram quantities and will be documented and disposed of according to DOE approved methods.

Mixed Waste Generation – As part of these activities, BWXT, ORNL, and INL will generate mixed waste. Each of these facilities is experienced in handling and is authorized to handle mixed waste. The amount of waste generated at each site is expected to be in gram quantities and will be documented and disposed of according to DOE approved methods.

Chemical Use/Storage – As part of these activities, BWXT, ORNL, INL, and OSU may use and store chemicals. Each of these facilities is experienced in handling and storing chemicals and is authorized to handle and store chemicals. The type and quantity of chemicals has not been identified but is expected to be small and would not create additional environmental impacts above those already permitted.

Chemical Waste Disposal – As part of these activities, BWXT, ORNL, INL, and OSU may dispose of certain chemicals. Each of these facilities is experienced in disposal of chemicals and is authorized to dispose chemicals. The type and quantity of chemicals has not been identified but is expected to be small and would not create additional environmental impacts above those already permitted.

Hazardous Waste Generation – As part of these activities, BWXT, ORNL, INL, and OSU may generate hazardous waste. Each of these facilities is experienced in handling hazardous waste and is authorized to dispose of hazardous waste. The type and quantity of hazardous waste has not been identified but is expected to be small and would not create additional environmental impacts above those already permitted.

Industrial Waste Generation – As part of these activities, BWXT, ORNL, INL, and OSU may generate industrial waste. Each of these facilities is experienced in handling industrial waste and is authorized to dispose of industrial waste. The type and quantity of industrial waste has not been identified but is expected to be small and would not create additional environmental impacts above those already permitted.

Water/Well Use – As part of these activities, BWXT, ORNL, INL, and OSU may utilize water from wells or other sources to support activities associated with this project. The exact quantity of water is not known at this time but is expected to be small.

Discharge of Wastewater – As part of these activities, BWXT, ORNL, INL, and OSU may discharge wastewater. The exact quantity of wastewater is not known at this time but is expected to be small.

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

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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 research activities to further pebble-bed HGTR reactor design.

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 04/12/2015