

DOE-ID NEPA CX DETERMINATION

SECTION A. Project Title: Establishing Modular In-Chamber Electron Beam Welding Capability in the USA—Phase II

SECTION B. Project Description

The Electric Power Research Institute (EPRI), in collaboration with BWXT Nuclear, PTR-Precision Technologies, Bridger Welding Engineering, Rusach International, and Advanced Manufacturing Research Center, proposes to manufacture and assemble several critical sections of a 2/3-scale reactor pressure vessel (RPV) using various advanced manufacturing and fabrication technologies, including electron beam welding (EBW), diode laser cladding, powder metallurgy-hot isostatic pressing, and advanced machining.

The project will look to demonstrate modular-in-chamber electron beam welding (MIC-EBW) on a full-size RPV section (10-ft [3.05-m]). The MIC-EBW system will be established at BWXT Nuclear's facility in Barberton, Ohio. The project activities will include:

- Manufacture of a large rotary table to manipulate reactor pressure vessel sections during welding of the sections together.
- Production of four modules/stages and a base support that make up the modular chamber which will be used during demonstration and validation of the MIC-EBW system.
- Production of 10ft diameter low alloy steel welds that demonstrate the capability of the integrated MIC-EBW system.
- Comparison and validation of the EBW system against state-of-the-art smaller EBW welding system capabilities in the United Kingdom (UK). Additionally, this task will support EBW technology transfer from the UK to the USA.
- Development and assessment of the weldment quality produced within the MIC-EBW system using phase array characterization methods.

SECTION C. Environmental Aspects / Potential Sources of Impact

EPRI and the collaborating organizations have 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 occurring at the locations in which the activities are located.

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.

B3.10 Siting, construction, modification, operation, and decommissioning of particle accelerators, including electron beam accelerators, with primary beam energy less than approximately 100 million electron volts (MeV) and average beam power less than approximately 250 kilowatts (kW), and associated beamlines, storage rings, colliders, and detectors, for research and medical purposes (such as proton therapy), and isotope production, within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible), or internal modification of any accelerator facility regardless of energy, that does not increase primary beam energy or current. In cases where the beam energy exceeds 100MeV, the average beam power must be less than 250 kW, so as not to exceed an average current of 2.5 milliamperes (mA).

Justification: The activity consists of research activities to develop advanced manufacturing and fabrication technologies in support of nuclear reactor design.

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

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Approved by Jason Sturm, DOE-ID NEPA Compliance Officer on 1/14/2021