

# DOE-ID NEPA CX DETERMINATION

**SECTION A. Project Title:** A Holistic Artificial Intelligence Tool to Mitigate Human Factor Uncertainty in Operation and Maintenance

**SECTION B. Project Description**

The University of Tennessee (UT), in partnership with the Tennessee Valley Authority (TVA), proposes to develop a holistic artificial intelligence (AI) tool to help the detection and mitigation of human factors errors in nuclear power plants. The AI tool will be developed, validated and tested. UT will partner with TVA to access an array of historical continuously collected sensor data as well as manually collected data. The data will be used to develop baseline algorithms that capture the normal operation of select target systems. The existing testbeds at UT will be used to design and conduct experiments to capture continuous sensor data as well as manually collected data subject to human errors. UT will use two testbeds for accelerated degradation of rotating machinery, specifically small induction motors and sealed ball bearings, and a small flow loop. The AI tool will be developed and validated on that data.

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

The university has 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 permitted at the university.

**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 activities to develop an artificial intelligence (AI) tool for detection and mitigation of human factors errors in nuclear power plants.

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 8/10/2020