

DOE-ID NEPA CX DETERMINATION IDAHO NATIONAL LABORATORY

SECTION A. **Project Title:** Idaho National Laboratory (INL) Support to Analysis and Measurement Systems Corporation (AMS) for Performance Monitoring Technology Deployment at the Advanced Test Reactor (ATR) on the INL

SECTION B. Project Description:

The purpose of this proposal is to expand the scope of traditional maintenance activities at the Advanced Test Reactor (ATR) to trend the performance of its equipment and anticipated failures before they occur. In order to identify and apply new predictive maintenance technologies at the ATR, a Research and Development (R&D) effort is needed to verify the ATR equipment and systems can benefit from these maintenance technologies, adapt the technologies to ATR equipment and systems, and establish the procedures that must be used to implement these technologies at ATR.

In the past, equipment reliability and process safety and efficiency in nuclear facilities have been evaluated through maintenance programs involving hands-on work such as visual inspections, cleaning, oil change, alignments, tuning, calibration, response time testing, and replacement of degraded or obsolete components. These activities are often regulated and performed according to industry standards in compliance with technical specification requirements and/or regulatory mandates. The frequency of maintenance of the equipment depends on the role of the equipment in the plant operation and safety, manufacturer's specifications, and the history or rate of equipment degradation.

In recent decades, hands-on maintenance procedures have been largely replaced with predictive maintenance activities to identify when and where maintenance is needed. Predictive maintenance activities involve an array of technologies such as vibration analysis, partial discharge testing, oil analysis, thermography, ultrasonic testing, and other methods. These technologies are applicable to rotating equipment such as pumps, motors, compressors, fans, and motor-operated valves (MOVs). As for predictive maintenance of Instrumentation and control (I&C) equipment, there are a variety of performance monitoring techniques such as on-line calibration verification, in-situ response time testing, signal validation, cable diagnostics, and electrical measurements such as insulation resistance (IR) tests, and inductance and capacitance measurements. Some of these techniques have been used at the Advanced Test Reactor (ATR) with great success, contributing to a history of excellent performance and safety.

Additionally, almost all the testing and diagnostics used in commercial nuclear plants are also useful to ATR and, in fact, critical to the Department of Energy Idaho Operations Office's (DOE-ID) plan for ATR's aging management and reliability improvements. The proposed action would be focused on ATR's rotating equipment such as pumps, motors, compressors, fans, and I&C systems such as temperature, pressure, level, flow instrumentation, neutron detectors, and cables.

In this project, INL personnel knowledgeable about the operation and maintenance of ATR would work with personnel from the Analysis and Measurement Systems Corporation (AMS) to identify the operational characteristics, degradation mechanisms, and failure modes of ATR equipment. INL's role in this work will be to consult with AMS via teleconference and face-to-face meetings to discuss the potential for use of commercial or advanced equipment monitoring techniques for application at ATR. Based on the information provided by INL, AMS will perform an analysis of the maintenance practices and failure histories of ATR's rotating equipment and I&C systems, and develop a matrix of equipment degradation and failure modes that must be measured and trended to identify faults and predict failures. In order to capture the required operational data, it would be necessary to install monitoring devices on specific ATR equipment. The monitoring devices are not a facility modification, but rather tools used to capture data. If it is determined that a facility modification would be required to complete this scope, additional NEPA analysis would be required.

INL staff would then review the developed matrix, and AMS would develop a program to systematically assess the condition of rotating equipment and I&C systems at ATR, trend their performance, and prevent failures.

This Environmental Checklist (EC) will be reviewed against the detailed final work plan, with modifications to the EC if required.

SECTION C. Environmental Aspects / Potential Sources of Impact:

Generating and Managing Waste - All waste generated from this activity will be managed in accordance with company procedure. Pollution prevention will be implemented where economically practicable to reduce the volume and/or toxicity of waste generated. All waste generated will be transferred to Waste Generator Services (WGS) for appropriate disposition.

Using, Reusing, and Conserving Natural Resources - Pollution Prevention will be incorporated wherever economically practicable to reduce the volume and or toxicity of waste generated. Products that contain recycled materials will be used where economically practicable.

SECTION D. Recommended 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: National Environmental Policy Act Implementing Procedures; Final Rule, Categorical Exclusions B3.6 "Siting/construction/operation/decommissioning of facilities for bench-scale research, conventional laboratory operations, small-scale research and development and pilot projects" effective August 8, 1996.

Justification: Project activities in this EC are consistent with Categorical Exclusion B3.6 "Siting, construction (or modification), operation, and decommissioning of facilities for indoor bench-scale research projects and conventional laboratory operations (for example, preparation of chemical standards and sample analysis); small scale research and development projects; and small scale pilot projects (generally less than two years) conducted to verify a concept before demonstration actions." Project activities are needed to verify ATR equipment and systems can benefit from these maintenance technologies.

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 11/15/2011