NEUP Nuclear Energy University Programs
U.S. Department of Energy

University of Wisconsin Nuclear Reactor

University Research Reactor Upgrades Infrastructure Support

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Collaborators: Name – Organization *[N/A if none]*

Program: Infrastructure

ABSTRACT:

Project Objective

The specific objective of this proposal is to replace the electromechanical coolers attached to the high purity germanium (HPGe) radiation detectors to support the operation and research being conducted at the University of Wisconsin Nuclear Reactor (UWNR) and associated Characterization Laboratory for Irradiated Materials (CLIM).

Project Description

The UWNR-CLIM maintains various radiation detecting equipment for regulatory compliance, research and education. Currently, the facility utilizes and maintains two Advanced Measurement Technology (AMETEK) ORTEC brand X-Cooler II electromechanical coolers to maintain the facilities two high purity germanium (HPGe) detectors at cryogenic temperatures. The transition from liquid nitrogen to mechanical coolers occurred more than a decade ago to minimize the hazards of frost bite, asphyxiation and transportation of large cryogenic dewars. The facilities HPGe's utilized the ORTEC brand PopTop connector design so the transition of the X-Cooler II was the most cost effective solution. Over the last decade the mechanical cooler's vacuum seals have started to fail requiring frequent down time for the HPGe detectors while the coolers are being pumped back out. The objective of this project is to replace the older X-Cooler II coolers with the newer X-Cooler III in an effort to minimize the time the HPGe's are out of service.

Potential Impact of the Project

The proposed effort of acquiring the replacement mechanical coolers are necessary to maintain the infrastructure and enhance the capabilities at the UWNR-CLIM. These capabilities are relevant to the objectives of the Department of Energy's (DOE) Office of Nuclear Energy (NE) in the following ways:

- The equipment is necessary to maintain the UWNR-CLIM as a cutting edge facility which is a strong incentive when attracting high quality students interested in nuclear energy related studies
- The radiation detecting equipment is integral to the undergraduate curriculum within the UW's NE program enabling the education and training of a strong work force in nuclear science and engineering
- The proposed enhancements to the UWNR-CLIM infrastructure supports research and development (R&D) that is relevant to the DOE-NE mission through DOE-NE funded research programs at the UW