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## Continuous Air Monitor and Source Range Detection Upgrade for the University of Utah TRIGA Reactor

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**Program:** Reactor Upgrades

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### **ABSTRACT:**

The objective of this proposal for the University of Utah TRIGA Reactor (UUTR) is to increase operational reliability for UUTR operations by providing redundancy for aging equipment necessary for reactor operation. These objectives will be achieved through completion of the following tasks.

- 1) Upgrade of continuous air monitoring system (CAM).
- 2) Installation of a new source range neutron flux monitor (SRM).
- 3) Installation of a new I & C drawer for monitoring output from the new detector.
- 4) Tests and analysis of the installed systems.
- 5) Final reporting on the new system capability and effects on reactor operation and safety.

The successful accomplishment of the proposed objectives will achieve our **goal: Obtaining and sustaining operational reliability of necessary equipment to enhance capability for a wide range of research and development efforts that support the Nuclear Engineering Program, the University of Utah, partner institutions and laboratories, and the DOE-NE mission.** The UUTR is an integral core research facility available to researchers from across campus, other universities, laboratories, and industry.

The upgrade to the continuous air monitor (CAM) and source range monitoring (SRM) system is part of a greater long-term goal to ensure the UUTR is a valuable and cost-effective research and training focused facility. Part of the long-term goals of the UUTR is the on-going effort to open a neutron beam port to provide thermal neutrons for a neutron imaging facility and the eventual uprate of reactor power.

### *Description:*

Upgrading the CAM and SRM system of the UUTR will enhance performance and utility by ensuring our reactor can continue operations even if a fault were to be discovered during reactor startup or operations. It will also increase safety and operational reliability. The current CAM for the facility uses a chart recorder that is no longer produced or maintained by the supplier. The CAM itself is estimated to be 30 years old and is no longer supported by the manufacturer. Troubleshooting solutions to replace the failing chart recorder revealed the CAM wiring differs from electrical diagrams in the manual. A new CAM would provide more reliable monitoring of any airborne radioactivity.

An additional SRM system would increase safety and reliability by providing an additional monitoring channel of power in the source range. Currently, our reactor only has one source range detector to monitor power while approaching criticality. Due to a technical specification requirement for a low source counts interlock, this detector and supporting drawer are necessary for reactor operation. A failure in this system would result in the reactor being inoperable for at least several months until repaired. Upgrading the CAM and SRM system is an integral step to maintaining and opening new opportunities for user research, training, and supporting NSUF projects and the DOE-NE mission.