



Upgrade of the MURR High Resolution Gamma Spectroscopy System

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Collaborators: NA

Program: Minor Reactor Infrastructure

ABSTRACT:

This proposal requests \$200,000 from the DOE NEUP Reactor Specific Infrastructure Program to upgrade the existing High Resolution Gamma Ray Spectroscopy system with modern data acquisition and management functionality. MU and MURR are providing matching support (\$50,000) to DOE funds, and MURR will cover the cost of labor for the installation of the gamma spectroscopy system components, as well as system testing and integration in teaching laboratories and the facility monitoring systems. The gamma spectroscopy system is one of the most critical systems of the reactor for normal and emergency operations, while simultaneously providing instructional and research infrastructure for students and faculty researchers in nuclear science and engineering fields across campus. The system supports monitoring of facility operations, including exhaust stacks, radioactive liquid waste, analyses of water, soil and vegetation samples for environmental monitoring, and other sampling to ensure NRC regulatory compliance.

In addition to the upgrade of the data acquisition and analysis system, the requested funds will be used to acquire new High Purity Germanium (HPGe) and MultiChannel Analyzer (MCA) detectors to replace aging detectors that currently use, which have been in continuous use well beyond their expected service life. Replacing these older detectors will long turnaround times for replacements and/or the high costs of repairing the older detectors, which will avoid unplanned downtime for faculty and student research. These replacements will also ensure continued operational compliance with regulatory requirements.

The main objective of the requested funds from DOE is to support MURR's educational and research mission through the availability of modern equipment for student and faculty researchers interested in radioenvironmental sciences, health physics, reactor safety, detector design and optimization, nuclear forensics, radiochemistry, nuclear analytic methods, quality control, and data acquisition and analysis. Under direction of Dr. Oladiran (Project Director) and MURR's senior operations staff, MURR's Gamma Spectroscopy System upgrade project will be conducted in two major phases:

Phase 1: Procurement. The procurement phase will consist of purchasing the requested equipment and software. These components must meet very specific design specifications, consistent with the system that is currently installed at MURR.

Phase 2: Installation. The installation phase will begin with installation of the new detector units, concurrently with installation and configuration of server and upgraded network infrastructure components. Individual laboratory systems will be upgraded and configured on a schedule designed to minimize disruption of MURR's ongoing research, education, regulatory compliance, and quality control processes.

With MURR's contributions to the nuclear science and engineering infrastructure in the United States, the requested funding under the NEUP Reactor Upgrades program is an excellent investment in our country's ability to respond to preparing future scientists and engineers with the knowledge to contribute to and advance the state of knowledge crucial to the Department of Energy's mission. The proposed project is an essential upgrade to continue MURR's 90% capacity factor in support of the education and training of nuclear science and engineering students, as well as our extensive research portfolio related to the Department of Energy, the nuclear power industry, and related constituents in areas including Health Physics, Radiochemistry, Reactor Safety, Nuclear Forensics, and Radioenvironmental Sciences.