
University of Florida Training Reactor Gaseous Effluent Monitoring in Support of Reactor Operations and Research Activities

PI: Donald Wall, University of Florida

Collaborator: Andreas Enqvist, University of Florida

Program: Reactor Upgrade

ABSTRACT:

We propose the procurement of new gas effluent monitoring systems that will enable the UFTR to offer an increased suite of capabilities including plume monitoring and source term-tracking. The redundancy will enable a significant improvement of reliability.

The goals of the proposed upgrade are:

- Increase the scope and quality of the UFTR as a teaching and research asset;
- Use the UFTR facility to enhance the research capabilities of the Nuclear Engineering Program;
- Increase versatility of the UFTR as a research asset to the wider nuclear education and nuclear research community.

The objectives of the installation of a gaseous effluent monitoring system include:

- Replace the gaseous effluent monitoring system at UFTR, with a redundant two-detector monitoring system, that enables reliable reactor operation and monitors the unique UFTR gaseous effluent source term.
- UFTR is the only Argonaut reactor in the U.S. Argonaut reactors have an Ar-41 source term that arises from a unique core ventilation system which needs monitoring in addition to any accidental or unintended gaseous releases—monitoring is best served by a high-resolution effluent measurement system in case of mixed radioisotope effluent signatures.
- Increase the effluent monitoring accuracy of the UFTR and increase the fidelity in the facility tracking of annual effluents in compliance with Federal regulations.
- Train the next generation of nuclear scientists and engineers in radioactive effluent measurements, neutron activation impacts, radiation plume transport, and fuel cycle signature understanding.
- Cultivate a collaborative network of users across the U.S. with like-minded goals of addressing the needs of future nuclear energy systems, nuclear medical isotope production facilities and nuclear fuel cycle processing.

The proposed project has three key components:

1. A reliable continuous monitoring low-resolution system to be incorporated as the main gaseous effluent safety system.
2. A High Resolution Gamma Spectroscopy Platform for Gaseous Effluent Monitoring, which together with UFTRs unique gaseous effluent profile will enable unique research capabilities.
3. Combining the two measurement systems as a redundant cross-verifying and calibrating facility system that enables real-time generation of research—quality data while working as a training and verification test-bed for students and researchers.