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Computational and experimental assessment of public dose from normal research reactor operations

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The Missouri University Research Reactor (MURR) in Columbia, Missouri is interested in the amount of the Argon-41 being produced and released to the environment. The objective of this work is to know what operations within the facility are contributing to this production and the quantities released. I'll be working in collaboration with Jeancarlo Torres (Computational Assessment) and Erick Scheerer (Experimental Assessment) in determining these parameters. The calculational work analyzes the distribution of releases from the stack at the MURR. The dose is then predicted with the Comply program. EPA's Comply model was developed based on the procedures in the National Council on Radiation Protection and Measurements Commentary No.3 (NCRP89). The Comply computer software may be used to demonstrate compliance with the National Emission Standards for Hazardous Air Pollutants (NESHAPS) in 40 CFR 61 Subpart I and H. Comply calculates the effective dose equivalent (EDE) from radionuclide released from stacks and vents. The Nuclear Activation Analysis (NAA) is used in the experimental assessment of Argon-41 production. Neutron Activation Analysis is a nuclear process used for determining concentrations of elements in a vast amount of materials. NAA allows discrete sampling of elements as it disregards chemical form of a sample and focuses solely on its nucleus. NAA is a sensitive analytical technique useful for performing both qualitative and quantitative multi-element analysis for mayor, minor and trace elements in samples from almost every conceivable field of scientific or technical interest. Using NAA we will irradiate air samples from around the facility to determine the concentration of natural Ar-40 to produce Ar-41 for measurement. The relationship between these two different projects is that the results of the experimental technique will indicate if excess argon is present in the facility and the computational technique will calculate the dose the activation of Ar-40 to Ar-41 may have on the environment.