

Sample throughput improvements for the U.S. Noble Gas Laboratory

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As radioxenon samples are collected around the world at the CTBTO IMS stations, a subset of those are sent to radionuclide laboratories around the world for re-analysis. PNNL operates the U.S. Noble Gas Laboratory (US-NGL), which was certified in December of 2016. The laboratory currently has one certified detector, but there are potential scenarios where additional throughput is desired. Two examples of this desired throughput are when multiple samples arrive at once, such as during a Proficiency Test Exercise (PTE) or from an event at a station. Alternatively, if there was a calibration or PTE performed shortly before station samples, it is desirable to have a subset of pristine detectors with no additional backgrounds from the radioxenon spikes. We have installed a detector bank of four additional detectors for US-NGL. The gas handling system for these detectors has been optimized to minimize the dead volumes, allowing the detectors to meet the CTBTO requirement for transfer efficiency. The detectors have undergone initial testing and are in the process of being certified for operation. We present the detector calibration and gas handling mechanism for the new detector bank. Additionally, we present operational scenarios for the added sample throughput of the US-NGL.

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