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Performance monitoring of beta-gamma detectors using quality control data

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Quality Control (QC) measurements are taken to monitor and correct for gain drifts in radioxenon nuclear detectors. The measurement is performed by placing a ^{137}Cs source near the detector and measuring the position of the 662-keV photoelectric peak in the NaI detector and determining the endpoint for the Compton scatter distribution, but there is much more information that can be gleaned from the collected spectra, which PNNL is now leveraging. This QC data set is being utilized to additionally monitor the health and performance of the nuclear detectors over time by determining the relative efficiency, resolutions, and gains with respect to the check source. Baseline determination of these detector characteristics and placement of quality control limits enables an operator to determine if an issue is happening or has happened with the detectors. This presentation will go over how we determine these QC detector characteristics and how they can be used to infer the health of the detectors.

Promotional text

This presentation provides new opportunities and methods for improving nuclear test monitoring and verification by leveraging existing data to monitor the nuclear detectors' health.

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