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observations of environmental 125Xe, 127Xe, and 129mXe

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Environmental 125Xe, 127Xe, and 129mXe have been observed during testing of a next-generation xenon measurement system, Xenon International. The observations of these three radioxenon isotopes occurred during routine testing at the Xenon International manufacturing facility in Knoxville, Tennessee, USA, and they are believed to be the first observation of these isotopes in environmental samples collected by automated radioxenon systems. The observations are consistent with activation of xenon in air and have been attributed to the High Flux Isotope Reactor (HFIR) located at the Oak Ridge National Laboratory, about 20 km away.
The 125Xe, 127Xe, and 129mXe isotopes can be detected in the beta-gamma detector of Xenon International and would interfere with the quantification of the radioxenon isotopes used for nuclear explosion monitoring. The interferences would cause elevated concentration values for the radioxenons of interest in the current analysis methodology. The 125Xe was observed the most often, and it decays to 125I, which can also interfere with radioxenon measurements in the beta-gamma detector. This presentation will describe the observations, production mechanisms, implications for IMS systems and possible mitigation strategies.

Promotional text

This presentation provides understanding of radioxenon background and potential interferences to the International Monitoring System radioxenon systems.

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