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Impact of High Resolution Beta Detectors on the Detection of Radioxenon Isotopes

There are currently three ongoing efforts to use Silicon PIN diodes as the beta detectors in beta-gamma systems used for radioxenon measurements [1,2,3]. The high resolution that these detectors have demonstrated for conversion electron have shown that they can significantly reduce the minimum-detectable-concentrations for the two meta-stable isotopes 131mXe and 133mXe. Additional physics signatures can be elucidated as triple and greater coincidence between, beta-particles, CE, gamma-rays and X-rays, that were summed in the past using standard beta-gamma detectors [4]. This poster will discuss the impacts to fielded systems and lab operations and the potential reduction in the MDC's for the four radioxenon isotopes that these new detectors can achieve. 1. Hennig, W., et al., 2011, in Proceedings of 2011 Monitoring Research Review: Ground-Based Nuclear Explosion Monitoring Technologies, LA-UR-11-04823, Vol. 2, pp. 695–707. 2. V. Popov, N. Kazarinov , I.Popov, New beta – gamma detector System, International Noble Gas Experiment Workshop , 06-10 December 2011, Yogyakarta, Indonesia 3. Private communications with Gilbert Le Petit, CEA, DAM, DIF, F-91297 Arpajon, France, 2012. 4. Cooper MW, et al., Nuclear Instruments and Methods in Physics Research. Section A, Accelerators, Spectrometers, Detectors and Associated Equipment 579(1):426-430.

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