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Evaluation of Gamma-Ray Spectroscopy Software for On-Site Inspection under the Comprehensive Nuclear-Test-Ban Treaty BRIAN MILBRATH, DAVID JORDAN, Pacific Northwest National Laboratory, AUGUSTINE CAFFREY, Idaho National Laboratory, NATHAN WIMER, Lawrence Livermore National Laboratory — The Comprehensive Nuclear-Test-Ban Treaty (CTBT) would ban all nuclear explosions worldwide. As part of the verification regime of the Treaty an On-Site Inspection (OSI) may be called to investigate a location to determine if a nuclear explosion has occurred. Per the Treaty, in order to protect sensitivities of the inspected country, the measurement of radioisotopes may be limited to those relevant to the inspection. This means, for example, that gamma spectroscopy detectors would be limited in their function so as to only detect certain gamma-rays (and their corresponding radioisotopes). How to impose this limitation in a robust and reliable manner is not currently agreed upon. In order to investigate this issue technically we have developed a gamma spectroscopy software that includes an information barrier called OSIRIS (OSI RadioIsotopic Spectroscopy). We have also developed a set of fission-product spectra, both Treaty compliant and non-compliant, for testing the software to compare its performance relative to expert analysis. An ORTEC Trans-SPEC-DX-100T HPGE spectrometer serves as the OSIRIS prototype instrument.

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