ID: Type: **Oral**

3.2-O4. On-Site Inspection RadioIsotopic Spectroscopy (OSIRIS)—A Spectrum-Blind Gamma Ray Spectroscopy System for On-Site Inspections Under the Comprehensive Nuclear-Test-Ban Treaty

We are developing and testing a spectrum-blind system for the acquisition and analysis of high-resolution gamma ray spectra during on-site inspections under the Comprehensive Nuclear-Test-Ban Treaty (CTBT). The On-Site Inspection RadioIsotopic Spectroscopy— OSIRIS—system includes software filters that limit the display of spectral data to radioisotopic information relevant to CTBT on-site inspections, e.g., 131I. OSIRIS performance has been evaluated on the basis of two hardware and three software performance criteria. The energy-calibration accuracy and electronic-gain stability of an ORTEC trans-SPEC-DX-100 mechanically cooled high-purity germanium gamma ray spectrometer have been measured from 0 ℃ (32 °F) to 40 ℃ (122 °F). OSIRIS software performance has been evaluated on gamma ray net-peak-area measurement fidelity, treaty-relevant fission product isotope detection true positives, and fission product detection true negatives, using a set of over 150 fission product spectra. The test spectral compositions include non-nuclear-explosion scenarios, e.g., a severe nuclear reactor accident, and nuclear explosion scenarios such as a vented underground nuclear explosive test. Compared to expert manual analyses of over 100 of these test spectra, the OSIRIS analyses were over 95% correct for identification of treaty-relevant fission-product isotopes.

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