ID: **O4.4-209** Type: **Oral**

algorithms and prognostics for monitoring the Radionuclide Aerosol Sampler/Analyzer (RASA)

Thursday, 1 July 2021 14:50 (15 minutes)

State of health (SOH) data from radionuclide sensors in the International Monitoring System (IMS) provides critical information about the operating status of stations. Radionuclide systems typically have many sensors that are important indicators of normal operation or system problems. Since there are many IMS stations with radionuclide systems, monitoring them all simultaneously by a single analyst is a challenge. Over the past several years Pacific Northwest National Laboratory (PNNL), in collaboration with General Dynamics, has been developing a status of health monitoring architecture for analyzing SOH data from radionuclide systems of the IMS. The architecture was originally developed to support the Swedish Automatic Unit for Noble gas Acquisition (SAUNA). Recently, the Radionuclide Aerosol Sampler/Analyzer (RASA) was added to the SOH monitoring tool. The tool uses statistical methods such as Exponential Weighted Moving Average (EWMA) and standard deviation techniques to monitor the systems. PNNL is now investigating methods to improve RASA SOH monitoring capability by using advanced algorithms capable of identifying actual failures based on sensor signatures. This research is also seeking to detect and identify the failures as early as possible using advanced prognostic approaches. The results from failure identification techniques and prognostic algorithms will be outlined and presented.

Promotional text

The SOH monitoring methods outlined in this work seek to help IMS operators identify the source of problems early and quickly. This will improve sustainability efforts of the IMS and help both the data quality and availability which are critical to monitoring and verification.

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Session Classification: T4.4 - Network Sustainability and systems engineering for CTBT Verification

Track Classification: Theme 4. Performance Evaluation and Optimization: T4.4 - Network Sustainability and systems engineering for CTBT Verification