Contribution ID: **135** Type: **Oral presentation**

#07-135 Qualification Test System for Radiation Detection Devices - QuTeSt

Wednesday, June 23, 2021 2:40 PM (20 minutes)

Measurement equipment for the detection and identification of radioactive and nuclear (RN) material has a wide application area. The main application aspects are monitoring, search, and identification. Measuring systems are divided into different device classes. There are both portable systems like the handheld systems radiation isotope identifiers (RIID) or personal radiation detectors (PRD) and their spectroscopic versions (SPRD) as well as stationary systems like radiation portal monitors (RPM). A common goal is to gain reliable measurement results. In the past, the only way to assess the performance of a measuring device was to rely on the data given by the manufacturer of the device itself. This situation is unsatisfactory, which is also due to the lack of an international seal of approval. Reliable test results from an independent third party are more than welcome. These tests can be performed against consensus standards in order to have reproducible test results, independent of the testing location and the performing laboratory. This is especially relevant for the procurement of new devices, as well as for the comparison between different systems. Fraunhofer INT has conceived and built a test environment to perform dynamic and static test measurements using neutron and gamma sources. These qualification systems were part of a round robin test during Phase II of the project "Illicit Trafficking Radiation Assessment Program (ITRAP+10)", initiated by the European Commission to capacitate several laboratories to conduct qualification tests. Several tests were performed in accordance with the ITRAP+10 test procedures, which are based on ANSI and IEC standards, as well as in accordance with the ANSI standards themselves. In this paper both parts, the static one and the dynamic one, are presented, and exemplary results are shown. This includes qualification tests of truck portal monitors with the dynamic test system. Generally, the effects of one test parameter on other test parameters are not considered in the test procedures. For example, the accuracy of the dose rate may depend on the energy range of the radioactive source used. This will then also affect the over range tests. So far, the latter are only intended for one single nuclide. Besides the overview of the test systems the paper will address restrictions, problems and limitations of the possible qualification measurements as well as potential limitations arising from the given test procedures themselves.

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Session Classification: 07 Nuclear Fuel Cycle, Safeguards and Homeland Security

Track Classification: 07 Nuclear Fuel Cycle, Safeguards and Homeland Security