AbstractID: 10561 Title: Acceptance and commissioning of a novel ionizing radiation emitting isotope hospital detection and notification system suitable for use in radiation counter-terrorism

Introduction and Purpose: Radioactive patient contamination (from dirty bomb explosions, etc.) could force shut down of hospital services for an extended time. The University of Pittsburgh Medical Center (UMPC) established testing of Thermo Fisher Scientific's Emergency Department Notification System (EDNS) at its Presbyterian Hospital. The EDNS discriminates non-medical radioactive isotopes from medical isotopes. The EDNS at UPMC consists of large volume Sodium Iodide Detector Enclosures, System Control Unit, and networked Thermo Scientific ViewPoint^{TM} Monitoring Software. The purpose of this study was to perform initial acceptance and commissioning of the EDNS.

Methods and Materials: The following tests were performed for the initial acceptance of the EDNS: 1) evaluation of minimum detectable activity, 2) detector response distance to various source activities, 3) detector response to different speeds of a moving radioisotope and 4) ability to detect different radioisotopes passing under the detector at the same time. The radioisotopes used in the experiments were: Cs-137, Co-60, Ba-133, Th-228, Am-241, I 125 and Sr-90.

Results: The minimum detectable activity for the system was 4.38 μCi. The minimum detector response distance for a Cs-137 source of activity 7.28 μCi moving at an approximate speed of 1.2 m/s was found to be 2.3 m from the detector's centerline. The system easily detected a Cs-137 source of activity 7.28 μCi moving under the detector enclosure at speeds ranging from 0 to 2.5 m/s. The system detected and identified combinations of radioisotopes when these were moved under the detector probe at an approx. speed of 1.2 m/s.

Conclusions: All performed tests were within preset specifications. This novel EDNS system can effectively track movement of non-medical/suspicious radioisotopes in a hospital environment, identify potentially dangerous radioisotopes, and report their location. Further testing and evaluation of the EDNS system is in progress.