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Title

Standardized Air Kerma Testing for Personal Dosimeters at the National Research Council of Canada

Abstract

Purpose:

The Canadian Nuclear Safety Commission (CNSC) licenses dosimetry services under the Nuclear Safety and Control Act, with requirements detailed in the Radiation Protection Regulations. Licensed dosimetry services must monitor radiation doses for nuclear energy workers. According to CNSC REGDOC-2.7.2, licensed dosimetry providers must pass independent testing (IT) for each dosimeter design. As the Canadian National Metrological Institute, the NRC's Ionizing Radiation Standards (IRS) group offers this testing. Testing is conducted in six labs: 60Co, Neutrons, Beta, 137Cs, Radionuclide metrology and X-rays. This presentation will highlight the service's importance for radiation protection programs, summarize the testing process at NRC, and discuss CNSC acceptance criteria.

Methods and materials:

Co-60 and Beta independent testing of TLD badges for quality assurance: These services can be provided in terms of exposure, air-Kerma or personal dose equivalence, according to client's preference.

137Cs IT of Electronic Personal Dosimeters: This service is offered to test EPD responses at an SSD of 1 meter and a field size measuring 40 cm in diameter.

X-ray Personal Dosimeter Quality Assurance: This service is provided in accordance with Health Canada's Federal/Provincial/Territorial Requirements for Dosimetry Services in Canada.

IT for Neutron Irradiation: This is carried out using an Am-Be source. Personal dosimeters are irradiated for a time required to deliver between 1-10 mSv personal dose equivalent.

IT for radionuclide contamination monitoring: IT for radionuclide contamination is required by accreditation bodies for services which test for removable radioactive contamination. The IRS radionuclide laboratory prepares artifacts in client requested matrices, such as filter paper, cotton swabs, charcoal filters or planchettes for a variety of client requested isotopes including Am241, Co60, Cs137 and C14.

Results: The client provides their IT results to the responsible IRS laboratory at NRC. Reports (including an uncertainty budget) are then submitted to the appropriate regulatory body and the client contact.