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Developing a Procedure on Performance Testing for Personnel Monitoring Services (PMS) in the Philippines

1. Introduction

Accreditation to ISO/IEC 17025 for personnel monitoring services (PMS) is recommended to meet the safety standards of the International Atomic Energy Agency (IAEA) [1]. Performance testing is one of the requirements of ISO/IEC 17025.

The Philippine Nuclear Research Institute-Radiation Protection Services Section (PNRI-RPSS) is one of the three (3) PMS providers in the Philippines. In 2020, two (2) dosimetry systems of PNRI-RPSS, the Optically Stimulated Luminescence Dosimeters (OSLD) and Thermoluminescence Dosimeter (TLD); was awarded ISO/IEC 17025:2017 accreditation. The PNRI-RPSS regularly participates in the intercomparison activities organized by the IAEA Network of Secondary Standard Dosimetry Laboratory (SSDL).

Performance testing for local PMS providers is challenging because: (1) most of the intercomparison activities cater OSLD and seldom for TLD, (2) sending dosimeters to laboratories abroad that provide testing is expensive, (3) there is no local service provider that offers performance testing for radiation dosimetry, and (4) PNRI manages both SSDL and PMS that is subject to impartiality.

In the absence of performance testing, the RPSS developed a procedure on blind testing of dosimeter for OSL Personnel Monitoring Service (OPMS) and TLD Personnel Monitoring Service (TPMS) method validation. The PNRI-SSDL performed a blind sampling of OSLD and TLD to validate the performance of both dosimetry systems.

2. Materials and Methods

The activity was performed as described in the diagram. The purpose of the test is to validate the method and accuracy of reported dose by the OSLD/TLD personnel monitoring services. The SSDL Team implements the procedure and analysis for blind testing of the dosimeter to address the impartiality.

3. Result and Discussion

In 2020 blind testing, results are within the acceptable limit of ±10% of unity and within the trumpet curve. The Hp (10) response +2% and -7% of OSLD are demonstrated in Figures 1 and 2. The Hp (10) response is nearly perfect and -7% of TLD illustrated in Figures 3 and 4.

For 2021 performance testing, the result of OSLD gave acceptable results. However, the irradiation of TLD needs repetition for verification. The results are outside the range.

4. Conclusion

The performance testing of Hp (10) is promising since the result of both dosimetry systems are within the acceptable limit of ±10% of unity. The method caters to both OSLD and TLD. The PNRI-SSDL demonstrated its capacity to organize intercomparison exercises and addressed impartiality. The RPSS could offer performance testing services for local PMS providers although there are still improvements like uncertainty calculation or other radiation quality.

5. Reference

1. INTERNATIONAL ATOMIC ENERGY AGENCY, Occupational Radiation Protection, Safety Guide No. GSG-7, IAEA, Vienna, 1999
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3. M. Arib, A. Herrati, F. Dari, J. Ma, Z. Lounis-Mokrani (2014). Intercomparison 2013 on measurements of the personal dose equivalent Hp (10) in photon fields in the African region. Radiation Protection Dosimetry, Volume 163, Issue 3, February 2015, Pages 276–283.

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