

**33rd Asia Pacific Metrology Programme General Assembly**  
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**Laboratory Report**

*Bhabha Atomic Research Centre-India*  
*National Metrology Institute for Ionising Radiation for India*

**Section 1: Laboratory Related Matters**

Bhabha Atomic Research Centre (BARC), India develops and maintains various standards like primary, secondary and reference standards for ionising radiations (X rays,  $\gamma$  rays, beta and neutrons). Radiation Standards Section, RSSD, BARC has been recognized by International Atomic Energy Agency (IAEA) and World Health Organization (WHO) as a Secondary Standard Dosimetry Laboratory (SSDL) since the year 1976. SSDL-BARC has been designated by the competent national authorities to provide necessary link in the traceability of radiation dosimetry to the international standards through the national standard for various users in the country. One of the major activities of SSDL-BARC is to maintain primary and reference standards for air kerma and exposure for X-rays upto 300kV, air kerma and absorbed dose standard for  $^{60}\text{Co}$  energy, reference air kerma rate standard for brachytherapy sources (High Dose Rate  $^{192}\text{Ir}$  and Low Dose Rate  $^{137}\text{Cs}$  sources) and reference standard for beta dosimetry. It provides calibration services to all the radiotherapy and nuclear medicine centres in India for the therapy level and protection level dosimeters and also for various industries. It also provides chemical dosimetry services for high dose applications like food irradiation and medical sterilisation. The lab provides services for testing and calibration of neutron detectors used in the research and power reactors. The lab is involved in conducting R&D activities for development of various standards.

**Section 2: CIPM MRA Related Activities**

Establish equivalence with international standards by regular participation in the international intercomparison programmes of BIPM, APMP and IAEA.

**Section 3: International and Regional Cooperation**

Participated in various Co-ordinated Research Programme conducted by IAEA.  
Bilateral intercomparison of activity measurements of  $^{63}\text{Ni}$  with NMIJ, Japan.

#### **Section 4: Activities relevant to APMP's "Focus Groups"**

Under Medical Metrology: BARC is helping all radiotherapy and nuclear medicine centres in India for the accurate dose delivery to the patients. India has about 450 radiotherapy centres and 250 nuclear medicine centres.

Dissemination of diagnostic standards to the users in the field of diagnostic radiology is being established at BARC. Work is being carried out to establish a standard for the low and medium energy X-ray beam qualities used in diagnostic radiology. Standard diagnostic X-ray beam qualities have been established as per international guidelines.

Under food irradiation programme, dose intercomparison exercises are carried out in controlled conditions and based on this exercise, the facility is certified to carry out dosimetry for establishing radiation processing.

Dose verification is carried out in radiation processing facility using actual products used for irradiation. Dose mapping is done and based on the results certificate is issued for acquiring license to irradiate food and allied products.

#### **Section 5: Future Plans, Priorities and the Role of APMP**

1. SSDL-BARC will provide traceable calibration to the users in diagnostic radiology and conduct quality audits using passive and active detectors in the near future.
2. To participate in international intercomparison of X rays,  $\gamma$ -rays,  $\beta$  and neutron as participant as well as pilot lab.
3. BARC is in the process of developing a graphite calorimeter as a primary standard for absorbed dose measurements for high energy photons.
4. To upgrade from SSDL to PSDL