

# Progress report of NMIJ in Radionuclide Metrology (June 2007 - May 2009)

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## 1. International comparisons and SIR contributions.

- The NMIJ participated in the CCRI (II)-K2.Kr-85.
- The NMIJ has participated in the CCRI (II)-K2.H-3.
- The NMIJ sent I-131 solution to the SIR.
- The NMIJ conducted the APMP key comparisons of Ba-133 activity measurement (APMP.RI (II)-K2.Ba-133). The report for draft B was sent to the BIPM.
- The NMIJ has conducted the APMP key comparisons of I-131 activity measurement (APMP.RI (II)-K2.I-131). The I-131 solutions were sent to the six participating institutes.
- The NMIJ participated in the comparison of P-32 activity measurement performed as a bilateral international comparison between the BARC and NMIJ.

## 2. Standardization and calibration services.

- The NMIJ calibrated the several measurement systems of Japan Radioisotope Association (JRIA).
- The NMIJ quality management system of NMIJ was assessed by peer reviewers. They assessed the remote calibration service and found it satisfactory. The remote calibration service was authorized by Japanese government after that. Two measurement systems of Japan Radioisotope Association (JRIA) were calibrated by the authorized remote calibration service. (see figure 1)
- Domestic comparisons of In-111 and Mo-99 were carried out between JRIA and several radioactive pharmaceutical manufactures. The NMIJ calibrated these sources by using the  $4\pi\beta\text{-}\gamma$  coincidence counter.
- The new production techniques for area source using an inkjet printer have been tested continuously in the NMIJ. We made a Co-60 source by printing the solution on an aluminum plate. The standard deviation of surface emission rates was less than 2 % for 10 cm \* 10 cm area. We made several sources of Pm-147, Co-60, Cs-137 and Sr-90/Y-90 and estimated an energy dependence of response of an imaging plate to beta particles.
- The NMIJ assembled a large volume free air chamber for standardization of air kerma strength for I-125 brachytherapy seed. A source holder was designed to fix the source at the various inclinations. We planed to estimate the dependence of the output current on the angle of photon emission, as well as standardization. (see figures 2 (a) and (b))

## 3. Plans for fiscal years of 2009 and 2010.

- The development of new production method of area sources will be continued. We will develop a surface contamination detector by using an imaging plate with a reference area source.
- The NMIJ will finish a test of the large volume free air chamber for standardization of air kerma strength for I-125 brachytherapy seed and will start its calibration service.
- The NMIJ will renovate calibration system for radioactive gases.
- The NMIJ will participate in the BIPM key comparisons and other international comparisons.

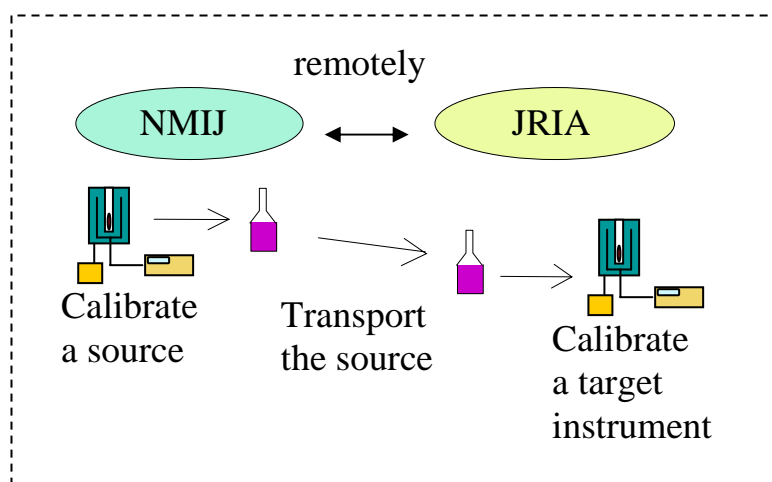


Figure.1. Calibration scheme of remote calibration service

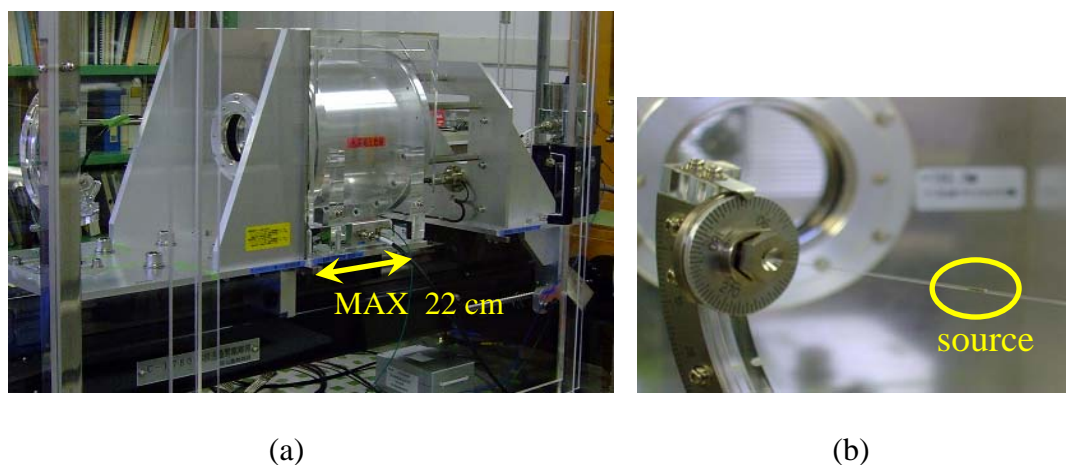


Figure.2. (a) Photograph of a free air chamber. It is designed for standardization of air kerma strength for I-125 brachytherapy seed. (b) Photograph of a source holder. It is designed to fix the source at the various inclinations.