

Report of SIM Laboratories to the CCRI (Section II, measurement of radionuclides)
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Radioactivity (Section II):

Comparisons SIM participants in the recent ^{55}Fe comparison were NIST (USA), CNEA (Argentina), and LNMRI/IRD (Brazil), which also participated in the CCRI comparison of ^{125}I . The comparison of soil reference material, Rocky Flats ([CCRI\(II\)- S2](#), radionuclide activity measurements in reference materials – soil), is still in progress (NIST is still waiting for clarification regarding results from Cuba before finishing the draft A).

CNEA had submitted a ^{134}Cs source to the SIR (2005), and is planning a submission of ^{109}Cd in 2007 (April or May). In addition, CNEA has participated in a comparison organized by the IAEA (IAEA-CU-2006-03, “World-Wide Open Proficiency Test on the Determination of Gamma Emitting Radionuclides”) for water (^{241}Am , ^{109}Cd , ^{137}Cs , ^{60}Co , ^{134}Cs , ^{54}Mn and ^{65}Zn), grass (^{137}Cs and ^{40}K), and soil (^{241}Am , ^{109}Cd , ^{137}Cs , ^{60}Co , ^{134}Cs , ^{54}Mn and ^{65}Zn) in 2006. LNMRI/IRD has submitted an ^{51}Cr source to the SIM (report to be published), and is participating in EUROMET 907 (^{124}Sb) and the AIEA-coordinated Research Project E2.10.05, *Harmonization of quality practices for nuclear medicine radioactivity measurements*, for ^{131}I .

Discussed proposals for future comparisons The SIM MWG-6 held a meeting at NIST in 2005 (minutes accompany this report). Several suggestions for future SIM supplementary comparisons (^{177}Lu , ^{85}Kr gas and completion of tritiated water; for ^{67}Ga , ^{22}Na , and ^{123}I to support future CMCs to be submitted by LNMRI/IRD) have been made over the last two years. Also, with NIST’s revival of its 4 pi β - γ system, a number of SIR submissions from NIST are likely for 2007, which may lead to an update to some CMCs.

CNEA is planning an ^{192}Ir submission to the SIR in 2007, but they do not yet have the solution. They are also planning to participate in the 2007 comparison of a multigamma solution (20 kBq and 0.1 kBq) organized by NPL and in the IAEA comparison, “IAEA-CU-2007-03 World Wide Open Proficiency Test on the Determination of Radionuclides in Water, Soil and Vegetation” by December 2007 (tentative list of analytes: soil and water : ^{54}Mn , ^{57}Co , ^{60}Co , ^{65}Zn , ^{134}Cs , ^{137}Cs , ^{210}Pb , ^{241}Am ; spinach : ^{40}K , ^{137}Cs , ^{234}U , ^{238}U , $^{239+240}\text{Pu}$, ^{238}Pu , ^{241}Am).

Because of their short half life, many radionuclides used in nuclear medicine are not conducive for SIM laboratories to submit to the SIR. The traveling $^{99}\text{Tc}^m$ standard may go some way to address this, but SIM will be considering other possible short-lived radionuclides for supplementary (SIM) comparisons over the next two years.

Status of CMCs A third set of comments on ININ’s activity CMCs (SIM.RI.6.2005) had been received from APMP, COOMET, EUROMET and SADC MET:

ININ-MEXICO Service Identification SIM - RAD	Column	Remarks queries and suggestions	ININ – MEXICO Response
2001-2006, 2017,		Check ordering of items	We made the corrections and re-

2019-2021			ordered the entries.
2001 to 2022		Entries 2001 to 2022 reorder. If the standards is from BNM – LNHB, it may simply described as “Calibrated source of same nuclide from BNM – LNHB (4 pi beta – gamma coincidence)” should be deleted.	We made the corrections We do not agree that this should be deleted, the calibration method should be indicated as the service being offered is not a primary method (Ge photon spectrometer)
2009, 2020	N	Calibrated sources of same nuclide. It may be possible but how can you get short half live standard source.	We accept the comment, and made the correction.
2023	D, E	Values are too exact such as 4.12E-2, for such wide range of energy and also for such “various geometries and several distances”	We accept the comments, and we made the corrections.
2023	H	You should define the geometries and distance. “various geometries and several distances does not make sense”	We accept the comments, and we made the corrections.
2024 to 2031		Explication of the unit Bq/Bq (COOMET) and Definitions of efficiency are complicated, particularly regarding the units (Bq/Bq) (SADCMET)	According to the “International Rules for filling in the CMC, Tables for Ionizing Radiation,” agreed at the RMO working group meeting 18/06/00 and updated on 26/09/03, the units for the calibrated factor can be Bq/Bq. We have reviewed the comment and changed the unit to $s^{-1} Bq^{-1}$ to CMCs 2023 to 2035
2030		The right service number in line is 2.10.3.1.	We accept the comments, and we made the correction.
2008, others	O	Concerning the traceability when more than one NMI is listed: it should show each source of traceability for the different standards used in the particular calibration.	We accept the comments, and we made the correction.

ININ has made corrections to their CMCs accordingly, and these have been submitted to the JCRB web site on 19 April 2007.

Based on a recent submission to the SIR, CNEA has proposed to change the expanded uncertainties on their two radioactivity CMCs for ^{134}Cs (SIM-RAD-CNEA-2092 and SIM-RAD-CNEA-2026); these changes were submitted to the CMC website for approval on 29 March 2007 ([SIM.RI.7.2007](#)):

Quantity	Instrument or Artifact	Instrument Type or Method	Minimum value	Maximum value	Units	Parameter	Specifications	Expanded Uncertainty old/new	Standard	Source of traceability	Comparisons supporting this measurement / calibration service	NMI Service Identification	Service Category
Activity per unit mass	Solution, single-nuclide source	4p(PC)-g coincidence counting; balance	1.0E+02	1.0E+06	Bq g ⁻¹	Cs-134	acid solution	3.4/1.0	4p(PC)-g coincidence counting; weight set	CNEA-LMR (Bq); SCS-METAS (g)	BIPM.RI(II)-K1.Cs-134	SIM-RAD-CNEA-2092	2.2.3.1. Cs-134
Activity	Solid, single-nuclide source	Germanium spectrometer	1.0E+02	2.0E+05	Bq	Cs-134	Point source, active diameter < 5 mm	4.2/2.2	4p(PC)b-g coincidence counting	CNEA-LMR	BIPM.RI(II)-K1.Cs-134	SIM-RAD-CNEA-2026	2.1.4.1. Cs-134

Additional review by the RMOs is pending posting of these results in Appendix B.

LNMRI/IRD intends to add ⁶⁷Ga, ²⁰¹Tl and ²⁰³Hg to their CMCs (later in 2007)

Quality Systems The NIST (USA) QS had been internally reassessed (September 2005) and self-declared in conformance with ISO/IEC 17025:1999, ISO Guide 34 and the NIST QS for high dose dosimetry, neutron dosimetry, natural matrix radioactive SRMs, and radioactive SRMs (accepted by the SIM-QSTF in March 2006). A second internal reassessment (September 2006) was also done.

The QS for ININ (Mexico) was presented for review at the SIM-QSTF meeting in Buenos Aires Argentina (March 2006), but was not approved (to support CMCs) by the quality system task force. ININ is now working on the recommended changes to the ININ-MEXICO SSDL Quality Manual to comply with ISO/IEC 17025:2005 and implementation of their QS based on ISO 9001:2000 and its equivalent national norm, NMX-CC-IMNC-2000, in response to input from the SIM-QSTF. The revised QS should be submitted for approval at the next SIM-QSTF meeting (September 2007, Canada). The IAEA has approved a project [reference MEX6008 (MEX2005005)] for ININ for the “Development of Infrastructure for Quality Control in Mexico Secondary Standard Dosimetry Laboratory for Dosimetry of Diagnostic X-Rays in Mammography and Conventional X-Rays” (2007 – 2008).

Since 2005, LNMRI (Brazil) has had two internal audits according to the requirements their QS (based on ISO/IEC 17025). No complications or difficulties have arisen.

The QS of Laboratorio de Metrología de Radioisótopos (LMR)-CNEA was approved by the SIM Quality System Task Force (QSTF-SIM) in the meeting held in Buenos Aires (Argentina) in March 2006. Since the original accreditation by the OAA (the Argentinean Accreditation Body; member of ILAC) in February 2005, which covers “Preparation and calibration of radioactive standards” and “Calibration of Activimeters,” two external audits for maintenance of the accreditation have been carried out (2005 and 2006); the next audit for accreditation maintenance will be carried out in May 2007. The OAA re-accreditation audit will be carried out in December 2007.