## PROTOCOL OF A LARGE AREA SOURCES COMPARISON EXERCISE (LASCE)

# CCRI(II)-S10 SUPPLEMENTARY COMPARISON

## Version June 2011

Calibration of surface contamination monitors is made using standard large area sources of different nuclides. The technical requirements for these sources are reported in ISO standards 8769 [1, 2, 3].

To date, there is no comparison carried out at the international level of the primary or secondary standards developed for calibration of large area reference sources. A comparison is needed for the demonstration of equivalence at the international level.

A proposal for such a comparison was initiated as an action item arising from a meeting at the ICRM Radionuclide Metrology Working Group in 2007. The comparison was endorsed by the CCRI(II) at its meeting in June 2009. The main aspects of the protocol are reported below:

**International comparison announcement:** A proposal has been prepared and circulated by the action coordinator (P. De Felice) among the ICRM RMT Working Group members and through the usual information channels of the ICRM (web site, liaison organizations, members...). It was also announced at the CCRI(II) meeting in June 2009.

**Participants:** Participants will be Primary Metrology Institutes and other interested laboratories actively involved in the calibration of large area reference sources. To be included in the KCDB the participants must be National Metrology Institutes, CIPM MRA Designated Institutes for activity measurements. In other cases, their country or state, normally through the signatory of the CIPM MRA, should give its consent for the participation. List of participants is reported below.

**Comparison classification**: This comparison is identified as a CCRI(II) supplementary comparison, CCRI(II)-S10.

**Comparison protocol**: The BIPM rules and comparison protocol will be followed, in particular for uncertainty budget requirements, nuclear data, details of experimental conditions and means, dead lines, anonymity, etc. The results will be collated by the BIPM and forwarded to ENEA, after receiving the ENEA result.

**Measurand**: The measurand of the exercise will be the emission rate of beta/alpha particles in  $2\pi$  sr solid angle. For beta particles, the energy threshold of 0.590 keV will be set, according to the ISO standards [3]. Measurement of source uniformity [3] will be requested for only one additional source.

Additional Measurements: Measurement of the nuclide activity and radionuclidic purity will be welcomed but will not be required.

**Measurement methods and equipments:** Absolute and relative measurements may be made using windowless or windowed large area multiwire proportional counters.

**Nuclides**: A low energy beta emitter (<sup>14</sup>C), two higher energy beta emitters (<sup>147</sup>Pm and <sup>90</sup>Sr/<sup>90</sup>Y) and an alpha emitter (<sup>241</sup>Am) will be used for emission rate measurements. A dedicated <sup>90</sup>Sr/<sup>90</sup>Y source will be used for source uniformity measurements.

**Source type**: Typical 100 mm  $\times$  100 mm anodised Al sources will be used. Detailed instructions will be provided by the pilot laboratory for the safe and correct manipulation of the sources. It will

be the responsibility of each participant to follow these indications strictly. Source activities will be between 1 and 3 kBq per source.

**Source shipment**: The same sources will be measured by all participants. These sources will be collated and measured by the first participant (PTB) that will ship to the second laboratory and so on up to the last participant. Each participant will have one week for measurement and one week to guarantee the transportation of the source to the next laboratory. Each participant will be responsible for their own shipment organization and costs. When the final list of participants becomes available, the coordinator will provide a source circulation scheme that will minimize the global distances covered. In the case of more than one laboratory per country, the local National Metrology Institute must approve the participation<sup>1</sup> and coordinate the circulation of the sources within the country. If participants in a country are formally accredited ISO17025 calibration laboratories, the accreditation body can contribute to the coordination work. When the first laboratory receives back the sources, it will measure them again to check the results are consistent.

No.	Date	COUNTRY	LAB	<b>Contact Person</b>
1	03/10/2011	Germany	РТВ	O. Nähle
2	17/10/2011	The Netherlands	VSL	W. de Vries
3	31/10/2011	France	LNE-LNHB	M. Moune
4.01	14/11/2011	UK	NPL	S. Collins
4.02	28/11/2011	UK (UKAS)	LAB1	M. Woods
4.03	12/12/2011	UK (UKAS)	LAB2	M. Woods
4.04	09/01/2012	UK (UKAS)	LAB3	M. Woods
4.05	23/01/2012	UK (UKAS)	LAB4	M. Woods
4.06	06/02/2012	UK (UKAS)	LAB5	M. Woods
5	20/02/2012	Spain	CIEMAT	E. García-Toraño
6	05/03/2012	USA	NIST	M. Unterweger
7	19/03/2012	South Africa	NMISA	Z. Msimang
8.01	02/04/2012	Japan	AIST-NMIJ	A. Yunoki
8.02	16/04/2012	Japan	JRA	T. Yamada
9	30/04/2012	Russia	VNIIM	T. Shilnikova
10	14/05/2012	Poland	POLATOM	R. Broda
11	28/05/2012	Czech Republic	CMI	P. Dryak
12	11/06/2012	Slovak Republic	SMU	A. Švec
13	25/06/2012	Austria	BEV	F.J. Maringer
14	09/07/2012	Slovenia	J. Stefan	M. Mihelič
15	23/07/2012	Hungary	MKEH	L. Szücs
16	06/08/2012	Romania	IFIN-HH	M. Sahagia
17	20/08/2012	Bulgaria	NCM	S. Stanev
18	03/09/2012	Italy	ENEA	M. Capogni
Check	17/09/2012	Germany	РТВ	O. Nähle

The following source circulation scheme is proposed.

<sup>&</sup>lt;sup>1</sup> According to the CIPM MRA rules, if a laboratory other than an NMI or designated institute wishes to participate, they will need the permission of the NMI before doing so.





#### **Comparison report**

The coordinator will be responsible for the comparison report. A meeting will be organized by the pilot laboratory to discuss the results and present the final report.

## **Pilot laboratory**

The Pilot laboratory will be ENEA. Coordinators of ICRM RMT WGs and PTB will collaborate with the pilot laboratory.

Schedule			
Dead line	Action	Person/Lab responsible	STATUS
2009-08-01	Circulation of draft proposal and preparation	Action and RMT WG	DONE
	of a preliminary list of participant laboratories	Coordinators	
2009-08-06	Circular message, call of interest and shipping	Pilot laboratory	DONE
	information		
2009-08-15	Formal submission as a BIPM CCRI(II)	Pilot laboratory	DONE
	comparison		
2009-09-08	Action presentation at the ICRM 2009	Pilot laboratory	DONE
	Radionuclide Metrology Techniques WG		
	meeting in Bratislava, and last call of interest		
2011-01-24	Identification of the laboratory providing the	Pilot laboratory	DONE
	sources, (Eckert & Ziegler Nuclitec)		
2011-06-21	Final list of participants agreed	All	Outstanding
2011-06-21	Source circulation scheme proposed and	Pilot laboratory	Outstanding
	agreed		
2011-07-22	Draft of measurement report circulated and	Pilot laboratory	Outstanding
	agreed		
2011-10-03	Starting date	PTB, All	Outstanding
2011 Oct	Source circulation and measurements	All the participants	Outstanding
2012 Sept			
2012-09-17	Source check	PTB	Outstanding
2012-09-17	Reporting dead line	All the participants	Outstanding
2013-02-28	Analysis of results	Pilot laboratory and	Outstanding
		RMT WG Coordinators	
2013-04-30	Preparation of final report	Pilot laboratory and	Outstanding
		RMT WG Coordinators	
2013 May	Discussion of results and of final report	All the participants	Outstanding
2013 July	Submission of final report for the approval of	Pilot laboratory and	Outstanding
	the CCRI(II)	RMT WG Coordinators	

## References

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- [1] ISO, "Reference sources for the calibration of surface contamination monitors Beta-emitters (maximum beta energy greater than 0.15 MeV) and alpha-emitters", ISO 8769-1 Standard, 1988.
- [2] ISO, "Reference sources for the calibration of surface contamination monitors Part 2: Electrons of energy less than 0.15 MeV and photons of energy less than 1.5 MeV", ISO Standard 8769-2, 1996.
- [3] ISO, "Reference sources Calibration of surface contamination monitors Alpha-, beta- and photon emitters", ISO Standard 8769, II Edition, 2010.

Ferius Detrehe

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