## SIM Comparisons in Radioactivity (ccri(ii)/13-29)

http://kcdb.bipm.org/appendixB/KCDB\_ApB\_search.asp

- Currently, 131 comparisons in measurement of radionuclides (radioactivity) are listed in the Key Comparison Database (KCDB; Appendix B)
- Comparisons include
  - SIM, EURAMET, COOMET, APMP,
     CCRI(II), BIPM (including TI)
  - Planned, in progress, measurements complete, Draft B, approved/published, equivalence
  - A variety of radionuclides for health, security, environmental protection, metrology; single and multiple
  - Many matrices (from solution to soils)
- Heavy use of MMM

### SIM Signatory Labs in Ionizing Radiation Metrology Working Group 6

Country	Institute	Field
Argentina	CNEA	Dosimetry, Radioactivity
Brazil	LNMRI/IRD	Dosimetry, Radioactivity, Neutron measurements
Canada	NRC-INMS	Dosimetry, Radioactivity, Neutron measurements
Mexico	ININ	Dos metry, Radioactivity, Neutron measurements
Uruguay	MIEM/ <u>Laboratorios</u> Tecnogestión	Dosimetry
USA	NIST	Dosimetry, Radioactivity, Neutron measurements









16 Ca-41	Nr	Nuclide	4P-BP/AP-PC/PPALS-GR-NA/GH-CO/AC	4P.XRAE-PC.PPALS-GR-NA/GH-CO/AC	4P-AP-LS-00-00-HE	4P-BP/AP/XR/AE-NA/CS-00-00-HE	4P-PH-NA-00-00-HE	4P-8P/AP-PP-66-86-HE* ('rucides emiting beta or alpha particles, accompanied by emission of gamma	4P-XR/AE-PP-00-00-HE	SA.AP.PS-00-00	4P-BP-PC.PPALS-GR-NA-CTAT	4P-AP/BP/PH/AE/XR-LS-60-60-CN	4P-BP-LS-00-00-TD** ("pure-beta emitting rucides only)	4P.AP/8P/PH/AE/XR-LS-06-00-TD*** (***all not pure-beta emitting nuclides)	4P-BP-PP-06-06-HE**** (****pure-beta emitting nuclides only)	4P-BP-PC-00-00-IG	??-XR/AE/PO-??-00-00-??	??-GR-??-00-00-??	4P-??-PC:PPA.S-??-NA/GH-CO/AC/CT/AT (DS)*	4P-77-LS-00-00-CN/TD (DS)*	4P-??-PP-00-00-HE (DS)*	SA-??-PS-00-00-00 (DS)*	4P-77-PC-00-00-IG (DS)*	
18   Ca-45				_	_	_			_	_	_	_				_	3	_	_		_	_	╙	T
19 Sc46 1			1	_	_	├	_	2	_	_		_				_	<u> </u>	_	<u> </u>		_	_	├	Т
21   Sc47   36					├	├				├	2	_	2		2	_	-	-	├	_	-	-	⊢	ī
22   C-51			_		-	-				-	-	_		$\vdash$	$\vdash$	-	-	$\vdash$	$\vdash$		-	-	-	T
25   Fe-55			0.6		-	-		1.5		-	-	3		$\vdash$	$\vdash$	-	-	$\vdash$	$\vdash$	-	-	-	$\vdash$	ŧ.
25   Fe-55	22	Ur-51 Mn-52				-		_	-	-	-	2				-	_		$\vdash$		-	_	-	Ħ
27   Co-56   0.8   0.4   3   3   3				1.0		-			6					2			4				-		-	ħ
27   Co-56   0.8   0.4   3   3   3	26		0.7			-	2	2				_		_									-	İπ
28 Co-57 1 2 2 3 3 3 Se-75 2 2 3 3 3 Se-75 2 2 3 3 3 Se-75 2 3 3 Se-75 2 3 3 Se-75	27			0.8			_																$\vdash$	П
38 Se-75									3			2		2									$\vdash$	П
39   8x7-76   1	35	Ga-67																	2	3				Т
40 8r-82 1 2 2 3 4 4 1 8r-85 1 2 2 2 2 2 3 4 3 8r-86 1 2 2 2 3 4 3 8r-86 1 2 2 3 4 4 4 8r-87m 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	38	Se-75		2															2	3				Т
41 Sr-85 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	39	As-76	- 1																	2				Т
42 Kr.85	40	Br-82	- 1																	2				Т
43   Rb-86   12   2     2				1																3				Т
R6-87 1.4 Sr-97m 3 3 3				<u> </u>	<u> </u>	₩	$\vdash$		_	<u> </u>	<u> </u>	_	<u> </u>	_	_	2	_	<u> </u>	<u> </u>		_	<u> </u>	₩	+
44 Sr-87m 3 3	43		1.2	_	$\vdash$	$\vdash$		2	-	<u> </u>	<u> </u>	<b>—</b>	$\vdash$	$\vdash$	$\vdash$	<u> </u>	<u> </u>	-	<u> </u>	-	-	-	$\vdash$	Т
	_			_	-	$\vdash$			_	_	<b>—</b>	_				_	_			1.4	-	-	$\vdash$	+
				_		-			-	-	-	<b>—</b>	$\vdash$	$\vdash$	$\vdash$	$\vdash$	-	3	_	_	-	-	-	Ŧ.
6 8 8 9 2 1 2 0 6				0.8	_	-	1.5		-	-	_			$\vdash$		_	-	$\vdash$	-		_	-	-	G

### **Measurement Methods Matrix**

#### **Strategy Applied to Comparisons**

- Matrix of generic groupings (and comparisons based on it) are a tool to support CMCs and advise on comparisons
- Matrix, assignation of difficulty, and "reasonable" uncertainties prepared by working groups (key comparisons, uncertainties) of CCRI(II) (radionuclide metrology)
- All CCRI(II) asked to contribute and evaluate
- CCRI(II) members had been asked to look again at radioactivity CMCs to see if there are comparisons to be added to support them
- Active participation in future comparisons will help fill out the matrix
- Matrix is a "living" document (i.e., changes are expected with time)

## **Recent Comparisons with SIM Participation**

#### **Activity**

Institution	Comparison	Description	Other SIM participants	Time Frame
NRC	CCRI(II)-K2-Tc-99	Tc-99 in solution	NIST, LNMRI, CNEA	2012
NIST	CCRI(II)-S8	Cs-137, K-40, Sr-90 activity concentrations in IRMM-426 Bilberry Reference Material		2011
	CCRI(II)-S9	Cs-137 and K-40 in Rice Powder Reference Material	CNEA	2009
	CCRI(II)-S10	LASCE (measurement of source emission rate for the calibration of surface contamination monitors)		2012
	CCRI(II)-K2.Lu-177	Activity concentration of the same Lu-177 solution	LNMRI	2009
	SIR	TI-201, I-131, In-111		2011/2012, 2013
LNMRI/IRD	BIPM.RI(II)- K4.Tc-99m	Transfer instrument		Scheduled 2014
	SIR	Ge-68		2012
	Bilateral (with LNHB)	Ge-68		2013
CNEA	IAEA-TEL-20 <u>XX</u> -04 ALMERA	Proficiency test on the determination of natural and artificial radionuclides in soil and water		20 <u>11</u> , 20 <u>12</u> , 20 <u>13</u>
	SIR	Co-60, Am-241, and Eu-152		2011
	BIPM.RI(II)- K4.Tc-99m	Transfer instrument		2012

# **Planned Comparisons for SIM**

#### **Activity**

Institution	Description	Time Frame		
NRC	Cs-134 to SIR	2013/2014		
INKC	Interest in hosting SIRTI	2014/2015		
	Proposed CCRI(II) Ge-68 comparison	2013/2014		
NIST	F-18 comparison among US clinics (transfer standard)	2014		
	Mo-99 (delayed from 2013) to SIR	Feb. 2014		
ININ	Several sources to SIR	2013		
LNMRI	Co-60 and Cs-134 to SIR	2013		
	Co-57, Cs-137, and Eu-152 to SIR	2014		
CNEA	Proposed beta emitting sources (SIM)	2014		