TC-Chair Report TC-IR

Date May 2012



1. General

This report summarizes activities of the Technical Committee for Ionising Radiation with the subfields dosimetry, activity referred to a radionuclide and measurement of neutrons.

The TC-IR is organised in three sub-committees having one common annual meeting.

The TC-IR has 27 contact persons including IRMM of EC. Last year we were informed that the Radiological Protection Institute of Ireland did not want to have a contact person for ionising radiation. Three CPs have been replaced; UK, Spain and Czech. The Nuclear Calibration Laboratory at the Belgian Nuclear Research Centre has interest in becoming a designated institute, but is still working on formalities.

The TC-IR Contact Persons annually meeting was organised by IRMM in Geel, Belgium in October 2012. In addition to regular topics the Fukushima accident and a strategy for the TC-IR were highlighted.

The Tohoku sea earthquake March 11 2011 led to a tsunami destroying the **Fukushima** Daiichi nuclear power plant. After this accident a debate on safety and security of the nuclear power is going on in many European countries. Maps of the fallout both in dose rate and the activity from caesium-134 and -137 are given in figures.



Dose rates and deposits of caesium-134 and -137 from Institut de radioprotection et de sûreté nucléaire (IRSN)

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2. Projects

There is one large comparison project and several smaller going on.

EURAN	IET IR Projects		No. of instit		
Refr. No.	Title	Coordinator	EURAM- ET	Non- EURAMET	Status
1221	Comparison of air kerma measure- ments for diagnostic X-ray beam qualities	IAEA	1	0	Started
1200	Comparison of measurements of the medium energy X-ray radiation pro- tection measurements	МКЕН	1	0	Started
1177	Comparison of calibration of KAP meters in term of air kerma product	IRCL/GAEC- EIM	11	9	Running
1173	Comparison of spectrometers	CMI	1	1	Completed
1175	Bilateral comparison of calibration of brachytherapy well type ionization chamber in terms of iridium-192 reference air kerma rate	IRCL/GAEC- EIM	2		Completed
738	Intercomparison of the personal dose equivalent for photon radiation	РТВ	12	6	Draft B
1132	Comparison of air kerma for Cs-137 and Am-241 radiation	РТВ	14	1	Pro- posed/Started

3. Comparisons

Many of the laboratories having CMCs still need supporting comparisons. Because of the high activity in the research area, comparisons have few resources. Some research projects have comparisons as part of the implementation.

As an example the EURAMET.RI(I)-S7 comparison of alanine dosimetry systems for absorbed dose to water measurements in gamma- and x-radiation at radiotherapy levels. It was a part of the EBCT iMERA PLUS project and set up between NPL, PTB and LNE-LNHB. BIPM collected the results. The results demonstrate the effectiveness of the EPR/alanine dosimetry system as a method of comparing therapy level dose standards. The maximum deviation in the ratio of measured dose to applied dose was less than 1 %.

1177 is a large comparison project of calibration of x-ray dosimetry in the field diagnostic. It is of great help for the rest of Europe that Greece is piloting this work. See instrument pictures below.

IBA KermaX-plus DDP TinO, Model 120-205, s/n 01E01232 KAP Ionization chamber Model 120-131 TinO, s/n 01A00120

Radcal Patient Dose Calibrator PDC (Radcal Corp) s/n 07 0008, part no 165 00 01







3 cc, REF 92650 s/n D082612



total

150

123

31

244

34

76

149

29

29

194

1915

Х

0

4. CMCs

Several EURAMET NMIs have still to update their CMCs, at least by completing column P, for activity of radionuclides using necessary grouping tables. In dosimetry 8 laboratories have already performed the periodical review, and their revised claims have been published. The second batch of the claims of five laboratories is being under internal review, some of them are waiting for supporting comparison reports. CMCs of the measurement of neutrons are reviewed by the CCRI(III).

	Country/lab	dosimetry	date of publ.	reviewed	activity	date of publ.	reviewed	neutron	date of publ.	reviewed
1	Austria/BEV	50	11.03.2005	52	100	15.09.2003				
2	Bulgaria/BIM NCM	7	14.02.2007				11 (new)			
3	Czech Republic/CMI	7	11.03.2005	X	104	15.09.2003		12	19.05.2005	X
4	Finland/STUK	31	11.03.2005	30						
5	France/LNE-LNHB	63	11.03.2005	X	166	15.09.2003		15	19.05.2005	X
6	Germany/PTB	88	19.11.2010		158	20.01.2010		20	19.05.2005	X
7	Greec/GAEC	35	12.10.2009							
8	Hungary/MKEH	20	11.03.2005	26	84	15.09.2003	71			
9	IAEA	13	23.02.2007							
10	IRMM				110	15.09.2003				
11	Italy/ENEA	76	11.03.2005	X	13	15.09.2003		9	19.05.2005	X
12	Netherlands/VSL	28	11.03.2005	25	57	15.09.2003				
13	Norway/NRPA	22	14.02.2007	22						
14	Poland/GUM	5	11.03.2005	4	68	15.09.2003				
15	Portugal/ITN	43	11.03.2005	X						
16	Romania/IFIN				34	15.05.2008				
17	Slovakia/SMU	30	15.05.2008		37	15.05.2008		9	15.05.2008	
18	Spain/CIEMAT	52	15.05.2008		97	15.05.2008				

Overview of the ionizing radiation CMCs (from István Csete).

selected for the second round in 2012 х

29

8

36

643

5. **Activities of the Sub-Committees**

The Sub-Committees are active in the reviewing of CMCs. Dosimetry: I. Csete, H. Bjerke, C. Hourdakis, U. Ankerhold Radionuclides: Bruno Chauvenet, F.-J. Maringer, J. de Los Arcos, D.Arnold, L. Szűcs

26

3

Х

188

21

116

1165

15.09.2003

15.09.2003

42

107

82

19.05.2005

11.03.2005

11.03.2005

11.03.2005

19 Sweden/SSM

Switzerland/METAS

total

21 United Kingdom/NPL

20



6. EMRP

Laboratories are deeply involved in many EMRPs. A list of them is given here:

The iMERA PLUS projects "External Beam Cancer Therapy" (**EBCT**) and "Increasing cancer treatment efficacy using 3D brachytherapy" (**Brachytherapy**) were finalised last year. A Conference on Advanced Metrology for Cancer Therapy (<u>CAMCT</u>) was arranged by PTB in Braunschweig. Invited speakers and project participants gave a comprehensive review of metrology in cancer therapy. Representatives from stakeholders (ESTRO) have been invited as observers in the Brachytherapy project, and they were active in the conference. The realisation of absorbed dose to water for Brachytherapy sources was regarded as a paradigm shift. These new standards still need to be implemented in the hospital.

<u>MetroFission.</u> NPL. The aims are to develop the necessary infrastructure to enable measurement of the parameters associated with new generation nuclear power plants, in the area of materials, temperature, neutron fluence, nuclear data and radiometric methods to ensure that energy suppliers and regulators can work towards an energy secure future within a metrology framework.

MetroMetal. CIEMAT. Foundry industries produce millions of tons of steel from recycled scrap loads each year. These loads are tested for the presence of orphan radioactive sources (mainly ⁶⁰Co, ¹⁹²Ir or ²²⁶Ra) by passing the scrap containers under radiation detection portals. Current gamma-radioassay systems used to monitor the steel production batches, differ in geometry, energy resolution, sensitivity or throughput. The project will configure appropriate instruments, develop reference materials, issue measurement procedures and technical standards for SI-traceable radioactivity monitoring of scrap, slag, fumes dust and cast steel.

MetroRWM. CMI. Metrology for Radioactive Waste Management. The project will develop improved measurement systems for free release measurement and for characterization of waste measurement, monitoring system for gaseous effluent measurement in repositories and mobile system for rapid in-situ measurement. Traceable calibration standard sources and reference materials development, and improvement of decay data of radionuclides occurring in waste are also deliveries of the project.

Other projects are under negotiation.

7. Meetings

CCRI(I) dosimetry, CCRI(II) radionuclides and CCRI(III) measurement of neutrons had meetings this year. In CCRI(I) the new developments in standards was reviewed and the European laboratories could present a huge amount of work, especially results from the iMERA projects. The TC chair will be invited as observer if he/she is not member of the CCRI by other reason.

The yearly RMO working group under the CCRI on the reviewing of CMCs and requirements for CMCs was arranged at the BIPM. A proposal from EURAMET for shorter reports from comparisons was accepted.

The International Conference on Radionuclide Metrology and its Applications (ICRM 2011) met in Tsukuba, Japan.

8. Strategic planning

At the Contact Person TC-IR meeting Beat Jeckelmann introduced EURAMET Strategy 2020. He recognized the added value through cooperation. EURAMET will meet the challenges in the development and application of measurement. The following Contact persons were invited to prepare a short presentation:

Antti Kosunen, STUK, Finland Bruno Chauvenet, LNE-LNHB, France. Jacco de Pooter, VSL The Netherlands Lena Johansson, NPL UK Ulrike Ankerhold, PTB, Germany. Hans Bjerke, NRPA, Norway



A workshop on road mapping was held at NPL in April. There are three drafts for roadmaps:

- 1) Dosimetry and Radionuclides in Health Care
- 2) Anthropogenic and Natural Radionuclides in Environment and Industry
- 3) Novel dosimetry concept for ionising radiation interaction with matter.

The new roadmaps will be highlighted in the TC-IR presentation at the EURAMET General Assembly. The success from the iMERA- and EMRP-projects will be used as input to the EMPIR-programme. New technologies and society needs are challenging, but we see metrology as the best tool to handle this in Health Care, Environment, Industry and Science.

9. Outlook for 2012

- 1. The work on the roadmaps and strategic plan for metrology of ionising radiation will continue.
- 2. Many laboratories are engaged in the EMRPs.
- 3. The reviewing of CMCs is going on.
- 4. The next contact person meeting will be in Bucarest, Romania October 2012.