

## Report to the Euramet GA on TC-IR activities

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### 1. General Aspects

This report summarizes activities of the Euramet Technical Committee for Ionising Radiation. In the last years the activity has developed in a direction away from the established three subfields dosimetry, radioactivity and neutrons. At the Contact Person meeting in October 2012 it was proposed to lay down the subfields and instead establish three working groups that are focussed on science related to the grand challenges and a working group for CMCs. New roadmaps for three science areas have been established and reviewed by a stakeholder organisation – HERCA (Heads of the European Radiological protection Competent Authorities). Based on the roadmaps, the TC-IR has also had input to the Euramet Strategic Research Agenda.

The TC-IR has 27 contact persons including IRMM from the European Commission. The TC-IR also has two observers: István Csete (IAEA) and Velko Velez (FYR Macedonia).

The TC-IR Contact Person annually meeting was organised by the CMI in Prague, Czech Republic in October 2013. In addition to regular topics the role of the new working groups were discussed during the meeting.

The NMIs/DIs in TC-IR are working in eight EMRP supported joint research projects with a total of 86 partners. Two new EMRP projects were successful in the 2013 call Environment.

### 2. Projects (non-EMRP)

There are several comparison exercise projects on-going and a few consultations (see below).

| Ref  | Starting date | Title  | Coordinating Institute | Status   | Collaboration Type |
|------|---------------|--|------------------------|----------|--------------------|
| 1326 | 2014-09-01    | Comparison of the air kerma standards for <sup>137</sup> Cs and <sup>60</sup> Co gamma-ray beams for radiation protection measurements | IST/ITN                | proposed | comparison         |
| 1313 | 2014-06-01    | On-site visit by external technical experts in the field of ionising radiation (radionuclide activity)                                 | VMT/FTMC proposed      | proposed | consultation       |
| 1292 | 2014-01-01    | Sm-151 activity measurement  | LNE-LNHB               | proposed | comparison         |
| 1287 | 2013-04-01    | Standardization of a solution of I-129.  | CIEMAT                 | agreed   | comparison         |
| 1285 | 2013-03-01    | Comparison of air kerma and dose to water standards for Co-60 radiation beams for radiotherapy   | METAS                  | agreed   | comparison         |
| 1284 | 2013-10-01    | Survey of European countries' legal regulations and practices in ionising radiation calibrations                                       | NRPA                   | proposed | consultation       |

|      |            |  |          |          |            |
|------|------------|--|----------|----------|------------|
| 1257 | 2013-02-18 | Comparison on the activity concentration of the same 166mHo solution   | PTB      | agreed   | comparison |
| 1243 | 2013-02-28 | The interlaboratory comparison of the radionuclide calibrators   | VMT/FTMC | proposed | Comparison |
| 1221 | 2012-08-31 | Comparison of air kerma measurements for diagnostic X-ray beam qualities                                       | IAEA     | agreed   | Comparison |
| 1200 | 2011-07-31 | Comparison of air kerma measurements of the medium energy X-ray radiation in radiation protection measurements | MKEH     | agreed   | comparison |
| 1132 | 2013-01-17 | Comparison of the ambient dose equivalent rate for photon radiation  | PTB      | agreed   | comparison |

### 3. CMCs and comparisons

A working group has been set up to manage this topic. At the moment there are one member reviewing CMCs for Dosimetry (Istvan Csete from the IAEA) and five for Radioactivity lead by Bruno Chauvenet from LNHB. This review team is composed of Marco Capogni (ENEA), Dirk Arnold (PTB), Franz Josef Maringer (BEV) and Laszlo Szucs (MKEH).

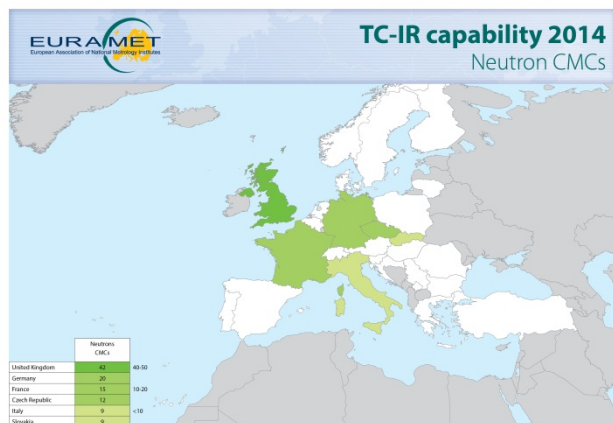
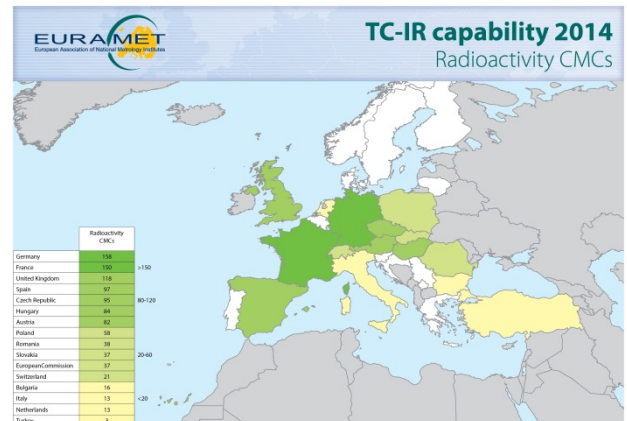
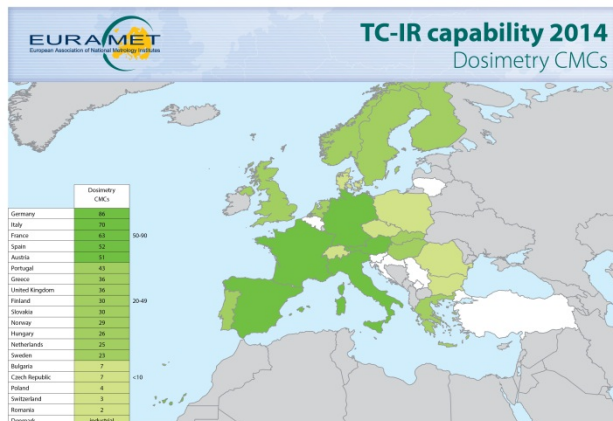
At the next CP meeting, the CMC Working Group will

- 1- Write a short report to CCRI(II) about challenges with CMCs
- 2- Get priority list for comparison reports to be published for CCRI(II)
- 2- Get the CMC WG to think about improvements in the Measurement Matrix for Radioactivity (communication needed between EURAMET and participating labs)
- 4- Propose new supporting comparisons

#### Overview of the ionizing radiation CMCs (from István Csete):

|    | Country/lab        | dosimetry  | date of publ. | review pending IRTC | review pending RMOs | activity    | date of publ. | review pending IRTC | review pending RMOs | neutron    | date of publ. | review pending IRTC | published total |
|----|--------------------|------------|---------------|---------------------|---------------------|-------------|---------------|---------------------|---------------------|------------|---------------|---------------------|-----------------|
| 1  | Austria/BEV        | 50         | 31/01/2012    |                     |                     | 100         | 15/09/2003    |                     |                     |            |               |                     | 150             |
| 2  | Bulgaria/BIM NCM   | 7          | 14/02/2007    | 8                   |                     | 16          | 6/4/2013      |                     |                     |            |               |                     | 23              |
| 3  | Czech Republic/CMI | 7          | 11/03/2005    | 7                   |                     | 104         | 15/09/2003    |                     |                     | 12         | 19/05/2005    |                     | 123             |
| 4  | Finland/STUK       | 30         | 31/01/2012    |                     |                     |             |               |                     |                     |            |               |                     | 30              |
| 5  | France/LNE-LNHB    | 82         | 4/10/2013     |                     |                     | 166         | 15/09/2003    | 139                 |                     | 15         | 19/05/2005    |                     | 263             |
| 6  | Germany/PTB        | 88         | 19/11/2010    |                     |                     | 158         | 20/01/2010    |                     |                     | 20         | 19/05/2005    |                     | 266             |
| 7  | Greece/GAEC        | 35         | 12/10/2009    |                     |                     |             |               |                     |                     |            |               |                     | 35              |
| 8  | Hungary/MKEH       | 26         | 31/01/2012    |                     |                     | 74          | 6/4/2013      |                     |                     |            |               |                     | 100             |
| 9  | IAEA               | 22         | 9/9/2013      |                     |                     |             |               |                     |                     |            |               |                     | 22              |
| 10 | IRMM               |            |               |                     |                     | 110         | 15/09/2003    | 36                  |                     |            |               |                     | 110             |
| 11 | Italy/ENEA         | 76         | 11/03/2005    | 76                  |                     | 13          | 15/09/2003    | 18                  |                     | 9          | 19/05/2005    | 9                   | 98              |
| 12 | Netherlands/VSL    | 21         | 31/01/2012    |                     |                     | 57          | 15/09/2003    |                     |                     |            |               |                     | 78              |
| 13 | Norway/NRPA        | 22         | 31/01/2012    |                     |                     |             |               |                     |                     |            |               |                     | 22              |
| 14 | Poland/GUM         | 4          | 31/01/2012    |                     |                     | 68          | 15/09/2003    |                     |                     |            |               |                     | 72              |
| 15 | Portugal/ITN       | 43         | 11/03/2005    | 38                  |                     |             |               |                     |                     |            |               |                     | 43              |
| 16 | Romania/IFIN       |            |               |                     |                     | 36          | 2/10/2013     |                     |                     |            |               |                     | 36              |
| 17 | Slovakia/SMU       | 30         | 15/05/2008    | ?                   |                     | 37          | 15/05/2008    |                     |                     | 9          | 15/05/2008    |                     | 76              |
| 18 | Spain/CIEMAT       | 52         | 15/05/2008    | 62                  |                     | 97          | 15/05/2008    | 97                  |                     |            |               |                     | 149             |
| 19 | Sweden/SSM         | 26         | 31/01/2012    |                     |                     |             |               |                     |                     |            |               |                     | 26              |
| 20 | Switzerland/METAS  | 3          | 31/01/2012    |                     |                     | 21          | 15/09/2003    |                     |                     |            |               |                     | 24              |
| 21 | United Kingdom/NPL | 36         | 11/03/2005    | 36                  |                     | 116         | 15/09/2003    | 115                 |                     | 42         | 19/05/2005    | 42                  | 194             |
|    | <b>total</b>       | <b>660</b> |               | <b>227</b>          | <b>0</b>            | <b>1173</b> |               | <b>405</b>          | <b>0</b>            | <b>107</b> |               | <b>51</b>           | <b>1940</b>     |
|    | reviewed           | 374        |               |                     |                     | 284         |               |                     |                     |            |               |                     |                 |
|    | %                  | 57         |               |                     |                     | 24          |               |                     |                     | 0          |               |                     |                 |

#### Geographical overview of European Capability in TC-IR in 2014 based on CMCs:



#### 4. Activities of the Sub-Committees and Working Groups

The Sub-Committees were not a useful organisation for the ionising radiation committee's work. Three working groups were established at the TC-IR Contact Person meeting in 2012.

##### **TC-IR WG CMCs and Comparisons, Convenor István Csete (IAEA) and member Bruno Chauvenet (LNE-LNHB)**

This working group will have the CMC reviewing as main task. The work is under the supervision of the CIPM MRA. In the reviewing technical competence is needed in the measurement application and methods, and in the technical rules set up by the JCRB. There are strict deadlines and a large metrology network to coordinate. The group will follow the results from comparison projects and update the EURAMET project data base.

##### **TC-IR WG Health care and new dose quantities, Convenor Jean Marc Bordy (LNE-LNHB)**

This working group will have focus on topics given in the roadmaps 1 and 3; Dosimetry and radionuclides in health care and Novel dosimetry concepts for IR. Neutron measurements are included. The work will be on strategy (updating of roadmaps) and planning for new research projects. The tasks related to traditional EURAMET projects lay also here.

##### **TC-IR WG Radionuclides and Dosimetry in Energy, Industry and Environment (nuclear and non-nuclear), Convenor Franz-Josef Maringer (BEV).**

This working group will have focus on topics given in the roadmaps 2; Anthropogenic and natural radionuclides in environment and industry. The work will be on strategy (updating of roadmaps) and planning for new research projects. The tasks related to traditional EURAMET projects lay also here.

## 5. Participation in EMRPs

EMRP JRPs in progress:

[MetroMeta](#), Measuring radiation in scrap metals, coordinator Eduardo Garcia-Toraño (CIEMAT), Spain, 14 partners  
[MetroRWM](#), Metrology for radioactive waste management, coordinator Petr Kovar (CMI), Czech Republic, 13 partners  
[MRI safety](#), Metrology for new generation safety standards and equipment in MRI, Bernd Ittermann (PTB), Germany, 3 partners  
[MetrExtRT](#), Metrology for radiotherapy using complex radiation fields, Jean-Marc Bordy (CEA), France, 10 partners  
[MetroMRT](#), Metrology for Molecular Radiotherapy, Vere Smyth (NPL) UK, 14 partners  
[BioQuaRT](#), Biologically weighted quantities in radiotherapy, Hans Rabus (PTB) Germany, 7 partners  
[MetroNORM](#), Metrology for processing materials with high natural radioactivity, Franz Josef Maringer (BEV), Austria

EMRP JRPs to start shortly:

[MetroERM](#), Metrology for radiological early warning networks in Europe, Stefan Neumaier (PTB), Germany  
[MetroDecom](#), Metrology for decommissioning nuclear facilities, Jiri Suran (CMI), Czech Republic

EMRP JRPs completed 2013:

[MetroFission](#), Metrology for New Generation Nuclear Power Plants, coordinator Lena Johansson (NPL), UK, 12 partners

## 6. Meetings

The TC-IR held its annual Contact Person meeting in Prague in October 2013. An additional meeting for Contact Persons for input from the TC-IR to the Euramet Strategic Research Agenda was held at NPL, UK in April 2013. The next Consultative Committee for Ionising Radiation (CCRI) meeting will be held in May 2015.

## 7. Issues

The decision on a Linac at the BIPM is still to be resolved; the CCRI has proposed to build an international medical accelerator at the BIPM to be open to all Member States. A working group was set down by CCRI many years ago, and comparison of NMI primary standards are running. The costly and time consuming work is done by people from BIPM using the BIPM Graphite Calorimeter Standard for Absorbed Dose to Water. The plan is to do two comparisons per year, 5 reported since 2009. This issue is linked to cancer treatments. In Europe the cancer death rate is 1.7 million per year. Susanne Picard, BIPM reported from the work in the TC-IR meeting in Bucharest 2012. Many European NMIs are in the plan for comparison in the next years. For the future, all TC-IR Contact Persons were in favour of having a facility at the BIPM.

There is a clear need for having a faster throughput of the results from key-comparison exercises. At the moment many reports are delayed more than 10 years, which creates problems with support for CMCs.

## 8. Strategic planning

New roadmaps have recently been drafted in the frame of the European Metrology Programme for Innovation and Research (EMPIR). One roadmap has been produced on health care common for radionuclide metrology, dosimetry and neutron measurements. Another roadmap is on environment and industry on anthropogenic and natural radionuclides and a third on novel dosimetry concepts in radiation therapy and radiation risk, and radiation sensitivity of nano-electronics (the roadmaps can be found here: <http://www.euramet.org/index.php?id=roadmaps0>). New working groups are proposed to work on the different parts of the strategy going forward. The TC-IR chair person has to-

gether with the chair of one Working Group, Jean-Marc Bordy, LNHB, has sent out a survey on current and future capabilities. Replies from the Contact Persons are expected to be returned by the end of May 2014. The result will be used as a basis for future Capacity building.