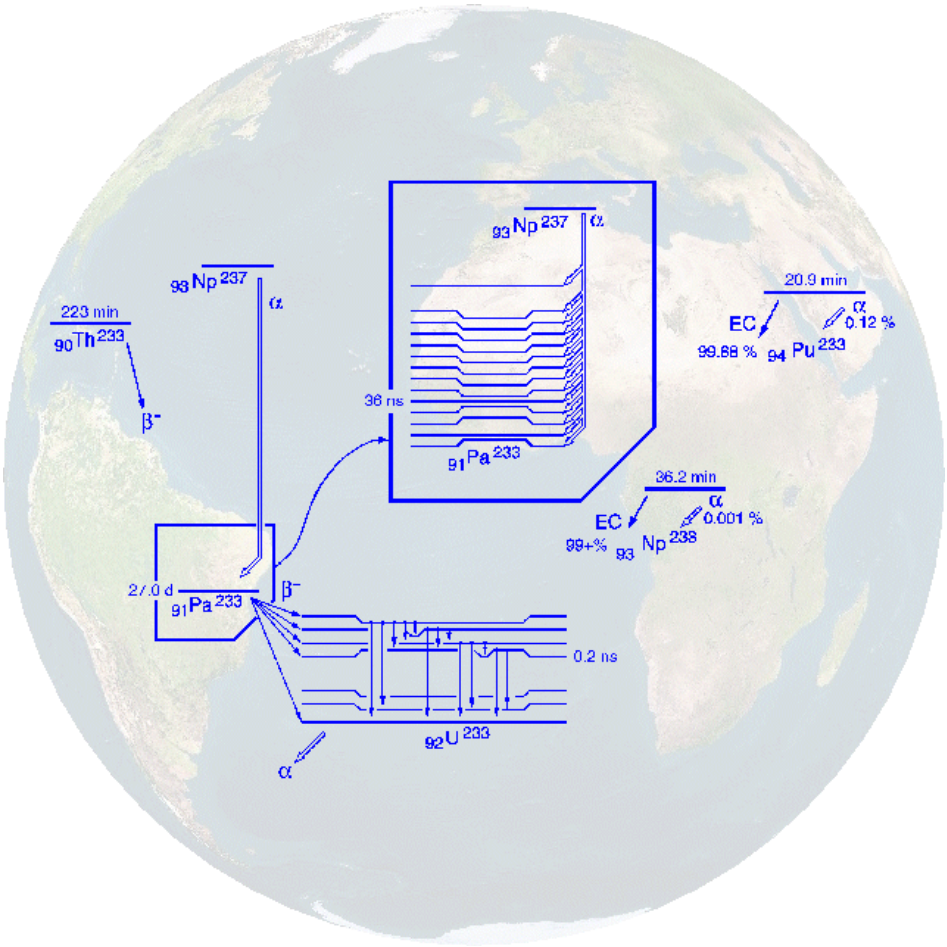
ICRM NEWSLETTER

Issue 24 – March 2010



International Committee for Radionuclide Metrology

Editor : Marie-Martine Bé

LABORATOIRE NATIONAL
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International Committee for Radionuclide Metrology ICRM

ICRM NEWSLETTER
Issue 24

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March 2010

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EDITORIAL

This newsletter was established in response to a recommendation of the International Committee for Radionuclide Metrology made during its General Meeting in Grenoble 1985. It is meant to serve as a medium for informal exchange of information between workers active in the field of Radionuclide Metrology.

The scope of the Radionuclide Metrology Newsletter is to describe briefly current activities in the following topics:

- foil and source preparation;
- α-, β- and γ-ray spectrometry including spectrum evaluation;
- improvement and development of radionuclide measurement techniques;
- measurement and evaluation of radionuclide data;
- low-level radioactivity measurement techniques;
- life-sciences;
- quality assurance and traceability.

In order to ensure that the Newsletter is as comprehensive and informative as possible, contributions are sought from all laboratories known to be engaged in measurements and data evaluation techniques relevant to Radionuclide Metrology.

All previous contributors will be informed concerning the deadline for the next issue. New contributing Radionuclide Metrology laboratories are welcome. Please contact the editor.

Any comments on this issue or suggestions for improvement will be welcome.

At the ICRM General Meeting in Paris 1995, it was decided that the ICRM Newsletter would also allow for the distribution of Progress/Planning Reports SA1 and SA2.

From the experience of this issue, we have the following situation : Laboratories regard their normal Newsletter contribution as the fulfilment of SA1/SA2. In this case this is indicated on the contribution by “SA1/SA2”. Or laboratories provide (additionally) the traditional SA1/SA2 reports which should not be longer than 2 pages. In the latter case it should be mentioned in the accompanying letter, that the SA1/SA2 contributions be intended for publication in the Newsletter.

For economy reasons, at the ICRM General Meeting in Dublin 2003, it was agreed that the ICRM Newsletter would be put in the LNE-LNHB (former BNM-LNHB) web site (http://www.nucleide.org/Publications/icrm_newsletter.htm) distributed in hard copy , or CD-rom only to those whom have asked for it.

- Contributions may be sent by E-mail as an attachment in MS Word or as plain text file.

INSTRUCTIONS TO CONTRIBUTORS

This Newsletter is realised with no alterations by the editor. To ensure readability and avoid unnecessary work by the editor, it is suggested that:

- Contributions should be typed on plain white A4 paper (21 cm x 29,7 cm)**,** please use the **"contribution.doc**" file.
- Contributions should contain **no** page number, date, signature, or any correspondence references typed on this sheet. Correspondence to the editor must be on a separate sheet.
- Contributions should be in English and carefully proofread by the authors.
- References to publications or reprints should be completed as required by the Physical Review.
- Complete mailing address and the name of a person who can be contacted for additional information by those desiring it should be given at the end.
- Please note that only files on "Word" format will be accepted.

Contribution Format

LABORATORY	Name of laboratory
NAMES	If more than one laboratory is involved identify affiliation through abbreviations (ORNL, LASL, etc.). Visitors can also be identified with asterisks.
KEYWORDS	Alpha spectrometry, beta spectrometry, calorimetry, (anti) coincidence method, cryogenic detector, data evaluation, data measurement, Euromet, gamma-ray spectrometry, gas proportional counter, ionisation chamber, life sciences, liquid scintillation, low-level, NaI well counter, neutron measurement, radioactive gas, radiochemistry, simulation code, SIR, source preparation, X-ray spectrometry, radionuclide by name (e.g. 55Fe or Fe-55). Choose the good ones
APPARATUS ACTIVITY	Choose one; the former for experiments and the latter for compilations, calculations, or theory.
RESULTS	Use this for experimental results.
PUBLICATIONS	Use Physical Review style. **Include only materials published during the referred year.**
IN PROGRESS	Use this for description of the current work.
INFORMATION SOURCE	Use this for evaluations or compilations.
IN PREPARATION	Use this to also indicate papers submitted for publication.
OTHER RELATED PUBLICATIONS	Optional.
ADDRESS	Mailing address. Give also telephone, telex, fax numbers and E-mail.
CONTACT	Single contact person.

General information on ICRM (President's Message)

The International Committee for Radionuclide Metrology (ICRM) is an association of radionuclide metrology laboratories whose membership is composed of delegates of these laboratories together with other scientists (associate members) actively engaged in the study and applications of radioactivity. It explicitly aims at being an international forum for the dissemination of information on techniques, applications and data in the field of radionuclide metrology. This discipline provides a range of tools for tackling a wide variety of problems in numerous other fields, for both basic research and industrial applications.

There are 39 institutions now represented by delegates in the ICRM. The ICRM has no membership fee and no paid secretariat or other staff. Its overall direction is determined by the delegates in General Meetings, which convene usually every two years, where organizational guidelines and directions for the working programs are agreed upon. The following officers of ICRM are presently serving on the Executive Board:

President	Pierino De Felice[1]	pierino.defelice@enea.it
Vice-President	Uwe Wätjen[2]	uwe.waetjen@ec.europa.eu
	Dirk Arnold[3]	dirk.arnold@ptb.de
	Marie-Martine Bé[4]	mmbe@cea.fr
Past-President	Yoshio Hino[5]	y.hino@aist.go.jp
Secretary	Franz Josef Maringer[6]	Franz-Josef.Maringer@bev.gv.at

The Executive Board relies heavily on the Nominating Committee which has the objective of ensuring the continuity of purpose and vigour of ICRM. It does this by soliciting from the membership, and by itself proposing, the names of eligible candidates to fill vacancies about to occur on the Executive Board and the Nominating Committee. The current membership of this committee is:

Chairperson	Guy Ratel[7]	gratel@bipm.org
Members	Mike Woods[8]	mike.woods@blueyonder.co.uk
	Eduardo García-Toraño[9]	E.garciatorano@ciemat.es

Plenary meetings of the ICRM are held biennially, and have developed into a successful instrument of communication among various specialists, thus encouraging international co-operation. The most recent series of ICRM meetings was at the 17th International Conference on Radionuclide Metrology and its Applications (ICRM 2009), which took place on 7 - 11 September 2009 at the Slovak Institute of Metrology (SMU) in Bratislava, Slovak Republic. The local organization was undertaken by the Centre for Ionizing Radiation of SMU.

Our appreciation and thanks go to all who contributed to this very successful and busy meeting. In particular we recognize the great contributions made by Dr. Anton Švec and his local organizing team Saskia Mikičová, Jozef Martinkovič and a number of other SMU colleagues, the Scientific Programme Committee, the referees and session chairmen and to the authors of papers.

ICRM activities are largely the responsibility of its working groups. Each group is guided by a co-ordinator who acts as a centre for ideas and communications and may organize conferences and workshops. There are now seven working groups with the following fields of interest:

(1) Radionuclide Metrology Techniques	http://users.skynet.be/icrmrmt/
John Keightley[10]	John.Keightley@npl.co.uk,
Mike Unterweger[11]	michael.unterweger@nist.gov
(2) Life Sciences	
Jeffrey T. Cessna[11]	jeffrey.cessna@nist.gov
(3) Alpha-Particle Spectrometry	
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(4) Gamma-Ray Spectrometry	http://www.nucleide.org/ICRM_GSWG.htm
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(5) Liquid Scintillation Techniques	http://www.nucleide.org/icrm.htm
Brian Zimmerman[11]	bez@nist.gov
(6) Low-Level Measurement Techniques	
Dirk Arnold[3]	dirk.arnold@ptb.de
(7) Non-Neutron Nuclear Data	
Marie-Martine Bé[4]	mmbe@cea.fr

We all thank above co-ordinators and also special thank Dr. Eduardo García-Toraño[9] for his great contributions as the chair of Alpha-Particle Spectrometry Working Group, until the last 17th ICRM meeting.

The next 18th international conference of ICRM 2011 will be held in September or October 2011 in Tsukuba, Japan organized by the National Metrology Institute of Japan, Advanced Industrial Science and Technology (NMIJ/AIST). The contact person of the local organizing committee is Dr. Yoshio HINO[5] (y.hino@aist.go.jp). The conference will include oral and poster presentations and business meetings of the ICRM Working Groups, in plenary format. In addition to these plenary meetings, each WG may have specific meetings in the form of international conferences or more restricted workshops. In this frame, a LLRMT working group Conference will be organized in 2012 (4 years after the last conference) presumably in Korea (KRISS).

All ICRM meetings are announced on the ICRM home page “http://physics.nist.gov/icrm” or in this Newsletter. Anyone wishing to participate in these ICRM's activities or to receive further information is encouraged to contact one of the officers or Working Group co-ordinators, and also to visit the ICRM home page.

Finally, we express our heartfelt thanks to Dr. Marie-Martine Bé[4] for compiling and upload this ICRM Newsletter, and also thanks to Dr. Lisa Karam[11] for maintaining our ICRM home page.

January 2010

Pierino De Felice
President of ICRM

References

1. Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile, C.R. Casaccia, P.O. Box 2400, I-00100 Rome, Italy.
2. European Commission, Joint Reseach Centre, Institute for Reference Materials and Measurements, Retiesweg 111, B-2440 Geel, Belgium.
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4. Laboratoire National Henri Becquerel, F-91191 Gif-sur-Yvette Cedex, France.
5. National Metrology Institute of Japan, National Institute of Advanced Industrial Science and Technology, Tsukuba Central 2, 1-1-1, Umezono, Tsukuba, Ibaraki, 305-8568, Japan.
6. Bundesamt für Eich- und Vermessungswesen, Arltgasse 35, 1160 Wien, Austria.
7. Bureau International des Poids et Mesures, Pavillon de Breteuil (BIPM), F-92312 Sèvres CEDEX, France.
8. Ionizing Radiation Metrology Consultants Ltd, 152 Broom Road, Teddington, Middlesex TWll 9PQ, U.K.
9. Metrología de Radiaciones Ionizantes, Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT), Avenida Complutense 22, E-28040 Madrid, Spain.
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11. National Institute of Standards and Technology (NIST), Gaithersburg, Maryland, 20899-8462, U.S.A.

ANNOUNCEMENTS

1) Conferences

- ICRM 2011 will take place in Tsukuba, Japan.

- ND 2010 : International Conference on Nuclear Data for Science and Technology, 26-30 April, Korea,
http://www.nd2010.org/

- LSC 2010, Advances in liquid scintillation spectrometry, 6-10 September, 2010, Paris, France,
http://www.nucleide.org/LSC2010

2) Proposal:

1. LRE (Croatia) is interested for collaboration in projects based on **"development of radiochemical methods for determination of radionuclides in natural samples"**

Coordinator's Report
ICRM Liquid Scintillation Counting Working Group

The main activity that was carried out by the Liquid Scintillation Counting Working Group (LSCWG) in the past year was the completion of the analysis of results for the ^{99}Tc Triple-to-Double Coincidence Ratio (TDCR) method data analysis comparison.

A total of nine laboratories took part in the comparison, which involved the distribution of a common set of TDCR data acquired during a recent NIST standardization of ^{99}Tc and the analysis by the participants using whatever normal procedures and programs that they would normally use. The most important findings from the study were:

1. The programs currently used by the various laboratories to calculate efficiencies as a function of TDCR all give results that are in agreement to within the experimental uncertainties reported by the participants.
2. As expected, it is crucial to apply the appropriate nuclear and atomic data when analyzing TDCR data. For certain radionuclides, such as ^{99}Tc, the shape factor plays an important role in the accuracy of the efficiency calculation.
3. It is important to account for photomultiplier tube (PMT) asymmetry when calculating the detection efficiency of the logical sum of doubles, even for relatively high-energy cases such as ^{99}Tc. This study indicated an average difference of 0.6 % between ^{99}Tc activity results obtained with and without accounting for PMT asymmetry.
4. More detail in the reporting of uncertainties is needed in order to gain a complete understanding of how the individual uncertainty components were identified and evaluated. Specifically, it would be extremely beneficial for all future inter-laboratory comparisons to require that a complete description of each uncertainty component be provided that includes the number of measurements or assumed degrees of freedom, the magnitude of the uncertainty component (the input quantity), and the sensitivity factor (the ratio of the uncertainty on the measurand due to the uncertainty on the input quantity to the uncertainty on the input quantity).

The results of the study were recently published in the proceedings of the ICRM2009 meeting, with all participants as co-authors. A follow-up comparison study, using TDCR data from LNHB for ^{3}H, was to be conducted in mid-2009. However, this has been delayed until 2010 because it was deemed desirable to wait until all the results from the CCRI(II) Key Comparison of ^{3}H were submitted to the BIPM before the data set was distributed. The Co-ordinator of the LSCWG will send out a call for participants in April 2010, with distribution of the data set to take place in early summer.

The most recent meeting of the LSCWG was held on 10 September 2009, during the ICRM 2009 meeting in Bratislava. Because of the limited amount of time, the meeting consisted of only four short presentations: the Co-ordinator's report of activities since the ICRM2007 meeting, a presentation on recent studies with solid plastic scintillators by Dr. Kossert (PTB), a report on recent experience with a commercial TDCR spectrometer by Dr. Shilnikova (VNIIM), and a discussion of coincidence resolving times and afterpulsing in TDCR systems by Dr. Cassette (LNHB).

During the ICRM2009 conference, a total of 16 papers (5 oral, 11 poster) were presented in the Liquid Scintillation session, including the winner of the Best Poster Award, which was

“Simulation of Cherenkov photons in photomultiplier windows induced by Compton diffusion using the Monte Carlo GEANT4 code”, by C. Thiam, et al. (LNHB).

The next meeting of the LSCWG is proposed to be held at the PTB in Braunschweig sometime between the LSC2010 meeting in Paris (6-10 September 2010) and the ICRM2011 meeting in Japan, assuming that the ICRM2011 meeting will take place in the autumn of 2011. A decision regarding the dates of the WG meeting will be made once the dates of the ICRM2011 meeting are established.

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Non-Neutron Nuclear Data Working Group (3NDWG): Report, January 2010

Coordinator: Marie-Martine Bé

Key words: decay data; evaluations; nuclear decay data requirements

1. The primary aim of the 3NDWG is to provide the worldwide scientific community with an appropriate environment for communications between specialists in the field of non-neutron nuclear data measurements and evaluations so that they can learn more about each others' work, liaise and combine forces to undertake research programmes of mutual interest, and organise multinational efforts to produce recommended sets of non-neutron nuclear data.

2. 3NDWG members continue to be involved in the evaluation efforts of the Decay Data Evaluation Project (DDEP). Communications between decay data evaluators are encouraged through this project (co-ordinator: E. Browne, ebrowne@lbl.gov). Details of this work and the recommended decay data can be found on the Internet: http://www.nucleide.org/DDEP_WG/DDEPdata.htm. A second working meeting of the DDEP was organized in May 2008 by IFIN in Bucharest. Minutes of the meeting can be requested to A. Luca. A third meeting is planned in June 2010, organized by Ciemat in Madrid, http://www.ciemat.es/portal.do?TR=C&IDR=1524.

3. 3NDWG members continue to evaluate decay schemes for specific actinides and their decay products as part of an agreed IAEA Coordinated Research Project on "Updated decay data library for actinides" (2005-09). Last meeting was held in October, 2008. Contact: M. A. Kellett (e-mail: m.kellett@iaea.org). Summary Report 2nd coordination meeting, INDC(NDS)-0508. A status of the CRP was given by M.A. Kellett during the WG conference meeting.

4. 36 new nuclides have been evaluated or updated since the last Monographie 5-4 issue, then the publication of two new issues are planned for 2010.

5. Five oral communications and three posters were presented during the 2009 conference. Various information were given during the WG session where about 40 people attended. In particular, work to calculate beta spectra has been undertook, following two approaches: one based on existing experimental results and the other one based on theoretical calculations. However, both approaches require new measurements to be validated.

6. **At the General Meeting (Oxford, September 2005) of the *International Committee for Radionuclide Metrology* (ICRM) the Delegates formally approved the recommendation made by the Nuclear Data Working Group of using the DDEP evaluated decay data in all future nuclear data studies.**
The 2009 ICRM Executive Board has renewed this recommendation, particularly in view of the drafting and refereeing work for the ICRM 2011 Conference.
The work of the 3NDWG was re-endorsed at the 2009 ICRM General Meeting (11 September 2009, Bratislava, Slovakia).

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10 January 2010

2009 Report of the ICRM Gamma-Ray Spectrometry Working Group

The Gamma-Ray Spectrometry Working Group is devoted to the development of the metrological aspects of gamma-ray spectrometry and its applications. This includes, but is not restricted to: measurement techniques and equipment, determination of photon emission intensities, detector efficiency calibrations, coincidence-summing corrections, uncertainties, correlations, new instrumentation and X-ray spectrometry.

1. Completed action

Comparison of Monte Carlo codes for efficiency calibration

The action to compare the Monte Carlo codes for efficiency calibration was leaded by Tim Vidmar and involved 18 participating laboratories (28 people involved). The results of the comparison was orally presented at ICRM2007 ant the relevant paper "An intercomparison of Monte Carlo codes used in gamma-ray spectrometry" is published in Applied Radiation and Isotopes (T. Vidmar et al., ARI 66, 2008, 764-768). Two related papers derived from this action were also published (O. Sima and D. Arnold, ARI 67(5), 701-705; K.L. Karfopoulos and M.J. Anagnostakis ICRM-21010 to be published in ARI).
No further developments are presently planned and this action is now completed.

2. On-going actions

Coincidence summing corrections

The main study recently underetaken by the ICRM GSWG focused on the coincidence summing corrections. Different methods (numerical computation, Monte Carlo simulation, empirical methods…) are used to compute these corrective factors and could be compared through this action. The goal of this exercise was to calculate the corrective factors for ^{152}Eu and ^{134}Cs, for several energies and 3 source-to-detector distances (10, 5 and 2 cm). Eighteen laboratories are participating in this action and provided about 26 series of results, using 12 different methods. Selected results were orally presented at ICRM2009 and the relevant paper "Intercomparison of methods for coincidence summing corrections in gamma-ray spectrometry" by M.-C. Lépy and all the participants of the intercomparison is being published in Applied Radiation and Isotopes.
An exhaustive report including all the results will be published at the end of the action.

Working Group meetings

2-days workshop

The meeting of the ICRM Gamma Spectrometry Working Group was held in Paris, in the building of the Laboratoire National d'Essais, on February 23-24, 2009. Twenty participants attended this workshop that was mainly dedicated to the coincidence summing action, but gave also the opportunity to discuss different topics such as: efficiency calibration, uncertainties, detection limits, etc.

Business meeting
The Gamma Spectrometry Working Group business meeting was held during ICRM2009, on September 9th, 2009. About 50 participants attended the meeting and the agenda included the WG activity report, some short presentations, information and discussions.

GS WG Web site

The web page dedicated to the Gamma Spectrometry WG is hosted by LNHB at the address: http://www.nucleide.org/ICRM_GSWG.htm with a link on the ICRM main site hosted by NIST:
(http://physics.nist.gov/Divisions/Div846/ICRM/working_groups.html#GSWG).
Information concerning the working group actions is available there.

GS WG forum

The GSWG forum (address: http://laraweb.free.fr/GRS_forum/) has been created to facilitate exchanges among the working group members. On January 2010, the forum had 72 registered members, unfortunately there are too few exchanges between them and suggestions for improving the attendance are welcome.

3. Further projects

Next step of the coincidence summing corrections

The next step of the coincidence summing action will be dedicated to coincidence summing corrections for volume samples. Experimental data will be obtained with ^{152}Eu and ^{134}Cs solutions measured close to the detector window and will be provided to the participants on spring 2010.

Detection limit- Decision threshold

It was proposed to have a "sub-working group" dedicated to this specific aspect. The output would be a short document (basic guide) with practical recommendations and simple application examples. Some discussion were held during the ICRM2009 business meeting and it was pointed out that the update of the ISO11929 standard should be taken into account.

Workshop
A workshop of the ICRM Gamma Spectrometry Working Group is planned in winter 2010 to report about the on-going actions and to give the WG members the opportunity to meet and to work on selected topics.

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Coordinator's Report, ICRM Life Science Working Group

The purpose of the Life Sciences Working Group is to provide a forum for ICRM members to address radionuclide metrology issues as they relate to the life sciences. Issues may include, but are not limited to: development of methodologies to calibrate short-lived radionuclides of interest in nuclear medicine, measurement of decay properties (half-lives, decay energies and probabilities, etc.) of radionuclides used in nuclear medicine and biological research, and development of measurement methodologies for transferring National Measurement Standards to the clinic and research laboratory. The Working Group will facilitate finding solutions to these problems through workshops, publications, electronic communications (i.e., email), and collaborative work.

The most recent meeting of the Life Sciences Working Group (LSWG) was held at the Slovak Institute of Metrology, Bratislava, Slovak Republic on 8 September 2009, as part of the 17th International Conference on Radionuclide Metrology and its Applications. The topics covered during the working group meeting included:

- A report of the 12-13 November 2008 LSWG meeting at the NPL in Teddington, UK
- Discussion of the ongoing CCRI(II) Comparison of ^{99m}Tc using a travelling instrument
- A proposed ^{90}Y microsphere activity comparison to be piloted by ANSTO. This comparison has been subsequently announced as a CCRI(II) supplementary comparison.

A sign-in list was circulated that included the option to indicate interest in a comparison of the measurement of ^{90}Sr as an impurity in ^{90}Y and interest in comparisons of various emerging radionuclides used in nuclear medicine. There was substantial interest in both categories. Potential pilot laboratories need to be identified. Because the sign-in list did not circulate through the entire auditorium, anyone who would like to be on the LSWG mailing list or indicate interest in a comparison should contact the coordinator.

Status of action, items from previous meetings:

- Collecting activity calibrator factors for medical radionuclides in different ionization chambers. (Status: An extensive reference list has been collected and has been posted on the LSWG web page.)
- The presentations from the LSWG meeting in Teddington, UK are now available on LSWG web site: http://physics.nist.gov/Divisions/Div846/ICRM/working_groups.html#LS

An interim meeting of the LSWG is being considered for mid-2010 to take place at the Physikalisch-Technische Bundesanstalt in Braunschweig. The date has not been planned, but will be dependent on the schedule of the next ICRM conference.

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Report on the Activities of the Low-Level Measurement Techniques Working Group

In the period since the last report (i.e. from 1st January 2009-31st December 2009) the proceeding of the most recent ICRM-LLRMT conference were published in Applied Radiation and Isotopes 67 No.5 (May 2009). The conference took place on 22-26 September 2008 at the Physikalisch-Technische Bundesanstalt (PTB) and was attended by 120 participants from 25 countries worldwide. We had in total 43 oral- and 42 poster-presentations and 68 written contributions to the proceedings.

The main activities of the LLMT-WG in the last year have been to facilitate the Low-Level Measurements session of the ICRM 2009 conference in Bratislava. There were eight contributions presented at the conference; these covered:

- Different radiochemical procedures to determine Ra-226
- An overview of gamma-ray spectrometry in European underground laboratories
- Efficiency evaluation of drum-type gamma activity counting systems
- Monte Carlo simulation of background characteristics of low-level counting systems
- Determination of gross alpha and beta activity indices in drinking water
- Measuring retrospective indoor radon concentrations
- Ra-226 and Ra-228 determination in mineral waters
- Measurement of fusion plasma conditions using ultra low-level γ-ray spectrometry

The papers were reviewed by IRMM, JSI, NPL and PTB staff. A review of current activities was presented at the ICRM General meeting after the conference.

In the tradition of the LLMT-WG conferences in Monaco 1991, Seville 1995, Mol 1999, Vienna 2003 and Braunschweig 2008 the next conference on Low-Level Radioactivity Measurement Techniques will be held in 2012. Our colleagues from KRISS volunteer to hold the conference in Daejeon, Korea.

Dirk Arnold, Coordinator

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INTERNATIONAL COMMITTEE FOR RADIONUCLIDE METROLOGY
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REPORT OF ACTIVITIES

October 2007-September 2009

The aim of this Working Group (WG) is described in the document "*WG Scope and Actions*", issued in 1993. Topics include detectors and measurement techniques, computer codes and algorithms and measurements of nuclear data related to alpha emission. This document, as well as other information of interest, can be found in the WG website:

http://www.ciemat.es/portal.do?TR=C&IDR=1366

Work has continued in the EURAMET 749 project about alpha-particle emission probabilities and energies of ^{240}Pu. This project was coordinated by G. Sibbens (IRMM-JRC). Participant Institutes are IRMM, CIEMAT, PTB, Univ. of Extremadura and CEA-LNHB. The project is now finished; the results were presented at the ICRM'2009 conference and will be published in the conference proceedings. Some aspects concerning the accurate determination of the energies of the alpha particles could not be satisfactorily solved by measurements with Si detectors and alternative procedures were considered.

The business meeting of the WG and a session on Alpha-Particle Spectrometry were held in September 2009, in Bratislava, Slovakia, during the ICRM'2009 conference. Although some possible research topics were identified, no new actions have been proposed yet.

This coordinator resigned and Stefaan Pommé from IRMM was elected as new WG coordinator at the general meeting.

CONTRIBUTIONS

LABORATORY	Ionizing Radiation Physics Group, Radiopharmaceutical Research Institute, Australian Nuclear Science & Technology Organization (ANSTO)
NAMES	D Alexiev, L Mo, L Bignell, T Steele
ACTIVITY	Activity standardisation of radionuclide. Provision of traceability program to radiopharmaceutical industries. Participation in international comparisons. Neutron flux measurements.
KEYWORDS	coincidence method, ionisation chamber, life sciences, liquid scintillation, neutron measurement, simulation code, SIR, source preparation, traceability, H-3, Lu-177, I-131, Ga-67, Tc-99m, Tl-201, Y-90.
RESULTS	• The international comparisons of activity measurements of H-3, Lu-177, I-131 and Y-90 have been performed. • The International comparison of uncertainty analysis of 4πβ(PC)-γ coincidence counting measurement of Co-60 have been completed. • A FPGA Acquisition System and Software Event Analysis (FASEA) system has been developed for the TDCR and 4πβ(LS)-γ coincidence counting measurement. • Simulations to model multiple γ-ray interactions within a liquid scintillation detector caused by a single radionuclide decay event have been carried out. The corrections for ionization quench derived using the multiple interaction model (*per interaction* model*)* and typically used single interaction model (*per event* model) have been compared. Studies on ^{131}I, ^{123}I and ^{177}Lu show that the differences are small, indicating that for most radionuclide activity measurements the *per event* quench correction should be adequate. • Annual calibration of the ionization chambers of ANSTO Radiopharmaceutical Industry for Ga-67, I-131, Tc-99m, Y-90 and Tl-201 has been performed. • Radioactive standards of Sr-90, Sr-89, Mn-54, Co-57, Co-60 and Cs-137 have been prepared for various user communities.
PUBLICATIONS	T Steele, L Mo, L Bignell, M Smith and D Alexiev, FASEA: A FPGA Acquisition System and Software Event Analysis for Liquid Scintillation Counting. *Nucl. Instrum. Meth. A,* 609, pp.217-220 (2009). L J Bignell, L Mo, D Alexiev and S R Hashemi-Nezhad, Sensitivity and Uncertainty Analysis of the simulation of ^{123}I and ^{54}Mn decay in liquid scintillation vials. *Appl. Radiat. Isot.* In press. L Mo, L J Bignell, T Steele and D Alexiev, Activity measurements of ^{3}H using the TDCR method and observation of source stability. *Appl. Radiat. Isot.* In press. L J Bignell, L Mo, D Alexiev, S R Hashemi-Nezhad. The effect of multiple γ-ray interactions on ionisation quenching corrections in liquid scintillants, *Nucl. Instr. and Meth. A.* In press.

IN PROGRESS	Organisation of an international comparison of activity measurement of Y-90 microspheres. Neutron flux measurement by Zr activation.
INFORMATION	
SOURCE IN PREPARATION	H A Wyllie, Derivation of the dead-time correction equation for a radioactivity detector. *Metrologia,* Submitted.
OTHER RELATED PUBLICATIONS	Thesis : T. Steele, An investigation into Digital Pulse Processing techniques for scintillation detectors'. Submitted to The Australian National University in completion of a Bachelor of Engineering with Honors. H A Wyllie, The Determination of Barium-133 by Efficiency Extrapolation, *ANSTO/E-768.*
ADDRESS	New Illawarra Road Lucas Heights NSW 2234, Australia
CONTACT	Li Mo, lmx@ansto.gov.au

LABORATORY	BEV – Bundesamt für Eich- und Vermessungswesen, Austria
NAMES	Franz Josef Maringer, Robert Brettner-Messler, Michael Kreuziger, Peter Michai
ACTIVITY	Metrological research, development and applications Participation in international comparison - EURAMET, CCRI(II) and bilateral comparisons Joint research projects in radionuclide metrology, applications and measurements Type approval and legal verification of medical activity meter, surface contamination monitors, hand-foot monitors, clearance monitors Internal dosimetry inter-comparison exercises and proficiency tests Calibration services
KEYWORDS	National Metrology Institute Radioactivity laboratory with low-level facilities Calibrated $4\pi\gamma$ ionisation chambers HPGe detectors for gamma-ray spectrometry Low-level anti-compton HPGe gamma-ray spectrometer Multiwire proportional chamber Radon ionisation chambers
RESULTS	BIPM-RI(II)-K2.Co-60 Comparison in radon activity concentration in air Comparison in gamma-ray spectrometry Monte Carlo calculations of ionisation chamber and HPGe detector response to emerging gamma and beta emitters
PUBLICATIONS	FJ Maringer, V Gruber, M Hrachowitz, A Baumgartner, S Weilner, C Seidel (2009): Long-term monitoring of the Danube river – sampling techniques, radionuclide metrology and radioecological assessment. Appl Radiat Isot, 67, 894-900; ISSN 0969-8043. Gruber, V; Maringer, FJ; Landstetter, C (2009): Radon and other natural radionuclides in drinking water in Austria: measurement and assessment.. Appl Radiat Isot. 67(5), 913-917 FJ Maringer, R Brettner-Messler, M Kreuziger (2008): Strengthening Activity Measurement Quality in Radiation Protection – from Metrological Science to Reliable End-user Application. In: IRPA - International Radiation Protection Association, Proceedings IRPA 12 - 12th International Congress of the International Radiation Protection Association, Bueno Aires, Argentinia, Oct 19-24, 2008 Gruber, V; Baumgartner, A; Seidel, C; Maringer, FJ (2008): Radon risk in Alpine regions in Austria: Risk assessment as a settlement planning strategy. Radiat Prot Dosim, 130: 88-91.

IN PROGRESS	Development of a primary standard for particle emission rate for large area sources Radon in soil-gas measurement calibration facilities Joint research co-operations: • IAEA – International Atomic Energy Agency • BOKU - University of Natural Resources and Applied Life Science Vienna • TU VIE - Technical University of Vienna • AIT - Austrian Institute of Technology • SEIB – Seibersdorf Laboratories GmbH *2 thesis and 2 joint research projects in the field of radionuclide metrology and applied measurements in progress*
INFORMATION	82 CMCs for radioactivity measurement calibration services
SOURCE IN PREPARATION	Planned participation in SIR / CCRI(II).K for Lu-177, Pb-210
OTHER RELATED PUBLICATIONS	F.J. Maringer, A. Baumgartner, V. Gruber, C. Seidel, S. Weilner, Y. Nabyvanets, V. Kanyevets, G. Laptyev (2008): Joint Danube Survey 2 - Final Scientific Report - Radioactivity. ICPDR - International Commission for the Protection of the Danube River, Vienna International Center, pp 203-208. V. Gruber, C. Seidel, F.J. Maringer (2008): Assessment of radon exposure in Austria based on geology and settlement. In: IRPA - International Radiation Protection Association, Proceedings IRPA 12 - 12th International Congress of the International Radiation Protection Association, Buenos Aires, Argentinia, Oct 19-24, 2008. Zehetner F., Lair G.J., Maringer F.J., Gerzabek M.H., Hein T. (2008): From sediment to soil: floodplain phosphorus transformations at the Danube River. Biochemistry, 88, 117-126; ISSN 0168-2563. Lair, GJ; Zehetner, F; Hrachowitz, M; Franz, N; Maringer, FJ; Gerzabek, MH (2009): Dating of soil layers in a young floodplain using iron oxide crystallinity. Quat Geochronol 2009; 4(3): 260-266.
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LABORATORY	European Commission - Joint Research Centre Institute for Reference Materials and Measurements (IRMM) Radionuclide Metrology Sector
NAMES	T. Altzitzoglou, Uwe Wätjen
ACTIVITY	* Liquid Scintillation Counting and TDCR * Gamma-ray spectrometry * Nuclear decay data measurement
KEYWORDS	Alpha spectrometry, beta spectrometry, coincidence method, data measurement, environmental control, Euromet, gamma-ray spectrometry, life sciences, liquid scintillation, low-level, simulation code, SIR, ESIR, source preparation, traceability, X-ray spectrometry
RESULTS	* International comparisons of the activity concentration of tritiated water and ^{177}Lu solution. * EUROMET project 907: Measurement of ^{124}Sb activity and determination of photon emission probabilities.
PUBLICATIONS	* Pommé S, Altzitzoglou T, Van Ammel R, Sibbens G, Eykens R, Richter S, Camps J, Kossert K, Janssen H, Garcia-Torano E, Duran T, Jaubert F. Experimental Determination of the 233U Half-Life. METROLOGIA 46 (5); 2009. p. 439-449. JRC51190. * Semkova V, Reimer P, Altzitzoglou T, Plompen A, Quetel C, Sudar S, Vogl J, Koning A, Qaim S, Smith D. Neutron Activation Cross Sections on Lead Isotopes . PHYSICAL REVIEW C 80 (2); 2009. p. 024610(1-12). JRC48228. * Vasile M, Altzitzoglou T, Benedik L, Spasova Y, Waetjen U. Radiochemical Separation and Determination of 228Ra in Mineral Waters by Low-level Liquid Scintillation Counting. In Conference Proceedings: J. Eikenberg, M. Jaeggi, H. Beer, H. Baehrle, editors. Proceedings of the 2008 International Liquid Scintillation Conference, ISBN: 978-0-9638314-6-0. Tuscon, Arizona (United States of America): RADIOCARBON, Department of Geosciences, The University of Arizona; 2009. p. 375-380. JRC47904. * Bé MM, Chauvenet B, Amiot M, Bobin C, Lepy M, Branger T, Laniece I, Luca A, Waetjen A, Sahagia M, Kossert K, Ott O, Naehle O, Dryak P, Sochorova J, Kovar P, Auerbach P, Altzitzoglou T, Pomme S, Sibbens G, Van Ammel R, Paepen J, Iwahara A, Delgado J, Poledna R, Johansson L, Stroak A, Bailat C, Nedjadi Y, String P. 124Sb - Activity Measurement and Determination of Photon Emission Intensities. Gif-sur-Yvette (France): Commissariat a l`Energie Atomique (CEA); 2009. JRC54482.
IN PROGRESS	* Determination of the half-lives of ^{235}U and ^{238}U. * International comparison of the activity of ^{241}Pu. * Development of a new TDCR Liquid Scintillation Counter.
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CONTACT	Timos Altzitzoglou

LABORATORY	European Commission - Joint Research Centre Institute for Reference Materials and Measurements (IRMM) Radionuclide Metrology Sector
NAMES	Mikael Hult, Gerd Marissens, Raquel Gonzalez de Orduña, Necati Çelik, Erica Andreotti
APPARATUS ACTIVITY	Seven HPGe-detectors for ultra low level gamma-ray spectrometry in the underground laboratory HADES. Two low-background HPGe-detectors above ground. One low-background NaI well (+plug) for Compton suppression.
KEYWORDS	Underground gamma-ray spectrometry, anti-coincidence method, data evaluation, data measurement, low-level, NaI well-type counter, neutron measurement, simulation code, SIR, source preparation, Plastic Scinillators, muon shield, In-115, Sn-122, Ta-180m,
RESULTS	* Results from experiment at JET aiming at quantifying the ratio of 3 MeV proton and 14 MeV protons. * Measurements of rare decays from $^{180}Ta^{m}$ and ECEC of ^{112}Sn and ββ of ^{124}Sn. * Determination of the half-life and Q-value of the decay with Nature's lowest Q-value: $^{115}In(\beta^{-})\ ^{115}Sn^{*}$ * Radiopurity measurements of materials for the GERDA experiment and ultra low-background detector development in HADES.
PUBLICATIONS	* Wieslander, Suhonen, Eronen, Hult, Elomaa, Jokinen, Marissens, Misiaszek, T. Mustonen,Rahaman, Weber, Äysto, " Smallest Known Q Value of Any Nuclear Decay: The Rare β^{-} Decay of $^{115}In(9/2+) \rightarrow {}^{115}Sn(3/2+)$". Phys Rev. Lett. 103, 122501 (2009). * Hult, Wieslander, Marissens, Gasparro and Misiaszek and Wätjen. " Search for the radioactivity of ^{180m}Ta using an underground sandwich spectrometer" Appl. Radiat. Isotop. 67 (2009) 918-921. * Wieslander, Hult, Marissens, Gasparro and Misiaszek " The Sandwich spectrometer for ultra low-level γ-ray spectrometry", Appl. Radiat. Isotop. 67 (2009) 731-735. * Budjáš, Laubenstein, Hult et al. "γ-ray spectrometry of ultra low-levels of radioactivity for the GERDA experiment". Appl. Radiat. Isotop. 67 (2009) 755. * Lövestam, Hult, Fessler, Gamboni, Gasparro, Geerts, Jaime, Lindahl, Oberstedt, Tagziria, " Measurement of threshold neutron excitation functions using moderated neutron beams", submitted to Nucl.Instr. and Meth. A. * Lövestam, Hult, Fessler, Gasparro, Kockerols, Okkinga, Tagziria, Vanhavere and Wieslander "Neutron fluence spectrometry using disk activation", Radiation Measurements 44 (2009) 72–79. * Wieslander, Lövestam, Hult, Fessler, Gasparro, Kockerols. "Validation of a method for neutron dosimetry and spectrometry using neutron activation of metal discs" Radiat. Prot. Dosim. (2009), pp. 1–8 doi:10.1093/rpd/ncp258. * The BOREXINO collaboration, "The Borexino detector at the Laboratori Nazionali del Gran Sasso". Nucl. Instr. and Meth. A600(2009)568–593. * The BOREXINO collaboration, ""The liquid handling systems for the Borexino solar neutrino detector". Nucl. Instr. and Meth. A609 (2009) 58–78. * Köhler, Degering, Laubenstein, Quirin, Lampert, Hult, Arnold, Neumaier,

	Reyss. "A new low-level γ-ray spectrometry system for environmental radioactivity at the underground laboratory Felsenkeller".Appl. Radiat. and Isotopes 67(2009)736–740. * Aalseth, Andreotti, Arnold, Sanchez Cabeza, Degering, Giuliani, Gonzales de Orduna, Gurriaran, Hult, Keillor, Laubenstein, le Petit, Mircea Margineanu, Matthews, Miley, Osvath, Pellicciari, Plastino, Simgen, Weber, Werzi. "Ultra-low background measurements of decayed aerosol filters", J. Radioanal. Nucl. Chem., (2009) DOI 10.1007/s10967-009-0307-0. * Vidmar, Çelik, Cornejo Díaz, Dlabac, Ewa, Carrazana González, Hult, Jovanović, Lépy, Mihaljević, Sima, Tzika, Jurado Vargas, Vasilopoulou and Vidmar "Testing efficiency transfer codes for equivalence ". Appl. Radiat. and Isotopes 68(2010)355-359. Doi: 10.1016/j.apradiso.2009.10.012. * PhD Thesis of J. S. E. Wieslander: "A new gamma-ray spectrometry system for measurements of radioactivity in the micro-Becquerel range", university of jyväskylä, February 2009.
IN PROGRESS	* Decay data for long-lived radionuclides and double beta decay * Neutron cross sections of Re, In and Bi * 4th experiment for plasma characterisation at JET using activation of metal discs * Pulse-shape analysis of BEGe-detectors * Intercomparisons, reference materials and metrology * Ultra low background detector developments * Installation of a new lead copper shield for an underground Compton suppression system
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LABORATORY	European Commission - Joint Research Centre Institute for Reference Materials and Measurements (IRMM) Radionuclide Metrology Sector
NAMES	Ljudmila Benedik, Mirela Vasile, Yana Spasova, Timotheos Altzitzoglou, Uwe Wätjen
ACTIVITY	* development of reference materials * organisation of measurement comparisons for EU member state laboratories monitoring radioactivity in the environment and food (ICS-REM) * facilities for radiochemical separations * quantitative radioactive source preparation facilities * large solid angle α-particle spectrometers * primary standardisation equipment when needed * HPGe detector systems and LSC when needed
KEYWORDS	Intercomparisons, proficiency tests, reference materials, traceability, environmental monitoring, source preparation, radiochemistry, low-level, liquid scintillation, alpha spectrometry, beta spectrometry, gamma-ray spectrometry,
RESULTS	* ICS-REM intercomparison "Ra and U in mineral waters" evaluated and presented at ICRM 2009 conference (3 mineral waters, ^{226}Ra, ^{228}Ra, ^{234}U and ^{238}U, 45 laboratories participated)
PUBLICATIONS	* L. Benedik, M. Vasile, Y. Spasova and U. Wätjen, Sequential determination of ^{210}Po and uranium radioisotopes in drinking water by alpha-particle spectrometry, Appl. Radiat. Isot. 67 (2009) 770-775. * Y. Spasova, L. Benedik, M. Vasile, M. Beyermann, U. Wätjen and S. Pommé, ^{234}U and ^{238}U in mineral water: reference value and uncertainty evaluation in the frame of an interlaboratory comparison, J. Radioanal. Nucl. Chem. 281 (2009)113-117. * M. Vasile, T. Altzitzoglou, L. Benedik, Y. Spasova and U. Wätjen, Radiochemical separation and determination of ^{228}Ra in mineral waters by low-level liquid scintillation counting, In: Eikenberg, J., Jäggi, M., Beer, H., Baehrle, H. (Eds.), LSC 2008, Advances in liquid scintillation spectrometry. Radiocarbon, Tucson, AZ, USA (2009) 375-380.
IN PROGRESS	* Development of reference material IRMM-426 "wild berries" certified for activity of ^{137}Cs, ^{40}K and ^{90}Sr; characterisation via a CCRI(II) Supplementary Comparison * EC interlaboratory comparison on natural radioactivity, ^{137}Cs and ^{90}Sr in soil
INFORMATION	Publications in print: * Y. Spasova, U. Wätjen, L. Benedik, M. Vasile, T. Altzitzoglou and M. Beyermann, Evaluation of EC comparison for ^{226}Ra, ^{228}Ra, ^{234}U and ^{238}U in three mineral waters, Report EUR xxxxx EN, ISBN978-92-79-xxxxx-x (2010) * U. Wätjen, Europäische Ringvergleiche für Messungen der Umweltradioaktivität, In: Umweltpolitik - 14. Fachgespräch Überwachung der Umweltradioaktivität, Editor: Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (BMU), Berlin, Germany (2010)

	* U. Wätjen, L. Benedik, Y. Spasova, M. Vasile, T. Altzitzoglou and M. Beyermann, EC comparison on the determination of ^{226}Ra, ^{228}Ra, ^{234}U and ^{238}U in water among European monitoring laboratories, Appl. Radiat. Isot. (2010). * M. Vasile, L. Benedik, T. Altzitzoglou, Y. Spasova, U. Wätjen, R. González de Orduña, M. Hult, M. Beyermann and I. Mihalcea, ^{226}Ra and ^{228}Ra determination in mineral waters – comparison of methods, Appl. Radiat. Isot. (2010).
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LABORATORY	European Commission - Joint Research Centre Institute for Reference Materials and Measurements (IRMM) Radionuclide Metrology Sector
NAMES	S. Pommé, T. Altzitzoglou, R. Van Ammel, J. Paepen, T. Vidmar, U. Wätjen
ACTIVITY	Primary standardisation of activity and determination of nuclear decay data
KEYWORDS	Alpha-particle spectrometry, coincidence counting, 4πCsI(Tl)-sandwich spectrometer, data evaluation, data measurement, defined solid angle (alpha-particle and X-ray) counting, Euramet projects, gamma-ray spectrometry, gas proportional counting (atmospheric, pressurised), ionisation chamber, life sciences, liquid scintillation, NaI well-type counter, simulation code, SIR, source preparation (quantitative drop deposition, IRMM source drying device, vacuum evaporation and electrodeposition), traceability, X-ray spectrometry
RESULTS	* Key Comparison of activity concentration measurement of an ^{177}Lu solution * Euramet project 749 on determination of alpha-particle emission probabilities in the decay of ^{240}Pu * Development of a new, small pre-amplifier for 2-wire proportional counters * Algorithm to calculate partially weighted mean of discrepant data (e.g. for KCRV)
PUBLICATIONS	* S. Pommé, Detection efficiency calculation for photons, electrons and positrons in a well detector; Part I: Analytical Model, Nucl. Instr. and Meth. A 604 (2009) 584–591. * S. Pommé, G. Sibbens, T. Vidmar, J. Camps and V. Peyres, Detection efficiency calculation for photons, electrons and positrons in a well detector; Part II: analytical model versus simulations, Nucl. Instr. and Meth. A 606 (2009) 501-507. * S. Pommé, J. Camps, G. Sibbens, T. Vidmar and Y. Spasova, Some modifications to Sima's model for total efficiency calculation of well-type detectors, J. Radioanal. Nucl. Chem. 281 (2009)143-147. * S. Pommé, T. Altzitzoglou, R. Van Ammel, G. Sibbens, R. Eykens, S. Richter, J. Camps, K. Kossert, H. Janssen, E. García-Toraño, T. Durán and F. Jaubert, Experimental determination of the ^{233}U half-life, Metrologia 46 (2009) 439-449. * T. Vidmar, A. Likar and B. Vodenik, Analysis of HPGe Spectra by Spectrum Matching – Experimental Verification, Appl. Radiat. Isot. 67 (2009) 716-718. * T. Vidmar and J. Gasparro, Crystal rounding and the efficiency transfer method in gamma-ray spectrometry, Appl. Radiat. Isot. 67 (2009) 2057–2061 * Bé et al., ^{124}Sb – Activity measurement and determination of photon emission intensities, Commissariat à l'Énergy Atomique, France, Rapport CEA-R-6222, 2009
IN PROGRESS	* Half-life determination of ^{109}Cd, ^{235}U, ^{238}U, ^{22}Na, ^{134}Cs, ^{57}Co. * Development of software for 4π γ-counting. * Development of the new reference ionisation chamber. * Installation of a new NaI well-type detector for 4 π γ -counting. * Uncertainty calculations for counting at defined solid angle. * Improvement of ALPHA program for deconvolution of alpha-particle spectra.

INFORMATION	http://www.irmm.jrc.be/html/activities/radionuclide_metrology/index.htm
SOURCE IN PREPARATION	* T. Vidmar, N. Çelik, N. Cornejo Díaz, A. Dlabac, I.O.B. Ewa, J.A. Carrazana González, M. Hult, S. Jovanović, M.-C. Lépy, N. Mihaljević, O. Sima, F. Tzika, M. Jurado Vargas, T. Vasilopoulou and G. Vidmar, Testing efficiency transfer codes for equivalence, Appl. Radiat. Isot. 68 (2010) 355-359. * J. Paepen, T. Altzitzoglou, R. Van Ammel, G. Sibbens and S. Pommé, Half-life measurement of ^{124}Sb, Appl. Radiat. Isot. (2010). * G. Sibbens, S. Pommé, T. Altzitzoglou, E. García-Toraño, H. Janssen, R. Dersch, O. Ott, A. Martín Sánchez, M.P. Rubio Montero, M. Loidl, N. Coron, P. De Marcillac, T.M. Semkow, Alpha-particle emission probabilities in the decay of ^{240}Pu, Appl. Radiat. Isot. (2010). *J. Paepen, E. Boogers, A charge-sensitive preamplifier and signal mixer for 2-wire proportional counters. * R. Van Ammel, J. Paepen, S. Pommé, G. Sibbens, Measurements of the half-life of ^{54}Mn. * M.-M. Bé et al, International exercise on ^{124}Sb photon emission determination, Appl. Radiat. Isot. (2010) * B. Chauvenet et al, International exercise on ^{124}Sb activity measurements, Appl. Radiat. Isot. (2010) * T. Semkow, A. J. Khan, D.K. Haines, A. Bari, G. Sibbens, S. Pommé, S. Beach, I. AlMahamid, G. Beach, Alpha-Spectrometry of Thick Samples for Environmental and Bioassay Monitoring, Nuclear energy and the environment, ACS Symposium Series xxx. American Chemical Society, Washington, DC, xxx, * C. Michotte, S. Courte, G. Sibbens, J. Camps, J. Paepen, Study of self-attenuation in a solution of ^{237}Np measured in ionization chambers.
OTHER RELATED PUBLICATIONS	
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LABORATORY	**SCK·CEN, Low Level Radioactivity Measurements**
NAMES	C. Hurtgen, F. Verrezen.
ACTIVITY	Gross alpha and beta, ^{3}H, ^{14}C, $^{89-90}Sr$, ^{131}I, ^{210}Po, ^{226}Ra and actinides activity measurements in environmental samples Assay of actinides (Th, U, Pu, Am...) in biological samples (urine, faeces) and environmental samples (water, sediment, soil ...) by alpha spectrometry and by KPA for U. Assay of ^{14}C, ^{63}Ni, ^{99}Tc, ^{129}I in low level waste
KEYWORDS	Alpha spectrometry, measurement, environmental control, gas proportional counter, liquid scintillation, low-level, radiochemistry.
RESULTS	Informatisation and integration of our ZnS α counting chain for low-level global α measurements into the QA system of our laboratory. Our validation report on ^{90}Sr measurement has been updated.
PUBLICATIONS	
IN PROGRESS	Setting up an analytical procedure for the measurement of low level activity of ^{210}Pb in water and other matrices following the QA system of our laboratory. Revision of our validation report on gross α and β measurements.
ADDRESS	Low Level Radioactivity Measurements SCK•CEN Boeretang 200 B-2400 Mol Belgium Telephone: (+32-14) 33 28 31 Telecopier: (+32-14) 32 10 56 E-mail:churtgen@sckcen.be Web: http://www.sckcen.be/lrm
CONTACT	C. Hurtgen

LABORATORY	**SCK·CEN, Reactor & Nuclear Measurements**
NAMES	M. Bruggeman, P. Vermaercke, F. Farina, L. Sneyers, L. Verheyen, W. De Boeck, E. Boogers
ACTIVITY	γ–spectrometry, Preparation of Radioactive Standards, Neutron activation analysis with relative NAA and k_0 – method Non-destructive assay of nuclear wastes and special nuclear material (γ–spectrometry and neutron counting)
KEYWORDS	coincidence counting, gamma-ray spectrometry, gas proportional counter, ionisation chamber, low-level, NaI well counter, neutron measurement, simulation code, source preparation, X-ray spectrometry.
RESULTS	• A PhD study with the aim to accurately determine some ill-defined k_0 factors for use in k_0 neutron activation analysis was initiated; • We used k_0 NAA to analyse lichens used as bio monitors. Up to 40 elements could be determined and can be used to monitor pollution; • For a particular application we measured the $^{77}Ge/^{75}Ge$ isotopic ratio by k_0 NAA; • We determined the Høgdahl parameters for the neutron spectrum in the BR1 reactor; • A dedicated LIMS was introduced in the laboratory for γ-ray spectrometry; • A software was developed to automatically update user defined Genie2K nuclide libraries (nlb files) using the latest ENDF data. All changes made in the revised library file are logged and are available for review. • A computer program was developed to correct for coincidence summing in Genie2K. The correction is applied from within the spectrum window of Genie and is based on an Access database containing the required nuclear data.
PUBLICATIONS	• Vermaercke et al., "*Validation of the determination of tin content in samples by k_0-neutron activation analysis*", Journal Radioanal Nucl Chem (2009) • Sneyers et al. , "*Trace element determination in beauty products by k0-neutron activation analysis*", Journal Radioanal Nucl Chem (2009) • Vermaercke et al., " *Neutron spectrum calibration using the Cd-ratio for multi-monitor method with a synthetic multi-element standard*", Journal Radioanal Nucl Chem (2009)
IN PROGRESS	Validation of efficiency transfer code and LIMS
OTHER RELATED PUBLICATIONS	• P.M.J Chard, S. Croft, M. Looman, P. Peerani, H. Tagziria, M. Bruggeman, A. L. Weber, *"A Good Practice Guide for the use of Modelling Codes in Non Destructive Assay of Nuclear Materials"*, Esarda Bulletin, N° 42, Nov. 2009.
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LABORATORY	**SCK•CEN, Radio-Chemical Analysis laboratories (RCA)**
NAMES	L. Adriaensen, M. Gysemans
ACTIVITY	• Destructive radiochemical analysis of spent fuels for the determination of burn-up and for spent fuel characterization programs • Determination of Pu concentration in MOX fuels (accredited according to ISO17025). • Radiochemical analysis of long-lived and radiotoxic nuclides in various types of radioactive waste such as resins, evaporator concentrates, filters, incinerator ashes... • Study of separation chemistry of actinides and specific radionuclides • Radiochemical analysis of reactor dosimeters and irradiated reactor materials.
KEYWORDS	Alpha spectrometry, beta spectrometry, gamma-ray spectrometry, low-level, NaI well-type counter, radiochemistry, source preparation
RESULTS	• Burn-up determination and spent fuel characterization for the LWR-Deputy program, the MALIBU program and the CHIPS program • Dissolution and separation of thorium in Th-based spent fuels in the framework of LWR-Deputy, a program funded by the EC in FP6 • Optimisation of the radiochemical separation of ^{63}Ni in a stainless steel matrix
PUBLICATIONS	
IN PROGRESS	• Dissolution, separation and analysis of ^{36}Cl in radioactive concrete or metal samples • Dissolution, separation and analysis of ^{36}Cl, ^{14}C, ^{3}H, ^{63}Ni in radioactive graphite samples in the framework of Carbowaste, a project of the 7th EURATOM programme • Microwave and high pressure dissolution of different types of waste materials
ADDRESS	Radio-Chemical Analysis SCK•CEN Boeretang 200, B-2400 Mol, Belgium Telephone: (+32-14) 33 32 26 Fax: (+32-14) 32 07 55 E-mail: ladriaen@sckcen.be Web: http://www.sckcen.be/en/Our-Services/Material-testing/Radiochemical-analysis
CONTACT	L. Adriaensen

LABORATORY	Laboratório Nacional de Metrologia das Radiações Ionizantes LNMRI/IRD/CNEN
NAMES	A. Iwahara, Antônio E. de Oliveira, C.J. da Silva, E.M.O. Bernardes, P.A.L. da Cruz, J. dos S. Loureiro, José U. Delgado, R. Poledna, M.A.R.R. di Prinzio, Vanessa de Bonis
ACTIVITY	1- Participation in international comparisons ; 2- Absolute activity measurements ;
RESULTS	1- Standardization of ^{177}Lu, ^{51}Cr, ^{60}Co solutions; 2-Comparative performance of 4πβ(LSC)-(NaI(Tl) anticoincidence and 4πβ(PC)-(NaI(Tl) coincidence systems 3- Participation in the international comparison of ^{177}Lu activity measurements organized by BIPM. 4- Participation in the international comparison Analysis of Uncertainty Budgets for 4πβ–γ Coincidence Counting, organized by BIPM
PUBLICATIONS	1- Iwahara A., L. Tauhata, A.E. de Oliveira, I.G. Nicoli, F.G. Alabarse, A.M. Xavier, M.L. Oliveira, M.F. Koskinas, M.C.M. Almeida Proficiency test for radioactivity measurements in nuclear medicine. J. Radioanal. Nucl. Chem. (2009) 281: 3-6 2- Akira Iwahara, Roberto Poledna, Carlos J. da Silva, L. Tauhata Appl. Radiation Isotopes 67 - Primary activity standardization of ^{57}Co by sum-peak method (2009) 1887-1891.
IN PROGRESS	1- Carlos J. da Silva, Akira Iwahara, Roberto Poledna, Ronaldo L. da Silva, Maria Candida M. de Almeida, José U. Delgado. Activity standardization and photon emission probability per decay determination of ^{177}Lu. To be submitted to Applied Radiation and Isotopes (2010) 2- National comparison of ^{131}I measurement among nuclear medicine clinics of eight countries, V. Olsovcova, A. Iwahara, P. Oropesa, L. Joseph, A. Ravindra, M. Ghafoori, Hye-K. Son, M. Sahagia, S. Tastan, B. Zimmerman To be published in Applied Radiation and Isotopes (2010)
ADDRESS	Instituto de Radioproteção e Dosimetria, Av. Salvador Allende, s/n, Recreio, CEP 22780-160, Rio de Janeiro, Brasil.Tel: ++55 21 2173 2879 Fax: ++55 21 2442 1605 E-maiL: iwahara@ird.gov.br
CONTACT	A.Iwahara

LABORATORY	Laboratório Nacional de Metrologia das Radiações Ionizantes LNMRI/IRD/CNEN
NAMES	E.M.O. Bernardes, J.U. Delgado, M.A.R.R. di Prinzio, Maria C.M. de Almeida, R. Poledna, Ronaldo L. da Silva.
ACTIVITY	1 - Half-life determination. 2 - Impurities study by gamma-ray spectrometry. 3- Determination of photon emission probabilities
RESULTS	Measurements of nuclear data parameters in the standardization of ^{177}Lu.
PUBLICATIONS	1- A Iwahara, José U. Delgado, Roberto Poledna, Carlos J. da Silva, Maria Candida M. de Almeida, Ronaldo L. da Silva Primary radioactivity standardization and gamma intensities determination of ^{124}Sb,Nucl. Instr. and Meth. In Physics Research A 602 (2009) 450-456 2- The ^{124}Sb activity standardization by gamma spectrometry for medical applications, M.C.M. de Almeida, A. Iwahara, J.U. Delgado, R. Poledna, RL. Da Silva, Accepted to be published in Nuclear Instruments and Methods in Physics Research A (2010)
IN PROGRESS	1- International exercise on ^{124}Sb photon emissions determination Marie-Martine Bé*, B. Chauvenet, M.-N. Amiot, C. Bobin, M.-C. Lépy, T. Branger, I. Lanièce ; A. Luca, M. Sahagia, A.-M. Wätjen ; K. Kossert, O. Ott, O. Nähle ; P. Dryak, J. Sochorovà, P. Kovar, P. Auerbach ; T. Altzitzoglou, S. Pommé, G. Sibbens, R. Van Ammel, J. Paepen ; A. Iwahara, J.U. Delgado, R.Poledna, Carlos J da Silva.To be published in Applied Radiation and Isotopes 2010; 2- International exercise on ^{124}Sb photon activity measurements B. Chauvenet*, M.-M. Bé, M.-N. Amiot, C. Bobin, M.-C. Lépy, T. Branger, I. Lanièce ; A. Luca, M. Sahagia, A.-M. Wätjen ; K. Kossert, O. Ott, O. Nähle ; P. Dryak, J. Sochorovà, P. Kovar, P. Auerbach ; T. Altzitzoglou, S. Pommé, G. Sibbens, R. Van Ammel, J. Paepen ; A. Iwahara, J.U. Delgado, R.Poledna,Carlos J. da Silva ; L. Johansson, A. Stroak ; C. Bailat, Y. Nedjadi, P. Spring.To be published in Applied Radiation and Isotopes (2010)
ADDRESS	Instituto de Radioproteção e Dosimetria, Av. Salvador Allende, s/n, Recreio, CEP 22780-160, Rio de Janeiro, Brazil.Tel: ++55 21 2173 2873 Fax: ++55 21 2442 1605 EmaiL :delgado@ird.gov.br
CONTACT	J. U. Delgado

LABORATORY	Laboratório Nacional de Metrologia das Radiações Ionizantes LNMRI/IRD/CNEN
NAMES	A.C.M. Ferreira, A.E. de Oliveira , A. F. Clain, L. Tauhata, M.E.C. Vianna, M. J. C. S. de Bragança and A.M.G.F.Azeredo.
ACTIVITY	1- Preparation of the spiked sources of beta, alpha and multi-gamma emitters in water matrix; 2- Participation in international comparisons
RESULTS	1- Participation in international comparison for the analysis of metallicimpurities in water and sediments, promoted by ARCAL RLA1/10 IAEA project, 2009; 2-Participation in proficiency assay for determination of trace elements inwater and algae, promoted by ARCAL RLA/2/014 IAEA project, 2009; 3-Participation in interlaboratorial comparison, organized by CNEN / Brazil,to characterize mussel tissue which will be candidate to reference material.
IN PROGRESS	Production soil spike samples and air filter
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CONTACT	Almir F. Clain

LABORATORY	**Laboratory for Radioecology**
NAMES	Delko Barišić, Željko Grahek, Martina Rožmarić Mačefat, Ivanka Lovrenčić Mikelić, Marijana Nodilo, Gorana Cvjetojević, Matea Rogić, Tomislav Kardum, Rajko Kušić
ACTIVITY	• Measurement of 3H, 89,90Sr and gamma emitters in natural samples • Measurement of 3H, 55Fe, 89,90Sr and gamma emitters in low level liquid waste • Participation in intercomparison excercises • Monitoring of NPP • Laboratory is acredited according to ISO 17025 • Participation in CIESM MEDITERRANEAN MUSSEL WATCH (including phase II Po-210 in mussels from the Adriatic sea) • Participation in project of radioactivity monitoring of marine indicator organisms • Monitoring of radioactivity in Danube river
KEYWORDS	environmental monitoring, determination of radionuclides 3H, 55Fe, 89,90Sr and gamma emitters, low level measurement, beta spectrometry, gamma-ray spectrometry, gas proportional counter, liquid scintillation, radiochemistry
RESULTS	
PUBLICATIONS	1. Rožmarić, Martina; Gojmerac Ivšić, Astrid; Grahek, Željko **Determination of uranium and thorium in complex samples using chromatographic separation, ICP-MS and spectrophotometric detection**. // *Talanta* **80** (2009) 352-360
IN PROGRESS	• Development of methods for uranium and thorium isotopes determination in natural samples by ICP MS • Development of methods for 3H and 90Sr determination in wines and carbonated beverages • Development of methods for determination of alpha emitters in natural samples by alpha spectrometry (using electrodeposition)
INFORMATION SOURCE	www.irb.hr
IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	**Laboratory for Radioecology** Rudjer Bošković Institute Bijenička 54 10000 Zagreb, Croatia phone: 00385 1 4561 060 or 00385 1 4560 932 fax: 00385 1 4680 205
CONTACT	Željko Grahek, zgrahek@irb.hr

LABORATORY	**Laboratory for Measurements of Low-level Radioactivity** Ruđer Bošković Institute, Zagreb, Croatia
NAMES	researchers: Bogomil Obelić, Nada Horvatinčić, Ines Krajcar Bronić, assistants: Jadranka Barešić, Andreja Sironić, technician: Anita Rajtarić
ACTIVITY	• Radiocarbon dating of archaeological, geological and paleontological samples (benzene synthesis and direct absorption, both measured by LSC technique; preparation of graphite targets for AMS ^{14}C measurement) • Tritium activity measurements of natural waters (methane synthesis and GPC measurement; electrolytic enrichment and LSC measurement) • Use of stable (^{2}H, ^{13}C, ^{18}O) and natural radioactive isotopes (^{3}H, ^{14}C) in hydrogeological, paleoclimatological, environmental and ecological studies • Monitoring of ^{14}C in biological samples around nuclear power plant • Physico-chemical and isotopic study of processes in karst environment, particularly in carbonate sediments, and water-sediment interaction • Participation in intercomparison excercises • Participation in IAEA/WMO project: *"Global Network of Isotopes in Precipitation (GNIP) and Isotope Hydrology Information System (ISOHIS)"*. Data for stations Zagreb and Ljubljana since 1976 Participation in ICRU project "Key Data for Measurement Standards in the Dosimetry of Ionizing Radiation" *(I. Krajcar Bronić)*
KEYWORDS	(anti) coincidence method, data evaluation, data measurement,, environmental monitoring, gas proportional counter, liquid scintillation, accelerator mass spectrometry, dating, low-level, radionuclides C-14, H-3
RESULTS	A system for electrolytic enrichment of water with tritium has been validated and 10 series of enriched water samples were measured. This system will soon completely replace the GPC techniques of tritium measurement. Monitoring of ^{3}H in precipitation and that of ^{14}C in atmospheric CO_2 has been continued, as well as monitoring of ^{14}C in biological samples in a close vicinity of the Nuclear Power Plant Krško in Slovenia. ^{14}C dating of new charcoal samples from the Neolithic settlement Slavonski brod – Galovo was performed. The study of carbon cycle in karst areas was continued. We successfully participated in IAEA Tritium Intercomparison Study by both GPC and LSC measuring techniques and in the 5^{th} International Radiocarbon Intercomparison (VIRI) by both benzene (LSC) and graphite (AMS) samples.
PUBLICATIONS	1. Krajcar Bronić. I.; Horvatinčić, N.; Barešić, J.; Obelić, B.. **Measurement of ^{14}C activity by liquid scintillation counting**. *APPLIED RADIATION AND ISOTOPES*. 67 (2009) 800 – 804. 2. I. Krajcar Bronić, N. Horvatinčić, A. Sironić, B. Obelić, J. Barešić, I. Felja: **A new graphite preparation line for AMS ^{14}C dating in the Zagreb Radiocarbon Laboratory**, *Nuclear Instruments and Methods in Physics Research B (2009)* doi:10.1016/j.nimb.2009.10.070 **3.** Krajcar Bronić, I.; Obelić, B.; Horvatinčić, N.; Barešić, J.; Sironić, A.; Minichreiter, K.. **Radiocarbon application in environmental science and archaeology in Croatia.** *Nuclear Instruments and Methods in Physics Research A*. (2009) http://10.1016/j.nima.2009.11.032

IN PROGRESS	Project No. 245843 within the 7th Framework Programme *"SOWAEUMED - Network in Solid Wast and Water Treatment between Europe and Mediterranean Countries"* **(2009-2012)**. Universitat Autónoma de Barcelona (Bellaterra, Spain), Kungliga Tekniska Högskolan (Stockholm., Sweden), Ruđer Bošković Institute (Zagreb, Croatia), Université Cadi Ayyad (Marrakech, Morocco), NADREC S.A. (Barcelona, Spain), Sousse University (Sousse, Tunisia) *(responsible person for RBI:* B.Obelić); Bilateral Croatian-Slovene project *"Isotopic composition of precipitation on the region of Croatia and Slovenia"* - co-operation between Ruđer Bošković Institute and Jožef Stefan Institute in Ljubljana (**2009-2010**) (*Principal investigator:* I.Krajcar Bronić); Regional IAEA project **RER 8016** "Using Environmental Isotopes for Evaluation of Streamwater/Groundwater Interactions in Selected Aquifers in the Danube Basin" **(**2010-2012**).** Albania, Bulgaria, Croatia, Georgia, Hungary, Kyrgyzstan, Malta, Montenegro, Moldova, Romania, Serbia, Tajikistan, Macedonia, Turkey; Ukraine, Uzbekistan; (*responsible person for RBI:* N. Horvatinčić).
INFORMATION SOURCE	http://www.irb.hr/-ONy8-/en/str/zef/z3labs/lna/
IN PREPARATION	M. Surić, Z- Roller-Lutz, M. Mandić, I. Krajcar Bronić, M. Juračić: Modern C, H, and O isotope composition from Modrič Cave, Eastern Adriatic (Croatia)
OTHER RELATED PUBLICATIONS	1. N. Horvatinčić, B. Obelić, I. Krajcar Bronić, J. Barešić: Exchange processes of carbon isotopes ^{14}C and ^{13}C in the karst environment. Book of Abstracts, 20th International Radiocarbon Conference, Hawaii, USA, May 31–June 5, 2009. Tucson, Arizona, 2009. 46-46 2. B.Obelić[1], I.Krajcar Bronić[1], J.Barešić[1], N.Horvatinčić[1], B.Breznik[2]: ^{14}C in biological samples and in the atmosphere in the vicinity of the Krško Nuclear Power Plant (Slovenia). Book of Abstracts, 20th International Radiocarbon Conference, Hawaii, USA, May 31–June 5, 2009. Tucson, Arizona, 2009. 141-142 3. A.Portner, B.Obelić, I.Krajcar Bronić: ZAGRADA – the new Zagreb Radiocarbon Database. Book of Abstracts, 20th International Radiocarbon Conference, Hawaii, USA, May 31–June 5, 2009. Tucson, Arizona, 2009. 31 4. I. Felja, I. Krajcar Bronić, N. Horvatinčić: A RESPONSE OF ^{14}C ACTIVITY IN RECENT TUFA FROM THE PLITVICE LAKES TO CHANGES OF ATMOSPHERIC ^{14}C ACTIVITY. ESIR – European Society for the Isotope Research X Isotope Workshop, 22.-26.6.2009., Zlotniki Lubanskie, Poland, Abstract Book:, University of Wroclaw, 2009. 89-90 5. Barešić, J.; Horvatinčić, N.; Roller-Lutz, Z.; Mandić, M.. Delta ^{13}C values of dissolved inorganic carbon in the Plitvice Lakes. ESIR – European Society for the Isotope Research X Isotope Workshop, 22.-26.6.2009., Zlotniki Lubanskie, Poland, Abstract Book:, University of Wroclaw, 2009. 77-78. 6. Barešić J., Horvatinčić N., Kapelj S., Krajcar Bronić I., Obelić B. Naturally and anthropogenically induced environmental changes reconstructed from recent lake sediment in the Plitvice Lakes. International Interdisciplinary Conference "Sustainability of the Karst Environment - Dinaric Karst and other Karst Regions", 23.-26 Sept. 2009, Plitvice Lakes, Croatia. Abstract Book. 2009. 20-21 7. Horvatinčić, N.; Barešić, J. Water chemistry of the Plitvice Lakes from the springs to the Korana River – conditions for tufa precipitation. International Interdisciplinary Conference "Sustainability of the Karst Environment -

	Dinaric Karst and other Karst Regions", 23.-26 Sept. 2009, Plitvice Lakes, Croatia. Abstract Book. 2009. 68-69. 8. P. Vreča, M. Brenčić, I. Krajcar Bronić, A- Leis: Statistical analyses of stable isotopes time series in precipitation in Ljubljana – Slovenia. Abstract EGU General Assembly 2009, Geophysical Research Abstracts, vol. 11, EGU2009-8492-2, 2009 http://meetingorganizer.copernicus.org/EGU2009/EGU2009-8492-2.pdf 9. Marković, T.; Terzić, J.; Bronić-Krajcar, I.: Usage of tritium, δ^2H, $\delta^{18}O$ and chemical data in the hydrogeological investigations of the karstic area - Lička Jasenica. Goldschmidt 2009, Challenges to Our Volatile Planet. Davos, Switzerland, 21-26.06.2009. http://www.goldschmidt2009.org/abstracts/finalPDFs/A834.pdf 10. Krajcar Bronić, I.; Minichreiter, K. ^{14}C dating of Neolithic cultures in Croatia. Humboldt-Kolleg "Interdisciplinary Studies on Balkan Cultural Heritage", Program and Abstracts, Sofija, Bulgaria, 19-22.11.2009. 11. Barešić, J. Primjena izotopnih i geokemijskih metoda u praćenju globalnih i lokalnih promjena u ekološkom sustavu Plitvička jezera - Application of isotopic and geochemical methods in monitoring of global and local changes in ecological system of Plitvice Lakes, Ph.D. Thesis. Faculty of Chemical Engineering, Univ. of Zagreb, 16.02.2009., 163 pp. Mentor: Horvatinčić, N. 12. Felja, Igor. Procesi sedrenja na Plitvičkim jezerima i primjena 14C metode – Process of tufa development on the Plitvice Lakes and application of the ^{14}C method. Graduated Engineer Thesis. Department of Geology, Faculty of Science, Univ. of Zagreb, Croatia 11.02.2009, 53 pp. Mentors: Juračić, M.; Krajcar Bronić, I.
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LABORATORY	Czech Metrology Institute Inspectorate for Ionizing Radiation Prague, Czech Republic
NAMES	J. Sochorová , M.Havelka, P. Auerbach
APPARATUS	4π(PC)ß-γ coincidence equipment 4π(PPC)X,e-γ coincidence equipment 4π NaI(Tl) detector 4π LS ß-γ coincidence equipment TDCR
RESULTS	Standardization of ^{3}H for international comparison. Standardisation of ^{64}Cu for EURAMET 1085 New method for preparation of ^{124}Sb sources containing HCl was developed. Routine standardization of 25 radionuclides
PUBLICATION	M. Havelka, J. Sochorová**:** Standardisation of ^{124}Sb and ^{152}Eu using software coincidence counting system
IN PROGRESS	Software and measuring methods upgrade for TDCR

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CONTACT	P. Dryák	

LABORATORY	Czech Metrology Institute Inspectorate for Ionizing Radiation Prague, Czech Republic
NAMES	P.Dryák, P.Kovář
APPARATUS	Coaxial HPGe detectors for gamma spectrometry BEGe detector for gamma and X-ray spectrometry Si and Si(Li) detectors for alpha and beta spectrometry DSPs 9660, AIMs 556A, GENIE2000, InSpector 2k
RESULTS	Radionuclide impurities measurement Environmental samples measurement Standards production checking (activity measurement) Verification, type testing and calibration of alpha, beta and gamma spectrometers used in the Czech Republic, Slovakia and Bulgaria Noble gases standardization Monte Carlo calculation of coaxial Ge and BEGe detectors efficiency True summing corrections calculation
PUBLICATION	P. Dryák, P.Kovář: Total efficiency of Ge detectors – dead layer signal effect
IN PROGRESS	MC efficiency and true summing calculation, ^{64}Cu international comparison
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CONTACT	P.Dryák

LABORATORY	Laboratoire National Henri Becquerel (LNHB), France
NAMES	M.M. Bé, V. Chisté, C. Dulieu, X. Mougeot
ACTIVITY	Evaluation of Radionuclide Decay Data
KEYWORDS	data evaluation, ^{124}Sb, ^{126}Sn, ^{75}Se, ^{209}Po, ^{243}Am.
RESULTS	Evaluation of ^{124}Sb, ^{75}Se, ^{209}Po, ^{207}Bi, ^{243}Am. http://www.nucleide.org/DDEP_WG/DDEPdata.htm
PUBLICATIONS	**M.M. Bé, *et al.*** ^{124}Sb – Activity measurement and determination of photon emission intensities. Rapport CEA R-62222, ISSN 0429 – 3460, CEA Saclay, 91191 Gif sur Yvette Cedex **P. Bienvenu, ….. M.M. Bé** Determination of ^{126}Sn half-life from ICP-MS and gamma spectrometry measurements, Radiochimica Acta 97 (2009) 687 - 684
IN PROGRESS	Evaluation of : ^{182}Ta, ^{41}Ar, ^{64}Cu
INFORMATION	Program to calculate beta spectra with the Gove and Martin formalism done, start of experimental study. Monographie: new issue planned in 2010
OTHER RELATED PUBLICATIONS	CD Rom NUCLÉIDE, Editor EDP Sciences, ISBN 978 2 7598 0077 3
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CONTACT	Marie-Martine Bé

LABORATORY	Laboratoire National Henri Becquerel (LNHB), France
NAMES	M.N. Amiot, M. Morin, F. Rigoulay, I. Le Garrérès.
APPARATUS	Ionisation chamber dose calibrators.
ACTIVITY	Monte Carlo calculations for the determination of ionisation chambers response to photons, positrons and electrons. Participating in international intercomparison of activity measurements organized by BIPM. Routine metrological assessment and calibration of radionuclide calibrators used in Nuclear Medecine Services. Standardization of radioactive sources and solutions for Secondary Metrology Services. Half life measurements
RESULTS	Standardisation of ^{67}Ga, ^{99}Tc^{m}, ^{201}Tl, ^{137}Cs and ^{90}Y Zevalin for Secondary Metrology Services. Measurements of ^{85}Sr, ^{134}Cs, ^{60}Co, ^{113}Sn, ^{65}Zn, ^{109}Cd, ^{133}Ba, ^{54}Mn for multi-gamma solutions used for national intercomparisons among Nuclear Power Plants Laboratories. Participation to SIR for ^{207}Bi, ^{152}Eu. Measurement of ^{204}Tl Half life Assessment and calibration of 35 commercial dose calibrators.
IN PROGRESS	Monte Carlo simulation of a PTW-Vacutec ionisation chamber Standardization of ^{18}F, ^{64}Cu, ^{123}I, ^{51}Cr Activimeters calibration.
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CONTACT	Marie-Noëlle Amiot

LABORATORY	Laboratoire National Henri Becquerel (LNHB), France
NAMES	C. Bobin, B. Censier, C. Thiam (post-doc), J. Bouchard
ACTIVITY	$4\pi\beta-\gamma$ coincidence and $4\pi\gamma$ measurements, Cherenkov-TDCR counting
KEYWORDS	(anti) coincidence method, gas proportional counter, liquid scintillation, NaI well-type counter, simulation code (Geant4), Cherenkov-TDCR counting
RESULTS	- The hypothesis that spurious Cherenkov light can be emitted from photomultiplier windows due to Compton diffusion has been confirmed using a modelling based on the Monte Carlo code Geant4. - Participation to the ^{3}H international comparison using a digital MAC3 module based on an on-line processing of TDCR counting (live-time technique).
PUBLICATIONS	- Thiam et.al, *Simulation of Cherenkov photons emitted in photomultiplier windows induced by Compton diffusion*. To be published in ARI. - Bobin et al., *First results in the development of an on-line digital counting platform dedicated to primary measurements*. To be published in ARI. - Censier et al., *Digital instrumentation and management of dead-time: first results on a NaI well-type detector setup*. To be published in ARI.
IN PROGRESS	- Based on the TDCR counter modelling with Geant4 used to confirm the existence of Cherenkov light emitted from photomultiplier windows, the implementation of a stochastic approach for the coincidence calculations is underway. The goal is to simulate all the optical process taking place inside the TDCR counter (from the creation of photons in the vial to the production of photoelectrons). The first application of this stochastic approach was carried out for Cherenkov-TDCR activity measurements. Good results were obtained in the case of ^{90}Y Cherenkov counting; ^{11}C measurement study are underway. - The validation of the digital system dedicated to NaI(Tl) $4\pi\gamma$ activity measurements is underway. This new apparatus is based on an off-line processing of dead-times using the live-time technique. A comparison with the "analog" system has been carried out for a SIR participation of ^{207}Bi. - The development of an on-line digital platform dedicated to primary measurements is continued. The implementation of a digital MAC3 module gave good results; the next step corresponds to a complete system for anticoincidence counting.
SOURCE IN PREPARATION	
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CONTACT	Bobin Christophe : christophe.bobin@cea.fr Censier Benjamin : Benjamin.censier@cea.fr Thiam Cheick : cheick.thiam@cea.fr Bouchard Jacques: jack.bouchard@cea.fr

LABORATORY	Laboratoire National Henri Becquerel (LNHB), France
NAMES	Sylvie Pierre
ACTIVITY	Alpha spectrometry and alpha counting
KEYWORDS	^{210}Po, half-life, ^{222}Rn
RESULTS	Measurements of the polonium half-live with and without cooling.
PUBLICATIONS	"On the variation of the ^{210}Po half-life at low temperature", *S. Pierre et al.*, Accepted for publication in Appl. Radiat. Isotopes
IN PROGRESS	Measurement of ^{222}Rn activity by defined solid angle alpha counting using cryogenic source
INFORMATION	Alpha spectrometry chambers for high and low level activities, defined solid angle (ASD) equipment. All equipments with PIPS detectors.
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	LNE/LNHB CEA-Saclay – BC 111 F-91191 Gif-sur-Yvette cedex, FRANCE Tel +33.0.1 69 08 43 75 Fax : +33.1.69.08.26.19 E-mail : sylvie.pierre@cea.fr
CONTACT	Sylvie Pierre

LABORATORY	Laboratoire National Henri Becquerel (LNHB), France
NAMES	Laurent Ferreux, Yves Menesguen, Xavier Mougeot, Marie-Christine Lépy
ACTIVITY	Gamma-ray spectrometry
KEYWORDS	Gamma-ray spectrometry, Monte Carlo simulation, Calibration, ^{126}Sn, decay scheme
RESULTS	Efficiency calibration of HPGe detectors within 0.5 % for point sources. Efficiency calibration for volume sources (15 and 50 cm^3) Measurement of half-life and photon emission probabilities of ^{126}Sn
PUBLICATIONS	Determination of ^{126}Sn half-life from ICP-MS and gamma spectrometry measurements, *P. Bienvenu, L. Ferreux, G. Andreoletti, N. Arnal, M.-C. Lépy, J. Comte, M.-M. Bé* Radiochimica Acta 97 (2009) 687-694 Measurement of beta plus emitters by gamma-ray spectrometry, *M.-C. Lépy, P. Cassette, L. Ferreux* To be published in Appl. Radiat. Isotopes Decay scheme study of ^{126}Sn and ^{126}Sb, *L. Ferreux, M.-C. Lépy, M.-M. Bé, P. Cassette, P. Bienvenu, G. Andreoletti* To be published in Appl. Radiat. Isotopes
IN PROGRESS	Activity measurement of beta plus emitters Measurement of photon emission probabilities of ^{113}Sn Accurate calibration of HPGe detectors in the 50 to 150 keV energy range
INFORMATION	Coaxial and planar HPGe Detectors
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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CONTACT	Marie-Christine Lépy

LABORATORY	Laboratoire National Henri Becquerel (LNHB), France
NAMES	Laurent Ferreux, Isabelle Tartès
ACTIVITY	Low-level activity measurements
KEYWORDS	Alpha spectrometry, environmental control, gamma-ray spectrometry, gas proportional counter, liquid scintillation, low-level
RESULTS	
PUBLICATIONS	Measurement of natural radionuclides in phosphogypsum using an anti-cosmic gamma-ray spectrometer, *L. Ferreux, G. Moutard, T. Branger*, ARI 67 (2009) 957-960
IN PROGRESS	Participation in the 2008 IAEA-CRP1471-01 proficiency test on the determination of gamma emitters using gamma spectrometry in marine sediment Participation in the IAEA-2009-03 world wide open proficiency test on the determination of natural and artificial radionuclides in moss-soil and spiked water
INFORMATION	Main equipment: HPGe detector with active anti-cosmic shielding
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	LIST-LNHB CEA-Saclay – BC 111 F-91191 Gif-sur-Yvette cedex, FRANCE Tel. : +33.1.69.08.56.08 Fax. +33.1.69.08.26.19 E-mail : laurent.ferreux@cea.fr
CONTACT	Laurent Ferreux

LABORATORY	Laboratoire National Henri Becquerel (LNHB), France
NAMES	Yves Menesguen, Marie-Christine Lépy
ACTIVITY	X-ray Spectrometry
KEYWORDS	X-ray Spectrometry, fluorescence yield, attenuation coefficient
RESULTS	Measurement of linear attenuation coefficients and fluorescence yields of different materials
PUBLICATIONS	Aperiodic multilayer mirrors for efficient broadband reflection in the extreme ultraviolet, *Y. Ménesguen, S. de Rossi, E. Meltchakov and F. Delmotte,* Applied Physics A: Materials Science & Processing 98, 2 (2010), p 305-309, published online 19 september 2009 Mass attenuation in the range 3.8<E<11 keV and K_α and K_β fluorescence yields for Ti, V, Fe, Co, Ni, Cu, and Zn measured with a tunable monochromatic X-ray source, *Y. Ménesguen, M.-C. Lépy,* submitted to NIMB
IN PROGRESS	Characterization of the metrology beamline at the SOLEIL synchrotron facility
INFORMATION	Si(Li) and HPGe Detectors Tunable monochromatic X-ray source (1-20 keV) (SOLEX) Synchrotron beam line (SOLEIL)
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	LIST-LNHB CEA-Saclay – PC 111 F-91191 Gif-sur-Yvette cedex, FRANCE Tel : +33.1.69.08.50.88 Fax : +33.1.69.08.26.19 E-mail : yves.menesguen@cea.fr
CONTACT	Yves Menesguen

LABORATORY	Laboratoire National Henri Becquerel (LNHB), France
NAMES	P. Cassette, H. Grigaud-Desbrosses, I. Tartès
ACTIVITY	Liquid Scintillation Counting
KEYWORDS	LSC, Compton spectrometer, organic scintillators
RESULTS	Development of TDCR and tracer LS methods
PUBLICATIONS	P. Cassette, F. Jaubert and I. Tartès. Study of the influence of the liquid scintillator in the Compton efficiency tracing method. *Applied Radiation and Isotopes*, in press, 2010.
IN PROGRESS	Development of a new TDCR counter with Compton spectrometer using CPM and data acquisition based on FPGA.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	LIST-LNHB CEA-Saclay, PC 111 F-91191 Gif-sur-Yvette cedex, France
CONTACT	Philippe Cassette Tel : 33 1 69 08 48 68 Fax : 33 1 69 08 26 19 E-mail : Philippe.cassette@cea.fr

LABORATORY	Laboratoire National Henri Becquerel (LNHB), France
NAMES	P. Cassette, F. Ogheard
ACTIVITY	Cerenkov-γ coincidence counting
KEYWORDS	^{56}Mn, Cerenkov
RESULTS	Development of an on-line activity measurement system for ^{56}Mn
PUBLICATIONS	
IN PROGRESS	Development of a dynamic 4π(Cerenkov)-γ detection system for the on-line activity measurement of a neutron-activated manganese sulphate solution
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	LIST-LNHB CEA-Saclay F-91191 Gif-sur-Yvette cedex, France
CONTACT	Philippe Cassette Tel : 33 1 69 08 48 68 Fax : 33 1 69 08 26 19 E-mail : Philippe.cassette@cea.fr

LABORATORY	Physikalisch-Technische Bundesanstalt
NAMES	Dr. Annette Röttger, Anja Honig, Thomas Reich
ACTIVITY	Radon reference chamber of the PTB. Production and measurement of Rn-222 and Rn-222 progeny reference atmospheres. Thoron progeny reference chamber. Production and measurement of Rn-220 progeny reference atmospheres.
KEYWORDS	Alpha spectrometry, data measurement, environmental control, ionisation chamber, radioactive gas, traceability, radionuclide by name (Rn-222, Rn-220)
RESULTS	Traceable calibrations and reference atmospheres
PUBLICATIONS	
IN PROGRESS	Moving the Thoron Progeny Reference Chamber and rebuild a new Radon Reference Chamber in an other building
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	Physikalisch-Technische-Bundesanstalt Department 6.1 Bundesallee 100 D-38116 Braunschweig Germany Tel. ++49-531-592-6103 Fax. ++49-531-592-8525 E-mail: Anja.Honig@ptb.de
CONTACT	Anja Honig

LABORATORY	Physikalisch-Technische Bundesanstalt
NAMES	Dr. Karsten Kossert
ACTIVITY	R&D in liquid scintillation counting, Čerenkov counting and plastic scintillation counting, measurement of nuclear decay data
KEYWORDS	data measurement, ionisation chamber, life sciences, liquid scintillation, radionuclides: Cl-36, Cu-64, Se-79, Cd-113m, Sm-147, Lu-176, Pu-241
RESULTS	Activity standardization and determination of decay data for various radionuclides
PUBLICATIONS	*Kossert, Jörg, Nähle, Lierse v. Gostomski*: **High precision measurement of the half-life of ^{147}Sm**. Applied Radiation and Isotopes 67 (2009) 1702-1706 *Chmeleff, v. Blanckenburg, Kossert, Jakob.*: **Determination of the ^{10}Be half-life by multicollector ICP-MS and liquid scintillation counting**. Nuclear Instruments & Methods B, in press, doi:10.1016/j.nimb.2009.09.012 *Nähle, Kossert, Cassette:* **Activity standardization of ^{3}H with the new TDCR system at PTB.** ICRM 2009, in press *Wanke, Kossert, Nähle, Ott:* **Activity standardization and decay data of ^{64}Cu.** ICRM 2009, in press *Kossert:* **Activity standardization by means of a new TDCR-Čerenkov counting technique.** Applied Radiation and Isotopes, in press
IN PROGRESS	Development and improvement of a new TDCR-Cherenkov technique; Pu-241 comparison
INFORMATION	Works are done with many collaborators
SOURCE IN PREPARATION	- Activity standardization and nuclear decay data of Cd-113m; - Activity determination of Pu-241 by TDCR and CNET; - Cl-36 measurement by means of Čerenkov counting; - Preparation of radiochemically pure Se-79 and highly precise determination of its half-life
OTHER RELATED PUBLICATIONS	*Oropesa Verdecia, Kossert:* **Activity Standardization of ^{131}I at CENTIS-DMR and PTB within the scope of a bilateral comparison**. Applied Radiation and Isotopes 67 (2009) 1099-1103 *Kossert, Grau Carles:* **Improved method for the calculation of the counting efficiency of electron-capture nuclides in liquid scintillation samples.** ICRM 2009, in press
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CONTACT	Karsten Kossert

LABORATORY	Physikalisch-Technische Bundesanstalt
NAMES	D. Linzmaier, J. Leppelt, A. Röttger, A.Honig, T. Reich
ACTIVITY	Development of a low-level radon reference chamber
KEYWORDS	Alpha spectrometry, environmental control, gamma-ray spectrometry, low-level, radioactive gas, traceability
RESULTS	Calibration of measurement devices for activity concentrations of Rn-222 in air below 1 kBq/m^3
PUBLICATIONS	http://www.dpg-verhandlungen.de/2010/regensburg/st2.pdf
IN PROGRESS	Development of a multiwire impulse ionisation chamber with an optimized preamplifier and FPGA data analysis.
INFORMATION	http://www.ptb.de/de/org/6/_index.htm
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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CONTACT	Diana Linzmaier

LABORATORY	Physikalisch-Technische Bundesanstalt
NAMES	Dr. Annette Röttger, Anja Honig, Dr. Dirk Arnold, Dr. Rainer Dersch, Dr. Oliver Ott
ACTIVITY	Development of a primary standard for activity concentration of Rn-220 (thoron) in air
KEYWORDS	gamma-ray spectrometry
RESULTS	Realization of a primary standard for the unit Bq/m^3 f_{pr} Rn-220
PUBLICATIONS	A primary standard for activity concentration of Rn-220 (thoron) in air Annette Röttger, Anja Honig, Rainer Dersch, Oliver Ott, Dirk Arnold Applied Radiation and Isotopes 2010 (in press) PII: S0969-8043(10)00020-5 DOI: doi:10.1016/j.apradiso.2010.01.004 ARI 4942
IN PROGRESS	Determination of precise emanation rates for Th-228 area sources
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	http://www.ptb.de/en/org/6/61/613/_index.htm
ADDRESS	Physikalisch-Technische-Bundesanstalt Department 6.1 Bundesallee 100 D-38116 Braunschweig Germany Tel. ++49-531-592-6130 Fax. ++49-531-592-8525 E-mail: Annette.Roettger@ptb.de
CONTACT	Annette Röttger

LABORATORY	Bhabha Atomic Research Centre, India
NAMES	Leena Joseph, Anuradha Ravindra, D.B. Kulkarni
ACTIVITY	1. Participation in international intercomparisons 2. Absolute activity measurements 3. Audit program of activity measurements in nuclear medicine centres
KEYWORDS	APMP, I-131, dose calibrator, large area sources
RESULTS	1. Standardized ^{131}I under APMP programme 2. Calibrated radioactive sources for users 3. Large area sources prepared for calibration of contamination monitors
PUBLICATIONS	1. Standardization of ^{65}Zn an electron capture source under BIPM SIR programme. D.B.Kulkarni, R. Anuradha, Leena Joseph, U.V. Phadnis, 7th International Conference on Advances in Metrology, New Delhi, 18-20 February 2009. 2. Standardization of ^{32}P: Bilateral comparison with NMIJ, Japan, R. Anuradha, Leena Joseph, D.B.Kulkarni, Sonali P.D. Bhade and Priyanka J Reddy, 7th International Conference on Advances in Metrology, New Delhi, 18-20 February 2009. 3. Audit of I-131 activity measurements for quality improvement in nuclear medicine, Anuradha R., D.B. Kulkarni, Leena Joseph, R.N. Ambade, S.N. Shinde, presented at 30th Annual Conference of Association of Medical Physicists of India, AMPICON-2009 conference at Hyderabad. 4. Quality practices in nuclear medicine: equivalence of Co-57 a mock standard for Tc-99m", Leena Joseph, Anuradha R. and D.B. Kulkarni, presented at 30th Annual Conference of Association of Medical Physicists of India, AMPICON-2009 conference at Hyderabad.
IN PROGRESS	1. Development of multiwire large area proportional counter for standardization of large area sources. 2. Development of liquid scintillator based system for primary standardization. 3. Standardization of ^{18}F by primary method and determination of sensitivity coefficient for secondary standard.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	Head , Radiation Standards Section, Radiation Safety Systems Division, BARC, Mumbai - 400 085, India Telephone : 25592278 Telefax : 0091(22) 5505151,5519613 E-mail : amahant@barc.gov.in, leena@barc.gov.in
CONTACT	Mr. A. K. Mahant, Ms. Leena Joseph

LABORATORY	National Metrology Institute of Japan, National Institute of Advanced Industrial Science and Technology (NMIJ/AIST)
NAMES	Yoshio HINO, Akira YUNOKI, Yasushi SATO and Yasuhiro UNNO
ACTIVITY	Calibrations of activity by using the following apparatus; 4πβ(pc)-γ(NaI) and 4πβ(ppc)-γ(Ge) coincidence systems, Calibrated 4πγ ionisation chamber, HP-Ge and Si(Li) detectors, Liquid scintillation system, NaI(Tl) well-type counter, PIPS for α counting and 2π multi wire chamber, Length-compensated internal gas counting system.
KEYWORDS	remote calibration, coincidence method, data measurement, define solid angle measurement, gamma-ray spectrometry, gas proportional counter, ionisation chamber, liquid scintillation, NaI(Tl) well-type counter, radioactive gas, simulation code, SIR, source preparation, traceability
RESULTS	(1) A remote calibration service of activity measurement instruments authorized by the government has started. (2) NMIJ participated in CCRI(II)-K2.Kr-85 and conducted APMP.RI(II)-K2.I-131.
PUBLICATIONS	(1) A. Yunoki, L. Mo, V.V. Shaha, Nazaroh, W.M. van Wyngaardt, M. C. Yuan, D. D. Nhan, T. S. Park, Y. Yuandi, T. Soodprasert, C. Michotte, ”APMP comparison of the activity measurement of Ba-133 (APMP.RI(II)-K2.Ba-133) and links to the SIR”, Metrologia 46 No 1A 06014. (2) A. Yunoki, Y. Kawada, Y. Unno, T. Yamada, Y. Sato, Y. Hino, ”Activity measurement of Kr-85 diluted by a large volume balloon technique”, APPLIED RADIATION AND ISOTOPES, DOI 10.1016/j. apradiso. 2009.12.030
IN PROGRESS	(1) Estimation of uniformity of surface emission rate of a large area source made by an inkjet printer. (2) Surface contamination monitor for large-area floor by using IP (imaging plate) and sources of various surface emission rates. (3) Air kerma strength standards for brachytherapy sources.
INFORMATION	--
SOURCE IN PREPARATION	Area sources printed on aluminium plates by an ink jet printer with wide-range surface emission rate.
OTHER RELATED PUBLICATIONS	--
ADDRESS	Radioactivity and Neutron Section, Quantum Radiation Division, National Metrology Institute of Japan. Central2,1-1-1 Umezono Tsukuba, Ibaraki 305-8568, JAPAN.
CONTACT	Akira Yunoki (e-mail: a.yunoki@aist.go.jp)

LABORATORY	Institutul National de C&D pentru Fizica si Inginerie Nucleara « Horia Hulubei » (“Horia Hulubei” National Institute of R&D for Physics and Nuclear Engineering) IFIN-HH Radionuclide Metrology Laboratory (LMR)
NAMES	Aurelian Luca
ACTIVITY	Evaluation of nuclear structure and decay data
KEYWORDS	Data evaluation, 84Kr, 113Sn, 211Bi, 211Po, 228Ra, 234Th
RESULTS	-Evaluation of ^{234}Th, ^{228}Ra, ^{211}Bi and ^{211}Po, in the frame of the IAEA CRP “Updated decay data library for actinides”, http://www.nucleide.org/DDEP_WG/DDEPdata.htm . -Organization and participation at the Workshop for Nuclear Structure and Decay Data Evaluators (ENSDF-2009), 30 March – 3 April 2009, IFIN-HH, Bucharest-Magurele, Romania, http://tandem.nipne.ro/~workshop_ensdf/
PUBLICATIONS	1. *“Evaluation of ^{234}Th nuclear decay data”*, A. Luca, Appl. Radiat. Isot. (2009), doi: 10.1016/j.apradiso.2009.11.034, available online 18 November. 2.*“Table of Radionuclides (Comments on Evaluation)”*, M.-M. Bé, V. Chisté, C. Dulieu, E. Browne, C. Baglin, V.P. Chechev, A. Egorov, N.K. Kuzmenko, V.O. Sergeev, F.G. Kondev, A. Luca, M. Galán, X. Huang, B. Wang, R.G. Helmer, E. Schönfeld, R. Dersch, V.R. Vanin, R.M. de Castro, A.L. Nichols, T.D. MacMahon, A. Pearce, K.B. Lee, S.C. Wu; Monographie BIPM-5, Volumes 1-4, 2008, Ed. BIPM, Pavillon de Breteuil, Sèvres, France, ISBN 92-822-2204-7. 3.*“Nuclear Data Sheets for A=84”*, D. Abriola, M. Bostan, S. Erturk, M. Fadil, M. Galan, S. Juutinen, T. Kibédi, F. Kondev, A. Luca, Al. Negret, N. Nica, B. Pfeiffer, B. Singh, A. Sonzogni, J. Timar, J. Tuli, T. Venkova, K. Zuber, Nuclear Data Sheets 110, 2815-2944, 2009.
IN PROGRESS	-Evaluation of ^{113}Sn nuclear decay data (in cooperation with CEA/LNE-LNHB, France). -Participation at the 3rd Workshop of Radioactive Decay Data Evaluators (DDEP-2010), at CIEMAT, Madrid, Spain, 9-11 June 2010.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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LABORATORY	Institutul National de C&D pentru Fizica si Inginerie Nucleara "Horia Hulubei" ("Horia Hulubei" National Institute of R&D for Physics and Nuclear Engineering) IFIN-HH Radionuclide Metrology Laboratory
NAMES	M.Sahagia, A.C. Wätjen, C.Ivan
ACTIVITY	- CCRI(II)-K2.Lu-177 comparison; - Analysis of Uncertainty Budgets for Coincidence Counting. Co-60 - Radionuclide Metrology Laboratory (RML), Coincidence measurement: Accreditation, RENAR Certificate: LE/013/2009 Notification, CNCAN Designation LE 05/2009
KEYWORDS	Coincidence method , Key comparison, Uncertainty budget Radionuclides by name (Lu-177; Co-60)
RESULTS	Under evaluation at NIST and IRA-NPL
PUBLICATIONS	1. M-M.Bé, ... A.Luca, M.Sahagia, A-M.Wätjen..... RAPPORT CEA-R-6222/2009
IN PROGRESS	-Implementation of software for collection and processing of data in the new coincidence system
INFORMATION	
SOURCE IN PREPARATION	1. M-M.Bé, ... A.Luca, M.Sahagia, A-M.Wätjen..... *"Sb-124 activity measurement and determination of photon emission intensities"* 2. C.Michotte, S.Courte, G.Ratel, M.Sahagia, A.C.Wätjen, R.Fitzgerald, F-J. Maringer, "Draft B Update Report for Co-60 2010/01/19"
OTHER RELATED PUBLICATIONS	-
ADDRESS	Atomistilor Str.407, Magurele, Ilfov County, POB. MG 6, Code 077125, Romania Tel +40214046163, Fax +40214574440, +40214574945 e-mail: msahagia@nipne.ro
CONTACT	Dr. Maria Sahagia

LABORATORY	Institutul National de C&D pentru Fizica si Inginerie Nucleara "Horia Hulubei" ("Horia Hulubei" National Institute of R&D for Physics and Nuclear Engineering), IFIN-HH. Radionuclide Metrology Laboratory
NAMES	M.Sahagia, A.C.Wätjen, A. Luca, A. Antohe, C.Ivan
ACTIVITY	- Measurement with the Ionisation camber CENTRONIC IG12/20A of ^{222}Rn and daughters, as gas and dissolved in LS - Calibration of the chamber for ^{177}Lu (during CCRI(II) comparison) -Metrological check and calibration of radioiosotope calibrators with ^{131}I and ^{99m}Tc measured solutions - Radionuclide Metrology Laboratory (RML), Ionisation chamber measurement: Accreditation, RENAR Certificate: LE/013/2009 Notification, CNCAN Designation LE 05/2009
KEYWORDS	Ionisation chamber, Radionuclide by name (^{131}I,^{99m}Tc,^{222}Rn)
RESULTS	A list of 18 radionuclides calibration factors was obtained.
PUBLICATIONS	1.M.Sahagia, A.C.Wätjen, A.Luca, C.Ivan *« IFIN-HH ionization chamber calibration and its validation; electrometric system improvement »*Appl.Radiat.Isotopes(2009),doi:10.1016/j.apradiso.2009.11.009, available online 13 November 2.V.Olsovcova, A.Iwahara, P. Oropesa, L.Joseph, A.Ravindra, M. Ghafoori, Hye-Kyung Son, M. Sahagia, S.Tastan, B. Zimmerman *« National Comparisons of I-131 measurement among nuclear medicine clinics of eight countries »* Appl.Radiat.Isotopes(2009),doi:10.1016/j.apradiso.2009.11.008, available online 20 November 2009 3. M.Sahagia, A.C.Wätjen, C.Ivan *Progress in organizing national and international comparisons for nuclear medicine measurements* Romanian Journal of Physics, Volume 54, 7-8, Pages 619-627, 2009
IN PROGRESS	M. Sahagia, A.C. Wätjen, A.Luca, C.Ivan, A.Antohe *« National and International Comparisons on Radiopharmaceuticals' activity measurement* « Romanian Journal of Physics, accepted paper, 2010
INFORMATION	
SOURCE IN PREPARATION	Calibration of the chamber for ^{222}Rn
OTHER RELATED PUBLICATIONS	
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NAMES	A.C.Wätjen, C.Ivan, P. Cassette, M. Sahagia, A. Antohe
ACTIVITY	- Participation in CCRI(II)-K2.H3 with the "classical" LSC-TDCR system - Testing of the new system with 6 CPMs - Comparative measurements with both systems - Measurements of Rn-222 - Radionuclide Metrology Laboratory (RML), LSC-TDCR measurement: Accreditation, RENAR Certificate: LE/013/2009 Notification, CNCAN Designation LE 05/2009
KEYWORDS	LSC-TDCR, CPM, CCRI(II)-K2.H3, Rn-222, H-3
RESULTS	The result of the comparison for tritiated water is under evaluation at BIPM. The standardization of Rn-222 is done currently. The new system with 6 CPMs was tested for several radionuclides and the results were published.
PUBLICATIONS	1. C. Ivan, A.C. Wätjen, P. Cassette, M. Sahagia, A. Antohe, E.L. Grigorescu *« Participation in the CCRI(II)-K2.H-3 comparison and study of the new TDCR-LS counter with 6 CPMs »* Appl.Radiat.Isotopes(2009),doi:10.1016/j.apradiso.2009.11.061, available online 3 December 2009 2. M. Sahagia, D. Stanga, A.C. Wätjen, A. Luca, P. Cassette, C. Ivan, A. Antohe «*The ^{222}Rn standard system established at IFIN-HH, Romania »* Appl.Radiat.Isotopes(2009),doi:10.1016/j.apradiso.2009.11.060, available online 3 December 2009
IN PROGRESS	Further investigations will be carried out for a better determination of the kB value for the new CPM-system, to standardize other radionuclides, like ^{55}Fe, and test the stability of the system during a longer period of time
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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LABORATORY	Institutul National de C&D pentru Fizica si Inginerie Nucleara « Horia Hulubei » (“Horia Hulubei” National Institute of R&D for Physics and Nuclear Engineering) IFIN-HH, Radionuclide Metrology Laboratory (LMR)
NAMES	Aurelian Luca, Andrei Antohe
ACTIVITY	-Gamma-ray spectrometry measurements -Radionuclide Metrology Laboratory (RML), Gamma-ray spectrometry: measurement -Accreditation, RENAR Certificate: LE 013/2009 - calibration and Certificate: LI 804/2009-testing -Notification, CNCAN Designation LE 05/2009
KEYWORDS	Data measurement, environmental control, Euramet, gamma-ray spectrometry, low-level, radioactive gas, simulation code, X-ray spectrometry, 113Sn, 124Sb, 222Rn.
RESULTS	- Relative standardization of ^{222}Rn (glass vials with gas, respectively liquid scintillator) and other activity measurements, by using gamma-ray spectrometry.- - Implementation and successful testing of the GESPECOR ver.4.0 software (for efficiency transfer and coincidence summing corrections), in measurements of ^{222}Rn progeny and environmental type samples. - Preliminary testing of a new Si(Li) detector for X-ray spectrometry. - A. Luca, *“Some considerations about MDA and ISO 11929-3(2000)”*, Workshop of the ICRM Gamma and Beta spectrometry W.G. (23-24 Feb. 2009, LNE, Paris, France), and ICRM 2009 Int. Conf. (7-11 Sep. 2009, Bratislava, Slovak Republic),http://www.nucleide.org/ICRM_GSWG/Workshop_2009/WS_2009_Presentations.htm
PUBLICATIONS	1. A. Luca, R. Margineanu, M. Sahagia, A.C. Wätjen,“*Activity measurements of technically enhanced naturally occurring radionuclides (TENORM) in phosphogypsum”* Appl. Radiat. Isot. 67 (5), 961-963, 2009 2. M.-M. Bé et al., “*^{124}Sb – Activity measurement and determination of photon emission intensities*”, Rapport CEA-R-6222, CEA/Saclay, France, 2009.
IN PROGRESS	-New efficiency calibrations for vials with ^{222}Rn (gas) and other samples. -Experimental determination of ^{113}Sn photon emission intensities; testing of the AÇORES software (in cooperation with CEA/LNE-LNHB, France).
SOURCE IN PREPARATION	1. M-M. Bé, ... A. Luca, M. Sahagia, A.C. Wätjen..... *“Sb-124 activity measurement and determination of photon emission intensities”* 2. A. Luca, A.C. Wätjen, E.L. Grigorescu, M. Sahagia, C. Ivan, *“ Conclusions from the Participation at Proficiency Tests for Gamma-Ray Spectrometry Measurements “*, Romanian Journal of Physics, accepted paper 2010, http://www.nipne.ro/rjp/accepted_papers.html
OTHER RELATED PUBLICATIONS	A. Harms and C. Gilligan, “*Environmental Radioactivity Proficiency Test Exercise 2008*”, NPL Report IR 15, May 2009, NPL, Teddington, UK.
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CONTACT	Dr. Aurelian Luca

LABORATORY	Slovak Institute of Metrology
NAMES	Jozef Dobrovodský, Robert Hinca, Matej Krivošík, Anton Švec
APPARATUS	Two calibrated well-type ionization chambers HPGe detector Large area (20 × 30 cm) scintillation detectors for alpha and beta measurements
ACTIVITY	Calibrations of ionization chambers, point and large area sources and contamination monitors, gamma-ray spectrometry, illicit traffic radiation monitors, releases of contaminated materials and effluents into environment
KEYWORDS	environmental control, Euromet, gamma-ray spectrometry, ionisation chamber, life sciences, SIR, large area sources
RESULTS	Participation in the COOMET 319-RU-04 and 386-RU-07 (COOMET.RI(II)-K2.Cs-137) intercomparisons, NPL environmental radioactivity proficiency test exercise 2007, ICRM GSWG Coincidence Summing Action
PUBLICATIONS	Švec A.: Interpretation of ionization chamber efficiency curves. Metrologia 46 (2009) 43-46
IN PROGRESS	Participation in comparisons CCRI(II)-K2.Kr-85, EURAMET 1085, COOMET 389-RU-07, COOMET 423-RU-08, ICRM-LASCE, EMRP projects, a TDCR system acquisition
INFORMATION	
SOURCE IN PREPARATION	Near absolute method for testing of alpha and beta emitting area sources
OTHER RELATED PUBLICATIONS	
ADDRESS	Slovak Institute of Metrology, Center for Ionizing Radiations, Karloveská 63, 842 55 Bratislava Tel.: +421 2 60294 671, Fax.: +421 2 60294 670 e-mail: dobrovodsky@smu.gov.sk, svec@smu.gov.sk
CONTACT	Jozef Dobrovodský, the Director of the Center

LABORATORY	Laboratory for Radiological Measuring Systems and Radioactivity Measurements
NAMES	J. Kožar Logar, D. Glavič-Cindro, B. Vodenik, P. Maver Modec, B. Zorko, M. Korun
ACTIVITY	
KEYWORDS	environmental control, Euromet, gamma-ray spectrometry, liquid scintillation spectrometry, low-level, traceability, X-ray spectrometry
RESULTS	Measurement of the influence of summing effects between electrons and gamma-rays on the gamma-ray count rate in Ru-106 sources
PUBLICATIONS	Influence of Pb-210 on the continuous background of gamma-ray spectrometers, Appl. Radiat. Isot. 67 (2009) 762; An analysis of causes of discrepant results in proficiency tests in a testing laboratory, Appl. Radiat. Isot. 67 (2009) 683; Establishment of low-level tritium laboratory, LSC 2008, advances in liquid scintillation spectrometry, proceedings, Radiocarbon (2009) 241
IN PROGRESS	Coincidence summing between electrons and X-rays, empirical evaluation of the probability of Type 1 errors in gamma-ray spectrometry, interpretation of gamma-ray spectrometric results near detection limit for dose calculations, analysis of radon daughters background in gamma-ray spectrometers, interpretation of liquid scintillation spectrometric results near detection limit.
INFORMATION	
SOURCE IN PREPARATION	Traceability in gamma-ray spectrometry, Measurements of Ru-106 in thin samples, Interpretation of measurement results near the detection limit in gamma-ray and liquid scintillation spectrometry using Bayesian statistics
OTHER RELATED PUBLICATIONS	
ADDRESS	Jožef Stefan Institute, Jamova cesta 39, 1000 Ljubljana, Slovenia
CONTACT	Jasmina Kožar Logar, Jasmina.Logar@ijs.si

LABORATORY	National Metrology Institute of South Africa (NMISA) (SA1/SA2)
NAMES	Freda van Wyngaardt, Martin van Staden, Joline Lubbe, Bruce Simpson
ACTIVITY	**Activities undertaken in 2009** • Undertook a full review of all quality management system procedures pertaining to the Radioactivity Standards laboratory. • FvW assisted with an internal audit of the Environmental Radioactivity Laboratory of iThemba LABS (an accelerator-based facility), in preparation for ISO17025 accreditation. • Completed a study of the measurement of ^{55}Fe using the TDCR method. The use of different vial types, quenching and a new data analysis program that accounts for phototube mismatch, were investigated. • BS reviewed all abstracts submitted for inclusion in the ICRM 2009 conference programme. He attended the ICRM Scientific Committee and Executive Board meetings held in Bratislava, Slovakia. He also refereed six papers on liquid scintillation counting. • BS presented a paper in poster form at the ICRM 2009 conference held at the Slovak Metrology Institute in Bratislava, Slovakia in September. A full paper was accepted for publication in the conference proceedings and has been published electronically. BS attended the ICRM Executive Board meeting as the chairman of the nominating committee and also attended the ICRM General Meeting. • Participated in the intercomparison of tritiated water, CCRI(II)-K2.H-3. • Participated in the intercomparison of Lu-177, CCRI(II)-K2.Lu-177. • Measured ^{137}Cs by liquid scintillation coincidence counting using tracers of ^{60}Co and ^{134}Cs. Data analysis to be completed. • During June, BS attended a number of CCRI(II)-related meetings at the BIPM. He chaired the CCRI(II) meeting and attended the CCRI executive meeting. He also participated in the Key Comparisons, the Uncertainties and the Extension of the International Reference System Working Group meetings. • BS reviewed two manuscripts submitted for publication to an international scientific journal. • FvW successfully applied for rating by the National Research Foundation (NRF). The rating will be valid from January 2010. • Participated in the International Comparison of Uncertainty Evaluation, organised by the Uncertainties Working Group of the CCRI(II). • FvW reviewed CMCs from Euramet. • Trained new staff members (JL and MvS). • Many strong ^{131}I and ^{99}Mo/^{99m}Tc solutions were measured in the NMISA ionization chamber over a three month period as part of the quality assurance program of a nuclear reactor isotope production facility. These strong sources enabled NMISA to extend linearity checks on our own ionization chamber. A number of ^{131}I capsules, which are administered orally to patients, were measured for clients for verification and calibration purposes. The activities of two ^{152}Eu standards in vials were checked for a nuclear reactor facility. A number of ionization chambers maintained at a particle accelerator facility were checked for long-term stability. Determined a calibration factor for ^{18}F for one of the chambers at this particle accelerator facility. **Programme for 2010** • Ongoing training of new staff members. • Complete data analysis for the absolute standardization of ^{137}Cs and submit a sample to the International Reference System of the BIPM. • Participate in the CCRI key comparison of ^{241}Pu activity measurement.

	• Attend the Liquid Scintillation Counting conference (LSC 2010) to be held in Paris in September. • Continue with the installation and commissioning of an HPGe detector and Digital Spectrum Analyzer. • Submit additional radioactivity CMCs for intra- and inter-regional review. • Undertake an absolute standardization of ^{18}F by liquid scintillation coincidence counting and establish calibration factors for the NMISA ionization chamber. • Undergo a 3-yearly International re-assessment of our Quality System in March. • Provide radioactivity measurement services to the user community.
KEYWORDS	Coincidence method, gamma-ray spectrometry, ionisation chamber, life sciences, liquid scintillation, radiochemistry, SIR, source preparation, ^{55}Fe, ^{3}H, ^{177}Lu, ^{137}Cs, ^{134}Cs, ^{60}Co, ^{241}Pu, ^{18}F, ^{131}I, ^{99}Mo, ^{99m}Tc, ^{152}Eu
RESULTS	Yunoki, A., Mo, L., Shaha, V.V., Nazaroh, van Wyngaardt, W.M., Yuan, M.C., Nhan, D.D., Park, T.S., Yuandi, Y., Soodprasert, T., Michotte, C., 2009. APMP comparison of the activity measurements of Ba-133 (APMP.RI(II)-K2.Ba-133) and links to the SIR. Metrologia, 46, Tech. Suppl. 06014. Michotte, C., Ratel, G., Courte, S., Garcia-Toraño, E., Kossert, K., Nähle, O., van Wyngaardt, W.M., Simpson, B.R.S., 2010. Update report of the BIPM comparison BIPM.RI(II)-K1.Na-22 of activity measurements of the radionuclide ^{22}Na to include the CIEMAT, PTB and the NMISA. Metrologia, 47, Tech. Suppl. 06001.
PUBLICATIONS	Van Wyngaardt, W.M., Simpson, B.R.S., 2009. Standardization of sulphur-35 by the TDCR efficiency calculation technique. In: Eikenberg, J., Jäggi, M., Beer, H., Baehrle, H. (Eds.), LSC 2008, Advances in Liquid Scintillation Spectrometry. Radiocarbon, Tucson, AZ, p. 173.
IN PROGRESS	Simpson, B.R.S., van Wyngaardt, W.M., Lubbe, J. Fe-55 activity measurements at the NMISA revisited. Applied Radiation and Isotopes (in press).
INFORMATION	B.R.S. Simpson reached retirement age and since October 2009 has been employed on a part-time basis. M. van Staden was appointed as the metrology group leader for the Radioactivity Standards laboratory.
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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CONTACT	W.M. van Wyngaardt Tel./fax (office) +27 21 685 7776, Tel. (lab) +27 21 685 4325 E-mail : fvwyngaardt@nmisa.org

LABORATORY	Laboratorio de Metrología de Radiaciones Ionizantes (CIEMAT)
NAMES	Virginia Peyrés Medina, Eduardo García-Toraño
ACTIVITY	Monte Carlo simulation of the measurement of positron-emitting sources with Ge and NaI (Tl) detectors.
KEYWORDS	Gamma-ray spectrometry, Monte Carlo simulation
RESULTS	Oral communication to the Gamma-spectrometry working group in Paris (February 2009)
PUBLICATIONS	
IN PROGRESS	Paper to be sent to NIM
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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LABORATORY	Laboratorio de Metrología de Radiaciones Ionizantes, CIEMAT
NAMES	Eduardo García-Toraño
ACTIVITY	Measurement of the half-life of ^{233}U
KEYWORDS	Defined solid angle counting, Half-life measurements
RESULTS	Standardization of sources of ^{233}U as a part of an international cooperation project coordinated by IRMM (partners PTB, LNHB, NPL and CIEMAT)
PUBLICATIONS	"Experimental determination of the ^{233}U half-life" , Metrologia 46 (2009) 439 S Pommé, T Altzitzoglou, R Van Ammel, G Sibbens, R Eykens, S Richter, J Camps, K Kossert, H Janßen, E García-Toraño,,T Durán and F Jaubert.
IN PROGRESS	
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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CONTACT	Eduardo García-Toraño, e.garciatorano@ciemat.es

LABORATORY	Laboratorio de Metrología de Radiaciones Ionizantes, CIEMAT
NAMES	Eduardo García-Toraño, Miguel Roteta Ibarra, Virginia Peyrés Medina
ACTIVITY	Standardization of radionuclides of interest for Nuclear Medicine.
KEYWORDS	Life sciences
RESULTS	Standardization of ^{99m}Tc, ^{131}I, ^{18}F by several techniques and dissemination to users.
PUBLICATIONS	
IN PROGRESS	Measurements of the positron emitter ^{13}N
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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CONTACT	Eduardo García-Toraño, e.garciatorano@ciemat.es

LABORATORY	Laboratorio de Metrología de Radiaciones Ionizantes (CIEMAT)
NAMES	Eduardo García-Toraño, Miguel Roteta Ibarra, Virginia Peyrés Medina
ACTIVITY	Measurement of the half-life of ^{18}F using several techniques
KEYWORDS	Half-life measurements, ^{18}F
RESULTS	
PUBLICATIONS	"The half-life of ^{18}F", Applied Radiation and Isotopes, (2010) in press
IN PROGRESS	
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	CIEMAT, Ed. 12 Avenida Complutense s/n, 28040 Madrid, Spain Tel: +34 91 346 6225, FAX: +34 91 346 6442
CONTACT	Eduardo García-Toraño, e.garciatorano@ciemat.es

LABORATORY	Laboratorio de Metrología de Radiaciones Ionizantes (CIEMAT)
NAMES	Virginia Peyrés Medina, Eduardo García-Toraño, Miguel Roteta Ibarra,
ACTIVITY	Preparation and standardization of a reference solution of gamma-ray emitters for dissemination to environmental monitoring laboratories in Spain (9 nuclides)
KEYWORDS	gamma-ray spectrometry, reference materials
RESULTS	10 reference solutions dispatched to laboratories in Spain.
PUBLICATIONS	
IN PROGRESS	
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	CIEMAT, Ed. 12 Avenida Complutense s/n, 28040 Madrid, Spain Tel: +34 91 346 6225, FAX: +34 91 346 6442
CONTACT	Virginia Peyres virginia.peyres@ciemat.es

LABORATORY	Laboratorio de Metrología de Radiaciones Ionizantes, CIEMAT
NAMES	Miguel Roteta Ibarra
ACTIVITY	$4\pi\beta-\gamma$ Coincidence Measurements with pressurised proportional counters
KEYWORDS	coincidence method, digital acquisition
RESULTS	
PUBLICATIONS	
IN PROGRESS	Studies of the new digital acquisition system with two channels, and development of software to analyze data, including correlations. Standardization of ^{99m}Tc, ^{154}Eu, ^{152}Eu, ^{67}Ga
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	CIEMAT, Ed. 12 Avenida Complutense s/n, 28040 Madrid, Spain Tel: +34 91 346 6244, FAX: +34 91 346 6442
CONTACT	Miguel Roteta Ibarra, Miguel.Roteta@ciemat.es

LABORATORY	Laboratorio de Metrología de Radiaciones Ionizantes (CIEMAT)
NAMES	Virginia Peyrés Medina, Eduardo García-Toraño, Miguel Roteta Ibarra,
ACTIVITY	Setup of a digital acquisition system for gamma-ray spectrometry
KEYWORDS	Gamma-ray spectrometry, digital acquisition
RESULTS	
PUBLICATIONS	
IN PROGRESS	
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	CIEMAT, Ed. 12 Avenida Complutense s/n, 28040 Madrid, Spain Tel: +34 91 346 6225, FAX: +34 91 346 6442
CONTACT	Virginia Peyres virginia.peyres@ciemat.es

LABORATORY	Laboratorio de Metrología de Radiaciones Ionizantes, CIEMAT
NAMES	M. GALÁN, J.M. LOS ARCOS
ACTIVITY	Decay data evaluations, maintenance and update of the Spanish National Database for Ionizing Radiation (BANDRRI)
KEYWORDS	Data evaluation
RESULTS	^{22}Na, ^{59}Ni evaluations within DDEP ^{84}Nb evaluation within ENSDF Participation in the Workshop ENSDF-2009, 30 March- 3 April, Bucharest-Magurele (Romania)
PUBLICATIONS	Nuclear Data Sheets A = 84, D. Abriola, M. Bostan, S. Erturk, M. Fadil, M. Galan, S. Juutinen, T. Kibedi, F. Kondev, A. Luca, A. Negret, N. Nica, B. Pfieffer, B. Singh, A. Sonzogni, J. Timar, J. Tuli, T. Venkova, K. Zuber, Nucl. Data Sheets **110** (2009) 2815-2943. Evaluation of ^{22}Na decay data: http://www.nucleide.org/DDEP_WG/Nuclides/Na-22_tables.pdf
IN PROGRESS	^{94}Nb decay data evaluation (DDEP) Mass chain A = 183 evaluation (ENSDF)
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	BANDRRI: http://bandrri.ciemat.es
ADDRESS	
CONTACT	

LABORATORY	IRA
NAMES	Claude Bailat, Yvan Caffari, Youcef Nedjadi
ACTIVITY	Source preparation, coincidence method, gas proportional counter, NaI well counter, liquid scintillation, alpha spectrometry, gamma-ray spectrometry, ionisation chamber, Monte Carlo simulation, Radon measurements
KEYWORDS	Alpha spectrometry, beta spectrometry, (anti) coincidence method, cryogenic detector, data evaluation, data measurement, define solid angle (ASD) measurement, environmental control, Euramet, gamma-ray spectrometry, gas proportional counter, ionisation chamber, life sciences, liquid and plastic scintillation, low-level, NaI well-type counter, neutron measurement, radioactive gas, radiochemistry, simulation code, SIR, source preparation, traceability, X-ray spectrometry
PUBLICATIONS	Claude J. Bailat,Thierry Buchillier, Marc Pachoud, Raphaël Möckli,François Bochud, Medical Physics, An Absolute Dose Determination of Helical Tomotherapy Accelerator, TomoTherapy High-Art II, Claude J. Bailat,Thierry Buchillier, Marc Pachoud, Raphaël Möckli,François Bochud, Medical Physics, Med. Phys. Volume 36, Issue 9, pp. 3891-3896. Yvan Caffari, Claude Bailat, Youcef Nedjadi, Philippe Spring, François Bochud, Activity measurements of 18F and 90Y with commercial dose calibrators for nuclear medicine in Switzerland, ARI Youcef Nedjadi, Claude Bailat, Yvan Caffari, François Bochud, Standardisation of 18F by a coincidence method using full solid angle detectors, ARI Claude Bailat, Thierry Buchillier, Yvan Caffari, Youcef Nedjadi, Philippe Spring, Sybille Estier and François Bochud, Seven Years of Gamma-ray Spectrometry Comparison in Switzerland, ARI Marie-Martine Bé, B. Chauvenet, M.-N. Amiot, C. Bobin, M.-C. Lépy, T. Branger, I. Lanièce; A. Luca, M. Sahagia, A.-M. Wätjen; K. Kossert, O. Ott, O. Nähle; P. Dryak, J. Sochorová, P. Kovar, P. Auerbach; T. Altzitzoglou, S. Pommé, G. Sibbens, R. Van Ammel, J. Paepen; A. Iwahara, J.U. Delgado, R.Poledna; L. Johansson, A. Stroak; C. Bailat, Y. Nedjadi, P. String, Activity measurements and gamma emission intensities determination in the decay of 124Sb, ARI
IN PROGRESS	Validating the TDCR method; Measuring the period of Ho-166m and replacing the reference sources for the Swiss reference ionisation chamber; Characterising a HPGe well-detector for Monte Carlo simulation.
ADDRESS	Institut Universitaire de Radiophysique Appliquée, Grand-Pré 1 CH-1007 Lausanne, Switzerland Tel : +41 21 6233434 Fax : +41 21 6233435 http://www.chuv.ch/public/instituts/ira
CONTACT	Claude Bailat

LABORATORY	National Radiation Standard Laboratory, Institute of Nuclear Energy Research (NRSL/INER)
NAMES	Ming-Chien Yuan, Jeng-Jong Wang, Chien-Yung Yeh, Ing-Jane Chen
ACTIVITY	1. Standardization of Sr-89 2. Set up a 6"x6" well type NaI(Tl) integral counting system. 3. Syringe calibration factors of Tl-201 radiopharmaceutical for the NE type 288 pressurised ion chamber. 4. Participated in the APMP.RI(II)-K2.I-131 radioactivity comparison piloted by NMIJ/AIST and the CCRI(II)-S7 comparison. 5. Performed the 2009 environmental radioactivity proficiency testing. Eight kinds of spiked samples were used for this proficiency testing program including radionuclides of ^{3}H, ^{89}Sr, ^{90}Sr, ^{60}Co, ^{134}Cs and ^{137}Cs. 6. Performed the 2009 low-intermediate radioactivity proficiency testing program and the ^{89}Sr and ^{90}Sr were measured. 7. Performed the 2009 proficiency testing program for radioactivity waste measurement on clearance level and the Cs-137, Co-60 samples were measured.
KEYWORDS	liquid scintillation , NaI well-type counter , ionisation chamber, Sr-89
RESULTS	1. Standardization of Sr-89 by Ciemat/NIST method and the standard measurement uncertainty was around 0.3%. 2. The 6"x6" well type NaI(Tl) counter was set up, an efficiency curve for the point source from 0.3 to 1.1 MeV was established. 3. Calibration factors for several types of syringe used in nuclear medicines were established. 4. Seven laboratories participated in the environmental radioactivity proficiency testing and all of the participants passed the testing. 5. Five laboratories participated in this low-intermediate radioactivity proficiency testing program and all of the participants passed the testing. 6. Six domestic laboratories from INER and nuclear power plants participated in the proficiency testing program of radioactivity waste measurement on clearance level and all of the participants passed the testing.
PUBLICATIONS	1. M-C Yuan, C-H Yeh, C-Y Yeh, I-J Chen and C-F Wang, 2009, Proficiency testing feasibility study for the measurement of gamma-emitting clearance sample. ICRM 2009. 2. J-N. Wang, C-H Yeh, Y-F Chyoeu, M-C Yuan, 2009. Efficiency Evaluation of Drum-type Gamma Activity Counting System. ICRM 2009. 3. J-J Wang, 2009. Low-level radioactivity proficiency testing program in Taiwan. Applied Radiation and Isotopes, 67, 681-697. 4. M-C Yuan, C-H Yeh, J-J Wang, I-J Chen and C-F Wang, 2009,The calibration and evaluation of a radioactive waste drum counting system. Applied Radiation and Isotopes, 67, 931-934.
IN PROGRESS	1. Developing the efficiency curve and the integral counting code for the NaI(Tl) integral counting system.

	2. Setting up the TDCR counter 3. Standardization of Y-90 . 4. Planning the next proficiency testing programs for the environmental radioactivity, low-intermediate radioactivity and the radioactivity waste measurement on clearance level.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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CONTACT	Ming-Chien Yuan (mcyuan@iner.gov.tw)

LABORATORY	NPL
NAMES	Andy Pearce, Sean Collins
ACTIVITY	High Resolution Gamma Spectrometry
KEYWORDS	gamma-ray spectrometry
RESULTS	Installation of a new low-background detector for actinide measurements. Investigation of discrepancies in radium-in-scale assays.
PUBLICATIONS	none
IN PROGRESS	none
INFORMATION	-
SOURCE IN PREPARATION	-
OTHER RELATED PUBLICATIONS	-
ADDRESS	National Physical Laboratory Hampton Road Teddington TW11 0LW United Kingdom
CONTACT	Sean Collins

LABORATORY	NPL
NAMES	Andy Pearce, Arzu Arinc
ACTIVITY	Nuclear Decay Data Evaluation
KEYWORDS	Data evaluation, ^{228}Ac, ^{232}Th, ^{232}U, ^{231}Pa
RESULTS	Decay data evaluations of ^{228}Ac, ^{232}Th, ^{232}U provided to *Decay Data Evaluation Project* as part of IAEA coordinated research project.
PUBLICATIONS	-
IN PROGRESS	Decay data evaluation of ^{231}Pa for *Decay Data Evaluation Project*
INFORMATION	-
SOURCE IN PREPARATION	-
OTHER RELATED PUBLICATIONS	-
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CONTACT	Andy Pearce (andy.pearce@npl.co.uk)

LABORATORY	National Physical Laboratory
NAMES	Julian Dean, Arvic Harms, Sean Collins
ACTIVITY	UK Measurement Infrastructure for Nuclear Decommissioning • Development of reference materials (e.g. concrete) • Organisation of 'mock waste drum' comparison exercises • Contributions to guidance documents on radionuclide metrology in site decommissioning • Research into metrology of contaminated surfaces
KEYWORDS	Gamma-ray spectrometry, ionisation chamber, low-level, NaI well-type counter, radiochemistry, traceability
RESULTS	2009 'drum comparison' data submitted by 14 laboratories, mostly UK. Results submitted for 'Exempt' and 'LLW' drum types. Drums contained ^{241}Am, ^{60}Co and ^{137}Cs. Matrix was ion-exchange resin and vermiculite. Data obtained on the effect of paint layers (over contaminated surfaces) on observed surface emission rates for various radionuclides
PUBLICATIONS	Dean, J. C. J. 'A UK comparison for measurements of low levels of gamma-emitters in waste drums.' ARI, 67, 5, 2009, 678-682.
IN PROGRESS	Report on second drum comparison exercise Good Practice Guide on mathematical modelling for measurements of gamma-emitters in waste Completion of 'paint layer' project and measurements of radionuclide adsorption into surfaces
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CONTACT	Julian Dean (julian.dean@npl.co.uk)

LABORATORY	NPL
NAMES	Lena Johannson, John Keightley, John Sephton
ACTIVITY	4πβ–γ coincidence counting
KEYWORDS	Coincidence method, gas proportional counter, liquid scintillation, SIR.
RESULTS	New cylindrical High Pressure Proportional Counter (HPPC) system designed and manufactured. Submitted results for Lu-177 to CCRI(II) key-comparisons. Mn-56, Ho-166m, Cs-134, Cu-64 and Y-90 submitted to the SIR.
PUBLICATIONS	
IN PROGRESS	NPL is leading the Pu-241 Key Comparison exercise. Commissioning of new HPPC system, including design and manufacture of pressure control system. Continuation of developments in Digital Coincidence Counting (DCC), as related to pulse-interval time distribrutions and dual-channel correlation counting.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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CONTACT	Lena Johansson (lena.johansson@npl.co.uk)

LABORATORY	National Physical Laboratory
NAMES	Chris Gilligan, Simon Jerome, Arzu Arinc, Lena Johansson and Arvic Harms
ACTIVITY	*Organisation of laboratory proficiency testing programmes *Provision of low-level standards of radioactivity
KEYWORDS	Alpha spectrometry, (anti) coincidence method, gamma-ray spectrometry, ionisation chamber, liquid scintillation, low-level, radiochemistry, source preparation, traceability, ^{3}H, ^{14}C, ^{55}Fe, ^{60}Co, ^{65}Zn, ^{85}Sr, ^{89}Sr, ^{90}Sr, ^{99}Tc, ^{125}Sb, ^{129}I, ^{133}Ba, ^{134}Cs, ^{137}Cs, ^{152}Eu, ^{226}Ra, ^{232}Th, ^{238}U, ^{237}Np, ^{236}Pu, ^{238}Pu, ^{239}Pu, ^{241}Am and ^{244}Cm
RESULTS	*Organisation of the NPL Environmental Radioactivity Proficiency Test Exercise 2009 (72 participants; seven sample types (aqueous and solid); nuclides included ^{3}H, ^{14}C, ^{55}Fe, ^{60}Co, ^{65}Zn, ^{85}Sr, ^{89}Sr, ^{90}Sr, ^{99}Tc, ^{125}Sb, ^{129}I, ^{133}Ba, ^{134}Cs, ^{137}Cs, ^{152}Eu, ^{226}Ra, ^{232}Th, ^{238}U, ^{237}Np, ^{238}Pu, ^{239}Pu, ^{241}Am and ^{244}Cm) * Provision of ^{236}Pu standards * Provision of a neutron-irradiated concrete reference material
PUBLICATIONS	Harms, A.V., Johansson, L., MacMahon, D., 2009. Decay correction of ^{95}Nb. Applied Radiation and Isotopes, 67, 641-642. Harms, A.V., 2009. A new Approach for Proficiency Test Exercise Data Evaluation. Accreditation and Quality Assurance, 14, 253-261. Harms, A.V., 2009. Visualisation of Proficiency Test Exercise Results in Kiri plots. Accreditation and Quality Assurance, 14, 307-311. Harms, A.V., Gilligan., C. 2010. Development of Neutron-irradiated Concrete Powder Reference Material. Applied Radiation and Isotopes, in press.
IN PROGRESS	*Organisation of the NPL Environmental Radioactivity Proficiency Test Exercise 2010 *UKAS accreditation (ISO Guide 43, part 1; Proficiency Test Exercise Providers) *Provision of low-level standards of ^{241}Pu *Development of synthetic environmental radioactivity reference materials
INFORMATION	–
SOURCE IN PREPARATION	–
OTHER RELATED PUBLICATIONS	–
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CONTACT	Arvic Harms

LABORATORY	National Physical Laboratory
NAMES	Arzu Arinc, Eleanor Bakhshandeiar, Lena Johansson, John Keightley, Andy Pearce, John Sephton
ACTIVITY	Liquid Scintillation Counting
KEYWORDS	liquid scintillation, CIEMAT/NIST, TDCR, (DCC)
RESULTS	- Standardisation of ^{3}H, ^{55}Fe, ^{64}Cu, ^{99}Tc, ^{129}I, ^{177}Lu and ^{236}Pu by CIEMAT/NIST, 100% efficiency alpha liquid scintillation counting and TDCR methods. - Installation of a manually operated sample changer and significant improvements to the shielding of extraneous light were done on the TDCR system. The TDCR was validated using ^{3}H and ^{55}Fe. A poster describing the new system was presented at ICRM 2009 and will be published in Applied Radiation and Isotopes. - Digital Coincidence Counting (DCC) system connected to Liquid Scintillation Counting system and NaI(Tl) detector in a $4\pi\beta-\gamma$ coincidence arrangement and used for ^{64}Cu and ^{177}Lu standardisations. - Organisation of the Liquid Scintillation Users' Forum (LSUF) at NPL. This forum is an opportunity for the users' of LSC in the UK to discuss issues encountered with routine measurements and transfer knowledge.
PUBLICATIONS	L.C.Johansson, J.P.Sephton, 2010, Validation of a new TDCR system at NPL. Applier Radiation and Isotopes, in press.
IN PROGRESS	Standardisation of ^{241}Pu.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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CONTACT	Arzu Arinc

LABORATORY	NPL
NAMES	Hilary Phillips, Lena Johansson, John Sephton, Julian Dean
ACTIVITY	Internal gas proportional counting
KEYWORDS	Internal gas proportional counting, correlation counting, tritiated water, tritium, threshold estimation, carbon-11, tritum in air monitor
RESULTS	Standardisation of carbon-11 by internal gas proportional counting. Standardisation of krypton-85 by internal gas proportional counting. Determination of the activity concentration of an HTO solution by gas conversion and tritium measurement by internal gas proportional counting. Evaluation on the effect on the counting threshold of the addition of carbon dioxide, nitrogen or krypton to P10.
PUBLICATIONS	ICRM 2009 “Standardisation of krypton-85 by internal gas proportional counting”. Standardisation of positron-emitters in gas with the NPL primary gas counting system (in press)
IN PROGRESS	Calibration of secondary standard detector for PET nuclides (eg ^{11}C) Standardisation of HTO. Evaluation of the response of tritium in air monitors to tritiated water vapour and tritium in air containing typical humidity levels
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	National Physical Laboratory Hampton Road Teddington TW11 0LW United Kingdom
CONTACT	Hilary Phillips (hilary.phillips@npl.co.uk)

LABORATORY	NPL
NAMES	John Keightley, Andrew Fenwick, Michaela Baker, John Sephton
ACTIVITY	Ionisation Chamber Measurements
KEYWORDS	Ionisation Chamber, Dose Calibrator, Radionuclide Calibrator, Life Sciences
RESULTS	Radionuclide calibrator users Forum (RCUF) meeting held at NPL (minutes on web page) : www.npl.co.uk/rcuf New electrometer system installed : to be operated in parallel with old system for foreseeable future. New Lu-177 calibration factors determined for NPL Secondary Standard Ionisation chamber (FIDELIS).
PUBLICATIONS	
IN PROGRESS	Intercomparison exercise for Y-90 measurements in UK Hospitals held in late 2009. Report in preparation. New calibration factors for NPL Secondary Standard Ionisation chamber (FIDELIS): Gd-153, Cu-64 Ir-192 LDR brachytherapy wires I-125 seeds/strands I-131 capsules
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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