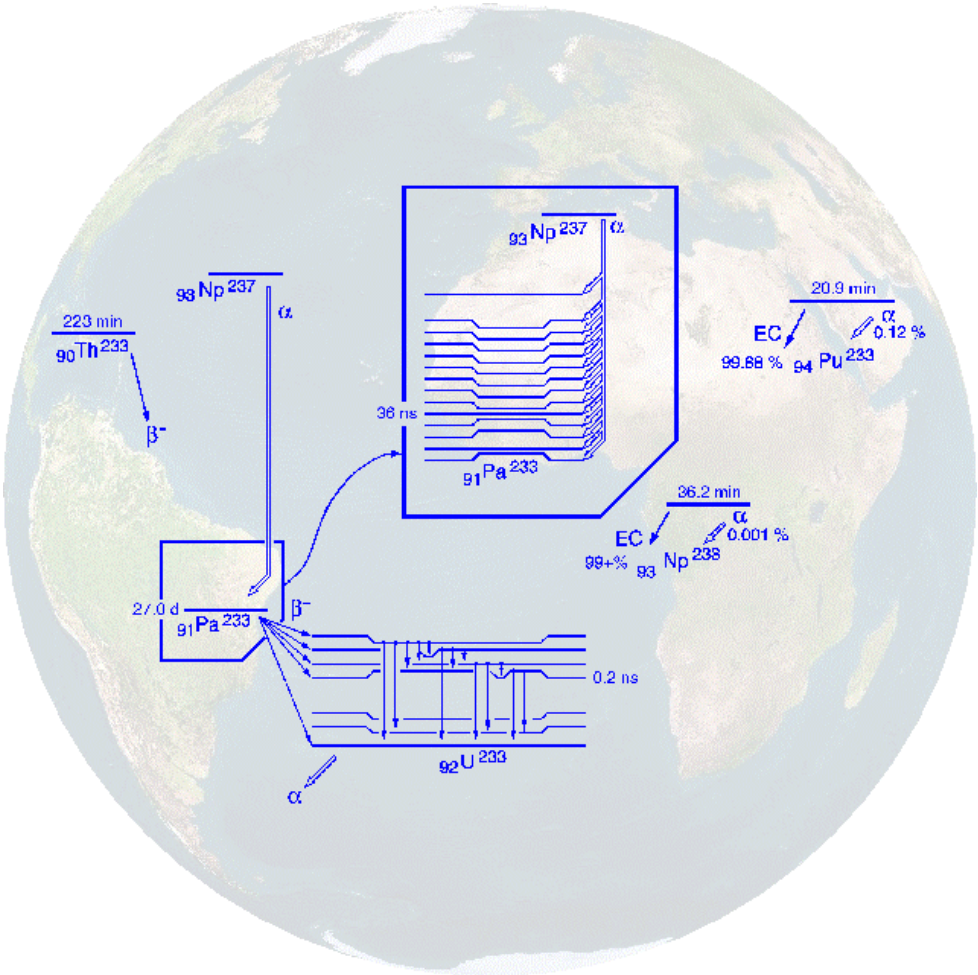
ICRM NEWSLETTER

Issue 21 – March 2007



International Committee for Radionuclide Metrology

Editor : Marie-Martine Bé

LABORATOIRE NATIONAL
HENRI BECQUEREL

International Committee for Radionuclide Metrology ICRM

ICRM NEWSLETTER
Issue 21

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March 2007

CONTENTS

CONTRIBUTIONS

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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) **format** inside a box of **15,5 cm x 20 cm** which should be situated **4,5 cm** from the upper and **3 cm** from the left margin. Please use font **Times New Roman** size **12**. The format indicated below should be followed.
- 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 use the **"contribution.dot**" file included on the pdf version of this issue.

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 published materials.
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

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 37 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:

Past-President	Mike Woods [1]
President	Yoshio Hino [2]
Vice-President	Matjaz Korun[3]
	Guy Ratel[4] (elected on 2005)
	Carlos José da Silva[5] (elected on 2005)
Secretary	Pierino De Felice[6]

We all thank B.R.S. Simpson for serving the ICRM and wish G. Ratel and C.J. da Silva a fruitful and productive period of office.

The Executive Board 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	Bruce Simpson[7]
Members	Maria Sahagia[8]
	Herbert Janβen[9]

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@irmm.jrc.be>,
Mike Unterweger[11]	<michael.unterweger@nist.gov>
(2) Life Sciences	
Brian Zimmerman[11]	<B.Zimmerman@iaea.org>
(3) Alpha-Particle Spectrometry	http://www.ciemat.es/sweb/metrologia/Alpha.html
Eduardo Garcia-Torano[12]	<E.garciatorano@ciemat.es>

(4) Gamma-Ray and Beta-Particle Spectrometry
Marie-Christine Lépy[13] <marie-christine.lepy@cea.fr>

(5) Liquid Scintillation Techniques http://www.nucleide.org/icrm.htm
Philippe Cassette[13] <cassette@ortolan.cea.fr>

(6) Low-Level Measurement Techniques
Dirk Arnold[9] <dirk.arnold@ptb.de>

(7) Non-Neutron Nuclear Data
Alan Nichols[14] <A.L.Nichols@iaea.org>

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 last biennial conference was held in September 2005 at Oxford University, Oxford, England.

The next 16th international conference of ICRM 2007 will be held in September 2007 in Cape Town, South Africa. This conference will include oral and poster presentations and business meetings of the ICRM Working Groups, in plenary format. More detailed information are available on: http://www.icrm2007.org.za/index.php

Conference Topics

- Aspects of international metrology
- Intercomparisons
- Measurement standards and reference materials
- Radionuclide metrology techniques
- Alpha-particle and beta-particle spectrometry
- Gamma-ray spectrometry
- Liquid scintillation counting techniques
- Nuclear decay data
- Low level measurements
- Life sciences
- Source preparation

Additional activities during the conference will be the meeting of the ICRM Executive Board, the General Meeting of ICRM members, a visit to the laboratory facilities of the National Physical Laboratory and social events.

Anyone wishing to participate in ICRM's activities or to receive further information is encouraged to contact one of the officers or Working Group chairs.

References

1. Ionizing Radiation Metrology Consultants Ltd, 152 Broom Road, Teddington, Middlesex TWll 9PQ, U.K.
2. National Metrology Institute of Japan, National Institute of Advanced Industrial Science and Technology, Tsukuba Central 2, l-1-1, Umezono, Tsukuba, Ibaragi 305-8568, Japan.

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12. Metrología de Radiaciones Ionizantes, Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT), Avenida Complutense 22, E-28040 Madrid, Spain.
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ICRM

CONTRIBUTIONS

Report of the Liquid Scintillation Counting Working Group

Coordinator's report

The Liquid Scintillation Counting Working Group, created in 1997 held its first meeting during the ICRM'99 conference in Prague. Further meetings were organized in Saclay in November 2000 and during the ICRM conferences. An intermediate meeting of the working group was held in Paris in January 2007.

The aim of the Liquid Scintillation Counting (LSC) working group (WG) is to share information on the use of liquid scintillation techniques in the field of radionuclide metrology. This working group focuses on the CIEMAT/NIST and the TDCR methods but also on source preparation and the developments of new instruments and methods in LSC. The topics of interest discussed during the previous WG meetings include:

- Ionisation quenching models and calculation of electron stopping power in the scintillator,
- Atomic and nuclear data needed: beta spectra shape factors, detailed X-ray and Auger K, L and M lines, etc.,
- Implementation of the CIEMAT/NIST and the TDCR methods,
- Source stability studies,
- Standardization of various nuclides: ^{18}F, ^{11}C, ^{153}Sm, ^{226}Ra, ^{222}Rn and ^{177}Lu,
- Need to standardize very long-lived radionuclides for the measurement of the half-life: ^{235}U, ^{238}U, ^{40}K, ^{79}Se, ^{87}Rb, ^{147}Sm, ^{176}Lu, ^{187}Rh, ^{190}Pt…

A comparison of the calculated absorbed spectra for the interaction of the 835 keV photons of ^{54}Mn in a liquid scintillator was organised in 2004. The aim of this action was to compare the calculation results obtained using various calculation tools, and to provide the metrology community with some information on the choice of these tools. Nine laboratories participated in this exercise and a total of 12 calculation codes were used. The results were presented and discussed during the ICRM2005 conference in Oxford (Comparison of calculated spectra for the interaction of photons in a liquid scintillator. Example of ^{54}Mn 835 keV emission. Applied Radiation and Isotopes. Vol. 64, 10-11. *Pages 1471-1480*)

The intermediate meeting organized in Paris in January 2007 was attended by 25 participants, mostly from national metrology institutes. The following subjects were discussed:

- design of a TDCR counter (including optical chamber, coincidence unit and scalers),
- influence of the asymmetry of the photomultiplier tubes,
- behaviour of the counter when efficiency is changed,
- statistics of light emission,
- new photodetectors,
- new software,
- LS spectrometry,
- Measurement of mixture of pure-beta emitters,
- Standardization of various radionuclides: ^{55}Fe, ^{63}Ni, ^{209}Po, ^{210}Po…
- Measurement of the half-life of long-lived isotopes: ^{40}K, ^{87}Rb,^{10}Be, ^{41}Ca, ^{79}Se, ^{233}U, ^{147}Sm, ^{176}Lu…
- LS cocktails chemistry effects,
- Study and characterisation of locally developed scintillators.

Two future actions of the working group were planned:

- Compilation of LS sources preparation procedures used in metrology laboratories, from a questionnaire sent to the working group members. This action will be will coordinated by J. Cessna (NIST)

- A comparison of the influence of the asymmetry of a TDCR counter on the detection efficiency of low-energy radionuclides. The LSC WG coordinator will collect measurement data from various laboratories and will send them for analysis to laboratories wishing to participate in this exercise.

No specific intercomparison measurement was proposed but the working group reaffirmed its interest in the international tritiated water comparison planned in 2007.

A report of this intermediate meeting will be made during the next LSC working group meeting in Cape Town in September 2007. It is not intended to publish proceedings of this meeting but the presentations files will be compiled in a CD ROM. This CD ROM will be distributed to the participants and is available to the ICRM community, upon request to the coordinator.

General information on LSC, TDCR and CIEMAT/NIST methods can be found in the LSC working group web page. Software to calculate detection efficiency can be downloaded and information is given on the composition of usual LSC cocktails The LSC working group web page is hosted by the LNHB server and is accessible, via an hyperlink, from the main ICRM web page or through the LNHB web site at the following address:

http://www.nucleide.org/icrm.htm

Participant contributions are welcome and must be sent to the coordinator:

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Non-Neutron Nuclear Data Working Group (3NDWG): Annual Report, 2006

Coordinator: A.L. Nichols

Key words: data evaluations; data measurements

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

3. A number of 3NDWG members are involved in the evaluation efforts of an IAEA Coordinated Research Project (CRP) "Updated decay data library for actinides" that covers a programme of work to be undertaken over approximately 4 years (2005-09; contact: M. A. Kellett (e-mail: m.kellett@iaea.org)). The proposed decay data evaluations are listed in Table 1 (half-lives, alpha, beta and gamma-ray emission probabilities, other decay data parameters and associated uncertainties will be evaluated by means of agreed DDEP procedures). Decay data measurements are also planned if suitable sources can be identified and made available. For further details, see INDC(NDS)-0479, January 2006.

Table 1. Allocation of radionuclides for decay data evaluation.

Participant	Actinides	Decay daughters
A. Luca	^{234}Th, ^{236}U	^{228}Ra
A. L. Nichols	^{228}Th, $^{242m, 244}$Am	^{208}Tl, ^{212}Pb, ^{212}Bi, ^{212}Po, ^{220}Rn, ^{224}Ra
A. Pearce	^{232}Th, ^{231}Pa, ^{232}U	^{228}Ac
F. G. Kondev	$^{243, 245, 246}$Cm	^{206}Hg, ^{206}Tl
G. Mukherjee	^{229}Th, ^{233}U	
M.-M. Bé	^{243}Am, $^{234, 238}$U, ^{252}Cf	$^{210, 214}$Pb, $^{210, 214}$Bi, $^{210, 214, 218}$Po, ^{222}Rn, ^{226}Ra
V. P. Chechev	^{233}Th, ^{233}Pa, $^{237, 239}$U, $^{236, 236m, 237, 238, 239}$Np, $^{238, 239, 240, 241, 242}$Pu, ^{241}Am, $^{242, 244}$Cm	
X. Huang	^{231}Th, ^{235}U	^{213}Bi, ^{225}Ra, ^{225}Ac
Unallocated		$^{207, 209, 210}$Tl, $^{209, 211}$Pb, $^{209, 211, 215}$Bi, $^{211, 213, 215, 216}$Po, $^{215, 217, 218, 219}$At, $^{217, 218, 219}$Rn, $^{221, 223}$Fr, ^{223}Ra, ^{227}Ac

4. Participants at a meeting at IAEA, Vienna, on 12-14 December 2005 debated the needs for additional decay data to be measured and entered in the various decay-data libraries for decay heat calculations. Specific recommendations and actions arose from this meeting in 2005, and were addressed further at another meeting on 3 May 2006 prior to a full meeting of the OECD/NEA Working Party on International Nuclear Data Evaluation Cooperation (WPEC). A list of radionuclides recommended for TAGS measurements has been assembled (TAGS, total

absorption gamma-ray spectroscopy, Table 2). Good progress has also being made in the identification of suitable TAGS facilities in Europe, and plans for ALTO at IPN-Orsay represent an exciting opportunity for undertaking TAGS for some of the more refractory radionuclides to be found in Table 2. Progress made by the experimentalists over 2007-2008 will be monitored, and further meetings are envisaged after the IPN-Orsay studies have begun, hopefully in approximately 2 years time.

Table 2: Requested TAGS measurements.

Radionuclide	Priority	Q_b-value (keV)	Half-life	Radionuclide	Priority	Q_b-value (keV)	Half life
35-Br-86	1	7626(11)	55.1 s	43-Tc-102	1 ?	4532(9)	5.28 s
35-Br-87	1	6852(18)	55.65 s	43-Tc-103	1	2662(10)	54.2 s
35-Br-88	1	8960(40)	16.36 s	43-Tc-104	1 ?	5600(50)	18.3 min
36-Kr-89	1	4990(50)	3.15 min	43-Tc-105	1 ?	3640(60)	7.6 min
36-Kr-90	1	4392(17)	32.32 s	43-Tc-106	1	6547(11)	35.6 s
37-Rb-90m	2	6690(15)	258 s	43-Tc-107	2	4820(90)	21.2 s
37-Rb-92	??	8096(6)	4.49 s	51-Sb-132	1	5509(14)	2.79 min
38-Sr-89	??	1493(3)	50.53 d	52-Te-135	??	5960(90)	19.0 s
38-Sr-97	2	7470(16)	0.429 s	53-I-136	1	6930(50)	83.4 s
39-Y-96	??	7096(23)	5.34 s	53-I-136m	1	7580(120)	46.9 s
40-Zr-99	3	4558(15)	2.1 s	53-I-137	1	5877(27)	24.13 s
40-Zr-100	2	3335(25)	7.1 s	54-Xe-137	1	4166(7)	3.82 min
41-Nb-98	1 ?	4583(5)	2.86 s	54-Xe-139	1	5057(21)	39.68 s
41-Nb-99	1	3639(13)	15.0 s	54-Xe-140	1	4060(60)	13.6 s
41-Nb-100	1	6245(25)	1.5 s	55-Cs-142	??	7308(11)	1.69 s
41-Nb-101	1	4569(18)	7.1 s	56-Ba-145	2	5570(110)	4.31 s
41-Nb-102	2	7210(40)	1.3 s	57-La-143	2	3425(15)	14.2 min
42-Mo-103	1	3750(60)	67.5 s	57-La-145	2	4110(80)	24.8 s

5. Further points of note:

(a) request to re-measure the half-lives of U-235 and U-238 to high accuracy;
(b) request to evaluate Np-237 decay data;
(c) requests for better definition of ß-decay shape factors;
(d) need to resolve anomalies between recent and on-going half-life measurements (particularly all relevant work of national standards laboratories: NIST, NPL, PTB, LNHB).

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5 January 2007

Report of the 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.

Following the ICRM 2005 conference, an exercise to compare Monte Carlo simulation codes, applied to detector calibrations, is in progress.
A first workshop dedicated to this action was held in Paris, on November 26-27th, 2006. The main goal of this meeting was to examine the results obtained during the first step of the Monte Carlo exercise and to discuss further developments.
The Monte Carlo action, leaded by Tim Vidmar, started on January 2006. The participants were asked to run Monte Carlo codes to compute full energy peak and total efficiencies for three simple sample-germanium detector geometries, for a list of energies from 45 keV to 3 MeV. Eighteen participants were involved in the action and six different Monte Carlo codes were used. Contrary to what was expected, rather spread results were observed. These *a priori* not satisfactory results were discussed, some clues were given to explain the differences (cross sections, efficiency definitions, size of the bins used …), and it was decided to run a new set of computations, with accurately defined parameters. These new results will be presented during the next ICRM2007 conference.

Some proposals on other GSWG actions were discussed during the meeting, such as:

- Fitting efficiency curves and correlations,
- Efficiency calibration in the energy range around 100 keV,
- Coincidence summing corrections: the subject is of main interest for all participants. During the ICRM2005 meeting, it was decided to momentarily postpone the action and to start by the Monte Carlo exercise, as this one could bring precious information before dealing with the more complex problem of coincidence corrections.

General information about Gamma Spectrometry and actions in progress can be found in the GSWG web page that is hosted by the LNHB server (http://www.nucleide.org/ICRM_GSWG.htm) and is also accessible, *via* an hyperlink, from the main ICRM web page. Participant contributions are welcome and should be sent to the coordinator.
In addition, a forum has been created to facilitate exchanges among working group members. The purpose of this forum is to report on recent studies and results, discuss about in progress exercise or set out specific problems, etc.
Please feel free to join the discussion at the forum address: http://laraweb.free.fr/GRS_forum/

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LABORATORY	RADIOISOTOPE METROLOGY LABORATORY - CNEA, ARGENTINA
NAMES	P. ARENILLAS, C. BALPARDO, M. E. CAPOULAT, D. RODRIGUES
ACTIVITY	1. Absolute activity measurements 2. Participation in international comparisons
KEYWORDS	Alpha spectrometry, beta spectrometry, coincidence method, data evaluation, data measurement, gas proportional counter, liquid scintillation, NaI well counter, simulation code, TDCR counter
RESULTS	1. Upgrade of a LSC TDCR System. 2. Participation in a comparison organised by BIPM for Fe-55.
PUBLICATIONS	
IN PROGRESS	1. Improvement of a new definite solid angle alpha system. 2. Improvement of a LSC TDCR system. 3. Improvement of a HPPC-NaI(Tl) coincidence system. 4. Absolute activity measurements. 5. Participation in the SIR for Eu-152 and Ir-192. 6. Improvement of a new 4π-gamma system
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	Comisión Nacional de Energía Atómica, Centro Atómico Ezeiza. Unidad de Actividad Radioquímica. Av. del Libertador 8250 (C.P.1429) - Buenos Aires - ARGENTINA Telephone/Fax: (54-11) 6779-8279/8554 e-mail: arenilla@cae.cnea.gov.ar
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LABORATORY	RADIOISOTOPE METROLOGY LABORATORY - CNEA, ARGENTINA
NAMES	G.L. CERUTTI, X.L. ARAYA, E.CIRELLO, L. RAMÍREZ
ACTIVITY	Measurement of natural and artificial radionuclides in environmental samples.
KEYWORDS	Alpha spectrometry, beta spectrometry, liquid scintillation, low-level, radiochemistry
RESULTS	1. Activity determinations of ^{90}Sr in 259 samples of milk powder, maize, soyabean meal, wheat and cheese. 2. Activity determinations of ^{241}Am and ^{239}Pu in 259 milk powder, maize, soyabean meal, wheat and cheese samples.
PUBLICATIONS	Implementación en Laboratorios de Latinoamérica de Procedimientos de Ensayo Armonizados para la Determinación de la Contaminación Radiactiva de Alimentos". I.M. Fernández Gómez, F. A. Iglicki, A. C. de Melo Ferreira, I. J. Tomicic Manzoni, L. G. Loría Meneses, J. Aguirre Gómez Memorias del II Simposio Internacional Transferencias de Tecnologías. Tecnotransfer 2006. Cuba. September 19 – 22, 2006. ISBN 959-270-087-7.
IN PROGRESS	Implementation of a quality system based on Guide ISO 17025.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	Comisión Nacional de Energía Atómica, Centro Atómico Ezeiza. Unidad de Actividad Radioquímica. Av. del Libertador 8250 (C.P.1429) - Buenos Aires - ARGENTINA Telephone/Fax: (54-11) 6779-8408/8554 e-mail: cerutti@cae.cnea.gov.ar
CONTACT	G. L. CERUTTI

LABORATORY	RADIOISOTOPE METROLOGY LABORATORY - CNEA, ARGENTINA
NAMES	G.L. CERUTTI, F.A. IGLICKI, G.R. BOCCA, X.L. ARAYA, E.CIRELLO, L. RAMÍREZ
ACTIVITY	1. Preparation, quality control, standardisation and issue of : - Standard point sources and solutions of several radionuclides for gamma-ray and alpha spectrometry. - Large area standard sources of alpha, beta and gamma emitters. 2. Development of standard sources. 3. Routine measurements and certifications of non radioactive contamination in exported foodstuffs.
KEYWORDS	Gamma-ray spectrometry, liquid scintillation, low-level, radiochemistry, source preparation
RESULTS	1. Participation in a comparison organised by IAEA, (IAEA-CU-2006-03 World-wide open proficiency test on the determination of gamma emitting radionuclides) 2. Certifications of non radioactive contamination, by gamma emitters in about 4322 samples of exported foodstuffs. 3. Preparation and calibration of 164 radioactive sources. 4. Determination of Co-60 activity in 605 samples for surface contamination and sealed control of sources used in cobalt therapy. 5. Argentinean Accreditation Body audit for accreditation maintenance of "Preparation and calibration of radioactive standards"
PUBLICATIONS	
IN PROGRESS	1. Development of simulated water standards. 2. Characterisation of a metrological ionisation chamber
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	Comisión Nacional de Energía Atómica, Centro Atómico Ezeiza. Unidad de Actividad Radioquímica. Av. del Libertador 8250 (C.P.1429) - Buenos Aires - ARGENTINA Telephone/Fax: (54-11) 6779-8218/8554 e-mail: iglicki@cae.cnea.gov.ar
CONTACT	F. A. IGLICKI

LABORATORY	RADIOISOTOPE METROLOGY LABORATORY - CNEA, ARGENTINA
NAMES	M.I. MILA, M. CAPOULAT
ACTIVITY	1. Routine metrological assessment of radionuclide calibrators used in Nuclear Medicine. 2. Preparation, quality control and standardisation of standard sources for Nuclear Medicine. 3. Organisation of comparisons for activity measurements among Nuclear Medicine Centres in Argentina.
KEYWORDS	Ionisation chamber, life sciences.
RESULTS	1. Assessment of 35 Nuclear Medicine Centre calibrators for ^{18}F, ^{32}P, ^{67}Ga, ^{90}Y, ^{99m}Tc, ^{111}In, ^{131}I, ^{153}Sm, and ^{201}Tl. 2. Assessment of 49 commercial calibrators for ^{67}Ga, ^{99m}Tc, ^{111}In, ^{131}I, ^{153}Sm and ^{201}Tl. 3. Preparation and calibration of 72 radioactive solutions to perform the assessment of calibrators. 4.Argentinean Accreditation Body audit for accreditation maintenance of "Activimeters calibration" 5.Argentinean Accreditation Body audit for accreditation maintenance of "Activimeters calibration"
PUBLICATIONS	
IN PROGRESS	Organisation of a comparison for activity measurements of ^{131}I, among Argentinean Nuclear Medicine Centres.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	Comisión Nacional de Energía Atómica, Centro Atómico Ezeiza. Unidad de Actividad Radioquímica. Av. del Libertador 8250 (C.P.1429) - Buenos Aires - ARGENTINA Telephone/Fax: (54-11) 6779-8491/8554 e-mail: mila@cae.cnea.gov.ar
CONTACT	M. I. MILA

LABORATORY Ionizing Radiation Physics, Australian Nuclear Science & Technology Organisation (ANSTO)

NAMES D Alexiev, L Mo, M.J. Qin, M Smith, L. Bignell

ACTIVITY

1. Perform neutron flux measurements for the OPAL reactor core, 6 NTD Si, 17 bulk irradiation facilities, 2 NAS facilities, 55 low flux facilities and 8 neutron beam lines for commissioning the reactor and neutron beam lines.

2. Establish TDCR measurement capability. We have completed construction of the system and data acquisition Labview program. Validation of the system is in progress.

3. Monte Carlo simulation of liquid scintillation process using GEANT4.

4. Establish efficiency curve for HPGe detectors for point source.

5. Continue the annual traceability program for ARI for I-131, Ga-67, Tl-201, Tc-99m and Y-90 activity measurements.

6. Undertake new scintillator study. Comparison of new scintillators, Lanthanum Bromide ($LaBr_3$:Ce), Lanthanum Chloride ($LaCl_3$:Ce), with Cadmium Zinc Telluride (CdZnTe or CZT) and Sodium Iodide (NaI(Tl).

PUBLICATIONS

1. D. Alexiev, L. Mo and M. Smith. Comparison of $LaBr_3$:Ce, $LaCl_3$:Ce, CZT and Nal(Tl) for resolution of Nuclear Material spectra. Accepted for oral presentation in the IEEE-9th International Conference on Inorganic Scintillators and their Applications, Winston-Salem, NC USA, June 4-8, 2007.

2. L. Mo, H.Y. Wu and C. Baldock. Absolute activity determination of Au-198 solid source using $4\pi\beta-\gamma$ coincidenc counting corrected by Monte-Carlo calculation. Submitted to IEEE transaction on Nuclear Science.

ADDRESS New Illawarra Road

Lucas Heights NSW 2234, Australia

CONTACT Li Mo, lmx@ansto.gov.au

LABORATORIES	IAEA Nuclear Data Section, Vienna, Austria; Serco Assurance, Winfrith Science Centre, Dorchester, UK
NAMES	A L Nichols (IAEA) and R J Perry (Serco Assurance)
ACTIVITY	Decay-data evaluations and preparation of databases
RESULTS/ INFORMATION	Decay-data evaluations underway in 2006-08: (a) evaluations for DDEP: ^{97m}Tc, ^{109}Pd, ^{126}Sb, ^{127}Sb, ^{127}Te and ^{127m}Te; (b) ^{192}Au and ^{214}Bi (latter within ^{226}Ra decay chain); (c) evaluations for JEFF-3 fusion.
PUBLICATIONS	O Bersillon et al, "JEFF-3T: Decay Data and Fission Yield Libraries", ND2001 Int. Conf. Nucl. Data for Science and Technology, 7-12 Oct 2001, Tsukuba, Japan; also J. Nucl. Sci. Technol., Supplement 2, Vol. 1 (2002) pp 478-480.
IN PROGRESS	Evaluation of decay data for DDEP.
INFORMATION	Decay data evaluations completed in 2006, and databases assembled in early 2007 for the JEFF-3 library: ^{73m}Ge, ^{73}As, ^{76}As, ^{77m}Se, ^{87m}Sr, ^{87}Y, ^{87m}Y, ^{101}Rh, ^{101m}Rh, ^{109m}Ag, ^{166}Dy, ^{167m}Er, ^{167}Tm, ^{168}Tm, ^{183}Re, ^{183m}Re, ^{186}Re, ^{186m}Re, ^{194}Os, ^{193m}Ir, ^{195m}Pt, ^{195}Au, ^{195m}Au and ^{194}Hg. Future years for DDEP: ^{106}Rh, ^{132}Te, ^{132}I, ^{144}Pr and ^{201}Pb, and further evaluations for JEFF-3.
IN PREPARATION	X-ray and gamma-ray decay data standards for detector efficiency calibration and other applications (to be issued as an IAEA Technical Reports Series document). Also available on the Web: http://www-nds.iaea.org/xgamma_standards/
OTHER RELATED PUBLICATIONS	A L Nichols, Nuclear Decay Data: On-going Studies to Address and Improve Radionuclide Decay Characteristics, pp. 242-251 in Proc. Int. Conf. on Nuclear Data for Science and Technology, Santa Fe, USA, 26 Sept. – 1 Oct. 2004, AIP Conf Proc. **769**, Part 1, Melville, New York, 2005. A L Nichols, Nuclear Decay Data: Observations and Reflections, *Appl. Radiat. Isot*. **64** (2006) 1384-1391.
ADDRESS	IAEA Nuclear Data Section, Department of Nuclear Sciences and Applications, PO Box 100, Wagramerstrasse 5, A-1400 Vienna, Austria.
CONTACT	Dr Alan Nichols

Summary of the research program related to radionuclide metrology
for the years 2006 and 2007

at the "Institut für Isotopenforschung und Kernphysik" (IIK) (name until 31.Dec.2006), Research Groups "Isotopenforschung" (Isotope Research) and "Kernphysik" (Nuclear Physics) of the Faculty of Physics (since 1.Jan.2007)
at the University of Vienna, Austria
Währingerstrasse 17, A-1090 Wien; Tel: +43-1-4277-51754, FAX: +43-1-4277-51752
http://www.univie.ac.at/Kernphysik/irk_engl.htm

[also to be regarded as contribution according to the ICRM standing actions SA1 and SA2]

Some activities of the two research groups concentrate on the improvement and development of atomic and nuclear measuring techniques and data handling procedures for basic physics and interdisciplinary applied physics work with special emphasis on the detection of long-lived radionuclides, particularly in the very-low-level range. Nuclear-decay-counting techniques have been widely replaced by mass-spectrometric techniques with high selectivity and high sensitivity. More detailed information about research at the IIK is also provided via the institute's internet home page given above.
A reorganisation of the whole Faculty of Physics into the direction of a kind of department structure has been very recently introduced at the University of Vienna.

Names: M. Auer, F. Dellinger, R. Drosg, O. Forstner , E. Friedl, H. Friedmann, R. Golser, J. Gröller, P. Hille, B. Jettmar, K. Knie, P. Kröpfl, J. Kühtreiber, W. Kutschera, St. Lehr, J. Lukas, K. Melber. L. Michlmayr, T. Orlowski, E. Pak, A. Pavlik, A. Priller, F. Quinto, K. Rumpelmayr, P. Steier, B. Strohmaier, S. Tagesen, H. Vonach, A. Wallner, F. Weninger, E. Wild, G. Winkler, B. Wünschek

Facilities, projects, tasks:

1. The tandem-accelerator mass-spectrometry facility VERA (Vienna Environmental Research Accelerator) and its use:

For details on the experimental equipment see:
http://www.univie.ac.at/Kernphysik/VERA/welcome.htm .
Accelerator mass spectrometry (AMS) is a major tool for research. With AMS the radionuclides are measured by direct atom counting; selectivity is achieved employing energy-, momentum- and velocity-selecting devices (electrostatic, magnetic, velocity and time-of-flight filters) and using ion detectors for counting and final energy measurement. The interesting nuclides (with extremely small radioisotope-to-stable-isotope ratios in the 10^{-10} to 10^{-15} range) cannot be measured at natural levels through radioactive-decay counting, particularly for small samples in the milligram range, typically containing only 10^5 to 10^8 radionuclide atoms. Predominantly isotope ratios are measured relative to appropriate standards.

Typically, in the light-ion region atoms like ^{14}C (5.7×10^3 a, for radiocarbon dating), ^{10}Be ($T_{1/2}=1.5\times10^6$ a) and ^{26}Al ($T_{1/2}=7.2\times10^5$ a) (both, e.g., for applications in geology), heavy long-lived radionuclides such as ^{129}I ($T_{1/2} \approx 1.6\times10^7$ a), ^{236}U ($T_{1/2} \approx$

23×10^6 a), ^{244}Pu ($T_{1/2} \approx 81\times10^6$ a) [for research on e.g. interstellar medium grains], ^{242}Pu ($T_{1/2} \approx 3.8\times10^5$ a) and ^{182}Hf ($T_{1/2} \approx (9\pm2)\times10^6$ a) [of interest in astrophysics and geophysics] are counted in natural samples with an excellent suppression of isobaric background. Recently, AMS studies with ^{41}Ca and ^{55}Fe atoms were performed.

Projects involving radiocarbon measurements are, e.g.,

- "dating" of recent events using the "bomb peak"(^{14}C produced by nuclear weapons tests in the atmosphere prior to the Nuclear Test Ban Treaty in 1963), applied to problems of biophysics and biomedicine, antiquity and forensic science
- identification of carbonaceous aerosols
- synchronization of civilizations in the East Mediterranean: CHRONOLOGY FOR THE AEGEAN LATE BRONZE AGE 1700-1400 B.C.: S. W. Manning, C. Bronk Ramsey, W. Kutschera, T. Higham, B. Kromer, P. Steier, E. M. Wild; Science **312** (2006) 565-569

Some other recent publications relevant to radionuclide metrology are:

DETERMINATION OF PLUTONIUM IN ENVIRONMENTAL SAMPLES BY AMS AND ALPHA SPECTROMETRY,
E. Hrnecek, P. Steier, A. Wallner;
Applied Radiation and Isotopes 63 (2005) 633 - 638

HIGH PRECISION MEASUREMENTS OF ^{26}Na ß$^-$ DECAY,
G.F. Grinyer, et al.;
Physical Review C 71 (2005) 44309-1 – 44309-13

2. Conventional radionuclide measurements and evaluation

a) A further improved value of the *half-life of ^{44}Ti* was obtained from a 14-years long decay measurement relative to the half-life of ^{60}Co (assumed to be 5.2711 ± 0.0004 a), *that is 58.9 ± 0.3 years.*
I. Ahmad, J.P. Greene, E.F. Moore, S.Ghelberg, A. Ofan, M. Paul, W. Kutschera; to be published in Physical Review C (2007)

b) *The half-life of ^{183}Hf* was re-measured with high precision after it had been produced by the (n, γ) reaction on the long-lived *^{182}Hf [half-life (8.90 ± 0.09) ´ 10^6 a*; see the last year's report] giving a value *1.018 ± 0.002 hours.*
HALF-LIFE OF ^{183}Hf, C. Vockenhuber, M. Bichler, W. Kutschera, A. Wallner, I. Dillmann, F. Käppeler; Phys. Rev. C 74 (2006) 057303-1 to 057303-3

c) As a follow-up program of the *Austrian National Radon Project (ÖNRAP)* (http://www.univie.ac.at/Kernphysik/oenrap/onrap_e.htm) [H. Friedmann] correlations between the so-called radon potential and details of the geology are to be investigated.

d) Studies to assign uncertainties to the *Monte-Carlo simulation* of the *total detection efficieny of NaI(Tl) well-type detectors*, including the effect of electrons emitted from the source, will continue.

3. Work and co-operation on special reports and standard concepts, training tasks

Co-operation with the *Austrian Standards Institute* (OENORM) [related to low-level measurements and harmonisation of uncertainty statements] is continued.

Students' training in the field of general experimental physics, quantum physics, atomic physics, nuclear physics, ion physics and radioactivity measurements is taken care of by the staff of the IIK.

4. Participation in international organisations dealing with radionuclide metrology

- International Committee for Radionuclide Metrology (ICRM) [G. Winkler]
- Consultative Committee for Ionising Radiation (CCRI), Section II (Measurement of Radionuclides) at the BIPM, Sèvres, France [personal member: G. Winkler]

January 2007 Gerhard Winkler

LABORATORY	European Commission - DG Joint Research Centre Institute for Reference Materials and Measurements (IRMM) JRC Reference Laboratory for Radionuclide Metrology
NAMES	G. Sibbens, S. Pommé, R. Van Ammel
APPARATUS ACTIVITY	* radioactive source preparation by vacuum evaporation * two high resolution semiconductor alpha-particle spectrometers
RESULTS	* G. Sibbens, S. Pommé, R. Van Ammel, Total activity and Pu-238/Pu-239+240 ratio by alpha-particle counting and spectrometry for NUSIMEP-5, int. report GE/R/IM/01/06
PUBLICATIONS	* L. Benedik, T. Altzitzoglou, R. Van Ammel, S. Pommé, S. Richter, G. Sibbens, A. Stolarz, A. Verbruggen and R. Wellum, NUSIMEP 5: Uranium, plutonium and caesium isotopic abundances in a saline matrix, Report to participants, Report EUR 22286 EN (2006), ISBN 92-79-02272-5. * L. Benedik, A. Alonso, T. Altzitzoglou, S. Richter, G. Sibbens, A. Stolarz, A. Verbruggen and R. Wellum, Preparation of samples for the NUSIMEP 5 campaign containing uranium, plutonium and caesium certified for isotopic abundances, Report EUR 22180 EN (2006), ISBN 92-79-01701-2. * T. Altzitzoglou, M. Bickel, A. Bohnstedt, J.-G. Decaillon, C. Hill, L. Holmes and G. Sibbens, Characterisation of the IAEA-375 soil intercomparison material for radioactivity with assigned values traceable to the SI units, Report EUR 22226 EN (2006), ISBN 92-79-01928-7.
IN PROGRESS	* EUROMET project no 749 on alpha-particle emission probabilities and energies in the decay of ^{240}Pu. * S. Pommé, E. García-Toraño, G. Sibbens, S. Richter, R. Wellum, A. Stolarz, A. Alonso, ^{234}U/^{235}U activity ratios as a probe for the ^{238}U/^{235}U half-life ratio, J. Radioanal. Nucl. Chem.
ADDRESS	European Commission Directorate-General Joint Research Centre Institute for Reference Materials and Measurements (IRMM) Retieseweg 111, B-2440 Geel, Belgium Tel. +32 14 571 264 - Fax +32 14 584 273 e-mail: goedele.sibbens@ec.europa.eu
CONTACT	Goedele Sibbens

LABORATORY	European Commission - DG Joint Research Centre Institute for Reference Materials and Measurements (IRMM) JRC Reference Laboratory for Radionuclide Metrology
NAMES	Mikael Hult, Gerd Marissens, Joël Gasparro, Elisabeth Wieslander, Patric Lindahl
APPARATUS ACTIVITY	Seven underground HPGe-detectors for ultra low level gamma-ray spectrometry.
RESULTS	* Activation products flux monitors activated by the thermonuclear plasma at JET * Radionuclides as a means of check authenticity of organic farming * Neutron cross section measurements * Radiation protection – dosimetry using neutron activation by fast neutrons * Radiopurity measurements detector development. * Nuclear decay data
PUBLICATIONS	* M. Hult, W. Preuße, J. Gasparro and M. Köhler, Underground gamma-ray spectrometry, Acta Chimica Slovenica 53 (2006) 1-7. * J. Gasparro, M. Hult, G. Bonheure and P.N. Johnston, A low-level activation technique for monitoring thermonuclear fusion plasma conditions, Appl. Radiat. Isot. 64 (2006) pp. 1130-1135. * P.N. Johnston, M. Hult and J. Gasparro, Cascade summing effects in close geometry gamma-ray spectrometry, Appl. Radiat. Isot. 64 (2006) pp. 1323-1328. * Mikael Hult, Joël Gasparro, Gerd Marissens, Patric Lindahl, Uwe Wätjen, Peter N. Johnston, Cyriel Wagemans and Matthias Köhler, Underground search for the decay of 180Tam, Physical Review C 74 No. 5 054311 (2006). * U. Wätjen, Zs. Szántó, T. Altzitzoglou, G. Sibbens, J. Keightley and M. Hult, EC intercomparisons for laboratories monitoring environmental radioactivity, Applied Radiation and Isotopes 64 (2006) pp. 1108-1113. * J. Gasparro, M. Hult, P.N. Johnston and H. Tagziria, The effect of uncertainties in nuclear decay data on coincidence summing calculations for gamma-ray spectrometry, Czechoslovak Journal of Physics 56 (2006) Suppl. pp. D203-D210.
IN PROGRESS	* Measurements of ^{60}Co in steel from Hiroshima * Neutron dosimetry and plasma characterisation using activation of metal discs * Neutron cross section measurements by activation and

deconvolution.

* Intercomparison work

* Isotopic fingerprinting of environmental processes

* Ultra low background detector developments

ADDRESS

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CONTACT

Mikael Hult

LABORATORY	European Commission - DG Joint Research Centre Institute for Reference Materials and Measurements (IRMM) JRC Reference Laboratory for Radionuclide Metrology
NAMES	Timotheos Altzitzoglou
APPARATUS ACTIVITY	* 4 HPGe detector systems (incl. low background detectors). * 2 Low and Ultra low level liquid scintillation spectrometers. * Facilities for radiochemical separations. * Quantitative radioactive source preparation facilities.
RESULTS	* T. Altzitzoglou and A. Bohnstedt, Characterisation of the IAEA-152 milk powder intercomparison material for radioactivity with assigned values traceable to the SI units, Report EUR 22227 EN (ISBN 92-79-01925-2) (2006). * T. Altzitzoglou, M. Bickel, A. Bohnstedt, J.-G. Decaillon, C. Hill, L. Holmes and G. Sibbens, Characterisation of the IAEA-375 soil intercomparison material for radioactivity with assigned values traceable to the SI units, Report EUR 22226 EN (2006), ISBN 92-79-01928-7. * T. Altzitzoglou, "XAN6040 candidate reference liquid scintillation cocktail for the ESIR: Performance tests", GE/R/IM/17/05/Set01. * L. Benedik, A. Alonso, T. Altzitzoglou, S. Richter, G. Sibbens, A. Stolarz, A. Verbruggen and R. Wellum, Preparation of samples for the NUSIMEP 5 campaign containing uranium, plutonium and caesium certified for isotopic abundances, Report EUR 22180 EN (2006), ISBN 92-79-01701-2. * L. Benedik, T. Altzitzoglou, R. Van Ammel, S. Pommé, S. Richter, G. Sibbens, A. Stolarz, A. Verbruggen and R. Wellum, NUSIMEP 5: Uranium, plutonium and caesium isotopic abundances in a saline matrix, Report to participants, Report EUR 22286 EN (2006), ISBN 92-79-02272-5. * U. Wätjen, Zs. Szántó, T. Altzitzoglou, G. Sibbens, J. Keightley, R. Van Ammel and M. Hult, EC measurement comparison on simulated airborne particulates - ^{137}Cs in air filters, Report EUR 22612 EN (2006), ISBN 92-79-04591-1. * U. Wätjen, Y. Spasova, T. Altzitzoglou and S. Pommé, EC measurement comparison for ^{137}Cs, ^{40}K and ^{90}Sr in milk powder, Report EUR 22616 EN (2006), ISBN 978-92-79-02491-7.
PUBLICATIONS	* S. Pomme´, T. Altzitzoglou, R. Van Ammel, G. Sibbens, Seven

techniques for activity standardisation of ^{125}I, Applied Radiation and Isotopes 64 (2006) 1198.

* U. Wätjen, Zs. Szántó, T. Altzitzoglou, G. Sibbens, J. Keightley and M. Hult, EC intercomparisons for laboratories monitoring environmental radioactivity, Applied Radiation and Isotopes 64 (2006) pp. 1108-1113.

* P. Cassette, G.H. Ahn, T. Altzitzoglou, I. Aubineau-Lanièce, F. Bochud, E. García-Toraño, A. Grau Carles, A. Grau Malonda, K. Kossert, K.B. Lee, J.P. Laedermann, B.R. Simpson, W.M. van Wyngaardt, B.E. Zimmerman, Comparison of calculated spectra for the interaction of photons in a liquid scintillator: example of ^{54}Mn 835 keV emission, Appl. Radiat. Isotopes 64 (2006) pp. 1471-1480.

IN PROGRESS

* Half-life determination of ^{233}U by LSC.

* EUROMET project 907: Measurement of Sb-124 activity and determination of photon emission probabilities.

* EUROMET project no 749 on alpha-particle emission probabilities and energies in the decay of ^{240}Pu; gamma-ray emission probability measurements.

* Development of a new TDCR LSC.

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CONTACT

Timos Altzitzoglou

LABORATORY	European Commission - DG Joint Research Centre Institute for Reference Materials and Measurements (IRMM) JRC Reference Laboratory for Radionuclide Metrology
NAMES	S. Pommé, G. Sibbens, T. Altzitzoglou, R. Van Ammel, J. Keightley, J. Paepen, J. Camps, U. Wätjen
APPARATUS ACTIVITY	* radioactive source preparation (quantitative drop deposition, IRMM source drying device, vacuum evaporation and electrodeposition) * 4π pressurised gas proportional counter * windowless 4πCsI(Tl)-sandwich spectrometer * two α-particle counters at defined solid angle * atmospheric 4πβ–γ coincidence counter * pressurised 4πβ–γ coincidence counter * 4πγ NaI well counter * two secondary standard ionisation chambers and one prototype IC * two 4p liquid scintillation counters * X-ray counter at defined solid angle * HPGe detector * Si(Li) X-ray detector spectrometer
RESULTS	* U. Wätjen, Zs. Szántó, T. Altzitzoglou, G. Sibbens, J. Keightley and M. Hult, EC measurements comparison on simulated airborne particulates - ^{137}Cs in air filters, int. report GE/R/IM/08/06 * R. Van Ammel, B. Denecke, D. De Smet, J. Paepen and T. Szabo, The IRMM source dryer: user manual, int. report GE/R/IM/13/06 * L. Benedik, A. Alonso, T. Altzitzoglou, S. Richter, G. Sibbens, A. Stolarz, A. Verbruggen and R. Wellum, Preparation of samples for the NUSIMEP 5 campaign containing uranium, plutonium and caesium certified for isotopic abundances, Report EUR 22180 EN (2006), ISBN 92-79-01701-2. * T. Altzitzoglou, M. Bickel, A. Bohnstedt, J.-G. Decaillon, C. Hill, L. Holmes and G. Sibbens, Characterisation of the IAEA-375 soil intercomparison material for radioactivity with assigned values traceable to the SI units, Report EUR 22226 EN (2006), ISBN 92-79-01928-7. * J. Camps and J. Paepen, Development of an ionisation chamber for the establishment of the SI unit becquerel, Report EUR 22609 EN (2006), ISBN 92-79-04588-1.

* U. Wätjen, Zs. Szántó, T. Altzitzoglou, G. Sibbens, J. Keightley, R. Van Ammel and M. Hult, EC measurement comparison on simulated airborne particulates - ^{137}Cs in air filters, Report EUR 22612 EN (2006), ISBN 92-79-04591-1.

* U. Wätjen, Y. Spasova, T. Altzitzoglou and S. Pommé, EC measurement comparison for ^{137}Cs, ^{40}K and ^{90}Sr in milk powder, Report EUR 22616 EN (2006), ISBN 978-92-79-02491-7.

PUBLICATIONS

* G. Ratel, C. Michotte, Y. Hino, J. Keightley and U. Wätjen, Update of the ongoing comparison BIPM.RI(II)-K1.Co-60 including activity measurements of the radionuclide ^{60}Co for the NMIJ, Japan and the IRMM (Geel), Metrologia 43 (2006) Tech. Suppl., 06003 (on-line).

* S. Pommé, J. Keightley, Count rate estimation of a Poisson process: unbiased fit versus central moment analysis of time interval spectra, American Chemical Society Press (2006), Applied Modeling and Computations in Nuclear Science. T.M. Semkow, S. Pommé, S.M. Jerome and D.J. Strom, Eds. ACS Symposium Series 945, ISBN 0-8412-3982-7, pp. 316-334.

* S. Pommé, Dead time, pile-up, and counting statistics, American Chemical Society Press (2006), Applied Modeling and Computations in Nuclear Science. T.M. Semkow, S. Pommé, S.M. Jerome and D.J. Strom, Eds. ACS Symposium Series 945, ISBN 0-8412-3982-7, pp. 218-233.

* S. Pommé, Problems with the uncertainty budget of half-life measurements, American Chemical Society Press (2006), Applied Modeling and Computations in Nuclear Science. T.M. Semkow, S. Pommé, S.M. Jerome and D.J. Strom, Eds. ACS Symposium Series 945, ISBN 0-8412-3982-7, pp. 282-292.

* J.D. Keightley, DCC-SIM : A simulation routine for the validation of $4\pi\beta$–γ digital coincidence counting software, American Chemical Society Press (2006), Applied Modeling and Computations in Nuclear Science. T.M. Semkow, S. Pommé, S.M. Jerome and D.J. Strom, Eds. ACS Symposium Series 945, ISBN 0-8412-3982-7, pp. 234-248.

* U. Wätjen, Zs. Szántó, T. Altzitzoglou, G. Sibbens, J. Keightley and M. Hult, EC intercomparisons for laboratories monitoring environmental radioactivity, Applied Radiation and Isotopes 64 (2006) pp. 1108-1113.

* S. Pommé, An intuitive visualisation of intercomparison results applied to the KCDB, Appl. Radiat. Isot. 64 (2006) pp. 1158-1162.

* R. Van Ammel, S. Pommé, G. Sibbens, Half-life measurement of ^{55}Fe. Applied Radiation and Isotopes 64 (2006) 1412-1416.

* S. Pomme´, T. Altzitzoglou, R. Van Ammel, G. Sibbens, Seven techniques for activity standardisation of ^{125}I, Applied Radiation and

Isotopes 64 (2006) 1198.

* T.M. Semkow, S. Pommé, S.M. Jerome and D.J. Strom (Eds.), Applied Modeling and Computations in Nuclear Science, ACS Symposium Series 945, American Chemical Society, Washington, DC, USA (2006), ISBN 0-8412-3982-7.

IN PROGRESS

* Half-life determination of ^{55}Fe, ^{54}Mn, ^{109}Cd, ^{233}U, ^{235}U, ^{238}U.

* Development of the new reference ionisation chamber.

* S. Pommé, The solid angle subtended by a circular detector for a linear source, Appl. Radiat. Isot.

* S. Pommé, Comments on "A comparison of different analytical methods of determining the solid angle of a circular coaxial source-detector system", Appl. Radiat. Isot.

* S. Pommé, J. Paepen, A series expansion of Conway's generalised solid-angle formulas, Nucl. Instr. and Meth. A.

* S. Pommé, J. Camps, R. Van Ammel, J. Paepen, A protocol for uncertainty assessment of half-lives, J. Radioanal. Nucl. Chem.

* EUROMET project 907: Measurement of Sb-124 activity and determination of photon emission probabilities.

ADDRESS

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CONTACT

Stefaan Pommé

LABORATORY	**SCK·CEN, Low Level Radioactivity Measurements (SA1/SA2)**
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, gas proportional counter, liquid scintillation, low-level, radiochemistry
RESULTS	Extension to the QA system following ISO17025 of the method for assay of actinides by alpha spectrometry. Now, all our measurements techniques are under accredidation.
IN PROGRESS	Comparative study of selected scintillation cocktails.
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	**Safeguards and Nuclear Physics Measurements (SA1/SA2)**
NAMES	M. Bruggeman, P. Vermaercke, P. Willeborts,
ACTIVITY	α- and γ–spectrometry, Preparation of Radioactive Standards, Whole body and organ counting, 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	Alpha spectrometry, coincidence method, gamma-ray spectrometry, gas proportional counter, ionisation chamber, low-level, NaI well counter, neutron measurement, simulation code, source preparation, X-ray spectrometry.
RESULTS	We set up new efficiency calibrations for the Whole Body Counting (WBC) system that is based on large NaI detectors. For that purpose we used a modular phantom in nylon that can be filled with small linear sources. The modular phantom can be used to simulate different human postures. We participated in the ESARDA neutron multiplicity benchmark. We investigated the use of Synthetic Multi-Element Standards (SMELS) for the determination of the flux parameters in k_0 NAA and to set up a quality control QC procedure for the folow up of the irradiation parameters.
PUBLICATIONS	P. Vermaercke, P. Robouch, L. Sneyers, F. De Corte, J. Radioanal. Chem. (to be published in 2007) Paolo Peerani, Martyn Swinhoe, ESARDA Multiplicity Benchmark Exercise, ESARDA Bulletin, No34, June 2006
IN PROGRESS	- develop a procedure to measure ^{32}P by NAA; - design and develop dedicated LIMS for the laboratories NAA and Gammaspectrometrie; - start up a project on Promp Gamma Neutron Activiation Analysis (PGNAA) and Fast Neutron Activation Analysis (FNAA); - improve simulation tools for efficiency transfer in gammaspectrometry; - calibratie a HPGe well detector to be used in k0-NAA.
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CONTACT	M. Bruggeman

LABORATORY	**SCK•CEN, 'Radio-Chemical Analysis' laboratories (RCA) (SA1/SA2)**
NAMES	M. Gysemans, L. Adriaensen
ACTIVITY	• Destructive radiochemical analysis of spent fuels for the determination of burn-up and for spent fuel characterization programs • Determination of Pu and ^{241}Am 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 counter, mass spectrometry, radiochemistry
RESULTS	• Separation and analyses of ^{147}Pm • Study of the suitability of ^{137}Cs and ^{144}Ce as burn-up monitors in different types of commercial and experimental irradiated fuels • Burn-up determination and spent fuel characterization 4 fuel samples of the international programs MALIBU, REBUS and HIMOX.
IN PROGRESS	• Study of the separation of ^{129}I from radioactive waste resins for mass-spectrometry. Comparative studies with gamma-spectrometry. • Radiochemical separation and analyses of activation products in nuclear vessel samples for retro-dosimetry (^{55}Fe, ^{63}Ni, ^{94}Nb, ^{60}Co)
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: ladriaens@sckcen.be
CONTACT	L. Adriaensen

(SA1/SA2)

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 ; 3- Traceability program with Nuclear Medicine Services
RESULTS	1- Standardization of ^{125}I, ^{203}Hg, Cr and ^{201}Tl solutions ; 2- Implantation of 4πβ(LSC)- (NaI(Tl)) 4πβ(PC)-γ(NaI(Tl)) coincidence/anticoincidence system with LNHB MTR2 module 3- Comparison runs of activity measurements of ^{99}Tc^{m}, ^{131}I, ^{67}Ga and ^{201}Tl with Nuclear Medicine Services
PUBLICATIONS	Am J. A. dos Santos, A. Iwahara, I. G. Nicoli, F. G. Alabarse, C. E. L. dos Santos, A. M. Xavier, E. J. Garcia, C. M. Dias, L. Tauhata, R. T. Lopes. Implementation of a national metrology network of radionuclides used in nuclear medicine Appl. Radiat. Isot. 64 (20 3- A.L.O.Damasceno, A. Iwahara, R. Poledna. Activity characterization of ^{192}Ir brachytherapy wires. Journal of Radioanalytical and Nuclear Chemistry, Vol. 269, No.2 (2006) 317-323.
IN PROGRESS	1- Standardization of ^{67}Ga and ^{55}Fe with MTR2 module using the anti-coincidence and liquid scintillation counting methods; 2- Implementation of TDCR liquid scintillation counting for absolute standardization
SOURCE IN PREPARATION	1- Determination of disintegration rate and photon intensities of ^{201}Tl and ^{202}Tl; 2- Radioactivity Laboratory of LNMRI in the Framework of MRA 3- Absolute standardization of ^{22}Na 4- Absolute standardization and photon emission intensities of ^{124}Sb
ADDRESS	Instituto de Radioproteção e Dosimetria, Av. Salvador Allende, s/n, Recreio, CEP 22780-160, Rio de Janeiro, Brasil.Tel: ++55 21 3411 8179 Fax: ++55 21 2442 1605 E-maiL: iwahara@ird.gov.br
CONTACT	A.Iwahara

(SA1/SA2)

LABORATORY	Laboratório Nacional de Metrologia das Radiações Ionizantes LNMRI/IRD/CNEN
NAMES	Antonio E. de Oliveira , A.Iwahara C.J. da Silva, E.M.O. Bernardes, J.U. Delgado, M.A.R.R. di Prinzio, Maria C.M. de Almeida, R. Poledna.
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 ^{65}Zn and ^{241}Am.
PUBLICATIONS	1- M. A. L. da Silva, R. Poledna, A. Iwahara, C. J. da Silva, J.U. Delgado, R. T. Lopes, Standardization and decay data determination of I-125, Mn-54 and Hg-203, Appl. Radiat. Isot. 64 (2006) 1440-1445 mistry (2005), 264(3), 571
IN PROGRESS	1-The Metrological Activity Determination of the ^{238}U and ^{230}Th by Gamma Spectrometry to Industrial Fuel-Cycle application; 2- Precise Determination of Ge Detector Efficiency Curves for Obtaining Activities in Radioclides Gamma-Emitters 3- Absolute Disintegration Rate and 320 keV Gamma Ray Emission Probability of ^{51}Cr M. C. M. de Almeida , A. Iwahara, R. Poledna, C. J. da Silva, J. U. Delgado
ADDRESS	Instituto de Radioproteção e Dosimetria, Av. Salvador Allende, s/n, Recreio, CEP 22780-160, Rio de Janeiro, Brazil.Tel: ++55 21 3411 8173 Fax: ++55 21 2442 1605 EmaiL :delgado@ird.gov.br
CONTACT	J. U. Delgado

(SA1/SA2)

	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.Azered.
ACTIVITY	1- Preparation of the spiked sources of beta, alpha and multi-gamma emitters in water matrix 2- Preparation of the samples of sediment and soils taken from Poços de Caldas region in Brazil 3- Participation in international comparisons
RESULTS	1- Quality control program of environmental laboratories ; 2- Homogeneity tests of soil material from Poços de Caldas and Goiânia Regions in Brazil ;
PUBLICATIONS	*C.Bragança, A M.G.F.Azeredo, L*1-The influence of uncertainties of measurements in laboratory performance evaluation using an intercomparison program of radionuclide assays in environmental samples, L.Tauhata, M.E.C.M.Vianna, A E.de Oliveira, A.C.M. Ferreira, M.J.C.Bragança, A.F.Clain Appl. Radiat.Isot. 64 (2006) 1174-1178 2- The Brazilian National Intercomparison Program(PNI/IRD/CNEN) : evaluation of 15 years of data, L.Tauhata, M.E.C.M.Vianna, A E.de Oliveira, A.C.M. Ferreira, M.J.C.Bragança, A.F.Clain, Rute Quelvia de Faria Jour. Env. Radiact. 86 (2006) 384-390
IN PROGRESS	Production soil spike samples and air filter
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CONTACT	L. Tauhata

LABORATORY	Laboratoire National Henri Becquerel, France
NAMES	M.M. Bé, V. Chisté, C. Dulieu
ACTIVITY	Evaluation of Radionuclide Decay Data
KEYWORDS	data evaluation, 238U, 79Se, 203Pb, 124Sb
RESULTS	- Evaluation of ^{238}U, ^{79}Se, ^{203}Pb
PUBLICATIONS	- Update of Recommended half-lives - a DDEP training session was organised in Saclay - A volume 3 of the Monographie 5 was published, it includes : ^{3}H, ^{55}Fe, ^{56}Co, ^{60}Co, ^{63}Ni, ^{65}Zn, ^{79}Se, ^{90}Sr, ^{90}Y^{m}, ^{90}Y, ^{108}Ag^{m}, ^{108}Ag, ^{111}In, ^{125}Sb, ^{137}Cs, ^{153}Sm, ^{159}Gd, ^{203}Pb, ^{233}Pa, ^{233}Th, ^{234}U, ^{236}Np, ^{236}Np^{m}, ^{237}U, ^{238}U, ^{242}Cm, ^{243}Am, ^{244}Cm.
IN PROGRESS	- Evaluation of Ra-226 and daughters - Edition of a Pocket Table of Radionuclides - Euromet 907: Activity measurements and gamma emission intensities determination of ^{124}Sb
INFORMATION	Two Special Web forums: for DDEP evaluators and for gamma spectrometry available
SOURCE IN PREPARATION	Tc-99, Sb-126, Sb-124
OTHER RELATED PUBLICATIONS	http://www.nucleide.org/Nucdata.htm
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CONTACT	Marie-Martine Bé

LABORATORY	Laboratoire Nationl Henri Becquerel
NAMES	P. Cassette, F. Jaubert, I. Tartès
ACTIVITY	Liquid Scintillation Counting
KEYWORDS	Liquid scintillation
APPARATUS	Triple coincidence counters Commercial LS counters
RESULTS	Development of TDCR and tracer LS methods
PUBLICATIONS	F. Jaubert, I. Tartès and P. Cassette**.** Quality control of liquid scintillation counters. Applied Radiation and Isotopes. Vol. 64, 10-11 (2006). *Pages 1163-1170.* P. Bienvenu, P. Cassette, G. Andreoletti, MM. Bé, J. Comte and MC. Lépy. A new determination of Se-79 half-life. Applied Radiation and Isotopes. Vol 65, 3 (2007). *Pages 335-364.*
IN PROGRESS	Standardization of ^{186}Re, ^{125}I and ^{93}Zr Study of new photodetectors for a TDCR counter
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CONTACT	Philippe Cassette

LABORATORY	Laboratoire Nationl Henri Becquerel
NAMES	P. Cassette, F. Jaubert
ACTIVITY	Radon standardization
KEYWORDS	Radon
APPARATUS	Cryogenic defined solid angle alpha spectrometer
RESULTS	Standardization of ^{222}Rn
PUBLICATIONS	P. Cassette, M. Sahagia, L. Grigorescu, M.C. Lépy and J.L. Picolo. Standardization of ^{222}Rn by LSC and comparison with *a*- and ?-spectrometry. Applied Radiation and Isotopes. Vol. 64, 10-11.*Pages 1465-1470.*
IN PROGRESS	Measurement of ^{220}Rn
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LABORATORY	Laboratoire Nationl Henri Becquerel
NAMES	I. Tartès, F. Jaubert, P. Cassette
ACTIVITY	Characterization of liquid scintillators
KEYWORDS	Liquid scintillator
APPARATUS	Monochromatic X-ray source with detector and liquid sample holder Compton spectrometer coupled with a TDCR LS counter
RESULTS	Measurement of photon absorption coefficients of liquid scintillator in the 1-15 keV energy range. Measurement of the response of scintillators in the 1-10 keV energy range
PUBLICATIONS	P. Cassette, I. Tartès, F. Maguet, J. Plagnard, M.C. Lépy and F. Jaubert. Measurement of photon absorption coefficients of liquid scintillators in the 5 to 12 keV energy range using a monochromatic X-ray source. LSC 2005, Advances in Liquid Scintillation Spectrometry. Radiocarbon, the University of Arizona, 2006.
IN PROGRESS	Characterisation of commercial and locally developed LS cocktails
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CONTACT	Philippe Cassette

LABORATORY	LNE- Laboratoire National Henri Becquerel
NAMES	Marie-Christine Lépy, Johann Plagnard.
ACTIVITY	X-ray spectrometry
APPARATUS	Si(Li) and HPGe Detectors Tunable monochromatic X-ray source (1-20 keV) (SOLEX)
RESULTS	Characterization of a HPGe detector by scanning the absorption edges of the detector conponents Measurement of linear attenuation coefficients and transmissions of different materials
PUBLICATIONS	J. Plagnard, C. Bobin, M.C. Lépy, « *Accurate efficiency calibration of low-energy HPGe detector using a monochromatic X-ray source",* To be published in X-Ray Spectrometry
IN PROGRESS	Development of a reference detector for semiconductor detectors efficiency calibration using the SOLEX source Study of the metrology beamline that will be installed at the SOLEIL synchrotron facility
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CONTACT	Marie-Christine Lépy

LABORATORY	LNE- Laboratoire National Henri Becquerel
NAMES	Johann Plagnard, Carine Hamon, Marie-Christine Lépy
ACTIVITY	Gamma-ray spectrometry
APPARATUS	Coaxial and planar HPGe Detectors
RESULTS	Efficiency calibration of HPGe detectors within 0.5% for point sources. Efficiency calibration for volume sources Study of the decay scheme of ^{67}Ga
PUBLICATIONS	M.-C. Lépy, M.-N. Amiot, M.-M. Bé, P. Cassette, *"Determination of the intensity of X- and gamma-ray emissions in the decay of ^{153}Sm"*, Applied Radiation and Isotopes 64, 1428-1434 (2006) M.-C. Lépy, P. Brun, C. Collin, J. Plagnard, *"Experimental validation of coincidence summing corrections computed by the ETNA software"*, Applied Radiation and Isotopes 64, 1340-1345 (2006) M.-C. Lépy, "*Total efficiency calibration for coincidence summing corrections »,* to be published in NIM
IN PROGRESS	Efficiency calibration in the low-energy range taking account of scattering effects Monte Carlo simulation of HPGe detector for total efficiency calibration Development and test of a software for fitting efficiency curves taking account of correlations between input data
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CONTACT	Marie-Christine Lépy

LABORATORY	Laboratoire National Henri Becquerel
NAMES	G. Moutard
ACTIVITY	Organisation of national and international interlaboratory comparisons in the field of activity measurements. An opened intercomparison program is proposed every year by LNE-LNHB.
APPARATUS	Calibrated HPGe, NaI(Tl), Liquid scintillation counters, Well-type ionisation chamber with standard electronics.
RESULTS	The program for 2006 was : - Mass activity measurement of tritiated water (about 40 $kBq.g^{-1}$, and 4 $Bq.g^{-1}$); - Mass activity measurement of mixtures of gamma emitting radionuclides with low activity (about 40 $Bq.g^{-1}$, and 1 $Bq.g^{-1}$) - Mass activity measurement of mixtures of activation and fission products (about 0,6 $Bq.g^{-1}$ and 20 $kBq.g^{-1}$)
IN PROGRESS	The proposed program for 2007 is: - Mass activity measurement of a solution of ^{239}Pu (about 4 $kBq.g^{-1}$, 4 $Bq.g^{-1}$ and 5 $Bq.kg^{-1}$);
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CONTACT	Gérard Moutard

LABORATORY	Laboratoire National Henri Becquerel
NAMES	C. Bobin, J. Bouchard
ACTIVITY	$4\pi\beta-\gamma$ coincidence counting
KEYWORDS	(anti) coincidence method, liquid scintillation.
RESULTS	
PUBLICATIONS	Standardization of ^{67}Ga using a $4\pi(LS)\beta-\gamma$ anti-coincidence system, accepted in Applied Radiation and Isotopes.
IN PROGRESS	Development of a $4\pi(LS)\beta-\gamma$ anticoincidence counting system using a liquid scintillation apparatus in the β-channel; TDCR measurements are combined with the coincidence method. Application to the tracer method.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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CONTACT	Bobin Christophe e-mail: christophe.bobin@cea.fr

LABORATORY	Physikalisch-Technische Bundesanstalt
NAMES	A. Röttger, A. Honig and D. Arnold
ACTIVITY	Radon-220 progeny reference chamber and mixed atmosphere reference chamber (Radon-222, Radon-220 and their progenies) of the PTB. Production and measurement of reference atmospheres. Online α-spectrometry and offline simultaneous αγ-spectrometry.
KEYWORDS	Alpha spectrometry, cryogenic detector, data evaluation, data measurement, Euromet, gamma-ray spectrometry, gas proportional counter, ionisation chamber, low-level, radioactive gas, simulation code, spectrometry, Rn-222,Rn-220
RESULTS	Setup and test of the Rn-220 progeny reference chamber: Check of tightness for radon and homogeneity of climate controlled atmosphere. Setup and traceable calibration of the simultaneous αγ-spectrometry for progeny measurements.
PUBLICATIONS	
IN PROGRESS	
INFORMATION	BMU-Project: Generation and characterisation of reference atmospheres of thoron decay products for the calibration of measuring devices for thoron decay products (St.Sch.-Nr. 4453 by BMU/BfS)
SOURCE IN PREPARATION	Mixed radon progeny reference atmospheres.
OTHER RELATED PUBLICATIONS	
ADDRESS	Physikalisch-Technische-Bundesanstalt Department 6.1 Bundesallee 100, D-38116 Braunschweig Germany Tel. ++49-531-592-6104 Telefax: ++49-531-592-8525 E-mail: Annette.Roettger@ptb.de
CONTACT	Annette Röttger

LABORATORY	Physikalisch-Technische Bundesanstalt
NAMES	Karsten Kossert (and collaborators also from other institutes)
ACTIVITY	Improvement of liquid scintillation counting techniques for activity determinations, LS spectrometry, CIEMAT/NIST for electron-capture nuclides, measurements of decay data (e.g. half-lives of long-lived isotopes), VERMI project U-233, installation of a TDCR system (with Ole Nähle)
KEYWORDS	CIEMAT/NIST, electron-capture nuclides, LS spectrometry, half-lives, TDCR
RESULTS	Improvement of LS spectrometry for Cd-109 and other nuclides
PUBLICATIONS	Kossert et al. Standardization and Nuclear Decay Data of ^{109}Cd. Appl. Radiat. Isot. 64 (2006) 1031
IN PROGRESS	Measurement of the half-lives of Be-10, Ca-41, U-233
INFORMATION	New TriCarb Counter purchased in Nov. 2006
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	Grau Carles and Kossert: New advances in the determination of the ^{87}Rb shape factor function. In: Nuclear Physics A 767 (2006) 248.
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CONTACT	Karsten Kossert

LABORATORY	Physikalisch-Technische Bundesanstalt
NAMES	Karsten Kossert, Heinrich Schrader (retired), Juliana Mintcheva (NCM, Bulgaria)
ACTIVITY	Calibration of an ionization chambers for the NCM, Bulgaria (EUROMET traceability project No. 909), establishment of procedures for data acquisition, analysis, QA, determination of an energy-dependent efficiency curve
KEYWORDS	Ionization chamber, nuclear medicine, traceability project, energy-dependent efficiency curve
RESULTS	Calibrated and characterized ionization chamber (PTW Curiementor 3)
PUBLICATIONS	
IN PROGRESS	EUROMET traceability project No. 909 still in progress
INFORMATION	
SOURCE IN PREPARATION	Report on the project with results for ICRM 2007
OTHER RELATED PUBLICATIONS	Schrader and Svec, Appl. Radiat. & Isot. 60 (2004) 369
ADDRESS	Physikalisch-Technische-Bundesanstalt Department 6.1 Bundesallee 100, D-38116 Braunschweig Germany Tel. ++49-531-592-6110 Telefax: ++49-531-592-6305 E-mail: Karsten.Kossert@ptb.de
CONTACT	Karsten Kossert

LABORATORY	Physikalisch-Technische Bundesanstalt
NAMES	Ole Naehle
ACTIVITY	4πβ–γ-coincidence counting Liquid Scintillation Counting TDCR Calibration of large area reference sources
KEYWORDS	(anti) coincidence method, gas proportional counter, liquid scintillation, SIR, data measurement, TDCR, large area sources
RESULTS	Standardization and branching ratio EC/β$^{?}$of Na-22
PUBLICATIONS	
IN PROGRESS	Design and setup of a TDCR detector system
INFORMATION	
SOURCE IN PREPARATION	Article on the activity standardization and branching ratio of Na-22 (for ICRM 2007)
OTHER RELATED PUBLICATIONS	
ADDRESS	Physikalisch-Technische-Bundesanstalt Department 6.1 Bundesallee 100, D-38116 Braunschweig Germany Tel. ++49-531-592-6322 Telefax: ++49-531-592-6305 E-mail: Ole.J.Naehle@ptb.de
CONTACT	Ole Naehle

LABORATORY	Physikalisch-Technische Bundesanstalt
NAMES	Oliver Ott
ACTIVITY	Determination of the emission probabilities of ^{124}Sb (Euromet project 907); calibration of a new HPGe spectrometer
KEYWORDS	Gamma-ray spectrometry, Sb-124
RESULTS	
PUBLICATIONS	
IN PROGRESS	Calibration of new spectrometer (also for new PTB-type ampoules)
INFORMATION	New HPGe purchased in 2006
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	Physikalisch-Technische-Bundesanstalt Department 6.1 Bundesallee 100, D-38116 Braunschweig Germany Tel. ++49-531-592-6312 Telefax: ++49-531-592-6305 E-mail: Oliver.Ott@ptb.de
CONTACT	Oliver Ott

(SA1/SA2)

LABORATORY	Bhabha Atomic Research Centre
NAMES	U.V. Phadnis, V. Sathian, G. Shobha, Yasoda Singh
APPARATUS	1. Manganese Sulphate Bath System. 2. Standard Thermal Neutron Assembly in Graphite 3. Precision Long Counter. 4. Multi-spheres for Spectrometry 5. 4p polythene assembly. 6. Thermal neutron Howitzer 7. Activation foils &Threshold detectors. 8. He-3 & BF_3 based thermal neutron fluence rate measuring systems. 9. Neutron Rem counters and flux meter. 10. Standard neutron sources including D_2O moderated ^{252}Cf source. 11. Water moderator based thermal neutron jig. 12. Bonner's spheres neutron spectrometry system 13. Liquid Scintillator based neutron spectrometer 14. Transfer Standard for onsite standardisation of neutron source
ACTIVITY	1. Standardization of radioactive neutron sources. 2. Standardization of fluence rate and dose rate. 3. Neutron spectrum unfolding 4. Calibration of neutron monitors. 5. R&D work associated with neutron standards.
KEYWORDS	Neutron measurement
RESULTS	1. Neutron sources were standardized for various users. 2. Neutron fluence rate and dose rate were standardized for various users. 3. More than fifty neutron monitors were calibrated. 4. Shielding properties of different materials for neutrons were studie
IN PROGRESS	• Development of Neutron Spectrometer. • Development of a detector for pulsed neutron
INFORMATION	• Fast neutron source yield and the thermal neutron fluence rate can be taken up for international intercomparison.

PUBLICATIONS

- **Establishment of ISO recommended radionuclide neutron sources at BARC,** U.V.Phadnis, V.Sathian, G. Shobha, S.Yashoda V.V. Shaha and D.N. Sharma. 6th International Conference on Advances in Metrology(AdMet-2006) during 11-13 December, 2006, New Delhi.

- **Pre –Criticality testing of radiation monitors associated with protective and regulatory channels of PHWR and related work**
  S.M. Tripathi, Suresh Rao, A.K. Mahant, V. Sathian, Shobha Ghodke, R.A. Satam, U.V. Phadnis, Yashoda Singh and V.V. Shaha , Operating Experience of Nuclear Reactors and Power Plants (OPENUPP-2006) held at BARC Mumbai during November 13-15, 2006.

- **An ISO recommended neutron source for calibration of neutron monitors**
  V. Sathian,U.V. Phadnis, G. Shobha, V.V. Shaha
  16th National Symposium on Radiation Physics(NSRP-16), 18-20 Jannuary 2006, Chennai

- **Neutron fluence rate measurement at F-7 position and thermal column of Apsara reactor**
  Deepa Sathian, V, Sathian, U.V. Phadnis & D.N. Sharma
  16th National Symposium on Radiation Physics(NSRP-16), 18-20 Jannuary 2006, Chennai

- **Simulated design of a neutron spectrometer for radiation protection**
  Sharma P.S, Sunil C, Ananda Raman, Nandy M, V. Sathian, Sarkar P.K and D.N Sharma
  16th National Symposium on Radiation Physics(NSRP-16), 18-20 Jannuary 2006, Chennai

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CONTACT

Shri Suresh Rao, Head , Radiation Standards Section

LABORATORY	Bhabha Atomic Research Centre
NAMES	Leena Joseph, Anuradha. R, D.B. Kulkarni
APPARATUS ACTIVITY	1. $4\pi\ \beta$(PC) γ(NaI) coincidence system. 2. Calibrated 4π Gamma ion chamber. 3. HPGe detector assembly for gamma ray spectrometer. 4. Dose Calibrator, CRC –15 Beta (Capintec Make)
KEYWORDS	Gas proportional counter, SIR, Fe-55, Zn-65, I-131, Tc-99m
RESULTS	1. Conducted national audit for I-131 activity measurements with dose calibrators among 70 nuclear medicine centres (NMC) in the country. 2. Conducted audit for Tc-99m activity measurements among five NMCs in the country. 3. Standardized I-131 solution under IAEA's CRP. 4. Standardized Zn-65 under SIR and Ba-133 under APMP. 5. Fe-55 was standardized under international intercomparison of activity measurements of BIPM. 6. Calibrated radioactive sources for users.
PUBLICATIONS	1. "Standardization of ^{54}Mn, an Electron Capture Radionuclide" Leena Joseph, Anuradha R, D.B.Kulkarni & V.V. Shah, 16th National Symposium on Radiation Physics(NSRP-16), 18-20 Jannuary 2006, Chennai 2. "Comparison of efficiency tracing and zero detection threshold techniques with CIEMAT/NIST standardization method under different quench conditions with Liquid Scintillation Spectrometer." D.B.Kulkarni, P.J.Reddy, SonaliBhade, K.K.Narayan, A. Narayanan, G.Krishnamachari and D.N. Sharma. Current Science, 2006 Volume 90, No. 1 , Page no 83-87. 3. "Standardization of Silver-110m at BARC, India", Leena Joseph, R. Anuradha, D.B. Kulkarni and V.V. Shaha , 6th International Conference on Advances in Metrology(AdMet-2006) during 11-13 December, 2006, New Delhi.
IN PROGRESS	1. Standardization of ^{32}P, ^{153}Sm, ^{18}Fand ^{67}Ga 2. Calibration of sources for users. 3. Calibration of dose calibrators for NMCs 4. National audit programme for activity measurements with dose calibrators in NMCs
ADDRESS	Head , Radiation Standards Section, Radiation Safety Systems Division, BARC, Mumbai - 400 085, India Telephone : 25595075 Telefax : 0091(22) 5505151,5519613 E-mail : suresh@barc.gov.in
CONTACT	Mr. U. Suresh Rao

LABORATORY	National Metrology Institute of Japan, National Institute of Advanced Industrial Science and Technology (NMIJ/AIST)
NAMES	Yoshio HINO, Akira YUNOKI and Yasushi SATO
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, Imaging analyser system, PIPS for α counting and 2π multi wire chamber.
KEYWORDS	CCRI, APMP, SIR, simulation code, e-trace, source preparation
RESULTS	(1) CCRI-II Key-comparisons of Fe-55 (2) APMP comparison (APMP.RI(II)-K2.Ba-133) for the activity measurements of Ba-133. The results of participating laboratories have been gathered. (3) SIR comparison of Co-57 activity measurement.
PUBLICATIONS	(1) Yasushi Sato, Yoshio Hino, Takao Yamada. " Response calculation for standard ionization chambers in APMP using EGS4 Monte Carlo Code" APPLIED RADIATION AND ISOTOPES, 64, pp.1211-1214, 2006. (2) T. Yamada, Y. Nakamura, Y. Kawada, Y. Sato and Y. Hino. "Standardization of ^{152}Eu, ^{154}Eu by 4πβ-4πγ coincidence method and 4π(β+γ) integral counting" APPLIED RADIATION AND ISOTOPES, 64, pp.1220-1224, 2006.
IN PROGRESS	(1) Application of IC tags (RFID) to a remote calibration system for identifying transfer standard sources. (2) Fabrication of surface emission sources on aluminium plates by an ink jet printer with an adjustable stage.
INFORMATION	--
SOURCE IN PREPARATION	Surface emission sources by an ink jet printer.
OTHER RELATED PUBLICATIONS	--
ADDRESS	Radioactivity and Neutron Standardization Section, Quantum Radiation Division, AIST Tsukuba central-2 1-1-1 Umezono, Tsukuba, Ibaraki, 305-8568 JAPAN. Tel : (+81) 29 861 3470, Fax : (+81) 29 861 5673 E-mail : a.yunoki@aist.go.jp, Web : http://www.aist.go.jp
CONTACT	Akira Yunoki

LABORATORY	Laboratory of Radioactive Standards, RC POLATOM
NAMES	Ryszard BRODA
ACTIVITY	Technical expert during 4 accreditation audits of calibration laboratories in Poland. Participation in the ^{55}Fe intercomparison. Rebuilding of the Laboratory of Radioactive Standards.
KEYWORDS	Coincidence method, liquid scintillation
RESULTS	Observation, that the correct description of measurements of low-energy emitters ^{3}H and ^{55}Fe in the LS-counter needs the negative binomial (Polya) distribution for number of photons instead of the Poisson distribution can be proved by analyse of energy transfer in the liquid scintillator.
PUBLICATIONS	A.C. Razdolescu, R. Broda, P. Cassette, B.R.S. Simpson, W.M. Van Wyngaardt, (2006), The IFIN-HH triple coincidence liquid scintillator counter. Appl. Radiat.Isot., No.64, pp. 1510-1514.
IN PROGRESS	Application for accreditation the Laboratory of Radioactive Standards by Polish Center for Accreditation.
SOURCE IN PREPARATION	P. Cassette, R. Broda, K. Kossert. Radionuclide Metrology using Liquid Scintillation Counting. Metrologia Special Issue (BIPM, 2007). R. Broda, T. Dziel. Some remarks on photon statistics in the LS-counter. (ICRM, 2007).
ADDRESS	Radioisotope Centre POLATOM, 05-400 Otwock-Swierk, Poland, e-mail: r.broda@polatom.pl tel.: (48 22) 718 07 21 fax: (+48 22) 718 03 50
CONTACT	Ryszard Broda

LABORATORY	Laboratory of Radioactive Standards, RC POLATOM
NAMES	Tomasz DZIEL
ACTIVITY	Standardization of radioactive solutions by 4π(LS)-γ coincidence/anticoincidence, TDCR and CIEMAT/NIST methods. Calibration of dose calibrators. Participation in the ^{55}Fe intercomparison. Participation in 4th VERMI Young Researchers Workshop (18-23.09.2006., Varna, Bulgaria).
KEYWORDS	Coincidence method, life sciences, liquid scintillation
RESULTS	Observation, that the correct description of measurements of low-energy emitters ^{3}H and ^{55}Fe in the LS-counter needs the negative binomial (Polya) distribution for number of photons instead of the Poisson distribution can be proved by analyse of energy transfer in the liquid scintillator.
IN PROGRESS	Application for accreditation the Laboratory of Radioactive Standards by Polish Center for Accreditation.
SOURCE IN PREPARATION	R. Broda, T. Dziel. Some remarks on photon statistics in the LS-counter. (ICRM, 2007).
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LABORATORY	Institut National de C&D pentru Fizica si Inginerie Nucleara « Horia Hulubei » IFIN-HH Radionuclide Metrology Laboratory
NAMES	Enric Leon Grigorescu, Aurelian Luca and Constantin Ivan
ACTIVITY	Gamma-ray spectrometry
KEYWORDS	Data measurement, Euromet, gamma-ray spectrometry, low-level, X-ray spectrometry, ^{124}Sb.
RESULTS	-Participation at the IAEA-CU-006-06-CCRI (II) supplementary comparison on the determination of gamma emitting radionuclides (low-level activity samples of soil, grass and water). -Participation at the VERMI-2006 Workshop (17-23 September 2006, Varna, Bulgaria), organised by JRC/IRMM, Belgium. -Measurement of the uranium enrichment for solid small volume samples. -Activity measurements for different types of samples: environmental, wastes; radionuclidic purity of radiopharmaceuticals; tightness control of industrial radioactive sources.
PUBLICATIONS	-A. Luca, "Experimental determination of the uranium enrichment", Romanian Journal of Physics (in press). -The final report of the IAEA-CU-2006-06-CCRI(II) supplementary comparison on the determination of gamma emitting radionuclides (issue scheduled for March 2007).
IN PROGRESS	-Participation at the IAEA-CU-2006-06-CCRI(II)-S5 supplementary comparison (activity measurements of phosphogypsum samples). -Participation at the EUROMET Project 907: "124Sb- Determination of photon emission intensities". -Putting in operation and calibration of a new spectrometric system, based on three semiconductor detectors: HPGe (new), Ge (Li) and Si (Li).
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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CONTACT	Dr. Aurelian Luca

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	A.C.Razdolescu, P. Cassette, C.Ivan, M.Sahagia
ACTIVITY	Measurement of ^{55}Fe (CCRI(II)-K2 Comparison). QS implementation in the Radionuclide Metrology Laboratory: Quality Assurance Pre-Assessment, according to EN ISO/IEC17025:2005 requirements, by the representative of Ionising Radiation Metrology Consultants LTD, UK, M.J. Woods. Note: The pre assessment regarded all kind of the Radionuclide Metrology Laboratory activities
KEYWORDS	Liquid scintillation, key comparison, radionuclide by name: Fe-55
RESULTS	^{55}Fe comparison result is under evaluation at BIPM; Application for national accreditation, at the national accreditation body, RENAR
PUBLICATIONS	1.A.C.Razdolescu, R.Broda, P. Cassette, B.R.S.Simpson, W.M.Van Wyngaardt" The IFIN-HH triple coincidence liquid scintiilation counter", Appl. Radiat. Isot. 64,10-11(2006)1510-1514 2. P.Cassette, M.Sahagia, L.Grigorescu, M.C.Lepy, J.L.Picolo "Standardization of ^{222}Rn by LSC and comparison with alpha and gamma spectrometry" , Appl. Rad. Isot. 64,10-11(2006) 1465-1470 3. M. Sahagia, A. C. Razdolescu, A. Luca, C. Ivan "Importance of the Primary Radioactivity Standard Laboratory and Implementation of its Quality Management" 6- th Balkanian Union Conf. Istanbul, Turkey, 2006, code.19-0-005,accepted, American Institute of Physics
IN PROGRESS	Upgrading of the LSC-TDCR system, by: (i)Use of Channel Photomultipliers tubes (CPM);(ii) Automatic command of operation, collection and processing of data;(iii) Comparison between the new and standard systems
SOURCE IN PREPARATION	Two abstracts , regarding: (i) TDCR-LS Counter based on the use of CPM; (ii) Standardisation of Fe-55 by LSC-TDCR, were sent to ICRM2007
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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.Razdolescu, C.Ivan
ACTIVITY	^{60}Co, ^{134}Cs (BIPM,RI(II)- K1 Comparison) QS implementation in the Radionuclide Metrology Laboratory: Quality Assurance Pre-Assessment, according to EN ISO/IEC17025:2005 requirements, by the representative of Ionising Radiation Metrology Consultants LTD, UK, M.J. Woods. Note: The pre assessment regarded all kind of the Radionuclide Metrology Laboratory activities
KEYWORDS	Coincidence method , Euromet, SIR, radionuclide by name (Co-60; Cs-134; Sb-124)
RESULTS	^{60}Co, ^{134}Cs results are under evaluation at BIPM; Application for national accreditation, at the national accreditation body, RENAR
PUBLICATIONS	1. M.Sahagia "Standardization of ^{99m}Tc" Appl.Radiat Isot, 64,10-11 (2006)1234-1237 2. Marie-Martine Bé "Activity measurements and determination of gamma-ray emission intensities in the decay of ^{65}Zn", IFIN-HH contribution. Appl. Radiat. Isot.64(2006)1396-1402 3.M. Sahagia, A. C. Razdolescu, E.L.Grigorescu, A.Luca, C.Ivan "Measurement of the activity of the radiopharmaceutcals used in therapy" Conference IRPA EUROPE, Paris, 2006 paper P 113, pp 1-6, http://www.irpa2006europe.com 4 . M. Sahagia, A. C. Razdolescu, A. Luca, C. Ivan "Importance of the Primary Radioactivity Standard Laboratory and Implementation of its Quality Management" 6- th Balkanian Union Conf. Istanbul, Turkey, 2006, code.19-0-005,accepted, American Institute of Physics
IN PROGRESS	- ^{124}Sb standardization, Euromet 907 Project. - A new coincidence system, will be constructed and put in operation; it is aimed to partially replace the old one and to upgrade it by automatic operation, collection and processing of data
SOURCE IN PREPARATION	One abstract , regarding X,Gamma-X,gamma coincidence system and I-125 standardization, was sent to ICRM2007
OTHER RELATED PUBLICATIONS	A. Stochioiu , M. Sahagia, F.Mihai, I.Tudor, H. Lupescu "Application of the Thermoluminescent Dosemeters for the Measurement of Low Level Background" Balkanian Union Conf. Istanbul, Turkey, 2006, code.19-0-005,accept , American Institute of Physics

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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.Razdolescu, C. Ivan, A. Luca
ACTIVITY	-New calibration of the Ionisation camber CENTRONIC IG12/20A for the Radionuclide I-131; -I-131 comparison in the frame of the IAEA-CRP. E 2.10.05, Contract.12921/ROM According to: Draft protocol for performing radioactivity measurement comparisons with SSDLs, IAEA, RCM, 30 June 2005 - A new Electrometer, type Keithley 6517A was put in operation and calibration figure is transferred from the old electrometric system - Organization of a national preliminary I-131 comparison and - Metrological check of radioiosotope calibrators QS implementation in the Radionuclide Metrology Laboratory (see the other files)
KEYWORDS	Ionisation chamber, life sciences, radionuclide by name: I-131
RESULTS	^{131}I comparison result is under evaluation at IAEA; Application for national accreditation, at the national accreditation body, RENAR
PUBLICATIONS	1.M. Sahagia, A. C. Razdolescu, E.L.Grigorescu, A.Luca, C.Ivan "Measurement of the activity of the radiopharmaceutcals used in therapy" Conference IRPA EUROPE, Paris, 2006 paper P 113, pp 1-6, http://www.irpa2006europe.com 2. M. Sahagia, A. C. Razdolescu, A. Luca, C. Ivan "Importance of the Primary Radioactivity Standard Laboratory and Implementation of its Quality Management" 6- th Balkanian Union Conf. Istanbul, Turkey, 2006, code.19-0-005,accepted, American Institute of Physics
IN PROGRESS	According to the IAEA contract:(i) National comparison in Romanian Nuclear Medicine units for I-131; (ii)IAEA, SSDL comparison for ^{67}Ga
SOURCE IN PREPARATION	An abstract "Quality Assurance in Nuclear Medicine Radioactivity Measurements" was sent to the IRPA Regional Congress for Central and Eastern Europe, IRPA2007, Brasov, Romania
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CONTACT	Dr. Maria Sahagia

LABORATORY	Institutul National de C&D pentru Fizica si Inginerie Nucleara « Horia Hulubei » IFIN-HH Radionuclide Metrology Laboratory
NAMES	Aurelian Luca
ACTIVITY	Evaluation of nuclear decay data
KEYWORDS	Data measurement, Euromet, 188W, 236U, 124Sb, 234Th.
RESULTS	-Participation at the DDEP Training Session, held at LNHB/CEA, Saclay, France (6-10 March 2006). -Participation at the VERMI-2006 Workshop (17-23 September 2006, Varna, Bulgaria), organised by JRC/IRMM, Belgium. -Evaluation (partial) of nuclear decay data for 236U, in the frame of the IAEA CRP "Updated decay data library for actinides".
PUBLICATIONS	
IN PROGRESS	-Evaluation (completed) of nuclear decay data for 236U and start a new data evaluation for 234Th. -Participation at the EUROMET Project 907: "124Sb- Determination of photon emission intensities". -Checking a previous nuclear decay data evaluation of ^{188}W and propose a paper for publishing, in co-operation with the colleagues from LNHB/CEA. -Participation at the second IAEA CRP ("Updated decay data library for actinides") Meeting, 28-30 March 2007, in Vienna, Austria.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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CONTACT	Dr. Aurelian Luca

LABORATORY	Slovak Institute of Metrology
NAMES	Jozef Dobrovodský, Robert Hinca, Lucia Pernická, Ivana Praženicová, Anton Švec
ACTIVITY	Calibrated $4\pi\gamma$ ionization chambers, HPGe spectrometer, large area plastic scintilator α and β measuring system, radioactivity monitoring systems
KEYWORDS	ionisation chamber, gamma-ray spectrometry
RESULTS	
PUBLICATIONS	Švec A., Janßen H, Pernická L., Klein R., A modified method for the characterisation and activity determination of large area sources. Appl. Rad.Isot. 64 (2006) 1207-1210
IN PROGRESS	
INFORMATION	www.smu.gov.sk
SOURCE IN PREPARATION	
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

LABORATORY	CSIR National Metrology Laboratory (SA1/SA2)
NAMES	Bruce Simpson, Freda van Wyngaardt
ACTIVITY	**Activities undertaken in 2006** • Participated in the international key comparison of activity measurements of ^{55}Fe organised by the BIPM. • Participated in the APMP regional key comparison of activity measurements of ^{133}Ba. • Presented a paper on ^{32}P activity measurements at the CSIR Research and Innovation conference held in Pretoria during February. • Presented a poster at the CSIR Research and Innovation conference on the development of a stable non-commercial liquid scintillation cocktail. • Presented a poster on maintaining South Africa's ^{90}Y activity standard at a local conference (SAAPMB) held near Cape Town in March. • Developed a simple counting technique to measure mixtures of two pure beta-emitting radionuclides by combining aspects of the TDCR and CIEMAT/NIST methods. • Measured the activity of a ^{99m}Tc source that was used for the calibration of seven dose calibrators used in nuclear medicine. This required careful logistical arrangements since the regional exercise was some 1600 km from Cape Town. • Hosted the ICRM Executive Board meeting in Cape Town in June 2006. • The Local Organising Committee started arrangements for hosting the ICRM 2007 conference. First announcement sent out and the ICRM 2007 website set up. • Involved with the organisation of the Metrologia Special Issue on radionuclide metrology. • Provided ^{131}I capsule measurement for a local hospital; calibration check of three ionization chambers maintained at a particle accelerator faclity; undertook ^{22}Na measurements and provided a standard for their radionuclide production department; measured ^{99}Mo and ^{90}Y for a radioisotope department at a reactor facility. **Programme for 2007** • Participate in and make presentations at both the ICRM Liquid Scintillation Counting Working Group and the Life Sciences WG meetings being held in Paris, France in January. • Submission to the SIR of a sample of ^{22}Na measured by $4\pi[LS]\beta^{+}$-γ coincidence counting. • Submit abstracts for possible inclusion in the ICRM 2007 conference and write papers if selected. • Review all abstracts submitted for inclusion in the ICRM 2007 conference programme. Attend the ICRM Scientific Committee/EB meetings in March, being held at Ispra, Italy. • Referee and edit papers selected for the Metrologia Special Issue on radionuclide metrology. • Attend the CCRI(II) and CCRI meetings being held at the BIPM in May. • Continue with a study on activity measurement of mixtures of pure beta-emitting radionuclides. • Referee papers accepted for the ICRM 2007 conference. • Organise the arrangements for hosting the ICRM 2007 conference. • Continue with the commissioning of a new HPGe detector and Digital Spectrum Analyzer. • The laboratory will undergo its 2nd international assessment in July for accreditation purposes.

	• Provide radioactivity measurements, standards, sources and calibration services to the user community.
KEYWORDS	coincidence method, activity measurement, ionisation chamber, life sciences, liquid scintillation, SIR, 55Fe, 133Ba, 32P, 99mTc, 131I, 22Na, 99Mo, 90Y
PUBLICATIONS	W.M. Van Wyngaardt and B.R.S. Simpson, *A simple counting technique for measuring mixtures of two pure ß-emitting radionuclides*. Nucl. Instr. and Meth. A 564 (2006) 339. B.R.S. Simpson and W.M. Van Wyngaardt, *Activity measurements of the high-energy pure ß-emitters ^{89}Sr and ^{90}Y by the TDCR efficiency calculation technique*. Appl. Radiat. Isot. 64 (2006) 1481. W.M. Van Wyngaardt and B.R.S. Simpson, *Absolute activity measurement of the electron-capture-based radionuclides ^{139}Ce, ^{125}I, ^{192}Ir and ^{65}Zn by liquid scintillation coincidence counting*. Appl. Radiat. Isot. 64 (2006) 1454. P. Cassette, G.H. Ahn, T. Alzitzoglou, I. Aubineau-Lanièce, F. Bochud, E. Garcia Torano, A. Grau Carles, A. Grau Malonda, K. Kossert, K.B. Lee, J.P. Laedermann, B.R.S. Simpson, W.M. van Wyngaardt, B.E. Zimmerman, *Comparison of calculated spectra for the interaction of photons in a liquid scintillator. Example of ^{54}Mn 835 keV emission*. Appl. Radiat. Isot. 64 (2006) 1471. A.C. Razdolescu, R. Broda, P. Cassette, B.R.S. Simpson, W.M. Van Wyngaardt, *The IFIN-HH triple coincidence liquid scintillation counter*. Appl. Radiat. Isot. 64 (2006) 1510. B.R.S. Simpson and W.M. Van Wyngaardt, *Activity measurement of phosphorus-32 in the presence of pure beta-emitting impurities.* South African Journal of Science, July/August 2006 – Vol. 102, No. 7 / 8.
IN PROGRESS	
INFORMATION	The ICRM 2007 conference will be hosted by the CSIR NML during 3-7 Sept. 2007 in Cape Town, South Africa. See http://www.icrm2007.org.za/
OTHER RELATED PUBLICATIONS	Yasushi Sato, et al., *Response calculation for standard ionization chambers in the APMP using EGS4 Monte Carlo code*. Appl. Radiat. Isot. 64 (2006) 1211.
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LABORATORY	IRA-METAS
NAMES	Claude Bailat, Youcef Nedjadi, Philippe Spring
ACTIVITY	Source preparation, coincidence method, gas proportional counter, NaI well counter, liquid scintillation, alpha spectrometry, gamma-ray spectrometry, ionisation chamber, Monte Carlo simulation.
RESULTS	Response factors of commercial radionuclide calibrators to a F-18 source. Organised a national gamma spectrometry intercomparison for the measurement of the activity of a Ba-133 and Co-57 solution. Contribution to SIR of activity measurement of Ho-166m
PUBLICATIONS	Spring, P., Nedjadi, N., Bailat, C., Triscone, G., Bochud, F. O., *Absolute Activity Measurement of Radon Gas at IRA-METAS*, Nucl. Instr. and Meth. 568 (2006) 752-759. Youcef Nedjadi, Philippe Spring, Claude Bailat, Marc Decombaz, Gilles Triscone, Jean-Jacques Gostely, Jean-Pascal Laedermann, François O. Bochud, *Primary activity measurements with 4p? NaI(Tl) counting and Monte Carlo calculated efficiencies*, to appear in Applied Radiation & Isotopes. François Bochud, Claude J. Bailat, Thierry Buchillier, François Byrde, Ernst Schmid, Jean-Pascal Laedermann, *Simple Monte-Carlo method to calibrate well-type HPGe detectors*, Nuclear Instruments and Methods in Physics Research A 569 (2006) 790–795.
IN PROGRESS	Improving source preparation process; Setting up TDCR system; Setting up 4pß-4p? coincidence system; Reviewing gamma spectrometry measurement system; Characterising an HPGe well-detector for Monte Carlo simulation.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
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-Chen Yuan, Chien-Yung Yeh, and Ing-Jane Chen
ACTIVITY	1. Participated in the APMP key comparison of Ba-133 and I-131. 2. Set up an LSC system and studied CIEMAT/NIST techniques. 3. Set up a low level gamma-ray spectrometry system.
KEYWORDS	coincidence method, APMP, gamma-ray spectrometry, gas proportional counter, ionisation chamber, life sciences, liquid scintillation, low-level, neutron measurement, Ba-133, I-131
RESULTS	INER's Ba-133 measurement results were in agreement with the mean of the APMP comparison.
PUBLICATIONS	1. Ming-Chen Yuan, Hsiao-Fang Pang and Chu-Fang Wang, 2006, Absolute Counting of Re-188 Radiopharmaceuticals, *Applied Radiation and Isotopes*, **64,** 1380-1383. 2. Chu-Fang Wang, Ming-Chen Yuan, Cheng-Yuan Chang, Su-Chen Huang, 2006, Elemental analysis of airborne particulate matter collected on PTFE-membrane filters by SRXRF: A feasibility study, *Journal of Radioanalytical and Nuclear Chemistry*, **Vol. 268, No.1**, 15–23
IN PROGRESS	1. Standardization of In-111 radiopharmaceuticals. 2. APMP C-14, I-131 key comparison piloted by KRISS/Korea.
INFORMATION	
SOURCE IN PREPARATION	
OTHER RELATED PUBLICATIONS	
ADDRESS	Health Physics Division, Institute of Nuclear Energy Research P.O. Box 3-10, Longtan 32546, Taiwan (R.O.C.) Tel:886-3-4711400 EXT:7673, Fax:886-3-4711171
CONTACT	Ming-Chen Yuan (E-mail:mcyuan@iner.gov.tw)