

SUMMARY**Meeting of Senior Representatives of Organisations
in Formal Relations with ICRP****Seoul, Korea****2015 October 19****Present:**International Commission on Radiological Protection

Claire Cousins (Chair), John Boice*, Christopher Clement, Donald Cool, John Harrison, Carl-Magnus Larsson, Jaiki Lee, Hua Liu, Jacques Lochar, Hans-Georg Menzel*, William Morgan, Ohtsura Niwa, Sergey Romanov, Eliseo Vañó

Representatives of Organisations in Formal Relations

William Irwin - Conference of Radiation
Control Program Directors (CRCPD)

Tae-Won Hwang - Information System on
Occupational Exposure (ISOE)

Fernand Vermeersch - European ALARA
Network (EAN)

Dr Jean René Jourdain - Multidisciplinary
European Low Dose Initiative (MELODI)

Bernd Lorenz - European Nuclear
Installations Safety Standards Initiative
(ENISS)

John Boice* - National Council for Radiation
Protection and Measurements (NCRP)

Analia Canoba - American Forum of
Radiological and Nuclear Regulatory
Organisations (FORO)

Ted Lazo - OECD Nuclear Energy Agency
(NEA)

Fredrik Hassel - Heads of the European
Radiological Protection Competent
Authorities (HERCA)

Thierry Schneider - European Platform on
Preparedness for Nuclear and Radiological
Emergency Response and Recovery
(NERIS)

Miroslav Pinak - International Atomic Energy
Agency (IAEA)

Malcom Crick - United Nations Scientific
Committee on the Effects of Atomic
Radiation (USNCEAR)

Hans Menzel* - International Commission on
Radiation Units and Measurements (ICRU)

Maria del Rosario Perez - World Health
Organisation (WHO)

Renate Czarwinski - International Radiation
Protection Association (IRPA)

Agneta Rising - World Nuclear Association
(WNA)

* Participating in a dual capacity

Meeting Summary

This meeting was held in conjunction with ICRP's 3rd International Symposium on the System of Radiological Protection, and follows a full-day meeting of senior representatives held in London in 2014. It was noted that another full-day meeting would be planned for 2016.

Short written reports were requested from each liaison organisation in advance of the meeting. All received reports are attached to this meeting summary.

Following a welcome from ICRP Chair Claire Cousins, ICRP Vice-Chair Jacques Lochard presented information on several ICRP initiatives to collaborate more closely and broadly with the radiological protection community and other stakeholders in the development of our recommendations and guidance. This included:

- Collaborating with IRPA Associate Societies, Harvard University, Fukushima Medical University, and other organisations to hold open workshops on the ethical basis of the system of radiological protection, to support the work of ICRP Task Group 94 on the Ethics of Radiological Protection;
- An open workshop held by ICRP Task Group 91 [name] held in conjunction with [ICRR] in Kyoto, and in collaboration with JANUS, with a summary published shortly thereafter in the open literature [ref];
- The multi-year series of Fukushima dialogue meetings organised by ICRP in collaboration with a long list of organisations domestic and foreign, governmental and non-governmental, in addition to many interactions with the Japanese government and power industry, to support the work of ICRP Task Group 93 on the Update of ICRP *Publications 109 and 111*.

The meeting continued with a structured dialogue, with each representative expressing their views followed by open discussion. The focus was to seek advice from the liaison organisations on areas in which ICRP could usefully provide recommendations.

The discussion was wide ranging, and not restricted to the question at hand.

General Issues

Several broad issues were raised, including that of communications in particular with the public. Many points were raised on risk communication, dealing with the media, etc. A general conclusion was that ICRP's primary communication responsibility is

to communicate the system of radiological protection. Increasingly, this must be aimed not only at radiological protection professionals, but also at decision makers and the interested public. As a result, more effort is needed to produce plain language materials.

ICRP's role in promoting radiological protection culture (an inseparable part of 'culture' defined more broadly) was also discussed.

Specific Suggestions for Recommendations

Many areas for possible future recommendations were raised. Among those not already part of the planned programme of work for ICRP were (in no particular order):

- Evaluation of dose from surface contamination
- Promoting safety culture in industrial radiography
- Advice on application of the precautionary approach for assessing risk, decision making, and in communications
- Technologically enhanced NORM
- Emergency response, including development of skilled resources and communications in an emergency
- Decommissioning of facilities
- A post-Publication 103 update of Publication 75 on radiological protection of workers
- Specific advice on radiological protection of NPP workers
- Measurements for characterizing the radiological situation after an accident
- Ethical aspects of the use of radiation in medicine
- A glossary of terms to provide consistency across organisations
- Quantities related to the presentation of the system of RP
- Tolerability of risk

In addition, appreciation was expressed for several initiatives now in progress, including the work on the ethics of radiological protection, updating ICRP *Publications 109* and *111*, protection of the environment, waste disposal, site remediation, providing advice on a strategic research agenda to improve the system of radiological protection, the series of 'end user' reports being developed by Committee 4 to more closely engage implementers of radiological protection, the continuing work of Committee 3 to provide radiological protection advice in the rapidly evolving medical field, and the ICRP glossary.

Organisational Issues

Included were discussions on how to improve collaborative working methods, looking for methods both formal and informal to be more involved in the work of ICRP, and to be informed earlier on emerging areas of work.

ICRP is dedicated to strengthening collaboration and engagement, but like all organisations, and even much more than most, has limited resources and so must find methods that are both effective and highly efficient.

It was noted that each organisation in formal relations nominates a single primary contact, and that through this individual the organisation has access to the members' area of the ICRP website¹. This provides access to, among other things: a full contact list of all ICRP members, a complete pdf library of ICRP publications from 1928 to present, and many working documents within the 'file areas'. This material primarily an internal resource for members, and as such its use is restricted and not to be distributed further. However, it can also be used by organisations in formal relations with ICRP to see in some detail the current work in progress.

In addition, it was strongly recommended that individuals 'register for updates' through the ICRP website to receive key news items from ICRP including, but not limited to, summaries of Main Commission and Committee meetings, and notifications of reports for consultation.

Other suggestions on effective and highly efficient modes of collaboration and sharing of information are welcome.

¹ To gain access, go to www.icrp.org, select 'Member Login' link in the top right corner, and log in using the email address of the primary contact (to verify the registered address, check to see what is listed at http://www.icrp.org/icrp_group.asp?id=80). If you do not know the password, click 'Forgot password?' and it will be sent to the registered e-mail address. If you still encounter difficulties, please contact Lynn.Lemaire@icrp.org for assistance.

Attachments

Presentation by Jacques Lochard

Reports from organisations:

- Conference of Radiation Control Program Directors (CRCPD)
- European ALARA Network (EAN)
- European Nuclear Installations Safety Standards Initiative (ENISS)
- European Platform on Preparedness for Nuclear and Radiological Emergency Response and Recovery (NERIS)
- Heads of the European Radiological Protection Competent Authorities (HERCA)
- Ibero American Forum of Radiological and Nuclear Regulatory Organisations (FORO)
- IndustriAll Global Union's International Network (INWUN)
- Information System on Occupational Exposure (ISOE)
- International Atomic Energy Agency (IAEA)
- International Commission on Radiation Units and Measurements (ICRU)
- International Radiation Protection Association (IRPA)
- Multidisciplinary European Low Dose Initiative (MELODI)
- National Council for Radiation Protection and Measurements (NCRP)
- OECD Nuclear Energy Agency (NEA)
- United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR)
- World Health Organisation (WHO)
- World Nuclear Association (WNA)

No written reports were received from:

- European Commission (EC)
- International Labour Organisation (ILO)

New modalities for the work of the Commission



Jacques Lochard
ICRP Vice Chair
Director of CEPN, France

Liaison Organisation meeting
October 19, 2015
Seoul, Korea

Content

- Involving stakeholders in the TGs' work
- Working with the Liaison Organisations

Context

The Strategic Plan 2011-2017

- Positive relationships with organisations interested in radiological protection

The ICRP Code of Ethics

- Accountability
- Transparency

Involving stakeholders in TGs' work (1)

- **From public consultations prior to publication ...**

« ... to ensure that the new recommendations adequately and appropriately address national issues and concerns, the Commission has initiated a much more open process than that used for the development of the previous recommendations. »

« By following this policy of transparency and involvement of stakeholders, ICRP is expecting a clearer understanding and wide acceptance of its Recommendations. » ICRP 103

- **... to involving stakeholders in the development of Task Group reports by organizing:**

- open scientific discussions
- stakeholder meetings
- joint workshops

Involving stakeholders in TGs' work (2)

- TG 91 on DDREF -

- Organisation of an open ICRP/JANUS meeting in conjunction with ICRR 2015 in Kyoto last May to discuss the work of the TG
- A paper summarizing the discussion has been published on line in September 2015:
 Werner Rühm *et al.* Dose and dose-rate effects of ionizing radiation: a discussion in the light of radiological protection. Radiat. Environ. Biophys., 54: in press, 2015

Involving stakeholders in TGs' work (3)

- TG 93 on the update of Publications 109 and 111 -

- Several meetings with representatives of industry and governmental bodies
- Organisation of 12 ICRP Dialogue meetings since November 2011 in Fukushima City, Date City, Iwaki, Minamisoma with local stakeholders (Supported by ASN, IRSN, NEA, NRPA and local organisations and NGOs)
- Invitation of 9 regular participants to the Dialogue meetings at the Task Group meeting in July 2015 in Tokyo
- For information an International Workshop on the Fukushima Dialogue Initiative entitled "Rehabilitation of Living Conditions after the Nuclear Accident" will be held in Date City, Fukushima Prefecture on December 12-13, 2015

12th ICRP dialogue seminar in Date City - September 2015 -



ICRP INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION

Task Group 93 meeting in Tokyo with stakeholders - July 2015 -



ICRP INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION

**International Workshop on the
Fukushima Dialogue Initiative**

"Rehabilitation of Living Conditions after the Nuclear Accident"

Date City Silk Hall, Fukushima Prefecture, 2015 December 12-13



Photo © Jun Tabei

Hosted by Date City

Organized by the International Commission on Radiological Protection

in cooperation with:

Date City • Ethos in Fukushima • French Institute of Radiation Protection and Nuclear Safety • French Nuclear Safety Authority • Fukushima Medical University • Fukushima Prefecture • Japan Health Physics Society • Japanese Cabinet Office (Support Team for Residents Affected by Nuclear Incidents) • Japanese Nuclear Regulation Authority • Ministry of the Environment of Japan • The Nippon Foundation • Norwegian Radiation Protection Authority • OECD Nuclear Energy Agency • Radiation Safety Forum Japan

Hosted by:



伊達市
DATE CITY

Organised by:



The International Commission
on Radiological Protection

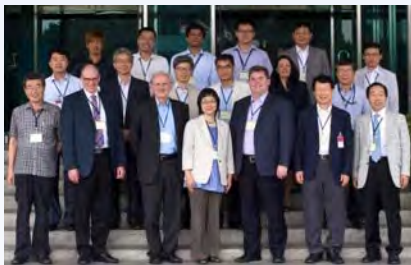
ICRP INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION

Involving stakeholders in TGs' work (4)

- TG 94 on the ethics of radiological protection -

- 8 workshops and meetings on 'The ethical dimensions of the radiological protection system' have been organized in Asia, Europe and North America in cooperation with IRPA Associate Societies, the Open Project for European Radiation Research Area (OPERRA), and the Fukushima Medical University (FMU)
- These events have shown that the core ethical values underlying the RP system - beneficence/non-maleficence, prudence, justice and dignity - are largely shared worldwide

The workshops and meetings on the ethics of radiological protection (1)



Daejeon, Korea, August 2013



Milan, Italy, December 2013



London, UK, June 2014



Baltimore, USA, July 2014

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The workshops and meetings on the ethics of radiological protection (2)



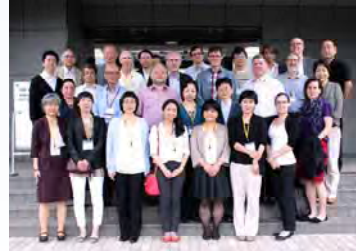
Budweis, Czech Republic, June 2014



Madrid, Spain, February 2015



Cambridge, USA, March 2015



Fukushima, Japan, June 2015

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Working with Liaison Organisations (1)

- The **First meeting** with SLOs took place in Abu Dhabi at the occasion of ICRP 2013
- Pertinent questions have been addressed to the Commission
- The **Second meeting** took place in London in Nov. 2014 and addresses two of these questions in moderated working groups:
 - Q1: What is the role of ICRP in interactions with the public, and what collaborative actions could to be taken in this area?
 - Q2: How should stability and evolution of the System of Radiological Protection be balanced?



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Working with Liaison Organisations (2)

Q1: Summary

- Moving from the classical vertical approach (*kind of boxes dropping one into the other*) towards a multi-connexion (3D) more flexible approach
- Simple and clear messages to improve understanding of the RPS.
- ICRP looking at the future of RPS , emerging issues with open eyes...
- How much ICRP should act reactively vs propectively (anticipating)
- Ad hoc meeting (electronic solutions) for interacting when/if necessary with SLOs, to put together messages or common position papers



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Working with Liaison Organisations (3)

Q2: Summary

1. Stability vs evolution: yes, both have important components
2. The system is fit and does not need so much evolution; evolution is expected in clarifications, explanations, ways to communicate, differences in engagement/involvement of stakeholders
3. To anticipate the implications of the changes (e.g. dose coefficients) before announcement (ICRP does not deal with implementation but "implementability")
4. Caution, precaution, digestion before the change
5. Individual focus, individualized risks, tolerability (what is my risk?, what is OK, how long it will be OK?, why it is OK?)
6. The broader concept of HEALTH, ethics, dignity, justice... these are the things to think through



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Working with Liaison Organisations (4)

- The focus of the **Third meeting** will be to seek advice on areas where ICRP should develop recommendations
- To be noted that a similar effort began some time ago with Committee 4 seeking input on areas of work



INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION



Report to ICRP 2015 Meeting of Senior Representatives

Conference of Radiation Control Program Directors

William Irwin, ScD, CHP, Chairperson

The Conference of Radiation Control Program Directors is a non-profit, non-governmental professional organization representing the radiation protection agencies in the states, territories, cities and counties of the United States. Our membership is currently about 1,000 people. We have an Executive Director, Ruth McBurney, and a seven member Board of Directors which oversees the work of the organization.

The work is aligned to five councils:

- The Environmental Nuclear Council
- The Homeland Security and Emergency Response Council
- The Healing Arts Council
- The Suggested State Regulations Council, and
- The General and Liaison Council

We have strong partnerships with federal agencies including the U.S. Food and Drug Administration, Environmental Protection Agency, Department of Energy, Department of Homeland Security, Centers for Disease Control and Prevention, and Nuclear Regulatory Commission, as well as the National Council on Radiation Protection and Measurements. We highly value our working relationships with the ICRP, the International Atomic Energy Administration, the Heads of the European Radiological Protection Competent Authorities and professional organizations like the Health Physics Society, the American Association of Physicists in Medicine, the American College of Radiology, and the American Society of Radiation Oncologists.

Some of our more important work in the past year resulted in:

- A June 2015 report on technologically enhanced naturally occurring radioactive material, *Review of TENORM in the Oil and Gas Industry*
- Continued collaboration on the *RadResponder* tool (<https://www.radresponder.net/>) for environmental data sharing
- Collaboration on the development of the Radiological Operations Support Specialist (ROSS) position for radiological/nuclear emergency incident command systems
- Our 47th annual National Conference on Radiation Control and 25th annual National Radon Training Meeting
- Revised regulations for
 - Medical Diagnostic and Interventional and Imaging Systems
 - Licensing Requirements for Uranium and Thorium Processing
 - Physical Protection of Category 1 and Category 2 Quantities of Radioactive Material
 - Transportation of Radioactive Material
- Collection of data for the Nationwide Evaluation of X-Ray Trend (NEXT) survey, where this year the survey was on dental radiography
- Centers for Disease Control and Prevention grants for Radiation Emergency Response Volunteer Corps

More may be learned about these products and more at our website (<http://www.crcpd.org>). Our next annual meeting is in Lexington, Kentucky May 16 through 19, 2016. We hope you all can attend!



European
ALARA
Network

2015 Meeting of senior representatives of organisations in formal relations with ICRP

Seoul, Korea October 19, 2014

Iris Room - Mayfield hotel Korea

Activities of the European ALARA Network

1. Introduction

The strategic agenda of the European ALARA Network for 2015-2020 emphasises stakeholder involvement and the exchange of practical experiences in radiation protection optimisation between professionals, the authorities and the public.

The workshop “ALARA in Industrial Radiography – How can it be improved?”, planned from 14-16 March 2016 in Bern, Switzerland is under preparation. The experiences and information gathered during the workshop can form the basis for the collaboration between EAN and the Commission to further develop recommendations in this particular area. We would therefore appreciate the participation of the Commission to the workshop.

The ALARA book is under further development by the EAN ALARA culture working group, a review by the Commission is also an element of collaboration between EAN and the Commission.

2. EAN objectives and priorities

a. General objectives

The EAN three General Objectives now adapted for the period 2015-2020 are:

- *Promote the implementation of the ALARA principle for the protection of worker, public and patient exposures in all situations.*
- *Engage stakeholders in ALARA and provide a focus and a mechanism for the exchange and dissemination of information, knowledge and practical experience.*
- *Identify and investigate topical issues of common interest to further improve the implementation of ALARA.*

Emphasizing the stakeholder involvement puts the focus on the exchange of practical experience in optimisation of the radiation protection between competent authorities, licensees, exposed workers, manufacturers, the public and radiation protection professionals.

b. Priority areas for the EAN

A discussion of the worldwide evolution of radiological protection helped identify priority areas for EAN. It was decided that the topics for the next EAN workshops, working groups and position papers should be chosen from this list:

- Industrial radiography
- Radon and NORM (the management of existing exposure situations)
- Emergency and post-accident situations (dissemination of ALARA culture in this)
- Medical field (revisiting the boundaries between the protection of the patients, public and workers can lead to practical implications in the application of ALARA in the medical field).

3. The ALARA book

The continuous technological developments in ionising radiation applications and the increasing number of exposure situations highlight the need for further actions to develop and disseminate ALARA culture. At the same time, the number of radiation protection specialists with relevant knowledge and experience is decreasing due to retirement.

Therefore, there is a need to re-establish the elements that constitute ALARA culture (exposure situations, attitudes, responsibilities etc) in order to facilitate its practical implementation. That's why the EAN working group on ALARA culture is preparing a publication "Optimisation of radiation protection (ALARA): a practical guidebook". This guidebook will contain the following elements:

- Basic concepts of radiation protection and their origins
- The ALARA process and the ALARA procedure
- Elements supporting the approach
- Actors and their responsibilities
- Examples of ALARA implementation in practice

The ALARA Book is in the process of completion but needs updates to take into account the publication of the EU BSS. The current draft of the book will be discussed at the next EAN Steering Group (December 2015) in order to gather comments for its further completion in 2016. The book can then also be presented to the Commission for review.

4. Preparation of the EAN Workshop on industrial radiography

Industrial radiography (for non-destructive testing (NDT)) using gamma and X-ray sources is a long-established and widespread practice. A key radiation protection principle is optimisation, to ensure that the radiation exposure of radiography workers and other persons is As Low As Reasonably Achievable (ALARA).

In 2001, in Rome, the 5th EAN Workshop specifically considered ALARA in industrial radiography. It was concluded that ALARA was not always being achieved, and improvements in radiography equipment, working procedures, training and safety culture were recommended.

Since then, industrial radiography has remained an area of concern in radiation protection, due to the levels of radiation exposure received and, in particular, the number and magnitude of accidental exposures. Consequently, EAN has decided to re-visit this topic.

The workshop will consist of presentations (oral and posters) intended to highlight the main issues, and a significant part of the program will be devoted to discussions within working groups.

The workshop is planned from 14-16 March 2016 in Bern, Switzerland and will discuss industrial radiography including improvements in equipment, radiation safety culture and training and education. The workshop main sessions will start off by setting the scene with contributions from EAN, ISEMIR (IAEA), ICRP, EFNDT, ERPAN and the users' point of view. Then it will continue to explore the development of new equipment, alternative sources, monitoring devices and alternative NDT techniques. Incidents and accidents and lessons learned will also be specifically explored and the final workshop sessions will consider training, education and ALARA culture. The workshop format also includes discussions in working groups reviewing issues associated with industrial radiography and the identification of recommendations to improve radiation protection and optimisation.

EAN invites competent authorities, licensees, exposed workers, manufacturers, the public and radiation protection professionals to participate and share their experiences in the process of the practical implementation of optimisation. We also extend our invitation to the Commission to take part in the workshop.

Dr. Fernand Vermeersch
Chairman of the
European ALARA Network

ENISS activities with relevance to the work of ICRP

ENISS unites a considerable number of European Nuclear Power Plant Operators with the aim to harmonize safety standards in Europe on a high level of safety. ENISS stands for the *European Nuclear Installations Safety Standards Initiative*, which is an organization of the European nuclear power plant and nuclear facility licensees and operators which was founded in 2005. At present, there are 24 companies from 16 European countries who share their experience within ENISS.

The major objective of ENISS is the development and application of harmonized safety standards for the design and operation of nuclear power plants and installations, and in this regard ENISS cooperates closely with the European authorities, namely the Western European Nuclear Regulators' Association WENRA. There have been many discussions between WENRA and ENISS about the WENRA Safety Reference Levels and a fair exchange of views and many of our comments to improve the documents have been accepted by WENRA.

ENISS has also sought for a participation in the international development of safety standards especially within the framework of the IAEA and now has observer status in the Safety Standards Committees NUSSC, RASSC and WASSC.

Within the ENISS organization there is an Expert Group on Radiation Protection which has intensively discussed the ICRP Recommendations 103 and the IAEA Basic Safety Standards on Radiation Protection and the Safety of Radiation Sources. We believe that such discussions are helpful for the effective and efficient implementation of radiation protection in practice.

We recognized that ICRP is the worldwide leading organization in setting basic radiation protection standards and we wanted therefore to intensify the contacts to ICRP. In February 2012 we started with an official application to become an observer in Committee 4. Then ICRP invented the Liaison Organisations and we became one in 2013.

Since then we had the possibility to present our views in two meetings with the Main Commission. We have not been invited to work in a Task Force, Working Party or in any other respect. Also personal applications of persons working in the nuclear industry to become members of ICRP were not successful. Taking this into account, we see potential for improvement of our contacts and activities towards ICRP.

In our statement in preparation of the 2014 London Meeting with the Main Commission we pointed already out that the movement from ICRP 26 via ICRP 60 towards ICRP 103 and especially some recent ICRP recommendations led to developments in radiation protection, that impose an additional and probably inadequate burden on those using ionizing radiation including the nuclear industry. Especially the new risk factor for Radon exposure and the new dose limit for the lens

of the eye have given signals in a direction where people might think that radiation protection in the past has been inadequate. This was not the case.

With the propagation of ICRP 103, representatives of ICRP underlined the principle of “continuity and stability”. The reality now is different. We are currently in the process of implementing the new EU Basic Safety Standards (Directive 2013/59/Euratom) in Europe and we see a number of new items which have to be done in the future but will not necessarily contribute to a higher safety.

There is no doubt about to look at new scientific evidence on the detrimental effects of radiation and so did ICRP, changing the coefficients, weighting factors etc. here and there. The overall risk factor in ICRP 103 is 20% lower than in ICRP 60. The conclusion of ICRP was not to change the limits. It is worth noticing that the change in the risk factor for the lens of the eye resulted in a dramatic reduction of the limit based on a criterion that there shall not more than 1% radiologically induced cataracts. This criterion is neither scientific nor societal justified. A similar problem arose with the risk for Radon exposure. The new risk factor is based primarily on the risk of smokers and imposes an unnecessary burden of protective measures for non-smokers. Again, the decision by ICRP was to reduce the level of tolerable exposure.

Changes should be introduced with due care, with caution so that they do not affect the proven practice unduly, a practice which is characterized by the lowest occupational exposure since ever.

The radiation protection system is based on the precautionary principle with respect to stochastic effects. This was recently clearly demonstrated by UNSCEAR in their report to the United Nations. There is no proven effect for low doses < 100 mSv. The LNT-Hypothesis is a hypothesis and is expected to remain so in foreseeable times. The real occupational doses are far below 100 mSv/a and at a worldwide average between 1 and 2 mSv/a. The doses for members of the public are in the μ Sv range and even lower. From this, we can raise the following questions and suggestions:

- Be cautious with changes of the system or refinements.
- Optimization should have a cut-off criterion, e.g. 1 mSv/a for occupational exposure.
- More scientific studies should be devoted to the effects of high natural background exposures instead of studies on relatively low occupational doses.
- Dose constraints should be understood as target values rather than new de-facto limits.



EUROPEAN PLATFORM ON PREPAREDNESS FOR NUCLEAR AND
Radiological Emergency Response and Recovery

**NERIS Report to the 2015 Meeting of Senior Representatives of Organisations in Formal
Relations with ICRP**

October 19, 2015, Seoul, Korea

The European Platform on Preparedness for Nuclear and Radiological Emergency Response and Recovery (NERIS Platform) was launched in June 15, 2010. Currently about 50 organisations from Europe and beyond are members of NERIS: research organisations, universities, expert bodies, authorities, emergency centres, NGOs, local authorities. The main objectives of the Platform are: to improve the effectiveness of current European, national and local approaches for preparedness concerning nuclear or radiological emergency response and recovery, to promote more coherent approaches in Europe through the establishment of networking activities, to maintain and improve know-how and technical expertise among all interested stakeholders in Europe by developing a supranational training programme, and to identify needs for further developments and to address new and emerging challenges.

Identification of research priorities

An integral part of the mission of NERIS is to identify gaps and needs for further research and developments and addressing new and emerging challenges in the field of preparedness for nuclear or radiological emergency response and recovery. The Strategic Research Agenda (SRA) of NERIS identifies these research needs.

In 2015, in the context of future EU research calls, NERIS has identified a list of 6 current research priorities. It has been emphasised that research and development in the field of emergency management and recovery at the European level calls for co-operation between authorities, emergency centres, research organisations and the academic community in different countries, as well as interactions with key concerned stakeholders. To reach this goal, apart from advances in the development of models, research improving the decision-making processes is crucial and requires a highly multidisciplinary approach including societal and ethical aspects. The identified priorities are:

1. **Assessment of and communication of uncertainties.** Investigation of data uncertainties (model or monitoring results) and how they can be communicated, e.g. in model results and in Decision Support Systems (DSS) to help decision-makers to understand the radiological situation. This includes also work on model sensitivity, validity of model results and inter-comparisons of models and measurements.
2. **Robust decision-making.** Structuring the decision processes and the protective strategies at national, regional and local levels with the help of formal decision aid tools, such as multi-criteria analysis and on the basis of feedback from stakeholder processes. Development of guidance on the use of DSS in the various phases of an event based on feedback from stakeholder processes and from Fukushima experience in emergency response and recovery.
3. **Countermeasure strategy preparedness.** Development of sustainable preparedness strategy at Local, National and European level, based on the analysis of countermeasures for relevant accident scenarios. Ensuring that parameters governing the radiological consequences can be identified in time to enable optimized remediation and contribute to the elaboration of robust recovery strategies.

4. **Atmospheric dispersion modelling.** To make more reliable forecasts of atmospheric dispersion, including data assimilation and improved inverse modelling (to determine source term and/or source location) in different environments (e.g. urban areas) and/or at different spatial scales (near range to global scale).
5. **Local radio-ecological models.** Development and integration in general DSS of local radio-ecological models interlinked with monitoring information and the more global and food chain dose models. Investigate the capability of such models to be operated by local stakeholders as farmers or local communities.
6. **Monitoring strategies.** Optimised use of monitoring resources, including mobile units and trans-border issues. Integration of new monitoring technologies (e.g.; drones). Development of processes and tools for integrating the monitoring results from experts and lay people into a common operational picture (monitoring crowdsourcing). Information fusion (radiological and non-radiological).

Proposal for cooperation with ICRP

- ***Presentation and discussion of the draft report of the ICRP Task Group on the update of Publication 109 & 111 with the NERIS Working Group on application of ICRP Recommendations***

As mentioned in the report last year, the NERIS platform would like to propose the organisation of a dedicated meeting of the NERIS Working Group on the application of the ICRP recommendations to discuss the draft report of the ICRP Task Group 93 on the update of Pub. 109 and 111. NERIS will also invite the other European radiation research platforms (i.e. ALLIANCE dealing with radioecology, EURADOS dealing with dosimetry, MELODI dealing with low doses). Issues to be addressed will cover application of the optimisation principle, transition phase from emergency situation to existing exposure situation, stakeholder engagement, health surveillance, management of contaminated goods, protection of the environment, monitoring strategies, social values in post-accidental situation, ...

- ***European Workshop on the management of contaminated goods to be held in Paris on Nov. 12-13, 2015***

A NERIS topical workshop dedicated to the management of contaminated goods will be organised in Paris on November 12-13, 2015 in order to report the results of the European panels of consumers and producers set up in different European countries within the EC research project PREPARE. A representative of ICRP has been invited to participate to the final round table of this workshop together with other international and European organisations.

- ***European Workshop on the dissemination of the results of the research project PREPARE to be held in Bratislava on January 20-22, 2016***

The PREPARE Dissemination Workshop will be organised on January 20-22, 2016 in Bratislava (Slovak Republic) and will allow to present the results of the project on the following topics:

- Operational arrangements and procedures (emergency preparedness for long lasting releases and management of consumer goods);
- Enhancing of the existing decision support systems (estimation of the source term, atmospheric and aquatic dispersion and consequence modelling);
- Improved means for the interaction of technical experts with authorities in charge, communication from and to the public and the training of key players;
- Analytical Platform of European dimension for collecting information, analysing and providing information about the consequences on nuclear or radiological events.
-

A representative of ICRP will be invited to participate to the final round table of this workshop together with other international and European organisations.

2015 Meeting of Senior Representatives of Organisations in Formal Relations with ICRP

Seoul, Korea, October 19, 2015

The Association **HERCA** (Heads of the European Radiological protection Competent Authorities) has the objective to contribute to a high level of radiological protection throughout Europe.

The members of HERCA are the European Radiation Protection Authorities (RPA) represented by the Heads of the authorities.

The programme of work of HERCA is based on common interest in practical and harmonized solutions to important regulatory issues to be applied at the national level.

HERCA collaborates with relevant stakeholders and approaches stakeholder involvement with a view on maximizing the efficiency and efficacy of its efforts. HERCA will keep relevant stakeholders informed about its activities and is prepared to consider requests from them for advice on radiological protection and regulatory matters.

Overview of HERCA activities

HERCA current activities cover the following areas:

- × Medical Applications
- × Emergency Preparedness and Response
- × Veterinary Applications
- × Non-Medical Sources and Practices
- × European Radiation Passbook and Outside Workers
- × Education and Training
- × Transposition of Euratom BSS
- × Radon

More information on [HERCA and its current activities](#).

Collaborative efforts with stakeholders in the medical field.-

Meeting between European radiation protection authorities and major stakeholders on the optimised use of CT scanners

On 1st April, HERCA organised a multi-stakeholder meeting kindly hosted by the French Nuclear Safety Authority (ASN) in its premises in Paris. The stakeholders included:

- × COCIR, supported by the main manufacturers of CT equipment (GE, Philips, Siemens and Toshiba),
- × the professional organisations: ESR, ESPR, EFRS, EANM, ESTRO and EFOMP,
- × the international organisations IAEA, EC, and the US FDA (present as observers).

The objective of the meeting was to exchange views with a variety of key stakeholders on issues with regard to the optimised use of computed tomography (CT) scanners. **The ultimate goal of this focus on dose optimization is to ensure the best patient care by providing an optimised balance between image quality and dose.**

A recently published [HERCA position paper](#) on the process of CT dose optimisation through education.

All organisations present welcomed HERCA's initiative recognising the importance of the CT dose management tools and techniques. There was a willingness to support a task-oriented approach and to propose voluntary commitments by the professional organisations to improve the use of CT dose

management tools and techniques. This goal can be achieved if all stakeholders work together on training & education, awareness, teamwork and the good use of available tools in daily practice. Further concrete steps were agreed upon and will be followed up.

The productive meeting in Paris proves again that this kind of multi-stakeholder meeting can lead to successful results and HERCA sincerely thanks all participants for their positive contribution. For more information click [here](#).

HERCA Workshop on the implementation of Radiation Protection Expert (RPE) and Radiation Protection Officer (RPO)

HERCA has organised on 6-8 July 2015, a workshop hosted by ASN (Montrouge, France) on the implementation of Radiation Protection Expert (RPE) and Radiation Protection Officer (RPO). This workshop was part of the [HERCA Action Plan](#) in relation with the transposition and implementation of the Directive 2013/59/Euratom (Euratom BSS).

The objectives of this workshop were:

- × to explore a common understanding of the new requirements on RPE/RPO;
- × to exchange national approaches relating to the implementation of the BSS on RPE/RPO. Whenever possible, to identify good practices with national implementation of RPE/RPO;
- × to develop recommendations, to be approved by HERCA, to facilitate implementation of BSS on RPE and RPO. To be sent to national authorities;
- × to comment on the draft guidance from ENETRAP III;
- × to develop a joint vision on future ambitions of HERCA on RPE/RPO : duties, harmonisation (registration, other).

Experts from 17 European regulatory countries participating in HERCA plus experts from international organisations such as EC, IAEA, and IRPA participated in this workshop. The event has also been the occasion to exchange with members of the ENETRAP Network (European Network on Education and Training in Radiological Protection) with a view to coordinate efforts.

This workshop has allowed to propose some common understanding on specific issues of the BSS requirements and specific recommendations for those cases where flexibility is allowed for transposition. In particular it has allowed to identify that radiation protection authorities share in general terms a common understanding of the relevant requirements on RPE/RPO in the new Euratom BSS. The presentations on the different national approaches have shown that if existing regulations need to be updated, there are not serious issues in the participating countries as regards the transposition activities in this field.

HERCA Radon Workshop on National Radon Action

A European workshop on radon, supported by HERCA, will be held in Geneva from 12 to 14 October 2015 and organised by ASN (France), NRPA (Norway) and PHFO (Switzerland). It will be mainly focused on the issue of controlling radon exposures in workplaces. The main objective will be to provide a forum for European countries to exchange points of view on the transposition of the specific requirements of the Euratom-BSS dealing with radon exposure in workplaces (articles 5, 9, 25, 31, 35, 54, 103, annex XVIII (2, 3, 4, 5, 6, 10)) and the impact on existing national approach and strategy.

In the framework of the activities of the ICRP on the issue of radon, a participation and contribution of ICRP to this workshop would be of most value. One key issue already identified concerns the lack of actualised ICRP recommendations on dose conversion factors.

As far as possible, a "Draft Position Paper" will be prepared integrating a common understanding of the BSS requirements and, if possible, specific recommendations for those cases where flexibility is allowed for transposition. This Draft Position Paper document will then be submitted for approval to the HERCA Board.

The international organisations (ICRP, WHO, IAEA and ILO) will give their comments on the identified key points and difficulties met by Member States. A general discussion should be organised point by point, particularly with ICRP representatives on dose calculation methodology.

FORO – The Ibero-American Competent Authorities on Radiological Protection, Nuclear Safety and Security SLO to the ICRP

Summary of FORO activities

Report 2014-2015

The Ibero-American Forum of Radiological and Nuclear Regulators (FORO) *is an association of nuclear and radiological regulators created in 1997 with the aim of promoting radiological protection, nuclear safety and security at the highest level in the region. At present, FORO is composed of the regulatory authorities with competence in radiological protection, nuclear safety and security of Argentina, Brazil, Chile, Colombia, Cuba, Mexico, Peru, Spain and Uruguay.*

The FORO considers the sharing of knowledge, experiences and good practices between the heads of the regulators and among the specialists of their organizations, as well as a common official language, Spanish, together with a rigorous technical programme a valuable mechanism to increase safety in their countries and consequently in the entire region. Cooperation with other organizations with similar goals is also a key component of the FORO's approach.

The FORO promotes radiological protection and nuclear safety and security through the:

- Exchange of information and knowledge,
- Sharing of knowledge and development of technical projects of common interest,
- Harmonization of the regulatory practices, and
- Cooperation with national, regional and international organizations and associations with similar objectives.

The FORO technical programme is focused on radiological protection and nuclear safety from a regulatory perspective. Priority is given to areas where the regulators of the Iberoamerican region identify a need towards maintaining high levels of safety.

Within this context, the FORO establishes technical projects and activities that nowadays cover a range of themes; from the probabilistic safety assessment applied to medical applications (i.e., radiotherapy), to the safe use of radiation sources, the licensing of cyclotrons. The safety culture and the safety of nuclear reactors as well as the radioactive waste management; emergency preparedness and response are areas where the FORO has focused its efforts.

In sum, the FORO is an association of regulators of Iberoamerican that works on key areas of radiological protection and nuclear safety for the region, together with a proactive spirit and

action towards collaborating with other organizations like the International Atomic Energy Agency (IAEA), the Pan-American Health Organization (PAHO), the World Health Organization (WHO), the International Commission on Radiation Protection (ICRP), the International Radiation Protection Association (IRPA), and the Ibero-American General Secretariat (SEGIB).

Since the beginning of 2015, FORO continues to work in key areas of radiation protection and nuclear safety for the Iberoamerican region, namely in the areas of:

- Prevention of accidental exposures in radiation therapy through the application of probabilistic risk assessment and a risk assessment practical tool (named SEVRRRA); An IAEA-FORO joint document was published and efforts are being made to translate SEVRRRA into English to spread its application to countries of other regions. At present, FORO and IAEA are working on the possibility of establishing a synergy between the tools SAFRON developed by IAEA and SEVRRRA by FORO. The central idea of this collaboration between our organizations is to strengthen tools that can be used to improve and to prevent the occurrence of potential accidents in radiotherapy services.
- Collaborative approaches between regulatory and health authorities for regulatory control of medical exposures. Time ago, FORO developed a guideline for the self-assessment of the regulatory program on radiation protection on medical exposures. This project defined a scheme to implement the recommended criteria in the Basic Safety Standards. During this period, members of FORO have implemented the guideline. The experience of FORO and the lessons learnt in implementing it were shared during IRPA Regional Congress in Buenos Aires in April 2015 at a special event that had a good audience from the health organizations of the region.
- The results were also presented at the Regional Meeting on the Implementation of the International Basic Safety Standards in Medical Practices, in Chile, from 23 to 27 march, co-organized by the IAEA, PAHO, IRPA, FORO and US-NRC in cooperation with the Government of Chile. The purpose of the meeting was to inform the national authorities, responsible for the control of medical applications, on the new international standards of the IAEA General Safety Requirements (GSR) Part 3, "Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards" to ensure the safety of workers, patients and the public in the use of radiation emitting sources in medical practices.
- Licensing and inspection program for cyclotrons. This addresses the fact that many cyclotrons are being installed in our region, thus there is a need to have a good regulatory approach to the licensing of these equipment. A complete guidance was established for the licensing and control of these facilities, and a detailed study on shielding and venting will be performed in the next future.

- The second project that is completed, it is on safety culture in radiation protection which objective is to provide a conceptual framework and guidance for the Regulatory Authority about its Safety Culture in practices with sources of ionizing radiation. The provisional results of this project were presented at the ICRP Side Event, during the IRPA Regional Congress in Buenos Aires.
- Besides, two projects are under development in this period: Clearance procedures and criteria for small radiological installations and one on risk matrix applied to industrial installations.
- The FORO and its projects and technical activities have had an important place at the 2015 Regional IRPA congress in Buenos Aires, Argentina, through a plenary session about the results of FORO technical work and a special event dedicated to the contribution outcome of the radiation protection in medical applications.
- Two new projects have been completed: one on capacity building for nuclear safety regulators with the overall objective of improving systems, programs and practices on training and competence development of regulators.
- FORO is also working on the control of inadvertent radioactive material in scrap metal and recycling industries; A practical guideline was produced that we expect will contribute to early detection and response; the assessment of stress tests performed to NPPs in the FORO member countries. The actions identified by FORO were subjected to review and they are being effectively implemented in the NPPs of our region; and on the area of preparedness and response to emergencies. A special place in our website, the RED, was established to exchange lessons learnt and experiences. Harmonization of approaches to emergencies is envisaged as part of the FORO's objectives.

A final but a very important note is the cooperation between FORO and the organizations and institutions with similar objectives and approaches. The relationship with the IAEA is a very special one, since both organisations work hand in hand in areas of radiation protection and nuclear safety from a regulatory perspective in innovative areas and without duplication of efforts. Moreover, the IAEA General Conference has recognized the contribution of FORO to enhance safety in our region and beyond.

FORO has also been interacting with the WHO, PAHO, IRPA, ICRP and other organizations. In particular, there have been interactions in areas of potential common interest in response to ICRP query to SLOs to identify areas or subjects within ICRP's interests and mandate.

FORO Reports, Joint publications, articles:

- All FORO technical projects and activities contain a report with the findings, recommendations and conclusions. Once these technical reports are approved by the Plenary of FORO, they are uploaded in its website, the RED (www.foroiberam.org) and are available to any interested party. In addition, these projects or activities are also published by the IAEA when it considers them of particular interest. Up to know, three joint technical documents were published by the IAEA within the FORO-IAEA Practical Arrangements: “Aplicación del Método de la Matriz de Riesgo a la Radioterapia” (unofficial translation: Risk Matrix Methodology applied to Radiotherapy) - TECDOC 1685/S-, “Análisis Probabilista de Seguridad de Tratamientos de Radioterapia con Acelerador Lineal” – (unofficial translation: Probabilistic Safety Assessment applied to Radiotherapy) - TECDOC 1670/S and “Programa de Protección Radiológica en Medicina” (unofficial translation: Programme of Radiological Protection in Medicine -self assessment guidelines to regulators-) - TECDOC 1710/S. These publications were issued in Spanish only, but some of the FORO reports are also available in English to further disseminate their results, thanks to the support of members of FORO. On the other hand, the outcome of the project on NPP ageing management and long-term operation made a major contribution to IAEA Safety Reports Series No. 57, Safe Long-Term Operation of Nuclear Power Plants.
- These publications are available in Spanish and some are also published in English at www.foroiberam.org. Access FORO www.foroiberam.org

INWUN

IndustriALL Global Union's International Nuclear Workers' Unions' Network

INWUN Report to the ICRP 2015 Meeting of Senior Representatives of Liaison Organizations

October 19, 2015. Seoul, Korea

We would like to start our report by thanking the ICRP for granting Special Liaison status to IndustriALL Global Union's International Nuclear Workers' Unions' Network.

IndustriALL Global Union is a global union federation founded in Copenhagen in 2012. IndustriALL represents 50 million working people in 600 Affiliated Unions in 140 Countries. IndustriALL's Members work across the supply chains in mining, energy and manufacturing.

IndustriALL Global Union's International Nuclear Workers' Unions' Network (INWUN) holds an annual meeting to exchange information between affiliates on nuclear energy policy and safety measures. Participants include Unions representing nuclear power station workers, uranium miners and staff employed across the nuclear supply chain. The next IndustriALL Global Union's INWUN and Electric Power Sector World Meeting will take place on October 29-30 in Geneva, Switzerland.

At the 2012 INWUN meeting in Ankara, Turkey, participants adopted a resolution stating *"Nuclear Power Stations around the world shall be operated and maintained to internationally accepted standards, such as those available from IAEA (International Atomic Energy Agency) and WANO (World Association of Nuclear Operators). We further support the timely refurbishment of such plants, and the free exchange of operational, engineering and maintenance information to support continued safe operation. We do this to ensure the health and safety of the workers, the communities they live in, and the environment in general. We would encourage all jurisdictions to participate as outlined above."*

INWUN includes in its mandate the sharing of information related to the health and safety of our Members. At our Conferences we have delivered presentations on a number of relevant topics such as: Alpha, Tritium, the Daiichi Nuclear Power Plant in Fukushima, and Worker's perspectives on Operational Safety. The Member organizations also share contract language on a number of health and safety related items including: Joint Committees on Radiation Protection, ALARA Committees, Radiation Exposure limits, Access to Radiation Dose Records, Training, Pregnant Nuclear Energy Workers, and Female Nuclear Energy Workers Wishing to Conceive. INWUN and the Canadian Nuclear Workers Council (CNWC) were involved in the development and delivery of Radiation Safety Training for Mine Workers in Southern Africa. The CNWC has been involved in investigations into Worker Radiation Exposures.

We are strong advocates of a Worker's right to understand the hazards they are faced with in the workplace: the hazard, the source of the hazard, the health effects of exposure and how they are being protected.

In addition to our continued work on the items mentioned above we are currently looking at a few new initiatives including: standardized qualifications for Radiation Protection Technicians (currently a Canadian Initiative), Worker ownership of Safety Culture (Workers looking after one another), Worker/Worker Representative participation on ALARA Committees, Worker/Worker Representative participation on investigation or audit teams.

INWUN looks forward to this new relationship with the ICRP.

ISOE Work Relevant for ICRP

The Information System on Occupational Exposure (ISOE) is pleased to attend the 2015 meeting of Senior Representatives of Organisations in Formal Relations with ICRP, to report on its work relevant to the mandate of ICRP, and to provide suggestions for collaborative efforts of interest to ICRP and the other participating organisations. The ISOE is a Joint Undertaking of the OECD Nuclear Energy Agency, co-sponsored by the IAEA. ISOE is a network of NPP utility and regulatory radiological protection professionals focused on exchanging operational experience and occupational exposure data to collectively improve radiological protection. While the ISOE does not address policy aspects of operational occupational exposure, it is extremely interested in the recommendations of the ICRP in view of their implementation, and their addressing practical RP issues for NPP operation. The ISOE projects and interests of relevance to the ICRP are listed below:

- **Occupational Exposure Management for NPPs in Decommissioning:** The ISOE recently created a sub-group to develop an approach to benchmarking occupational exposure management at plants in decommissioning. The ICRP concepts of optimisation and dose constraints will be part of this group's benchmarking development. The group's work in this area should be considered by ICRP should specific recommendations on decommissioning be issued. Such recommendations from ICRP would be appreciated, and the ISOE would like to be involved, in some fashion, in their production and/or review.
- **Radiological Protection of Workers:** ICRP Publication 75, General Principles for the Radiation Protection of Worker, dates from 1997. While ICRP Task Group 93 is, we understand, addressing the radiological protection of emergency and recovery workers, no specific ICRP recommendation has been developed to explicitly address NPP worker protection since the 2007 issuance of Publication 103. Such recommendations from ICRP would be appreciated, and the ISOE would like to be involved, in some fashion, in their production and/or review.

IAEA Report to the 2015 Meeting of Senior Representatives of Organizations in Formal Relations with ICRP Period 01/2015-12/2015.

19 October 2015, Seoul, Korea

I. IAEA Activities undertaken in cooperation with or relevant to the ICRP:

1. The Agreement between the IAEA and the ICRP:

The cooperation between the IAEA and the ICRP continues as described in the Agreement between IAEA-ICRP (*hereinafter* Agreement). This Agreement, signed in 2013, establishes the formal relation between both parties and aims to strengthen and enhance cooperation. This cooperation is aimed to ensure that adequate principles of radiation protection, which are identified through academic efforts and assessed, compiled and processed by UNSCEAR, are formulated as ICRP recommendations and issued as IAEA Standards in a harmonized way.

2. Participation at the IAEA Safety Standards Committees' meetings

The IAEA, in line with the Article 2 of the Agreement, invites representatives of the ICRP into the IAEA Safety Standards Committees' meetings as observers (namely Committee of Safety Standards (CSS) and Committee of Safety Standards and Radiation Safety Standards Committee (RASSC)). Participation of the ICRP representative at the RASSC meeting is seen as the most important step in implementing the joint and harmonized approach in formulating the radiation safety requirements and associated safety guides. In this way, the recommendation elaborated and prepared by the ICRP can be formally and directly incorporated into the countries' respective legislation(s), subject to countries making legislative decision in its favor.

3. Participation at the ICRP Committees' meetings

Based on the principle of reciprocity as being stated in Article 2 of the Agreement, the IAEA appreciates the possibility of participating on work of the ICRP Committees' meetings by nominating representatives to each Committee. Currently, the IAEA has nominated its representatives to all ICRP Committees, as well as to selected Task Groups (TG). These Groups are for example TG93 and TG92.

4. Cooperation on the preparation of the *General Safety Requirements Part 3: Radiation protection and safety of radiation sources : international basic safety standards (BSS)*

The cooperation on the implementation of the revised BSS is acknowledged. This revised document takes account of the findings of UNSCEAR as well as recommendations from

ICRP. The ICRP actively participates in the activities of the BSS Implementation Group formed under the Inter Agency Committee on Radiation Safety (IACRS).

II. Continuing collaborative effort

- The IAEA considers it as being very important for both parties of the Agreement - the IAEA and ICRP - to continue close cooperation in the area of radiation protection, in order to fulfil their mandates. The IAEA will try to ensure participation of staff nominated to the ICRP Committees' at the respective meetings, and reciprocally, it will welcome and strongly encourages participation of the ICRP representative(s) at IAEA Safety Standards Committees' meetings.
- Cooperation under the umbrella of the Inter-Agency Committee on Radiation Safety, particularly the one aiming at the Implementation of the BSS is welcome and foreseen.
- The IAEA sees that the cooperation that would lead to building and strengthening the international system of radiation protection as it is being recommended by the ICRP, and further formulated by the IAEA in cooperation with other international organizations, is of utmost importance in ensuring the highest level of radiation safety is not only maintained, but also adequately communicated.



2015 Meeting of Organizations in Formal Relations with ICRP

ICRU's activities and issues related to ICRP work

This short report is aimed at updating information on recent and ongoing activities of the International Commission on Radiation Units and Measurements (ICRU) for the meeting with ICRP's Main Commission on 19 October 2015 in Seoul.

Background

The responsibility of the ICRU is to provide internationally acceptable recommendations concerning concepts, quantities, units, and measurement procedures for users of ionizing radiation in basic science, medicine, industry, and radiation protection. ICRU is a member of Consultative Committee for Units (CCU) – BIPM and Consultative Committee for Ionizing Radiation (CCRI(I) – BIPM and Observer to CCRI(II) and CCRI (III).

ICRU and ICRP have the same parent, the International congress of Radiology (ISR) and were both established in the late 1920's. ICRU was mandated to address the then urgent need for an internationally recognized unit for radiation exposure in medicine and ICRP to provide guidance for practical radiation protection in medicine. The original objective of radiation protection in medicine was later extended to that of workers, the general public and the environment.

ICRU ICRP Collaboration

Since the late 1950's ICRP and ICRU have worked together in the field of radiation protection in joint committees and task groups and published several joint documents and reports. For example, in 1962 ICRU and ICRP introduced the quantity *dose equivalent*, H as the product of absorbed dose, D, and the quality factor, Q.

Recent **joint publications** include:

Reference Data for the Validation of Doses from Cosmic Radiation Exposure of Aircraft Crew (published as ICRU Report 84)

Adult Reference Computational Phantoms (published as ICRP report 110)

Dose Conversion Coefficients for Radiological Protection Quantities (published as ICRP report 116)

A currently prepared report on *Operational Radiation Protection Quantities for External Radiation* will take into account the changes in the definitions of the quantities, and the changes in the fields of application. It is planned to be published as joint ICRU/ICRP report.

Current ICRU Activities

Radiation Protection

Report on *Measurement and Reporting of Radon Exposures* (in press)

Report on *Radiation Monitoring for the Protection of the Public after Major radioactive Releases to the Environment* is in preparation. This work on this report is in collaboration with USDOE, NRC and assistance by IAEA.

A report on *Retrospective Assessment of Individual Doses in Cases of Acute Exposure to Ionizing Radiation* has been initiated.

Radiation therapy

Progress in radiation therapy requires the ability to compare clinical results achieved in different centers using different radiation modalities and protocols. Thus a common language for reporting fractionation schedules, doses, and techniques is required for optimum treatment. The ICRU has devoted considerable effort in that direction. In particular, ICRU has developed world wide used concepts and guidance on Prescribing, Recording, and Reporting different radiation therapy modalities. Recent examples are

Intensity-Modulated Photon-Beam Therapy (IMRT) (ICRU Report 83)

Brachytherapy for Cancer of the Cervix (in press)

Prescribing, Recording, and Reporting Stereotactic Treatments with Small Photon Beams (approved for publication)

Bioeffect Modelling and Equieffective Dose Concepts in Radiation Therapy (in preparation)

Ion-beam Therapy (in preparation)

Diagnostic Radiology and Nuclear Medicine

Diagnostic imaging has become increasingly complex, and manipulation of image information requires common concepts, terminology, and measurement methodology. This is essential for the benefit of the patient to assure maximum diagnostic information with minimum potential risk. ICRU has developed a theoretical framework on image quality and evaluation of medical imaging systems, including conventional and digital radiography.

Recent work

Mammography: Assessment of Image Quality (ICRU Report 82)

Image Radiation Dose and Image Quality Assessment in Computed Tomography (Report 87)

Dosimetry of Internal Emitters in Radiotherapy (initiated)

Radiation in Science

In basic science, the measurement of physical parameters concerning ionizing radiations is improving constantly, and the results are being re-evaluated for the application of ionizing radiation.

Recent work:

Fundamental Quantities and Units Report (ICRU Report 85a)

Key Data for Measurement Standards for the Dosimetry of Ionizing Radiation (to be published)

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IRPA

INTERNATIONAL RADIATION PROTECTION ASSOCIATION

The international voice of the radiation protection profession, providing a medium for communication and advancement of radiation protection worldwide.

2015 Meeting of Senior Representatives of Organisations in Formal Relations with ICRP

Seoul/Korea, October 19, 2015

The International Radiation Protection Association, IRPA, is an international organization that enlists individuals as members who are also members of an affiliated national or regional Associate Society. Its primary purpose is to provide a medium whereby those engaged in radiation protection activities in all countries may communicate more readily with each other and through this process advance radiation protection in many parts of the world. Beside many national seminars and workshops the regional and international congresses are main platforms for communication.

IRPA14 International Congress, Cape Town, 9-13 May 2016:

This major international congress will provide the platform for discussion of all the above IRPA programs, and we look forward to welcoming our international partner organizations to participate and share their own programs with the worldwide practitioners. IRPA is delighted to announce that the prestigious Sievert Award lecture at the congress will be presented by Dr John Boice from the US.

During the IRPA14 International Congress in Cape Town IRPA will celebrate its 50th Anniversary on Wednesday, 11th May 2016. This special day has five main components – an opening, two panel discussions, the General Assembly and the Gala dinner. The panel discussions will have two targets – to focus on current scientific highlights and challenges in radiation protection, and to argue the role and importance of IRPA and its Associate Societies as NGOs in radiation protection.

IRPA's programme of activities focuses on three principle topics:

- **Effective and focussed engagement with other international organizations**
To provide feedback on the system of protection between the practitioners and the international organisations
- To embed the **sharing of good practice and professionalism** in Associate Societies and individual members, and to support the establishment and development of effective Associate Societies
- **Scientific professionalism at Congresses**

As the 'International Voice of the Radiation Protection Profession' IRPA has an active program of relevance to the ICRP and other international organisations. Key aspects of the current program are addressed below:

Ethics: IRPA has been working jointly with ICRP to support the work of ICRP TG94 on reviewing the ethical basis of the system of protection. As this work moves towards a conclusion it is clear that there are two inter-related aspects – the ethics within the system of protection itself, and the ethics in the implementation of the system. It seems likely that the ICRP report will focus on the former component, whilst recognising the importance of the total picture. Over the coming period IRPA will consider whether it will be helpful and appropriate to give additional consideration to the second aspect – the role of ethics in the application of the system by the practitioners.

Challenges to the Understanding and Communication of the System of Protection: In the report to this meeting last year, IRPA noted one common and compelling theme – that of ensuring that the system of protection is fit for purpose, credible and able to be presented to, and understood by, all those impacted by radiation. IRPA agrees with many of our colleagues, both within national and international organisations and at practitioner level, who consider that there are clear challenges that must be addressed in this regard. To this end IRPA has commenced a consultation seeking input from the worldwide IRPA Associate Societies in order to determine the views of the practitioners on what steps should be taken in this respect. IRPA is asking them to develop views on how best to improve the presentation of the system of protection so that it better meets the challenges of communication and understanding, whilst of course remaining fit for purpose, ethically-based and appropriately comprehensive. It is envisaged that IRPA will be able to share the preliminary output from this exercise with our international colleagues at the IRPA14 Cape Town Congress.

Radiation Protection Culture: IRPA published its Guiding Principles on RP Culture last year, and our Associate Societies are encouraged to develop and promote national implementation of this important consideration. There is a particular challenge in the medical community, and IRPA is working jointly with IOMP and WHO to develop additional guidance for the medical sector firstly. A series of international workshops, with the next one in Geneva in November/December 2015, is forming the basis of this work. A set of guidance also in other e.g. industrial resorts is planned. Such guidance will be published in a series.

Other topical work: Several other work streams are in progress, including:

- Certification of Radiation Protection Experts (draft ready in 2016)
- Implementation of the Eye Dose Limit (questionnaire was sent out)
- Security of Radioactive Sources

For further news please visit the website of IRPA: www.irpa.net

MELODI's activities and issues related to ICRP

This short information paper has been approved by the bureau of the MELODI Association for the meeting with ICRP's Main Commission on 19 October 2015 and aims to update about MELODI's recent work.

It is based on the MELODI Chair's annual report to the General Assembly which was discussed at the 6th MELODI International Workshop (7-9 October 2014) and the recent developments of the OPERRA and CONCERT projects, and the activities of MELODI in 2015.

The bureau members responsible for the day to day management of MELODI are Jacques Repussard (France) served as Chair, Thomas Jung (Germany) as Vice-Chair, Frank Hardeman (Belgium) as Secretary, and Antonella Tabocchini (Italy) as Treasurer of MELODI and Mats Harms-Ringdahl (Sweden) as vice secretary, responsible for maintaining a strong link between the bureau activities and the scientific community.

BACKGROUND

The purpose of the MELODI Association is to constitute a European Research Platform in the field of low-dose exposure to ionizing radiation and of radiation protection from such exposure, aiming for a progressive integration of related national and European research activities in the field. Acting in accordance with the orientations set by its members and with the research policy of the EU, MELODI defines priority scientific goals and implements research.

These priority goals, specific resources, infrastructures and training capabilities needed to address them are recorded in a Strategic Research Agenda, which MELODI develops, maintains, makes publicly available and promotes, in interaction with the scientific community in Europe and beyond.

In compliance with its own rules and with third-parties rights, MELODI makes the main results of its activities available to the public.

RECENT ACTIVITIES

1. MELODI's continued development

Year after year, new members join MELODI: The number of members now reaches 32, including one honorary member. The General Assembly of MELODI will decide in November 2015 on the membership of at least 9 new members (possibly 11 as applications from EANM and EFRS are expected) including key European professional associations active in medical applications of ionising radiation. This positive evolution, with membership of R&D organisations from 17 countries illustrates the attractiveness of the MELODI model of organisation and strategic goals. Altogether, 15 of these members are signatories of the "Letter of Intent" which commits them

to cooperating within MELODI to integration of European research, on behalf of their national responsibilities in the field of radiation protection research.

Role of MELODI for the progressive integration of radiation protection European research: The research integration policy led by EURATOM is based on two complementary concepts: on one hand the development of European research platforms, which gather the scientific communities concerned for the development of strategic research agendas and associated road maps of priorities, and on the other hand, EURATOM funded projects which aim to implement these priorities, and develop synergies between the relevant R&D organisations, as well as between European and national research programmes. For example, MELODI is involved as a partner and WP3 leader in the consortium which is responsible for the implementation of the OPERRA FP7 project. In this project, MELODI was in charge of the organisation of two calls for research projects launched in December 2013 and December 2014. The allocated budget of the two calls is 4 M€ altogether. For this purpose, MELODI set up a procedure which ensures full independence and confidentiality of the call process, so as to avoid potential conflicts of interest with MELODI member bodies (which are eligible to the call as well). The text of the first call addressing low-dose risk research topics was published on 16 December 2013 and the call was closed on 14 March 2014. Among the 22 proposals submitted, 17 were scored above the required thresholds. This first OPERRA call led to the integration of 20 new partners within the OPERRA consortium.

MELODI has also played an important role in the implementation of a cooperation framework resulting from the conclusion of a Memorandum of Understanding with the three other key platforms active in the wider field of radiation protection research on the 5th of December 2013: ALLIANCE, NERIS and EURADOS. As a sign towards the research community, the associations showed their commitment to join efforts, and therefore defined synergetic topics for the second OPERRA call. Thus the second OPERRA call covered not only the low-dose risk research, but also the radioecology, the management of radiological and nuclear accidental situations and the research in dosimetry. The abovementioned associations succeeded in formulating four synergetic topics, to which in total 19 projects were submitted. Four projects were selected each one addressing one of the 4 topics, resulting in thirty new partners within OPERRA.

Another memorandum of understanding has been signed end of 2014 between MELODI, EURADOS and associations active in medical applications of ionising radiation, notably ESR, EFOMP, EANM, EFRS and ESTRO. Thanks to their joint efforts a fifth SRA is being prepared, to address radiation protection issues of medical applications using ionizing radiation.

MELODI has also been taking an active part in the discussions organised by the EC with the view of defining the orientations of the next Framework Programme, Horizon 2020. In particular, MELODI's President contributed to the preparation of the CONCERT (European Joint Programme for the Integration of Radiation Protection Research) European proposal submitted on 17 September 2014 under the coordination of the BfS. This project aims to contribute to the sustainable integration of European and national research programmes in the field of radiation protection. It will do so by focusing resources and efforts in five key directions:

- Bring together the elements of the European scientific communities in the fields of radiation effects and risks, radioecology, nuclear emergency preparedness, dosimetry and medical radiation protection,

whose joint expertise is essential to continue the development of radiation protection knowledge in a multidisciplinary mode to reduce further the uncertainties in radiation protection.

- Strengthen integrative activities with due attention to the synergies to be established between the various areas of expertise, in particular biology, biophysics, epidemiology, dosimetry and modelling as well as fostering the use of existing infrastructures and education and training (E&T) activities in the various fields of radiation protection.
- Stimulate and foster scientific excellence, by setting up and co-funding advanced research programmes that will have the potential to enhance current knowledge and the scientific evidence base for radiation protection.
- Exchange and communicate with all stakeholders, including the professional organizations concerned with radiation protection, the regulatory organizations across Europe, the public and media where necessary, and the international community of scientific, technical, legal and other professional experts in radiation protection.
- Foster the harmonious application of available scientific basis for radiation protection practices across Europe, by bringing together scientific and technical expertise in radiation protection issues, standard setting know how, particularly with respect to the implementation of the EURATOM Basic Safety Standards (BSS) at the legal, administrative and operational level.

CONCERT will organise 2 research calls, of which the first one expected to be published in January 2016, and the second one in January 2017. MELODI is active in the preparation of the calls, and is leading the task within CONCERT responsible for establishing a joint roadmap in radiation protection research. The roadmap should cover the research challenges in radiation protection for the next two to three decades. The boundary conditions for setting up a joint roadmap in radiation protection research are that the roadmap should be:

- In line with the general goals of Horizon 2020 (such as scientific excellence and challenge-driven research) and the more specific CONCERT EJP goals,
- based on state of the art science from all related or relevant research domains,
- balanced with respect to basic experience and innovation in radiation protection,
- balanced with respect to fundamental and applied science,
- characterized by a multidisciplinary approach,
- balanced with respect to funding between the research topics of the research platforms MELODI, ALLIANCE, NERIS and EURADOS, based on the historical funding allocations by the EC and national funding mechanisms, and adapted to the needs for a sustainable research arena in Europe,
- balanced with respect to the needs of the scientific community, society, stakeholders and radiation protection authorities.

In addition, MELODI participated as a consortium member in the kick-off meeting (13-14 March 2014 in Lyon, France) of the CO-CHER (Cooperation on Chernobyl Health Research) FP7 project. Within this project, the MELODI Association is responsible of WP4 that will set up a stakeholders group and discuss on agreements on a sustainable funding mechanism for future research on Chernobyl, and will contribute to WP2 and WP5. This work is being conducted with a close link to the OPERRA project in its Tasks 2.2 and 4.3. In 2015, research needs and priorities have been identified in the field of biology, epidemiology, dosimetry and health effects related to the psychological consequences resulting from the Chernobyl accident. The finalisation of the report

is expected by the end of 2015. Based on this report, a roadmap will be set up and proposed to the major concerned stakeholders.

2. *MELODI's functioning*

Board, Bureau and General Assembly Meetings: The Board met on February 10th 2014 in Paris, June 2nd 2014 in Munich, September 3rd 2014 in Brussels, March 17th 2015 in Brussels, and the Bureau met on several occasions, some of these meetings taking place by video conference. The General Assembly meets at least once a year, or more if necessary. In its meeting in Barcelona in October 2014, the General Assembly renewed one third of the Board members. As a result from this election, M. Jacques Repussard was reappointed as Chair of MELODI for the period extending to October 2017. The next general assembly and board meeting is foreseen on November 9th 2015 in Munich.

MELODI Scientific Committee: the Committee analysed the documents prepared in the frame of the implementation of the first OPERRA call and wrote a statement providing the panel of independent experts in charge of drafting the call text with its opinion on the feasibility and importance research priorities identified by the MELODI members. Also the Committee analysed as in 2012 and 2013 the proposals by young scientists, leading to the attribution of the MELODI Award 2014 to a UK laureate, who has received a prize of 4000€ and presented her work at the 6th MELODI workshop held in Barcelona on 7-9 October 2014. In 2015, the winner of the MELODI award selected by the Scientific Committee will present her work on November 11th during the Award ceremony of the 7th MELODI workshop.

MELODI's SRA: Since the first draft of the SRA published in October 2010, 6 drafts have been prepared. The SRAs are accompanied by Statements in case research calls are expected. The Statements clearly indicate the priorities to be funded in future research calls. The 6th draft of the SRA was published August 10th 2015, together with the 4th statement describing priorities and indicating the synergies with the other radiation protection platforms. All other radiation protection platforms produced statements with priorities that should serve as input to define joined priorities for the 1st CONCERT call. The 6th SRA draft and statement will be presented to the MELODI community during the MELODI workshop 2015 in Munich. Since the establishment of the working group on SRA (SRA WG), the drafting of the SRA and statements has been coordinated by Dr M. Kreuzer as chair of the MELODI SRA WG. In addition, two other MELODI WGs dedicated to research infrastructures and education & training were set up. Members were nominated and started their work by providing a significant input to the new version of the MELODI SRA and contributed to the establishment of the CONCERT proposal.

MELODI Open Workshops: year after year, the attendance of around 200 scientists to these workshops allows in-depth discussions on many topics of the SRA, proving the value of such multidisciplinary meetings where the necessary time is made available for informal thematic discussions, reinforcing the cooperative links between researchers. The 7th MELODI workshop is planned from 9 till 11 November in Munich.

The responsibility for the organization of the next workshop has already been allocated to UK (Oxford, 2016). This workshop will be the first workshop together with EURADOS, NERIS and ALLIANCE, and is named the 1st Radiation Protection Week, to be held 19-23 September 2016. In addition, MELODI is in contact with the ICRP with the view of jointly organising in 2017 in Paris the 4th ICRP Symposium and the 9th MELODI Open Workshop.

FUTURE PRIORITIES

The significant progress booked over the past year towards a better organisation of radiation protection research in Europe encourages the actors concerned, within MELODI but also in much wider circles, to further consolidate this approach.

There are three major directions to be followed:

- The SRA's, particularly that of MELODI but this is valid for all radiation protection research associations, including MoU partners active in the medical field, must be further streamlined, in order to be better communicate to stakeholders, decision makers, and of course research teams themselves. This is well underway for MELODI, thanks to the work of the working groups and the Scientific Committee. In particular the MELODI SRA working group has to provide a convincing bridge between the more fundamental scientific questions which both underpin and challenge the robustness of the European (and international) radiation protection system on one hand, and the professional needs in many fields using ionising radiation in order to improve current practice through innovation. In addition, the SRA includes sections on research infrastructure as well as education and training. It is to be noted also that, with the support of the CONCERT project, a complementary SRA on social sciences will be developed in order to better address societal issues associated to radiation protection.
- Research priorities, and the attached funding processes have to be supported by a much wider community than that of MELODI itself in order to become effective at both national and European levels. To achieve this, networking efforts have to be continued, using notably the vehicle of the MoUs which have been signed with other platforms as well as with major European medical associations. The EJP CONCERT also provides opportunities for a dialogue with national decision makers and stakeholders in general. MELODI must continue to be proactive in these actions, whilst recognising the necessary balance of influence with other platforms and medical actors. For this purpose, the continued development of MELODI membership must be actively pursued, in order to involve as many as possible research partners from Universities and research centres with scientific competence in the fields of interest, including in the medical research sector.
- A joint roadmap for radiation protection research: open multidisciplinary dialogue at field level between the concerned communities, with support from the European Joint Programming CONCERT will lead to a first Joint Roadmap in radiation protection research. The periodic launch of open RTD calls through instruments such as the EJP's like CONCERT are opportunities for engaging such a dialogue, with the perspective of forming R&D consortia to respond to the calls. Wider participation in workshops such as MELODI's and organisation of joint workshops with the other associations active in radiation protection research are very beneficial. These workshops serve as attraction pole for other meetings, stimulating dialogue and cooperation between scientists with complementary expertise in organic way.

New opportunities for European radiation protection research

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Editorial



New opportunities for European radiation protection research

MELODI (Multidisciplinary European Low Dose Initiative) was founded in 2010 as an international organization governed by the French law on associations. Its aim is to address scientific knowledge gaps and research needs concerning the effects of exposure to low doses of ionizing radiation on humans and the environment, noting that such gaps have the potential to undermine the robustness and effectiveness of the radiation protection regulatory system. Indeed, such knowledge gaps may constitute obstacles to innovation and improvement of techniques needed to ensure adequate protection of people and the environment, and may be one of the causes of the patent lack of consensus in society, in Europe in particular, about the optimal conditions for the use of nuclear technology for energy, medicine, research etc.

In their common search for continuous improvement of the scientific basis for radiation protection, MELODI members, who today represent a large majority of the European research institutions with scientific competencies in this field, have identified several key challenges, which need to be addressed collectively.

1. Four key challenges for radiation protection research in Europe

1.1. Enhance multidisciplinary approaches

There are different scientific disciplines involved in radiation protection research. The issues of the organization of the links between them and across Europe must therefore be addressed. Substantial efforts need to be undertaken to increase the proximity between the diverse disciplines, which must be combined to effectively address the questions raised and to reinforce the European integration of research programs in this field, in order to assemble project teams with a critical level of resources and creativity. To achieve this, an operational plan is needed for integrating scientific expertise and resources in Europe, with the aim to challenging knowledge gaps in radiation protection research. The implementation of this plan will optimize the mobilisation of scientific competence in basic as well as applied research and the use of available resources. The objective is to attract scientists working with new technologies and platforms developed for fundamental or medical sciences, in order to investigate scientific issues of radiation protection and thus stimulate the formation of research teams in different disciplines.

1.2. A holistic strategy with well thought out goals and resources

A holistic scientific strategy based on well-established priorities should be developed in order to rationalize research efforts and to enhance the feasibility and success rate of research projects by ensuring that the resources needed are available. This includes the experimental infrastructure required for radiobiology research in particular, observational data as well as the commitment from highly qualified scientists from the diverse fields of science needed to solve

the knowledge gaps in radiation protection research. These elements have to be gathered in strategic research agendas, which gather sufficient consensus within the scientific communities concerned and gain the support of key stakeholders across Europe.

1.3. Secure a reliable and stable funding system

A coherent, stable and reliable Europe-wide funding system should be established for a significant period of time. This system should be competitive, be based on scientific excellence and act as a driver for the implementation of the recognized strategic priorities across the whole spectrum of radiation protection scientific issues. To achieve this in a sustainable way, the above-mentioned organizations and the researchers and experts themselves must engage in an in-depth consultation process with stakeholders.

1.4. An inclusive approach of radiation protection issues must also address societal aspects

Last, but not least, radiation protection research must also investigate societal aspects of the problem. Radiation protection of workers or of patients is rightly seen as a regulatory matter to be governed by the principles of justification, optimization, limitation and guided by a scientific approach to the risks involved. But the situation can become quite different when the general public feels directly involved, for example after a major accident leading to significant exposure of people, or large releases into the environment, or when the radiological impact of nuclear facilities such as power reactors or waste storage sites are publicly debated. In such circumstances, the public may remain unconvinced by the abstract construct of radiation protection formulae and aspire to understand the nature of radiological risk resulting from 'low dose exposure' in particular, and to be directly involved in its management, as they would be for other types of risks invading their everyday life, such as climatic hazards, for example. Such a difficulty cannot be resolved by communication skills only. A true engagement of both experts and researchers with society's stakeholders on such matters is required, so that science is seen as willing to address society's questions and able to effectively interact with concerned stakeholders when the need arises, thus providing them with the practical resources to help addressing such risks effectively.

2. Progress in evidence

The 6th MELODI public workshop organized in Barcelona in October 2014 evidenced significant progress made in Europe in the last few years on all four above-mentioned perspectives:

2.1. Fast growing synergies between scientific communities

Over the last 12 months, the signing of a Memorandum of Understanding (MoU) between MELODI and sister platforms dedicated to other scientific areas of radiation protection (radioecology with ALLIANCE; dosimetry with EURADOS; emergency preparedness with NERIS) has brought together the respective communities, not to merge them, but to identify how common actions could benefit them all. In practice, this aims to identify common objectives and work processes, particularly for the implementation of the EURATOM R and D policy for radiation protection. Similarly, a few months ago, another MoU was signed between MELODI, EURADOS and the five main European medical associations which gather health professionals directly connected to the use of ionizing radiation for medical purposes:

EANM (nuclear medicine), ESTRO (radiotherapy), ESR and EFRS (radiology), EFOMP (medical physicists). This scientific cooperation will facilitate the elaboration of radiation protection strategies addressing the issues of medical exposure of patients, which is now the main source of exposure of members of the public to ionizing radiation. Radiation protection research may benefit from innovative approaches to medical applications of ionizing radiation and conversely. Medical exposure of patients can also provide a highly valuable source of information to enhance the understanding of low dose effects, inspiring innovative research projects associating the medical community with radiobiologists, dosimetry specialists and epidemiologists. Thus, gradually, a complementary strategic research agenda centered on the beneficial use of medical exposure could emerge, with its own priorities consistent with those of MELODI and EURADOS.

2.2. Consensus on the fifth version of MELODI's strategic research agenda

A key aspect of the research strategies to be developed hinges around the development of a good consensus on research priorities and on needs for access to experimental infrastructures or other scientific data (biobanks, cohorts), as well as training and education resources needed to provide radiation protection research with highly qualified scientists. MELODI now has a unique experience in identifying such priorities, and assembling them in strategic research agenda (SRA) proposals, which are then discussed and tested in open workshops gathering representative portions of the scientific communities concerned. Thus in Barcelona, the fifth version of the MELODI SRA was presented, in a shorter format compared to the precedent editions, highlighting the main priority topics and the relevant modes of research proposed for addressing these topics.

This strategic research agenda (SRA), available on MELODI website (www.melodi-online.eu) proposes to concentrate efforts on **three key research questions**:

- **What is the dose and dose rate dependence of cancer risk for low- level protracted or acute exposure?**
- **Which threshold exposure levels are appropriate for radiological protection to take into account public health risks other than cancer?**
- **Can reliable methods be developed to identify and address additional risks resulting from individual radiation sensitivity, including related ethical and radiological protection policy issues?**

The SRA further documents the consensus which has been formed on the need to address these questions through a consistent scientific approach based on **three complementary research paths**:

- **Research to improve understanding of the mechanisms contributing to radiation risk at low dose and dose rate exposure.**
- **Epidemiological research that integrates—where possible and informative—biological indicators for radiation risk evaluation.**
- **Research to address the specific effects of and risks associated with internal exposures, exposures of different radiation qualities and inhomogeneous exposures.**

2.3. Towards an integrated European funding system for radiation protection research

The evolution of EURATOM calls within the H2020 framework program aims for a broader approach to the scientific aspects of radiation protection research and invites a strategic

perspective to future funding of radiation protection research in Europe. In particular, this will encourage the integration of research policy aspects in this field, co-funding mechanisms with member states, SRA development and road mapping of priorities for the planning of open calls, common approaches of the issues of education and training and access to infrastructure. It will also provide reliable and attractive competitive call programs that are open to the whole scientific community, including non EU countries having arrangements with the EU allowing them to participate to EURATOM research programs. The progression from the network of excellence instruments (e.g. DoReMi and STAR) to the OPERRA project which tests new avenues for multidisciplinary open calls, and lately to the European joint program CONCERT, provides a strong signal to the research communities about the consistent effort currently deployed under the H2020 banner to enhance radiation protection research in Europe over the years ahead. CONCERT will thus gather a majority of European research institutions and universities with a high interest in radiation protection research.

2.4. First steps for a social sciences agenda in support to radiation protection science

Finally, a social sciences agenda must also be developed to address the above-mentioned societal aspects of the problem. This should not be the realm of social sciences specialists alone, since in this field as in others of low dose effects research, multidisciplinary approaches are needed, bringing together teams comprising dosimetry specialists, biologists, physicians, epidemiologist, etc. Within the CONCERT project, resources are foreseen to address the need to interface these different specialists, in order to design an action plan in this important area.

3. Conclusion

MELODI and the other European platforms work together to deliver a bright future for the research communities concerned with radiation protection science, facilitating advanced research programs addressing important and highly complex issues with a good chance of success. However, these platforms only reflect the strength and expertise of their own members. This strength should also be enhanced, through sustained efforts to increase their representativeness and visibility across Europe and beyond and to provide a privileged forum, through their working groups in particular, for high level multidisciplinary strategy making and operational planning. These associations are open for membership. Please join them to strengthen their action and benefit in return from the influential network they already represent today.

Jacques Repussard

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Select NCRP Initiatives

- Two high level Council Committees (CC)
 - CC 1: Radiation Protection Guidance for the United States
 - CC 2: Where Are the Radiation Professionals?
 - Program Area Committees (PACs)
 - Operating in various areas of radiation protection and measurements
 - Within each of the PACs there are Scientific Committees focusing on specific areas
1. Basic Criteria, Epidemiology, Radiobiology, and Risk
 - a. Ties together several scientific disciplines which lay the technical foundation for decision making in radiological protection and regulation
 - b. Basic criteria involve understanding, describing, and modeling the fundamental physical interactions of radiation with humans
 - i. SC 1-20: addressing unresolved questions in evaluating risk of cancer from exposure to low-LET radiation (*i.e.*, photons and electrons); addresses dependence of relative biological effectiveness (RBE) on energy
 - ii. SC 1-21: addressing critical research needs for evaluation of low-dose radiation biological and health effects; focus on integration of results of basic science studies with epidemiological studies on health effects of low-dose radiation exposures
 - iii. SC 1-23: evaluates recent studies on radiation dose response for the development of cataracts, also considering the type and severity of the cataracts as well as the dose rate; provide guidance on whether existing dose limits to the lens of the eye should be changed in the U.S.; and suggest research needs regarding radiation effects on and dose limits to the lens of the eye.
 - iv. SC 1-24: addressing concern that radiation exposures in space may result in acute CNS effects which could impair missions and that late CNS effects may result in serious cognitive and mental dysfunction in exposed astronauts.
 2. Operational Radiation Safety
 - a. Guidance for operational radiation safety topics
 - i. SC 2-6: Developing guidance for radiation safety programs that are involved or may become involved with the production and/or use of nanomaterials
 - ii. SC 2-7: Developing “cradle to grave” guidance on the radiation safety aspects of sealed radioactive sources
 3. Nuclear and Radiological Security and Safety
 - a. Provides guidance and recommendations for response to nuclear and radiological incidents of both an accidental and deliberate nature
 - i. SC 3-1: Developing guidance on how to determine doses in instances where personal dosimetry is incomplete or not available, and identify changes in how the recording of the dose will evolve as the event transitions from the emergency phase, where the radiation environment is

not well characterized and preplanning exposures are minimal; to the recovery phase, where the preplanning and supervision of exposures are performed to industry standards and in accordance with regulatory requirements

4. Radiation Protection in Medicine

- a. Provides oversight of activities in the field of radiation protection in medicine
 - i. SC 4-5: addressing imaging modalities such as cone-beam computed tomography (CBCT), digital radiography, and hand-held dental x-ray units (those that have evolved over the past 10 y) and update existing material as needed
 - ii. SC 4-7: developing guidance on the evaluating and communicating radiation risks for studies involving human subjects
 - iii. SC 4-8: developing guidance on practical aspects of CT radiation dose optimization and error prevention for practicing physicians and other healthcare providers, physicists and technologists

5. Environmental Radiation and Radioactive Waste Issues

- a. Provides oversight for activities related to environmental radiation and radioactive waste issues
 - i. SC 5-2: TENORM: preparing recommendations for a uniform approach for NORM/TENORM; focusing on waste management

NEA Work Relevant for ICRP

The OECD Nuclear Energy Agency is pleased to attend the 2015 meeting of Senior Representatives of Organisations in Formal Relations with ICRP, to report on its work relevant to the mandate of ICRP, and to provide suggestions for collaborative efforts of interest to ICRP and the other participating organisations. Within the structure of the NEA, the work relevant for the ICRP is being performed by the Committee on Radiation Protection and Public Health (CRPPH), and by the Radioactive Waste Management Committee (RWMC). The relevant projects of interest to the ICRP are listed below:

CRPPH Ongoing Work:

- **Scientific, Societal, Implementation and Regulatory Challenges of Radiological Protection:** The CRPPH Expert Group on Radiological Protection Science (EGRPS) drafted over the past 2 years a report summarising the state-of-the-art in RP science and application, and will publish this shortly. This was not intended to duplicate work of UNSCEAR or ICRP, but rather to briefly summarise what we know and what we don't know as input to decision making. Dr Bill Morgan was a member of this group, helping to assure consistency with and to avoid duplication of ICRP. The report will be available at the beginning of November.
- **The Expert Group on the Implication of International Recommendations (EGIR):** For some time CRPPH has performed detailed assessments of draft ICRP and IAEA documents. The EGIR performs word-by-word, line-by-line, page-by-page detailed assessments of drafts, proposing, as appropriate, changing of text from X to Y because Z. Alterations are proposed so the recommendation better reflects the needs of the CRPPH community. The following draft documents would potentially be of interest to the CRPPH EGIR process:
 - TG 90 (C2) Age-Dependent Dose Coefficients for External Exposures to Environmental Sources*
 - TG 76 (C4) Application of the Commission's Recommendations to NORM*
 - TG93 (C4) Implementation of ICRP Publications 109 and 111*
 - TG94 (C4) Ethics of Radiological Protection*
 - TG97 (C4) Application of the Commission's Recommendations as applied to the Surface and near Surface Disposal of Solid Radioactive Waste*
 - TG98 (C4) Application of the Commission's Recommendations to exposures resulting from contaminated sites from past industrial, military and nuclear activities*
 - WP Tolerability of Risk*
 - WP Effective Dose*

New CRPPH Work

Proposed Expert Groups:

- **Expert Group on Legacy Management (EGLM):** The CRPPH is considering establishing an ISOE-like network of legacy and national laboratory RP managers to exchange experience, and collect/analyse occupational exposure data. The CRPPH Bureau will discuss the draft proposal in late October, and if appropriate make a proposal to the CRPPH at its 11 – 13 April 2016 meeting. Coordination with ICRP TG 98 would be very much appreciated. Note that Ted Lazo is a TG 98 corresponding member.

- Expert Group on Plain Language (EGPL): The CRPPH has, for some time studied the role of radiological protection professionals with respect to supporting protection decisions. An aspect of this that has emerged as of central importance is the clarity of explanation of complex RP issues and concepts to those who are not RP specialists. For this, the CRPPH is considering developing a series of plain language descriptions of RP concepts, both written and possibly as U-Tube short presentations. ICRP consultation or participation in this effort, should it be undertaken, would be appreciated. It should also be noted that all CRPPH reports will now include, in addition to a technical executive summary, a short plain language summary. ICRP should consider this approach.

Agreed CRPPH Workshops:

- The CRPPH will hold a webinar on Stakeholder Communications Experience, consisting of 2-hour presentation / electronic discussion over 3 successive Wednesdays (17 and 24 Feb, 2 March 2016). The ICRP is invited to participate and to publicise this webinar.
- The CRPPH will hold a workshop on Food Safety Science in the fall of 2016. The ICRP is invited to participate, and the NEA Secretariat will be in contact with the ICRP Secretariat to coordinate participation.

Proposed CRPPH Workshops:

- It has been proposed that the CRPPH, jointly with the RWMC, should organise a workshop on the management of non-nuclear waste. Although this would focus on the practical and regulatory aspects of waste management, workshop discussions may be useful to ICRP in terms of the differences in management of industrial and NORM waste as opposed to nuclear-generated waste (e.g. half-life, chemical forms, heat generation, etc.). No ICRP recommendation currently exists in this area.

Relevant RWMC Work

- The RWMC participated actively in the development and review of ICRP Publication 122 on Radiological Protection in Geological Disposal of Long-lived Solid Radioactive Waste. Discussion in this document of long-term regulatory oversight is well viewed, but its practical implications need to be explored. For this, the RWMC, with participation of the CRPPH, is interested in investigating how regulatory oversight will evolve in the long to very-long term, and what would be the practical aspects over various long to very-long term periods. The participation of the ICRP in these RWMC/CRPPH discussions, to assure appropriate interpretation of these recommendations, would be of mutual interest to the NEA and the ICRP.

UNSCEAR's activities and issues related to ICRP

This short information paper has been prepared by the secretariat of the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) for the meeting with ICRP's Main Commission on 19 October 2015 in Seoul and aims to update about UNSCEAR's recent work and outline future directions.

It is based on the Scientific Committee's annual report¹ to the General Assembly which was agreed at the 62nd session of UNSCEAR (1-5 June 2015). The report will be presented by Yoshiharu Yonekura (Japan), Chair and Malcolm Crick, Secretary of the Committee to the Fourth Committee of the United Nations General Assembly in New York on 23 October 2015.

BACKGROUND

The United Nations General Assembly established the Scientific Committee in 1955 to assess and report levels and effects of exposure to ionizing radiation. The Assembly has designated 27 countries to provide scientists as members of this high-level Committee. The Committee's programme of work is approved by the General Assembly in New York. The secretariat, which is provided through arrangements with the United Nations Environment Programme in Vienna, collates data from Member States and other international organizations, and engages specialists to analyze information, study relevant scientific literature and produce scientific reviews for scrutiny at the Committee's annual sessions. The Committee also reports its findings annually to the General Assembly, which provides unique access to the highest level of decision-making in the UN system.

UNSCEAR'S PUBLICATIONS

The secretariat has established a mechanism to closely follow and review scientific literature related to the Fukushima-Daiichi NPP accident with a view to publishing a "White Paper" annually. At the 62nd session, the Scientific Committee approved its first White Paper following up on the UNSCEAR 2013 Report on the levels and effects of exposure resulting from the accident. The White Paper reviews information published in peer-reviewed literature since October 2012 up till end of 2014. No information had been published that seriously challenges the conclusions of the Committee's 2013 Report. The "White Paper" will be published in English and Japanese.

At its recent session, the Scientific Committee also discussed the following documents which will be part of future UNSCEAR Reports:

- 1) Methodology for estimating exposures from discharges into environment;
- 2) Radiation exposures from electricity generation;
- 3) Biological effects from selected internal emitters (Tritium and Uranium);
- 4) Cancer epidemiology of exposures at low dose-rates in the environment; and
- 5) Collection of data on radiation exposures for an evaluation of medical exposures.

Further, the UNSCEAR 2012 was published as an advanced copy on-line² and will be available as printed copy shortly. It consists of the two following annexes:

- A. Ability to attribute risks and effects to radiation exposure; and
- B. Uncertainties in risk estimates for cancer due to exposure to ionizing radiation;

¹ A/70/46 (Attached to this information paper)

² <http://www.unscear.org/unscear/en/publications/2012.html>

UNSCEAR'S OUTREACH ACTIVITIES

The secretariat has published the entire Annex A of the UNSCEAR 2013 Report on the Fukushima-Daiichi NPP accident in Japanese. Two events are planned to be held in Japan in 2016 to present the recent "White Paper" on the Committee's follow up work on Fukushima.

In 2016, the Scientific Committee will celebrate in 2016 the 60th anniversary of its first session in 1956. For this occasion, the secretariat plans to conduct specific outreach activities and to publish UNEP's updated public information booklet on Radiation (Effects and Sources) in several languages.

UNSCEAR'S FUTURE PROGRAMME OF WORK

The Committee discussed preliminary plans for four projects and decided to focus on selected evaluations of health effects and inferred risk from radiation exposure. The three other projects were:

- 1) Appraisal of the health effects of low-dose radiation exposure;
- 2) An evaluation of the risk of second cancers after radiotherapy; and
- 3) Assessment of the impact on biota of radiation exposure due to the nuclear industry.

UNSCEAR'S NEXT SESSION

The Committee will hold its 63rd session in Vienna from 27 June to 1 July 2016. The following elected officers will continue to serve for the 63rd session: Yoshiharu Yonekura (Japan), as Chair; Hans Vanmarcke (Belgium), John Hunt (Brazil) and Peter Jacob (Germany) as Vice-Chairs; and Michael Waligórski (Poland) as Rapporteur.

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United Nations

Report of the United Nations Scientific Committee on the Effects of Atomic Radiation

**Sixty-second session
(1-5 June 2015)**

**General Assembly
Official Records
Seventieth session
Supplement No. 46**

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Note

Symbols of United Nations documents are composed of letters combined with figures. Mention of such a symbol indicates a reference to a United Nations document.

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Chapter I

Introduction

1. Since the establishment of the United Nations Scientific Committee on the Effects of Atomic Radiation by the General Assembly in its resolution 913 (X) of 3 December 1955, the mandate of the Committee has been to undertake broad assessments of the sources of ionizing radiation and its effects on human health and the environment.¹ In pursuit of its mandate, the Committee thoroughly reviews and evaluates global and regional exposures to radiation. The Committee also evaluates evidence of radiation-induced health effects in exposed groups and advances in the understanding of the biological mechanisms by which radiation-induced effects on human health or on non-human biota can occur. Those assessments provide the scientific foundation used, inter alia, by the relevant agencies of the United Nations system in formulating international standards for the protection of the general public, workers and patients against ionizing radiation;² those standards, in turn, are linked to important legal and regulatory instruments.

2. Exposure to ionizing radiation arises from naturally occurring sources (such as radiation from outer space and radon gas emanating from rocks in the Earth) and from sources with an artificial origin (such as medical diagnostic and therapeutic procedures; radioactive material resulting from nuclear weapons testing; energy generation, including by means of nuclear power; unplanned events such as the nuclear power plant accidents at Chernobyl in 1986 and that following the great east-Japan earthquake and tsunami of March 2011; and workplaces where there may be increased exposure to artificial or naturally occurring sources of radiation).

¹ The United Nations Scientific Committee on the Effects of Atomic Radiation was established by the General Assembly at its tenth session, in 1955. Its terms of reference are set out in resolution 913 (X). The Committee was originally composed of the following Member States: Argentina, Australia, Belgium, Brazil, Canada, Czechoslovakia (later succeeded by Slovakia), Egypt, France, India, Japan, Mexico, Sweden, Union of Soviet Socialist Republics (later succeeded by the Russian Federation), United Kingdom of Great Britain and Northern Ireland and United States of America. The membership of the Committee was subsequently enlarged by the Assembly in its resolution 3154 C (XXVIII) of 14 December 1973 to include the Federal Republic of Germany (later succeeded by Germany), Indonesia, Peru, Poland and the Sudan. By its resolution 41/62 B of 3 December 1986, the Assembly increased the membership of the Committee to a maximum of 21 members and invited China to become a member. In its resolution 66/70 of 9 December 2011, the Assembly further enlarged the membership of the Committee to 27 and invited Belarus, Finland, Pakistan, the Republic of Korea, Spain and Ukraine to become members.

² For example, the international basic safety standards for radiation protection and safety of radiation sources, currently co-sponsored by the European Commission, the Food and Agriculture Organization of the United Nations, the International Atomic Energy Agency, the International Labour Organization, the Nuclear Energy Agency of the Organization for Economic Cooperation and Development, the Pan American Health Organization, the United Nations Environment Programme and the World Health Organization.

Chapter II

Deliberations of the United Nations Scientific Committee on the Effects of Atomic Radiation at its sixty-second session

3. The Committee held its sixty-second session in Vienna from 1 to 5 June 2015.³ Under arrangements agreed at the sixty-first session, the outgoing Chair, Carl-Magnus Larsson (Australia), opened the session, at which new officers were then elected to serve for the remainder of the Committee's sixty-second session and for its sixty-third session: Yoshiharu Yonekura (Japan), Chair; John Hunt (Brazil), Peter Jacob (Germany) and Hans Vanmarcke (Belgium), Vice-Chairs; and Michael Waligórski (Poland), Rapporteur.

4. The Committee took note of General Assembly resolution 69/84 on the effects of atomic radiation. It also took note of the report of the Secretary-General on the impact of the increase in the membership of the United Nations Scientific Committee on the Effects of Atomic Radiation, and possible approaches to further increases (A/69/350). It recalled that it had decided to consider its long-term strategic directions beyond the period covered by its present strategic plan (2014-2019), so as to help to inform future deliberations of the Assembly on the Committee's membership. The Committee discussed material developed on the matter, and expected to report on its conclusions to the General Assembly at its seventy-first session.

A. Present programme of work

1. Developments since the Committee's 2013 report on the levels and effects of radiation exposure due to the nuclear accident following the great east-Japan earthquake and tsunami

5. Following its assessment of the levels and effects of radiation exposure due to the nuclear accident after the 2011 great east-Japan earthquake and tsunami, as presented in its 2013 report to the General Assembly (A/68/46) and the supporting detailed scientific annex,⁴ the Committee had put in place arrangements for follow-up activities to enable it to remain abreast of additional information as it was published in the scientific literature. A considerable amount of additional relevant information had already been published or become available before the publication of the scientific annex. New material is still being published and will continue to be in the foreseeable future, including under international and national initiatives.⁵

6. The Committee identified a large number of new publications that had become available between the time it conducted its assessment and the end of 2014, and

³ The sixty-second session was also attended by observers for the World Health Organization, the International Atomic Energy Agency, the International Commission on Radiological Protection and the International Commission on Radiation Units and Measurements.

⁴ United Nations publication, Sales No. E.14.IX.1.

⁵ At the time of the sixty-second session, the International Atomic Energy Agency report on the accident, entitled "The Fukushima Daiichi accident: report by the Director General", had not been made public, and had thus not been evaluated by the Committee for the purposes of the present report.

systematically appraised about 80 of those in the lead-up to its sixty-second session. More than half of those 80 publications corroborated one or another of the major assumptions made by the Committee in its 2013 report. None of them challenged the report's major assumptions or affected its main findings, while some needed further analysis or more conclusive evidence from additional research. The Committee, as part of its continued efforts to identify and systematically evaluate new information as it came to light, would appraise other publications already identified and evaluate and periodically report how those publications affected the conclusions reached in its 2013 report. Depending on the outcome, the Committee expected to consider, at an appropriate time, the need to update that report.

7. The Committee expressed its gratitude to organizations and individuals that had engaged in the debate on the Committee's findings, and in some cases had publicized critiques of the 2013 report. It discussed and endorsed a commentary on the main themes appearing in those critiques to provide greater clarity where its judgement and/or impartiality had been questioned. The Committee considered the debate on its findings an important element of transparency and had therefore engaged in scientific forums, public dialogues and other outreach activities (see also section 6, entitled "Outreach activities").

8. The Committee requested the secretariat to make the findings of its review of new scientific literature and its commentary on the critiques available as a non-sales publication in both English and Japanese.

2. Updated methodology for estimating human exposures due to radioactive discharges and evaluation of radiation exposures from electricity generation

9. The Committee discussed two draft scientific annexes, one on updating its methodology for estimating human exposures due to radioactive discharges into the environment, and the other on the evaluation of radiation exposures from electricity generation. The Committee noted that the update of its methodology and the development of associated electronic workbooks that implemented the methodology were now essentially finished. The workbooks were to be used in the coming year to complete, in an internally consistent manner, the subsequent assessment of radiation exposures of populations from various types of electricity generation.

10. The Committee noted that progress on the draft scientific annex on radiation exposures from electricity generation had been hampered by, among other things, gaps in the available data on releases associated with electricity generated from non-nuclear energy sources, which contrasted with the thorough data collection and monitoring required of the nuclear energy industry. However, the Committee recommended that the scientific annex be completed on the basis of reasonable and transparent assumptions where precise data were not available, and requested the secretariat to expedite its completion on that basis. Because consistency needed to be maintained between the methodology and the assessment of radiation exposures from electricity generation, the Committee expected to formally approve for publication both documents at its next session.

3. Biological effects from selected internal emitters

11. The Committee discussed progress on evaluations of the biological effects of exposure to selected internal emitters for two specific radionuclides: tritium and

uranium. An introduction had been added that covered general aspects common to all internal emitters. A similar structure for the two draft scientific annexes was agreed upon. The review of the literature was essentially complete. The Committee requested that final conclusions be drawn from the material, which should be structured and streamlined in support of those conclusions. The Committee expected that final versions of the evaluations could be presented at its sixty-third session.

4. Cancer epidemiology of exposures at low dose-rates due to environmental radiation

12. The Committee discussed progress on an evaluation of epidemiological studies of low-dose-rate exposures of the public to naturally occurring and artificial environmental sources of radiation. The Committee acknowledged that the scientific review had been considerably improved. In the coming year, the strengths and limitations of each of the studies needed to be described. An additional section of the report should discuss the feasibility of improving the studies and, where applicable, the methods that could be used for that purpose.

5. Collection of data on radiation exposures, in particular on medical and occupational exposures

13. The Committee took note of a progress report by the secretariat on the collection, analysis and dissemination of data on radiation exposures, in particular on medical and occupational exposures. The Committee welcomed the fact that the General Assembly, in its resolution 69/84, had encouraged Member States to nominate a national contact person to facilitate coordination of the collection and submission of data on the exposure of the public, workers and patients. Forty-five Member States had nominated national contact persons by the sixty-second session of the Committee.

14. In 2014, the secretariat had launched an online platform for the collection of data on medical exposures and had invited all Member States to take part in the Committee's Global Survey of Medical Radiation Usage and Exposures. In preparation for the Global Survey it had fostered close cooperation with the International Atomic Energy Agency, the World Health Organization and the International Radiation Protection Association. The Committee requested the secretariat to prepare a preliminary evaluation of the results for the Committee's review at its sixty-third session. It also requested the secretariat to implement plans for a similar survey on occupational exposures, fostering close cooperation with the International Labour Organization and other relevant bodies, and to begin planning the collection of data on public exposures from natural and artificial sources of radiation.

6. Outreach activities

15. The Committee took note of a progress report by the secretariat on outreach activities, and acknowledged in particular the work done in Japan to disseminate the Committee's report on the levels and effects of radiation exposure due to the accident at the Fukushima Daiichi nuclear power station. It noted that the General Assembly had encouraged the secretariat to continue to disseminate the findings to the public. Outreach activities had included public meetings, media briefings, meetings with officials, discussions with academia and scientific presentations. The Committee recalled its outreach strategy for the coming years, in particular with regard to: further

enhancing the public website of the Committee; publishing an update to the United Nations Environment Programme (UNEP) booklet “Radiation: doses, effects, risks”; noting upcoming anniversaries, such as the sixtieth anniversary of the Committee’s inception, the thirtieth anniversary of the Chernobyl accident and the fifth anniversary of the nuclear accident in Japan; developing leaflets and posters; and publishing booklets in the six official languages of the United Nations to explain the findings of its recent reports to the general public. The Committee took note of the fact that the Assembly, in its resolution 69/84, had encouraged consideration to be given to publishing the website in all the official languages of the United Nations. However, the Committee recognized that, within the existing resources, that ideal could be realized only in part.

B. Future programme of work

16. The Committee discussed preliminary plans for four projects: an appraisal of the health effects of low-dose radiation exposure, selected evaluations of the risk to health from radiation exposure, an evaluation of the risk of second cancers after radiotherapy, and an assessment of the impact on biota of radiation exposure due to the nuclear industry. Having considered the current work programme and capacity of both the Committee and its secretariat, the Committee decided to give priority to initiating selected evaluations of health effects and inferred risk from radiation exposure. While the other three project concepts all had their merits, and the risk of second cancers after radiotherapy was of particular interest to the Committee, the discussion of those project concepts would be resumed at the sixty-third session with a view to possible further action, conditional on the completion of other projects in the current programme of work.

C. Administrative issues

17. The Committee recognized that, because of the need to maintain the intensity of its work — particularly its work to improve the dissemination of its findings, including in official languages of the United Nations other than English — voluntary contributions to the general trust fund established by the Executive Director of UNEP to receive and manage voluntary contributions to support the work of the Committee would be beneficial. The Committee suggested that the General Assembly might encourage Member States to consider making voluntary contributions to the general trust fund for this purpose or to make contributions in kind.

18. In accordance with intentions expressed at its sixty-first session, the Committee reviewed its governing principles and the terms of reference for its Bureau, and subsequently reconfirmed them with only minor modifications.

19. The Committee agreed to hold its sixty-third session in Vienna from 27 June to 1 July 2016.

Report on World Health Organization

Biennial Meeting of ICRP Main Commission with all Committees

Seoul, Korea, October 2015

About WHO

The World Health Organization (WHO) is the coordinating authority for health within the United Nations system. WHO has a decentralized structure with 147 country offices, six regional offices¹ and its headquarters in Geneva. The World Health Assembly is the supreme decision-making body of the WHO and is held annually in Geneva, attended by delegations from the 194 WHO Member States, the non-governmental organizations (NGOs) in official relations with the WHO and representatives from other UN agencies. The WHO has a radiation program conducted by the Department of Public Health, Environmental and Social Determinants of Health.

Cooperation between ICRP and WHO

ICRP and WHO has been in official relations since 1956. In accordance with the principles governing relations between WHO and NGOs², the basis of this official relationship is a mutually agreed three year plan for collaboration, the results of which are reviewed by the WHO Executive Board once every three years. In January 2015 the WHO Executive Board has agreed to continue the ICRP's official relations with WHO and approved the proposed plan for collaboration. The ultimate goal of this bilateral collaboration is to improve protection of people (i.e. patients, workers, general public) in the different scenarios where human exposure to ionizing radiation may take place, including planned, existing and emergency exposure situations. The collaboration with ICRP is implemented under the WHO Global Initiative on Radiation Safety in Health Care Settings, the WHO International Radon Project and the WHO Radiation Emergency Preparedness and Response programme. This collaboration includes the access to ICRP reports to developing countries through the WHO Hinari programme and the facilitation of translation of ICRP documents of interest to the health care community, with the technical contribution of WHO Collaborating Centres in different regions. WHO keeps a close collaboration with ICRP Committee 3 in the field of RP in medicine and contributes to working groups in the area of justification, individual susceptibility and communication with medical practitioners. WHO is member of the ICRP Task Group 94 on ethics of radiological protection and was represented at the Second European Workshop on Ethics in RP (Madrid, Spain / February 2015) organized by the ICRP in cooperation

¹ WHO Regional Office (RO) for Africa (AFRO), the Americas (AMRO), the Eastern Mediterranean (EMRO), Europe (EURO), South-East Asia (SEARO) and the Western Pacific (WPRO).

² <http://www.who.int/civilsociety/en/>

with IRPA. WHO is attending the biennial Meeting of ICRP Main Commission and all Committees, the 3rd International ICRP Symposium on the System of Radiological Protection and the ICRP Committee 3 Meeting (Seoul, Korea, 19-25 October 2015).

WHO activities during the reported period (November 2014 to mid-October 2015)

WHO continued working on the Global Initiative on Radiation Safety in Health Care Settings, to support implementation of the Bonn Call for Action³. WHO organized an expert consultation on justification of the use of CT for Individual Health Assessment of asymptomatic people (Munich, Germany, 15-17 October 2014)⁴. The IAEA and WHO co-organized a Workshop on the Role of Medical Physicist in Radiation Safety in Medicine in Africa (26-28 November 2014, Dar es Salaam, Tanzania). WHO contributed to the 8th Biennial Pan African Congress of Radiology (PACORI) and co-organized an African Workshop on Radiation Safety in Medicine⁵, that concluded with the launching of the AFROSAFE Campaign (17-20 February 2015, Nairobi, Kenya). During the 10th Latin American IRPA Congress (12-17 April 2015) WHO organized a refresher course on radiation protection in paediatric imaging and conducted a joint UNSCEAR-WHO-IRPA workshop on data collection in medical exposures⁶. A joint WHO-IRPA-IOMP Regional Workshop on Radiation Protection Culture in Medicine was held on in Buenos Aires on 11 April 2015, as a Pre-IRPA Congress event⁷. WHO contributed to the IAEA Technical Meeting on Justification on Medical Exposures and Use of Appropriateness Criteria 9-11 March, Vienna, Austria (Vienna, Austria, 9-11 March 2015). WHO, in collaboration with NIRS⁸, organized a Dialogue Seminar on Radiation Risk Communication⁹ to pilot a WHO tool on radiation risk communication to support radiation risk/benefit dialogue in paediatric imaging¹⁰. It was followed by a WHO-NIRS International Symposium on Radiation and Children (Tokyo, Japan, 7-9 December 2014). WHO participated in the meeting of the OPERRA Project for the development of a strategic research agenda on radiation protection in medical exposures (Munich, Germany, 18 December 2015). As a member of the Steering Committee of the EC Project on paediatric diagnostic reference levels (PiDRL) WHO provided technical advice for the development of the project including contribution to the European PiDRL Workshop (Lisbon, Portugal, 15-17 October 2015)¹¹. A side event entitled “Imaging for Saving Kids – the Inside Story about Patient Safety in Paediatric Radiology” co-organised by the Governments of Kenya, Spain, Uganda and

³ The Bonn Call for Action is the main outcome of the International Conference on Radiation Protection in Medicine organized by the IAEA and cosponsored by WHO. See http://www.who.int/ionizing_radiation/medical_exposure/bonncallforaction2014.pdf?ua=1

⁴ A member of ICRP C3 contributed to this consultation as invited speaker

⁵ The Secretary of ICRP C3 delivered a presentation at this workshop

⁶ This workshop completed a series of four UNSCEAR-WHO-IRPA workshops on data collection on medical exposures organized in 2014 during the regional IRPA Congresses in Asia, Africa and Europe.

⁷ A member of ICRP C3 participated in this workshop

⁸ NIRS: National Institute of Radiological Sciences, WHO Collaborating Centre, Chiba, Japan

⁹ A member of ICRP C3 delivered a presentation at this Dialogue Seminar.

¹⁰ A member of ICRP C3 has provided technical advice for the development of this risk communication tool, as member of the Core Expert Group.

¹¹ The ICRP C3 Chair is also member of the Steering Committee of this EC Project on paediatric diagnostic reference levels (PiDRL) and collaboration between WHO and ICRP was also implemented during the development of the activities related to this project.

Malaysia, in cooperation with the ICRP¹² and eight other NGOs in official relations with WHO, during the 68th World Health Assembly¹³. WHO participated in the IAEA-ILO International Conference on Occupational Radiation Protection (Vienna, Austria, December 2014) and contributed the conference sessions related to radiation health effects and risks, workers' health surveillance and ORP of health workers. WHO participated in the meetings of the HERCA Working Group on Medical Applications (Paris, France, 30-31 March 2015 and Helsinki, Finland, 17-18 September 2015) and was represented at the meeting of the Article 31 Working Group on Medical Exposures (Luxembourg, 29-30 April 2015).

WHO continues supporting its Member States in the implementation of the International Health Regulations (IHR (2005) and strengthening national capacities for radiation emergency preparedness and response (EPR). A number of activities have been conducted during the reported period by the two WHO specialised networks: Radiation Emergency Medical Preparedness Assistance Network (REMPAN) and BioDoseNet, such as the joint KIRAMS-REMPAN Workshop on Medical Preparedness and Response (Seoul, Republic of Korea, 10-12 March) and the meeting of the REMPAN Working Group on Internal Contamination held (Bruges, Belgium, 23 April). Information about those and other activities can be found at the biennial REMPAN e-Newsletter of REMPAN available from WHO REMPAN website¹⁴. WHO is working in close cooperation with key stakeholders in EPR area, and participated in a number of meetings including the HERCA Working Group on Emergencies meeting (Brigs, Switzerland, 22-23 January 2015), the meeting of the Global Health Security Initiative's Working Group on Medical Countermeasures against Radionuclear threats (Paris, France, 2-3 Feb 2015), the 4th annual meeting of the European cytogenetic laboratories network RENEB (Rome, Italy, 4-6 March 2015), the NEA's CRPPH annual meeting (Paris, France, 15-17 April, 2015), the meeting of the European Nuclear and radiological Emergency management and Rehabilitation strategies (NERIS) network (Milano, Italy, 28-29 April). WHO was one of the co-organizers of the 3rd UN World Congress on Disaster Risk Reduction /WCDRR (Sendai, Japan, 14-18 March 2015) and made a significant contribution to the development of Post-Sendai Framework for Disaster Risk Reduction 2015-2030. WHO experts participated and contributed to the ConRad-2015 conference (Munich, Germany, 5-7 May), the NEA/OECD's Science and Values workshop focused on medical follow-up of over-exposed persons hosted by the FMBC (Moscow, Russia, 9-10 June) and the RICOMET¹⁶ 2015 conference (Slovenia, 15-17 June). WHO contributed to the revisions of the IAEA's G-S-R Part 7 (co-sponsored) and the 2005 EPR-Medical and to the consultancy on

¹² The ICRP C3 Chair was one of the invited speakers in this side event

¹³ Jointly organized by the Governments of Kenya, Malaysia, Spain, and Uganda together with the following NGOs in official relations with the WHO: Diagnostic Imaging, Healthcare IT and Radiation Therapy Trade Association (DITTA), International Commission on Non-Ionizing Radiation Protection (ICNIRP), International Commission on Radiological Protection (ICRP), International Organization of Medical Physics (IOMP), International Society of Radiology (ISR), International Society of Radiographers and Radiological Technologists (ISRRT), RAD-AID International, World Federation for Ultrasound in Medicine and Biology (WFUMB), and World Organization of National Colleges, Academies and Academic Associations of General Practitioners / Family Physicians (WONCA), with the technical support of the WHO Secretariat. Summary report available at <http://www.wfpweb.org/CHILDIMAGINGSAFETY/Globaladvocacy.aspx>

¹⁴ http://www.who.int/ionizing_radiation/a_e/rempan/en/

¹⁵ www.wcdrr.org

¹⁶ RICOMET: Risk Perception, Communication and Ethics of Exposures to Ionising Radiation

medical follow-up of the over-exposed persons held by IEC on 15-17 June in Vienna. In cooperation with other international organizations, WHO contributed to the International Conference on Global Emergency Preparedness and Response (EPR-2015) as a member of the Program Committee (ICPC), attended the ICPC meeting held on 15-16 June at the IEC in Vienna and will participate the Conference (Vienna, 19-23 October 2015)¹⁷. WHO continues working on the development of a guide for public health response to radiation emergencies and on the revision of the WHO 1999 guide on KI thyroid blocking.

WHO gave a presentation on the new International Requirements for Radiation Protection from Radon at the 4^o Congreso Conjunto SEFM-SEPR in Valencia, Spain (June 25, 2015). WHO also delivered radon-related presentations at the 29th International Radon Symposium in Bloomington, Minnesota, USA (September 21, 2015) and at the HERCA meeting on radon in workplaces in Geneva (October 12, 2015).

WHO was represented at the 62nd UNSCEAR Session held in Vienna, Austria on 1-5 June 2015. WHO cosponsored the X Latin American Regional IRPA Congress held in Buenos Aires, Argentina in April 2015 and the International IRPA-14 Congress to take place in May 2016 in Cape Town, South Africa.

Final considerations

WHO looks forward to continuing its cooperation with the ICRP towards the maintenance and strengthening of the International System of Radiological Protection, as the basis for the development and implementation of radiation safety standards, norms, regulations and guidelines worldwide.

¹⁷ <http://www-pub.iaea.org/iaeameetings/45986/International-Conference-on-Global-Emergency-Preparedness-and-Response>

Report for the ICRP Special Liaison Organisation Meeting

October 2015

Nuclear energy is important for meeting the world's growing need for reliable, affordable and clean electricity. The World Nuclear Association is the international organisation that represents the global nuclear industry. The Association's mission is to promote a wider understanding of nuclear energy among key international influencers by producing authoritative information, developing common industry positions, and contributing to the energy debate. Active forums include the ICRP SLO meeting, observers at a range of IAEA Safety Standards Committees, the World Energy Council, etc.

In 2002, the World Nuclear Association's Radiological Protection Working Group (RPWG) was established to assure that the nuclear industry expertise and perspective were brought to bear in the setting of radiological standards with global implications on nuclear business and operations.

The Working Group:

- Enables the World Nuclear Association to pool industry knowledge, ideas and concerns;
- Provides a means by which the industry can systematically oversee international developments in radiological protection research, standards, regulations, etc.;
- Estimates the impact that any potential or new standards might or will have on the entire nuclear fuel cycle; and
- Engages with international organisations to ensure due consideration is given to proportionality and implementability of any changes to the system for radiological protection.

The RPWG is currently developing its longer term strategy, together with an active work plan, taking into account the work of international RP bodies. This will allow the RPWG to be more involved during the discussions prior to any further developments of the system of RP as well preparing for any subsequent changes should they be made.

Earlier in the year, the World Nuclear Association signed a cooperation agreement with IRPA to recognise that both organisations can complement each other in promoting the safe use of radiation, and to enhance the cooperation between both organisations in the field of radiation protection. We are actively engaged in supporting the preparations of the programme for IRPA14.

Agneta Rising presented on the practical implications of radiological protection for the nuclear industry in an OECD NEA steering committee policy debate on health effects of low dose radiation. Her message to the committee was that safety remains the pillar of the nuclear industry and that ALARA is being accomplished (e.g. the current average occupational dose for the entire nuclear fuel cycle is approximately a third of that for aircrew and reducing); however, the continual need to revisit and reduce dose limits was resulting in mistrust of the radiological protection system as well as putting a significant economic burden on the nuclear industry. This results in a misbalanced judgement of the benefits and impacts of the nuclear industry.

More recently, senior representatives from the ICRP, IAEA, OECD-NEA and IRPA attended a session during the RPWG meeting. It provided an excellent opportunity for open dialogue on practical considerations with the current system, and thoughts towards collaboration in future. Outputs from these discussions will contribute towards the group's longer-term strategy which is currently under development.

We continue to champion the continuation and evaluation of robust and impartial research to improve understanding on a selection of topics, and in particular:

- Variety of non-cancer effects
- Stem cell biology
- Dose response curve
- Dose and dose rate effectiveness factor
- 'Dosimetric' model validation for radon

Our review of the information available has allowed us to develop a dialogue on the following topics:

- The need to distinguish between radiation risk and the risk associated with tobacco smoke
- Certainty that protection of people provides adequate protection of the environment
- The necessity in tackling issues relating to perception of risk at low doses, whereby the risk in reality is much lower

Our members have been discussing some of their views on some of the following (challenging) topics:

- Practical means to measure the dose to the lens of the eye
- Radiological environmental impact assessments to demonstrate protection of the environment
- Emergency preparedness and response
- Transition from an emergency situation into planned/existing exposure situation

The RPWG provides a means by which expert practitioners can gather and discuss issues which are not only critical to the nuclear industry, but are important for developing and maintaining a system of radiological protection which works across many sectors. We would welcome an opportunity to participate in discussions and collaborations needed to develop a fit-for-purpose system of protection.