Technical Meeting of the Coordination Group on Radiation Protection of the Environment:
Input to Safety Standards taking into account the BSS and relevant ICRP/international recommendations.
IAEA Headquarters, Vienna
2–3 July 2013

SUMMARY NOTES

1. INTRODUCTION

The IAEA has unique statutory responsibilities within the United Nations system for establishing standards of radiation safety, including environmental radiation protection, and for providing for the application of those standards. Based on the findings and recommendations of the International Conference on Protection of the Environment from the Effects of Ionizing Radiation\(^1\) which took place in Stockholm, Sweden in 2003, the IAEA developed an International Plan of Activities on the Radiation Protection of the Environment\(^2\), with the main focus on the possible form of future regulatory criteria, the application of biota exposure and effect data, and their relationship to discharge regulation.

The Plan of Activities approved by the IAEA’s Board of Governors in September 2005, considers various activities, including “establishing a coordinating mechanism in order to facilitate coordination of work among international and regional organizations by reviewing their on-going work on the protection of non-human species”.

For this purpose, the IAEA’s Division of Radiation, Transport and Waste Safety established the Coordination Group on Radiation Protection of the Environment\(^3\), involving several international organizations such as: the International Commission on Radiological Protection (ICRP), the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), the United Nations Environment Programme (UNEP), the International Union of Radioecology (IUR), the European Commission (EC) and the OECD Nuclear Energy Agency (NEA), which are currently implicated or interested in the development of a system for environmental protection and, more specifically, biota radiation protection. This challenging issue is also being actively followed by a number of Member States and non-governmental organizations considered as relevant stakeholders, such as the World Nuclear Association (WNA) and Greenpeace International. The Coordination Group has been meeting regularly since 2006.

In July 2013, the IAEA organized a Technical Meeting (TM) of the Coordination Group of the Protection of the Environment. The first objective of this Technical Meeting was to discuss the current work on protection of the environment by the above mentioned International Organizations. The second objective was to consider and discuss how best to include in safety guidance currently in preparation by the IAEA, the requirements on radiological environmental impact assessment established in the BSS in 2011 [1] and the

\(^1\) For more information, see the Conference Proceedings at [http://www-pub.iaea.org/MTCD/Publications/PDF/Pub1229_web.pdf](http://www-pub.iaea.org/MTCD/Publications/PDF/Pub1229_web.pdf)
\(^2\) For more information, see the Plan of Activities at: [http://gnssn.iaea.org/RTWS/cgrpce/Shared%20Documents/Other%20Documents/Plan%20of%20Activities%20on%20RPE%20(2005).pdf](http://gnssn.iaea.org/RTWS/cgrpce/Shared%20Documents/Other%20Documents/Plan%20of%20Activities%20on%20RPE%20(2005).pdf)
\(^3\) See previous activities by the Coordination Group at [http://www-ns.iaea.org/tech-areas/waste-safety/coord-group-on-environment.asp?sz=3](http://www-ns.iaea.org/tech-areas/waste-safety/coord-group-on-environment.asp?sz=3)
relevant international recommendations, e.g. ICRP Publications 103 [2] in 2007 and 108 [3] in 2008. Additionally, the meeting was organized in order to be propitious towards identifying current and future work, as well as possible coordination of activities, that will support the development and improvement of future safety standards.

2. WORK DONE DURING THE MEETING

The meeting consisted of working sessions with presentations made by the participants to the meeting, and discussions. The sessions covered the following topics: (i) Background and future work by International Organizations/Committees in connection with policy approaches for radiological protection of the environment; (ii) Research activities and applications in the field of radioecology for the protection of the environment; (iii) Discussion of basis for consensus; and, (iv) Elaboration of conclusions.

The Meeting Agenda and list of participants nominated by the international organizations are attached at the end of these notes.

3. GENERAL CONCLUSIONS FROM THE TECHNICAL MEETING

The following general conclusions were elaborated during the discussions of the meeting:

— The meeting considered that the approach to address radiological protection of the environment developed by the ICRP [2–6] and based on the concepts of Reference Animals and Plants (RAPs), Representative Organisms (RO) and Derived Consideration Reference Levels (DCRLs), is conceptually and scientifically sound enough to be adopted into international radiation safety guidance for those circumstances when a more explicit consideration of the protection of non-human biota is considered necessary. In line with the aim of IAEA’s Fundamental Safety Principles [7], which state that the general intent of the measures taken for the purposes of environmental protection is to protect ecosystems against radiation exposure that would have adverse consequences for populations of a species, the ICRP approach is applicable to the protection of populations, communities, habitats and ecosystems. The development of international guidance by the IAEA for implementing radiological protection of non-human biota based on the ICRP approach should, however, carefully take into account the particular radiological conditions and exposure situations, as well as the objectives relating to any particular assessment.

— The ICRP approach was considered to be particularly straightforward with respect to the practical guidance necessary for the assessment and control of the radiological impact related to planned releases to the environment, as a complement to the approach typically used for human radiological protection. Such guidance is, for instance, often necessary for the assessment and control of impacts due to routine discharges resulting from normal operations of nuclear installations. Other radiological scenarios may need more detailed considerations and additional analysis prior to defining more detailed practical methods. The IAEA is recognized as the appropriate international organization for coordinating studies on methodologies applicable to practical guidance for the evaluation and control of radiological impact to the environment, and especially non-human biota, in cooperation with other relevant organizations and those Member States more active in this field.

— The meeting noted the comprehensive and complementary current and future work being done and being planned by the international organizations which are actively participating in the development of a system for protection of the environment. The work of these international organizations covers (i) development of safety guidance and
supporting technical reports based on the ICRP approach (IAEA), (ii) further development of the existing reference approach for protection of the environment (ICRP), (iii) development of an holistic approach for additional considerations related to ecological systems (IUR), and (iv) coordinated research on radioecology, scenarios related to emergencies, low doses effects and dosimetry issues (EC). These activities are related to the development of policy approaches for radiological protection of the environment and research activities and applications in the field of radioecology for the protection of the environment.

— The meeting noted the willingness of UNEP to consider positively invitations for co–sponsoring IAEA safety guidance, which was seen as relevant to obtain a wider acceptance of the IAEA Safety Standards for protection of the environment, e.g. among Ministries of Environment around the world.

— The meeting encouraged the IAEA Secretariat and the participating international organizations to keep on working in a coordinated manner. The results of this collaborative work should serve to enhance the current approaches for protection of the environment and, once incorporated into international safety guidance, will contribute to the efforts in Member States to protect the environment in order to use it in a sustainable manner.

— The next Meeting of the Coordination Group of the Protection of the Environment was proposed to be held in Barcelona, Spain, in September 2014, i.e. during the International Conference on Radioecology and Environmental Radioactivity, in order to foster information exchange and dissemination of the results of the Coordination Group with researchers, industry, regulators, and other key stakeholders participating to that conference.

The participants of the meeting from each organization were invited to make presentations regarding their work and views on topics associated with radiological protection of the environment. The presentations are summarized in the following section.

4. SUMMARY OF WORK AND EXPECTATIONS RELATED TO RADIOLICAL PROTECTION OF THE ENVIRONMENT BY INTERNATIONAL ORGANIZATIONS

4.1. IAEA

The IAEA is currently elaborating guidance [8], which follows the ICRP recommendations and approach for radiological protection of non-human biota, for radiological scenarios related to planned exposure situations. This guidance, which is also founded in the safety objectives established in the Fundamental Safety Principles [7] and the requirements established in the BSS [1], will be discussed first within the IAEA Safety Standards Advisory Committees and, once endorsed by them, with all of the Member States. In order to support the implementation on this guidance, the IAEA has been developing technical reports on environmental transfer parameters [9] and on generic environmental dispersion models and input data [10].

The IAEA has already developed guidance on the application of the ICRP approach on protection of non-human biota for particular exposure scenarios and for specific purposes, such as those related to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972\(^4\), established for the protection of the marine environment against dumping in the sea of any type of pollutants, including radionuclides. The guidance

\(^4\) For information on the Convention see http://www.imo.org/OurWork/Environment/LCLP/Pages/default.aspx
developed by IAEA is currently being analyzed and discussed within the Convention scientific groups. The IAEA’s proposal will be discussed for approval during the next Consultative Meeting of the governing body of the Convention⁵.

4.2. UNEP

UNEP⁶ expressed the view that radiation protection of the environment, as described in ICRP Publications 91 [4], 103 [2] and 108 [3], is too narrow. During the process of development of the BSS [1], UNEP suggested that the definitions given in the BSS [1] for ‘environment’ and ‘protection of the environment’ should have a wider perspective beyond the considerations of radiological effects to flora and fauna. UNEP remarked that, when applying the radiation protection principles of ‘justification’ and ‘optimization’ to control and manage radiological impact to people and the environment, the appropriate involvement of environmental issues as protection of flora and fauna, maintenance of quality of air, soil and water as well as considerations of sustainability aspects are key topics. UNEP’s proposed text for the 2011 BSS, that is consistent with the 1992 Rio declaration⁷ as well as with the conclusions of the 2003 Stockholm Conference on Radiation Protection of the Environment. UNEP expressed interest in enhancing the level of cooperation with other relevant international organizations in the field of radiological protection of the environment. To underline this interest, UNEP is willing to consider invitations for co-sponsoring IAEA Safety Guides currently under development that include environmental protection topics. Such co-sponsoring could be of relevance in order to obtain a wider acceptance of the IAEA Safety Standards for protection of the environment, for example, among Ministries of Environment around the world.

4.3. ICRP

In the next few years ICRP Committee 5 (C5) will continue to develop its current approach to assess and control the radiological impact to the environment. The basic concepts of the approach will remain the same as they currently are. During the forthcoming years, C5 will compile and analyze new data and methods that have arisen since publications 108 [3] and 114 [5] on exposure (transfer factors), dosimetry and radiation-induced effects produced for several Reference Animals and Plants (RAPs) were published. The further development of the databases for the RAPs will improve the ability to relate the specific databases on Reference Animals and Plants to a wide variety of Representative Organisms in specific exposure scenarios. The updated databases will also facilitate the evaluation of uncertainties associated with transfer factors, dosimetry, and radiation-induced effects values, and to examine the extent to which the existing databases are “fit for purpose” in assessments. Another issue to be resolved is the question of whether or not specific radiation modifying factors need to be applied to the RAPs, to take into account the differences in relative biological effectiveness (RBE) of different radiation qualities. The Committee will therefore work to consolidate the existing framework on radiation protection of the environment, both by improving the scientific basis, and through the experience gained in its application in the three exposure situations considered by ICRP (planned, existing and emergency). Further recommendations

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⁵ The 35th Consultative Meeting of the Contracting Parties of the London Convention, which took place on 14–18 October 2013 (after this Technical Meeting of the Coordination Group), approved the IAEA proposal to be incorporated into the procedures of the Convention for radiological assessment of materials candidate for marine dumping. The IAEA procedure will be published as a TECDOC entitled Determining the Suitability of materials for Disposal at sea under the London Convention and Protocol.

⁶ UNEP contributed to the development of the IAEA Basic Safety Standards in the area of radiological protection of the environment and is considering the co-sponsoring them.

on when and how to apply the ICRP system for radiological protection of the environment in these different exposure situations will also be provided.

4.4. IUR

Some years ago the IUR initiated the elaboration of an “ecosystem approach” for the radiological protection of the environment based on an ecological perspective [11, 12]. This is essentially because environmental protection objectives are now more and more expressed in ecological terms (biota populations, media where they live and their related ecosystems). In this context, protecting the environment means to preserve structural and functional capabilities of ecosystems, i.e. respectively, natural biodiversity and ecosystem services/life supporting functions which condition all life forms (including that of humans). This is also to help overcoming unavoidable uncertainties bound to the current need to use extrapolations. This type of approach is now embedded in many international environmental protection initiatives (such as the Convention on Biological Diversity [13], the United Nations Convention on the Law of the Seas [14], the FAO Code of Conduct for Responsible Fisheries [15], the OSPAR Convention [16] and the European Union’s Marine Strategy Framework Directive [17]) and it should be considered as well for dealing with impacts from radiation. As such, this approach by IUR can be considered complementary to the ICRP approach and used either in combination or separately, for instance: (i) in exposure scenarios where the use of the concepts of RAPs, ROs and DCRLs may need additional considerations related to the protection of ecological systems; (ii) for the purpose of fulfilment of legislations requiring a more ecological perspective and, moreover; (iii) with the aim of a better communication, on the basis of its more ecological realism that could be better defensible with the public. After a detailed justification and explanation of the “ecosystem approach” [11], current work by IUR is now directed towards the development of practical method(s) along this line, with special emphasis on identifying and developing more integrated ecological endpoints.

4.5. EC

At present, research in the whole field of radioprotection is coordinated in Europe through the activities of four European associations, each of them being dedicated to a specific sub-field related to radiation protection: NERIS8, ALLIANCE9, MELODI10 and EURADOS11, on Emergencies, Radioecology, Low doses and Dosimetry issues, respectively. Recently, the emerging good collaboration between the four associations resulted in the signing of a Memorandum of Understanding to coordinate their activities. Essentially each association has a Strategic Research Agenda in which the main challenges for the different disciplines are outlined.

REFERENCES


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9 European Radioecology Alliance (Radioecology Alliance) http://www.er-ALLIANCE.org
10 MELODI, Multidisciplinary European LOw Dose Initiative http://www.melodi-online.eu


Technical Meeting of the Coordination Group on Radiation Protection of the Environment:
Input to Safety Standards taking into account the BSS and relevant ICRP/international recommendations

Meeting Room M4 - IAEA Headquarters, Vienna, Austria
2 to 3 July 2013

AGENDA

Chairperson:
Mr Tiberio Cabianca,
Planned Exposures, Environmental Assessments Department, Leader,
Public Health England, UK

IAEA Scientific Secretaries:
Mr Gerhard Proehl and Mr Diego Telleria
Assessment and Management of Environmental Releases Unit

IAEA Consultants:
Mr T. Kobayashi (Otaru University of Commerce, Japan)
Ms M. Koyano (School of Law Hokkaido University, Japan)
Ms Jacqueline Garnier-Laplace (IRSN, France)

Day 1: Tuesday 2 July 2013:

09:30 Entry and collection of grounds pass (VIC – Gate 1)

10:30 Meeting Room M4

1) Welcome and objectives of the meeting (IAEA)

2) Agreement of the Agenda

3) Session 1: Background and future work by International Organizations/Committees in connection to policy approaches for radiological protection of the environment.

20 minutes for presentations from each organization, covering past and future work and expectations (each organization should decide on the number of speakers using the time allocated).

IAEA: G. Proehl, D.Telleria – IAEA related standards and applications

UNSCEAR/UNEP: M. Crick, C. Robinson – UNSCEAR and UNEP position and work

ICRP: J. Pentreath, A. Real – ICRP related recommendations and future work in ICRP Committee 5

European Commission: A. Janssens, M. De Cort – EC position and related standards (afternoon)

OECD-NEA: E. Lazo – NEA position and work (time to be defined)

World Nuclear Association: J. Townes, P. Hemidy, Mr G. Gontier – Reflections on the preceding presentations.

Greenpeace International: (Invited/ not confirmed)
4) Session 2: Research activities and applications in the field of radioecology for the protection of the environment.

20 minutes for presentations from each organization (each organization should decide on the number of speakers using the time allocated).

IUR: F. Bréchignac, L. Kapustka, U. Kautsky – IUR Ecosystem Approach Task Group: work and follow up; IUR contribution to identify research priorities in relation to the European Strategic Research Agenda developed by STAR and the European Radioecology Alliance.

IAEA Consultants: M. Koyano, T. Kobayashi – Summary of Japanese regulations/applications with regard to radiological protection of the environment J. Garnier-Laplace – Methods and data for demonstration illustrated through the “Fukushima case” implemented by UNSCEAR; Organisation of European Research in Radioprotection (STAR; COMET; European Radioecology Alliance; DoReMi; MELODI; PREPARE; NERIS, OPERRA)

20:00 Gathering (dinner) (TBC)

Day 2: Wednesday 3 July 2013

09:00 Meeting Room M4

5) Session 3: Discussion on Basis for consensus.

Suggested guiding questions:

Regulatory issues
- Is radiological protection of the environment appropriately addressed in ICRP documents?
- Is radiological protection of the environment appropriately included in IAEA safety standards/standards in preparation?
- Are the current approaches sufficiently developed for all the exposure situations?
- Are there sufficient methodologies/tools to apply the IAEA Safety Standards?

Research and applications
- Are there scientific topics leading to operational outcomes which may support/help decision/consensus for policy-related recommendations that need further investigation?
- Which topics are useful, but less urgent?
- Which methodologies/tools need more development?
- What should be done next within each international organization?
- How could activities by different organizations be coordinated?
- Can a road map for actions in the next 5 years be established?

6) Session 4: Conclusions

Conclusion on the approaches to be included in the IAEA Safety Standards in preparation.

Identification of future work by the international organizations related to the system of radiological protection of the environment

16:00 (latest) Meeting close