Report from the 3rd Meeting of the IAEA’s Coordination Group on Radiation Protection of the Environment

Hosted by NRPA
Bergen, Norway – 20 June 2008

Background

The International Coordination Group on Radiation Protection of the Environment (CGRPE) was established by the International Plan of Activities on the Radiation Protection of the Environment. It serves as a mechanism to facilitate the coordination of activities among international organizations by reviewing their ongoing work related to the protection of non-human species. The IAEA organizes the Secretariat of the CGRPE.

The CGRPE usually meets on an annual basis. The Bergen meeting was the third of the Group and was organized just after the International Conference on Radioecology and Environmental Radioactivity, at the same venue, therefore taking advantage of the presence of several participants of the CGRPE at this Conference.

Agenda and Participants

The agenda of the meeting included a short review of the 2007 activities by each participant and a presentation of planned future actions. Discussions addressed the needs of coordination for 2008 and further. The minutes of the meeting are given in Appendix 1.

The third CGRPE meeting was attended by 20 participants from five international organizations (EC, IAEA, ICRP, IUR, and OECD/NEA) and seven Member States (Brazil, Canada, France, Japan, Norway, UK and the USA). Appendix 2 presents the complete list of participants.

Actions for coordination in 2008

1. The IAEA’s work in development of Standards and supporting documentation, with relevance for the protection of the environment, is based on the explicit inclusion of Protection of the Environment in the IAEA Safety Fundamentals approved in 2006 and co-sponsored by EURATOM, FAO, ILO, IMO, OECD/NEA, PAHO, UNEP and WHO. It also includes among other actions the revision of the BSS. In particular, requirements on protection of the environment are now included in the Draft 1.0 version of the revised BSS, and are included in the following sections thereof: Section 1: Objective; Section 3: Planned Exposure Situations; Section 3; Emergency Exposure Situations and; Section 5: Existing Exposures Situations. Draft 1.0 will be distributed to the members of the CGRPE for comments.

2. The ICRP Committee 5 (C5) recognized that the use of the Reference Plants and Animals (RAPs) would be somewhat limited at present without comparable sets of environmental ‘transfer factor’ values. Such sets would normally be derived by others (such as the IAEA) for different exposure situations, but C5 has set up its own Technical Group to derive an initial set, in order to get the process moving. Similarly, C5 had reviewed the data on radiation effects relevant to the RAPs, in view of the absence of such data available in UNSCEAR reports (waiting for the report on radiation effects on biota due to be released following the next Committee meeting in July 2008), but have had a dialogue with UNSCEAR on the subject of what data interpretations C5 would find particularly useful.
3. In parallel, work has also started on the development of an IAEA TRS document on transfer parameters relevant for non-human biota. The framework of the IAEA EMRAS follow-up project will be used for this work.

4. Now that the ICRP 103 document has been published, with its introduction of the concept of ‘Reference Values’ for emergency and any existing exposure situations, C5 expects that any environmental modelling/impact/assessment work arising via the IAEA (or elsewhere) will also use the values and concepts arising from the ICRP set of RAPs, because an evaluation of human and environmental impact would contain many of the same essential features.

5. A cooperative work between the EMRAS Biota WG, the EC Project PROTECT and ICRP C4 and C5 started to test the applicability of the C5 framework.

6. OECD/NEA has initiated a review of situations in which the ICRP paradigm (that controls in place to protect humans will also ensure environmental protection) does not necessarily apply. Broader participation in this group is welcome.

7. An update of the IAEA Plan of Activities is needed considering the progress in recent years (ICRP, EC, BSS, MS): the IAEA Plan of Activities is used as a reference by other organizations.
Appendix 1

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MEETING MINUTES

IAEA:

The IAEA continued working within the Plan of Activities for the Protection of the Environment together with international, regional, intergovernmental and Member States, fostering information exchange and promoting a collaborative work.

The details of the IAEA’s work in the development of Standards and supporting documentation, with relevance for the protection of the environment were discussed.

This work is based on the explicit inclusion of protection of the environment in the IAEA Safety Fundamentals approved in 2006 and co-sponsored by EURATOM, FAO, ILO, IMO, OECD/NEA, PAHO, UNEP and WHO and includes:

- revision of the BSS;
- development of a Safety Guide on Radiological Environmental Impact Assessment;
- development of a Safety Report on Design and Operation of Source and Environmental Radiation Monitoring Programmes;
- finalization of the draft Safety Report on Practical Aspects of Setting Authorized Limits for Radioactive Discharges; and
- Revision and consolidation of TECDOC-1105 “Inventory of radioactive disposals at sea” and TECDOC-1242 “Inventory of accidents and losses at sea involving radioactive material”.

Particularly, regarding the BSS, requirements on the protection of the environment are now included (in the Draft 1.0 version) in the following sections:

- Section 1: Objective;
- Section 3: Planned Exposure Situations;
- Section 3: Emergency Exposure Situations; and
- Section 5: Existing Exposures Situations.

Work has also started to develop an IAEA TRS document on transfer parameters relevant for non-human biota. The framework of IAEA’s EMRAS follow-up project will be used for this work. Within this framework, also cooperative work with BWG and ICRP C5 and C4 has been agreed under the coordination of IAEA.

Comments for other participants:

A clear definition of what ‘protection of the environment’ meant in the framework of regulation is needed.

An update of the IAEA Plan of Activities is needed considering the progress in recent years (ICRP, EC, BSS, MSs): the IAEA Plan of Activities is used as reference by other organizations.
OECD/NEA:

‘Protection of the environment’ has been identified as an important topic. It is understood that the current system of protection has been successful in the protection of humans and also the environment. No major changes in the existing regulations to control discharges during normal operation are foreseen. The progress in the field is being followed with interest by NEA and the importance for society needs to be addressed.

The CRPPH has initiated a review of situations in which the ICRP paradigm (that controls in place to protect humans will also ensure environmental protection) does not necessarily apply. Broader participation in this group is welcome and the relevance of the work of the EMRAS Biota Working Group (BWG) in support of ICRP Committee 4 was noted.

The importance of the protection of the environment in the process of optimization, together with other social and economic issues was noted. Following the conference, a recommendation will be made to consider optimisation issues, including consideration of conservatism and the balance of risks between environment and human protection.

NEA is also preparing a report on Best Available Techniques/Technology (BAT) in the context of new build, which is due to be published at the end of 2008.

ICRP:

The ICRP C5 had set out, in its first term, to produce three documents: one on the Reference Animals and Plants (RAP); one on the issue of RBE and radiation weighting factors; and one on the application of this approach compared with other approaches to environmental protection.

With regard to the first of these, an initial draft report on the RAPs had been completed and sent out for review. It included the results of a Task Group that had been established to address issues of dosimetry. The extremely useful and valuable responses from the review have now been considered by C5, and a revised report will now go to the Commission. The RAPs were established to examine issues of the relationships between exposure and dose, and dose and effect, for different types of animals and plants, and thereby to lead to recommendations of dose values that could be used as a starting point to optimise the effort expended in environmental protection. The report has already been used internally to fulfil the first of these issues, and the dosimetry TG has been reconvened to examine further the relationships between exposure and dose, and dose and the relevant biological effect, for large animals, and for plants.

It has also been decided that the use of the RAPs would be somewhat limited at present without comparable sets of environmental ‘transfer factor’ values. Such sets would normally be derived by others (such as the IAEA) for different exposure situations, but C5 has set up its own TG to derive an initial set, in order to get the process moving. Similarly, C5 had reviewed the data on radiation effects relevant to the RAPs, in view of the absence of such data available in UNSCEAR reports, but have had a dialogue with UNSCEAR (since C5 was established) on the subject of what data interpretations C5 would find particularly useful.

A TG has been established to address the RBE issue. This work has been delayed because it was first necessary to complete the more basic review of the radiation effects data. But the work to produce the third document is well advanced.

Now that the ICRP103 document has been published, with its introduction of the concept of ‘Reference Values’ for emergency and any existing exposure situations, it is to be expected that any environmental modelling/impact/assessment work arising via the IAEA (or elsewhere) will also use the values and concepts arising from the ICRP set of RAPs, because an evaluation of human and environmental impact would contain many of the same essential features.

ICRP C5 would welcome any feedback on all or any of these topics.
IUR:

IUR is devoted to science, networking and coordination of research related to radioecology. It is relevant for the identification of issues which could be useful for the consideration of ICRP and IAEA and subsequently regulators. While UNSCEAR is doing retrospective analysis of the existing scientific information, IUR intends to take prospective actions in the field on research.

IUR can contribute to the development of the necessary databases (e.g., transfer parameters for non-human biota) and can play a role in the survey of scientific data.

Regarding NORM, a new group under IUR has been established. Another group has been identified to consider needs in Asia and Africa. Radioecology in different climates, such as tropical, and different environments, such as rice production, have been identified as issues of interest and will be covered in future planned work.

Comments for other participants:

IAEA asked the IUR to play a role in education and training in the area of radioecology which could be useful for MS: e.g., training courses on radioecology, network in education in radioecology, etc. NEA supports and could contribute to this proposal.

EC:

It is anticipated that statements on environmental protection will be included in the EURATOM BSS. The general requirements are likely to be process-based rather than results oriented. A title had been provisionally included on environmental protection to allow for any specific operational requirements (e.g. from the PROTECT project).

It was noted that it had been agreed, as part of the development of the revised international BSS, that environmental radiation protection requirements were not sufficient to warrant a dedicated chapter. The scope of the EURATOM and international BSS differ; a title is the only mechanism for including operational requirements in the EURATOM standards, while the IAEA Safety Requirements may be supplemented by lower-level documents (e.g. Safety Guides). The approach will be discussed further by Article 31 Experts early in 2009.

EC PROTECT:

The primary objective of the PROTECT co-ordinated action is to evaluate the practicability and relative merits of different approaches to protection of the environment from ionising radiation. The project also aims to compare these with methods used for non radioactive contaminants, particularly with respect to European frameworks for chemicals. This will provide a basis on which the EC could develop protection policies and revise its Basic Safety Standards, and ensure a fruitful collaboration with, and constructive input into, current ICRP and IAEA task groups.

Consultation with regulators and industry has shown that there is support for developing a system for assessment of non human biota that has, as far as possible, a common approach to that used for other chemicals. Workshops on potential numeric benchmark values have found good agreement on the requirement for screening values (using *species sensitivity distribution* analyses to derive values), preferably based on suitable organism groups. There was no agreement on the need for an upper benchmark with varying opinions on this issue. A comparison of the initial screening tier of freely available tools to conduct radiological environmental assessment showed considerable variability in outputs (risk quotients) and it was suggested that users may not have the required level of confidence in outputs.
EMRAS Biota Working Group

The BWG has conducted two model-model and two model-data comparisons with 15 models being applied. Whilst the dosimetric functions of the various models gave generally comparable estimates of unweighted dose (assuming the same activity concentrations in the organism and media) the estimates of whole-body radionuclide activity concentrations varied over orders of magnitude. The working group has made a number of recommendations which are being considered by the IAEA for inclusion in the follow-up to the EMRAS programme.

BRAZIL:

IRD mentioned the interest in promoting the awareness in the Latin-American Region of the relevance of the protection of the environment in accordance with the more advanced countries. They are trying to motivate discussions and would promote a meeting as an IRPA 12 satellite activity (probably in the University in Rio on a date close to IRPA 12 in Buenos Aires, Argentina).

Brazil is interested in areas with high background radiation (like Pozo de Caldas) and understands that the available information could contribute to the research necessary to define a regulatory approaches to protect the environment, including under multi-stressors situations (e.g. U, Th, lead, iron).

CANADA

CNSC has been implementing a quantitative integrated approach to risk assessment since 2000. This is working well and the quality of information provided has improved. On the basis of this experience, it was suggested that focus on numerical criteria was misdirected and that the application of expert judgement related to particular systems was key. CNSC is preparing to deal with the combined challenges of: potential development of new build non-CANDU reactors; the likelihood of uranium mining in the Arctic and the management of legacies from ageing facilities. Other issues include the application of radiation weighting factors for tritium. It was also noted that a collaborative international epidemiological study on tritium exposures is in progress, which involves Canada, UK and USA.

It was noted that the IAEA will hold a conference on uranium mining in 2009, at which a presentation of regulatory experience from CNSC would be welcome.

FRANCE:

IRSN continues to be involved as one of the main players in activities regarding protection of the environment within the framework of EC projects such as ERICA and latterly PROTECT, contributing in the derivation of benchmark values applicable for the screening of the radiological safety in the environment. It is also contributing and willing to continue to fill the gaps in the knowledge of relevant issues for environmental protection of non-human biota, such as transfer parameters and effects on individuals and populations due to low rate radiation doses. The research is oriented towards the application in modelling adequate to regulatory control.

IRSN continues to develop comparative methods for risk assessment in multi-stressor situations: e.g., chemical and radiological risk.

IRSN is willing to continue working in the IAEA’s EMRAS follow-up project.

JAPAN:

NIRS has been making efforts to conduct research, studies and collection of information in topics related to protection of the environment, although not in a systematic approach. Japan is interested in participating and cooperating with the work at the international level, offering as a contribution the work being done and also its willingness to complement these studies according to the international trends and needs.
NIRS is interested in continuing to support the development of a systematic approach for environmental protection and the development of associated parameters. NIRS has been closely involved in the development of data for rice and is keen to continue such collaborative work. Data specific for the Asian region is of primary interest at present.

Experimental work on multi-stressor effects and ecosystem interactions is underway, as presented during the conference.

NIRS indicated that they would be happy to provide courses in radioecology. The collaboration agreement arrangement in place with the IAEA may provide a possible mechanism for this.

**NORWAY:**

NRA has taken part in the ERICA Project and is now leading a consortium to continue development of the ERICA Assessment Tool for a further period of 3 years. Funds have been allocated to the maintenance/update of ERICA as an assessment tool as well as for the FREDERICA databases.

At the national level, regulations on NORM coming from the oil and mining industries (different from uranium mining and processing) are being developed. At the international level, regulations for the North Sea regarding NORM in the oil and gas industries are being discussed with the UK, Netherlands, Germany, Denmark and Norway. It was emphasised that the issue of harmonization of laws regarding radioactive environmental stressors with laws regarding other environmental stressors.

Norway cooperated with the IAEA in the recent translation of the Ex-USSR White Book.

**SWEDEN (S. Carroll – Observer):**

The observer expressed his general support for the work being done regarding protection of the environment. It expressed his willingness to network among other NGOs to foster the information exchange, noting the progress in comparison with other industries. There is a need to use a comprehensive approach and to consider the involvement of the NGO which will influence how the proposals on approaches for the protection of the environment will be received by society. It also stressed the need for the development of a precise definition of radiation protection of the environment. It acknowledged the convenience of RAPs as a tool appropriate for scaling, but remarked that if too narrow, could be inadequate to cover all species. The importance of multi-stressors consideration and the use of a precautionary and ecological based approach, was also noted.

It was stressed that the participation of NGOs is essential in order to ensure that the industry and the IAEA do not self restrict actions to improve protection of the environment because of the possible conflict of interest.

**UK:**

EA has applied a screening method to identify areas in the UK needing consideration regarding the conservation of habitats. Only a few sites were identified as needing more research (more site specific modelling and parameter values).

One such site is a protected habitat close to Sellafield, which is being scrutinized from the environmental protection perspective regarding current discharges, the historical legacy and environmental conservation. EA participates in the OSPAR convention and is willing to cooperate with future work regarding the IAEA’s EMRAS follow-up project, for instance in the transfer parameter work and others.

**USA:**

NRC has been interested in the work being done by the IAEA and ICRP regarding protection of the environment. NRC and EPA have responsibilities in the USA for the protection of the environment from radiation. Functional responsibilities are conducted in a coordinated way.

**Comments from other participants:**

IAEA requested cooperation regarding the transfer parameters document.
Appendix 2

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