

Information from the 4th Combined Meeting of the IAEA Programme on Environmental Modelling for Radiation Safety (EMRAS): Current Status and Plans for the Future

IAEA Headquarters, Vienna, 6–10 November 2006

Background. For the purposes of radioactive discharge control, emergency preparedness and response, environmental dose reconstruction and environmental restoration, it is necessary to have the capability to assess the impact of radionuclide releases to the environment. This is achieved by the use of predictive or, sometimes, retrospective modelling of the environmental behaviour of radionuclides. The IAEA's VAMP (1988–1994) and BIOMASS (1996–2001) Coordinated Research Projects (CRPs) contributed significantly to the improvement of modelling in areas of radioactive waste disposal, control of environmental releases and the effectiveness of remedial actions. However, all of the problems are not solved, uncertainties remain in predictive capability in several areas, notably in relation to the consequences of releases of radionuclides to particular types of environment, e.g. urban and aquatic environments, restoration of sites with radioactive residues, impact of environmental radioactivity on non-human species.

Based on Member States' needs, the Agency continues the series of exercises on radioecological modelling aimed at refining existing information and to improve models applied for the purposes of radiation protection of the public and the environment. The relevant Environmental Modelling for Radiation Safety (EMRAS) Programme was launched at the First Combined Meeting, held 1–5 September 2003 at the IAEA's Headquarters in Vienna, Austria. Two of the Agency's Divisions are involved in the implementation of this project: the Division of Radiation, Transport and Waste Safety (NSRW) and the Agency's Laboratories, Seibersdorf (NAAL).

The overall objective of the EMRAS Programme, its specific objectives, expected results and organization were endorsed during the First Combined Meeting and presented in the EMRAS Overview posted on <http://www-ns.iaea.org/projects/emras/emras-background.htm>. All the generic points presented in the EMRAS Overview remain unchanged since the First Combined Meeting took place.

EMRAS Programme implementation in 2003–2006

The *First Combined Meeting* was held 1–5 September 2003 at IAEA Headquarters in Vienna and was attended by 78 participants from 24 countries. The following Themes and Working Groups were established:

Theme 1. Radioactive Release Assessment

1. Revision of IAEA Technical Report series No. 364 "Handbook of parameter values for the prediction of radionuclide transfer in temperate environments" (*TRS-364 WG*);
2. Modelling of tritium and carbon-14 transfer to biota and man (*Tritium & C-14 WG*);

3. The Chernobyl Iodine-131 release: model validation and assessment of the countermeasure effectiveness (*I-131 WG*);
4. Model validation for radionuclide transport in the system “Watershed-River” and in estuaries (*Aquatic WG*).

Theme 2. Remediation of Sites with Radioactive Residues

1. Modelling of naturally occurring radioactive materials (NORM) releases and of the remediation benefits for sites contaminated by extractive industries (U/Th mining and milling, oil and gas industry, phosphate industry, etc.) (*NORM WG*);
2. Remediation assessment for urban areas contaminated with dispersed radionuclides (*Urban WG*).

The **Second Combined Meeting**, held 8–11 November 2004 at IAEA Headquarters in Vienna, was attended by 84 participants from 24 countries, an additional Theme and Working Group were established in order to meet growing societal demand for the development of an environmental protection system:

Theme 3. Protection of the Environment

1. Model validation for biota dose assessment (*Biota WG or BWG*).

More information on the operation of the Biota Working Group can be found on the EMRAS website (<http://www-ns.iaea.org/projects/emras/>).

The **Third Combined Meeting**, held 21–25 November 2005 at IAEA Headquarters in Vienna, was attended by 106 participants from 31 countries. As the Third Combined Meeting represented the midpoint of the EMRAS Programme, the Secretariat suggested that consideration should be given to producing final reports.

During the meeting, Mr. Didier Louvat, Head of the Waste Safety Section (WSS), and the WSS staff informed participants about the progress of the following safety assessment projects run by WSS in the areas of radioactive waste management and nuclear facility decommissioning:

- Evaluation and Demonstration of Safety during Decommissioning (DESA);
- Safety Assessment Driven Radioactive Waste Management Solutions (SADRWMS); and
- Application of Safety Assessment Methodology for Near-Surface Radioactive Waste Disposal Facilities (ASAM). The Working Groups have successfully operated in the time period between the First and the Fourth EMRAS Combined Meetings during 2003–2006. The TRS-364 WG has reviewed recently available information on radionuclide transfer in temperate, sub-tropic, tropic and arctic environments, developed a structure for the future revised handbook and drafted a TECDOC containing massive scientific data to be used for TRS-364 revision. The other WGs have mostly been developing experimental and hypothetical scenarios for model validation and performing model calculations to be compared with the experimental data or compared on a model-to-model basis. More detailed information on particular WG operations can be found at the EMRAS website (see above).

The **Fourth Combined Meeting**, held 6–10 November 2006 at the IAEA Headquarters in Vienna, was attended by 101 participants from 32 countries, was opened by Ms. Eliana Amaral, Director of the Division of Radiation, Transport and Waste Safety (NSRW).

The Plenary Sessions were chaired by Mr. Gordon Linsley, UK, focused on monitoring current and future EMRAS activities.

The Secretariat reminded the meeting that this Fourth Combined Meeting was being held one year prior to the completion of the EMRAS Programme and therefore suggested that focus should now be given to producing final reports. The outline format suggested earlier by Phil Davis (Tritium & C-14 WG Leader) was generally accepted as the basis for the final reports (except for the TRS 364 WG).

The IAEA is organising an International Conference on “Environmental Radioactivity: From Measurements and Assessments to Regulation” in April 2007 in Vienna (<http://www-pub.iaea.org/MTCD/Meetings/Announcements.asp?ConfID=145>), and after some discussion during the Steering Committee and the Plenary Meetings, it was decided that during the Session of the Conference devoted to Environmental Assessment, the results of each of EMRAS WGs would be presented. In addition, the final (Fifth) EMRAS Combined Meeting, being held 5–9 November 2007, will be used to report in full on the outcome of the EMRAS Programme.

The *Steering Committee Meeting* held during the Fourth Combined Meeting considered some current managerial issues, such as plans for production of EMRAS documents, mechanisms for Working Groups to contribute to the revision of the TRS-364, possible time-sharing of Working Groups and future meeting plans.

It was agreed that WG intermediate Working Materials will continue to be posted on their respective web pages and not printed as hard copies. As for the final EMRAS documents, the full reports of all the seven Working Groups will be published in separate documents of TECDOC format and additionally issued on a CD-ROM. The revised TRS-364 handbook would be published as before in a fully edited Technical Reports Series, or Safety Reports Series, document.

In order to inform a wide professional audience of the scientific findings of the EMRAS Programme, a series of papers will be published as a special issue of the Journal of Environmental Radioactivity (JER) as was the case with the BIOMASS Programme findings.

It was also noted that the other six Working Groups closely collaborate with the TRS-364 WG and have provided or will provide it with their findings, both conceptual and model parameter values, in order to ensure that TRS-364 revision is based on the most updated radioecological information. Joint meetings of the Working Groups with TRS-364 WG were recognised by SC as a most effective instrument. It was agreed that by the mid of 2007 the drafts TECDOC and updated TRS-364 will be placed on the EMRAS web-site for comment by all the EMRAS participants.

Some EMRAS participants are interested in participating in meetings of more than one Working Group. This could be achieved if the Working Groups having common fields of interest arranged their spring meetings “back-to-back”, i.e., in the same place and consecutively, during the same week. During the Combined Meetings, some joint WG meetings are being arranged so as to meet the same aim.

During the Fourth Combined Meeting, *the seven Working Groups* continued their operations. The results of their work during three and a half days of WG meetings can be found on their respective web pages in the form of minutes, scenarios, calculation results and other working materials. They are also presented on this web page under “Presentations”.

The EMRAS Secretariat expresses its satisfaction with the progress made in all Working Groups and with the enthusiasm of the Programme participants. The number of the Combined Meeting participants increased from about 80 in 2003–2004 to more than 100 in 2005–2006. The number of participating Member States increased as well, i.e., from 24 in 2003–2004 to 32 in 2006. For the IAEA, this is a clear message that this series of Programmes (VAMP/BIOMASS/EMRAS) remains attractive for the world environmental modelling community. Therefore, the IAEA is considering the opportunity of establishing a follow-up Programme, about one year after completion of the current EMRAS Programme.

The next series of the separate Working Group Meetings will be organized in April–June 2007 in various locations. Some WG meetings will be organised in Vienna immediately prior to, or just after, the forthcoming IAEA Conference (<http://www-pub.iaea.org/MTCD/Meetings/Announcements.asp?ConfID=145>). The Fifth (and final) EMRAS Combined Meeting will be held 5– 9 November 2007 at the IAEA's Headquarters in Vienna.

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