Information from the Third Combined Meetings of the IAEA Programme on Environmental Modelling for RAdiation Safety (EMRAS): Current Status and Plans for the Future

IAEA Headquarters, Vienna, 21–25 November 2005

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 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 at 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.

EMRAS Programme implementation in 2003–2005.

During the First Combined Meeting, held in September 2003 at the IAEA's Headquarters and 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 WG).
3. The Chernobyl ^{131}I release: model validation and assessment of the countermeasure effectiveness (Iodine 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).

During the Second Combined Meeting, held 8–11 November 2004 at the IAEA's Headquarters and attended by 80 participants from 25 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 Biota Working Group operation can be found on the EMRAS web-site.

The Working Groups have successfully operated in the time period between the First and the Second EMRAS Combined Meetings in 2003–2005. The TRS-364 WG has reviewed available recent information on radionuclide transfer in temperate, sub-tropic and tropic environments, developed a structure for the future revised handbook and started its drafting. The other WGs have been mostly developing experimental scenarios for model validation and performing model calculations to be compared with the experimental data. More detailed information on particular WG operations can be found at the EMRAS web-site (see above).

The Third Combined Meeting, held 21–25 November 2005 at the IAEA's Headquarters and attended by 106 participants from 31 countries, was opened by Ms. Eliana Amaral, Director of NSRW.

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

Mr. Didier Louvat, Head of the Waste Safety Section (WSS), informed participants about operation 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).Following the presentations by Waste Safety Section staff on these projects, it was observed that in ASAM and SADRWMS there are working groups dealing with different aspects of the management of NORM. It was therefore suggested that there should be some exchange between these groups and the EMRAS NORM WG in order to explore possible common areas and, if appropriate, common initiatives.

The IAEA will organize a Conference on environmental radioactivity during the Spring of 2007 and after some discussion in the Steering Committee and also in the Plenary, it was decided that a session of the Conference would be devoted to presenting the results of EMRAS. This will be discussed in more detail at next year's Combined Meeting. In addition, the final EMRAS Combined Meeting, in late 2007, will be used to report in full on the outcome of the EMRAS Programme.

The Secretariat reminded the meeting that this Third Combined Meeting represents the midpoint of the programme and therefore suggested that consideration should now be given to producing final reports. The outline format suggested by Mr. Phil Davis was generally accepted as the basis for the final reports (except for TRS 364 WG).

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

It was agreed that WG intermediate working materials will be posted on their respective web-sites 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 on the scientific findings of the EMRAS Project, a series of papers might be issued as a monograph published by Elsevier publishing house, or as a special issue of JER such as the recently published one which contained the BIOMASS findings.

It was also generally agreed that the other six Working Groups will closely collaborate with the TRS-364 WG and 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. The Working Group leaders discussed options for interaction with TRS-364 WG. Joint meetings were recognized by SC as a most effective instrument. It was agreed that TRS-364 WG distributes the request and format for the input of other WGs to TRS-364 revision. During next years Combined Meeting, TRS 364 WG will aim to have a draft version of the report ready for review by all participants and also a wider group of experts.

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 Meeting, some joint WG meetings are being arranged so as to meet the same aim.

During the Third Combined Meeting, **the seven Working Groups** continued their operations. The results of their work during three and a half WG meeting days can be found on their respective web-pages (listed on http://www-ns.iaea.org/projects/emras/)in the form of minutes, scenarios, calculation results and other working materials. They are also presented at 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 project participants. The number of the Combined Meeting participants increased from around 80 in 2003–2004 to more than one hundred in 2005. The number of participating Member States also increased, i.e., from 24–25 in 2003–2004 to 31 in 2005. For the IAEA, this is a clear message that this series of projects (VAMP–

BIOMASS–EMRAS) remains attractive for the world environmental modeller community. Therefore, the IAEA will consider the opportunity to establish a follow-up project in 1–2 years after completion of the current EMRAS Project.

The next series of the separate Working Group Meetings will be organized in June 2006 in Vienna and in some other locations. The Fourth Combined Meeting will be held from 6 to 10 November 2006 at IAEA's Headquarters in Vienna.

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