International Conference on
Environmental Radioactivity : From Measurements and Assessments to Regulation

Vienna, Austria
23 – 27 April 2007

SESSION 6: MODELLING AND ASSESSMENT

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The session on environmental modelling and assessment included 17 oral presentations and 20 posters.

A major part of the session was the collection of 7 presentations which summarized the results of the IAEA's EMRAS (**E**nvironmental **M**odelling for **Ra**diation **S**afety) programme. This programme is the latest of a series of IAEA programmes aimed at improving and testing mathematical models used for predicting the transfer of radionuclides in the environment. Such models are essential for use in demonstrating that discharges and existing radioactive materials in the environment are in compliance with dose limitations for the public. The series was started in 1988 shortly after the Chernobyl Accident with the VAMP programme which used the information available in many countries as a result of the Chernobyl release to test model predictions. It was followed by the BIOMASS and then the EMRAS programmes. Each programme has focused on resolving environmental issues of current interest. The EMRAS working groups cover the following topics:

- revision of the IAEA Handbook on transfer factors in the terrestrial and aquatic environments (TRS 364);
- environmental transfer of tritium and carbon-14;
- environmental transfer of iodine-131 (use of Chernobyl data);
- radionuclide transfer in aquatic systems;
- behaviour of radionuclides in urban environments;
- estimating the exposure of non-human biota; and
- the behaviour of naturally occurring radionuclides (NORM) in the environment.

The revision of TRS 364 will take account of the significant amount of data collected since the early 1990s and will broaden the data to include crops from tropical and semi-tropical environments, including, for the first time data, on radionuclide transfer to rice. The work of the non-human biota group reflects the current international radiological protection interest in protection of the environment; it showed that appropriate methodologies for assessing the impact radioactive materials on non-human species already exist in some countries. Data shortages are making the work of the urban and NORM working groups difficult.

The IAEA is considering following up EMRAS with another programme in the same field and it was proposed during the session that the implications of the new targets for public radiation dose assessment indicated in ICRP publication 101 might be one suitable topic to be addressed in a new programme.

Assessment models can be very complex in structure and such structures can often imply a degree of knowledge that does not, in fact, exist. One presentation in the session drew attention to the need to assess the uncertainty inherent in model predictions and noted that the most reliable results can often be produced with simple models which require a minimum of information.

The concern being expressed in many parts of the nuclear industry over the loss of experience and knowledge through the ageing of staff also applies in the area of radioecology. It was suggested that the IAEA should, to the extent possible, address the problem through training courses and it was noted that programmes such as EMRAS can also assist in this regard.

One presentation described the likely future development of ecosystems in the context of assessing the impact of geological disposal. Studies of future development of ecosystems may also be required to assess the potential effects of global warming in relation to the siting of future nuclear facilities.

The impact of radioactive releases from medical facilities was assessed in one paper and it was noted that although this is a common source of radionuclides in countries it often does not receive sufficient attention.

The value of environmental assessment considerations in the design of long-term monitoring programmes was emphasized in one presentation. Environmental monitoring programmes should serve clearly identified radiological purposes and be continually reviewed and optimized to reflect the important national radiological issues.

In summary, the session demonstrated the value of international exercises to develop and improve environmental assessment models and the continuation of suitably focused model testing programmes was recommended. In addition, to address concern over the potential loss of knowledge and competence in the environmental assessment area, the international organizations should organize and support appropriate training programmes.