Working Group 1 – Revision of the IAEA TRS No. 364, "Handbook of parameter values for the prediction of radionuclide transfer in temperate environments"

Twenty-three participants attended the first Working Group meeting.

The IAEA TRS 364 was published in 1994. Since that period, new data have been produced, such as those like the post-Chernobyl information. It is consequently important to keep such a document as accurate, relevant, complete as possible. The first action for revising TRS 364 should consist in analysing and completing the existing data. The second action should consist in extending the TRS 364 scope, compartments and processes. It is also necessary to consider the availability of data for new environmental conditions, such as under cold and tropical climates, or concerning inhabited environments.

Several participants volunteered for contributing to some TRS sections. These initial contributions should address the following issues: use of chemical analogies for deriving values; interactions between atmosphere and plants: update and revision of deposition/interception; translocation through plant compartments; alternative modelling and co-factors of interest for soil K_ds and soil to plant transfer factors; status of the IUR database on soil to plant transfer factors; modelling of resuspension and associated data; transfer to fruits; revision of the transfer to animals and animal products; revision of the transfer through aquatic systems; wash-off; update on semi-natural systems; new data on food processing; Asian food chains; inhabited environments.

In addition, the help from the Aquatic WG has been discussed, since the aquatic section needs to be rewritten. The urban WG will be helpful for creating a new section on inhabited environments.

Initial contributions to some TRS sections are expected by the end of 2003/ beginning of 2004. The first draft contributions are expected for the spring meeting. Data gathering is a continuous process, and all the EMRAS community should feel free to contribute to this task. By the end of 2004, it is expected that a final draft on the critical analysis of TRS 364 should be produced.

Working Group 2 – Modelling Tritium and Radiocarbon Transfer to Biota and Man

Twenty-three participants attended the sessions of the EMRAS Working Group on Modelling Tritium and Radiocarbon Transfer to Biota and Man.

The WG decided to mainly focus the work on improving models of OBT formation and translocation in plants, animals and fish. The WG will necessarily have to consider HTO as well, since an understanding of environmental HTO is needed before OBT can be modelled. ^{14}C will also be on the agenda since the dynamics of carbon and OBT are very similar.

To the extent possible, the WG will carry out its work by comparing model predictions with experimental data. Where data are not available, model intercomparison exercises may be undertaken or suitable data may be generated. The most obvious data gap is in OBT dynamics in large animals and fish, and steps have been taken to have data produced in this area. Reviews of previous work on ^{14}C model testing and on identifying the key processes and pathways that must be considered in estimating tritium doses will also be undertaken.

11 experimental data sets that could be used for OBT model testing were identified. These data sets covered topics ranging from short-term plant exposures through OBT measurements in tree rings to chronic exposure of a freshwater ecosystem. All of the data sets were presented and discussed at the meeting.

Four scenarios were taken on to begin with, all dealing with tritium. Two of these address continuous releases of HTO to air and water. Acute releases, which are more difficult to address, are approached through one model-data scenario for a specific process (concentrations in plants and animal products), and one comprehensive hypothetical scenario involving the calculation of doses following short-term releases of HT and HTO to the atmosphere.

Working Group 3 – The ^{131}I Chernobyl releases: model validation and assessment of countermeasure effectiveness

The Working Group on Iodine, which has been established in the framework of the EMRAS programme, continues some of the work of previous international programmes (VAMP, BIOMOVS, BIOMASS) that were aimed at increasing confidence in methods and models for the assessment of radiation exposure related to the environmental releases. Eight participants attended the sessions of this WG.

The main activity of the EMRAS Working Group on Iodine (IWG) will be to carry out environmental modelling exercises on radioiodine to test and compare model predictions with environmental data and to compare modelling approaches and model predictions among several assessors.

The main objectives of the exercises to be carried out by the Working Group on Iodine are to evaluate the performance of the participating models in dose reconstruction exercises in cases when ^{137}Cs (^{129}I) tracer is used to estimate the deposition of ^{131}I and to assess the applicability of the models to countermeasure response. The group agreed focus their activities in 2004 on the Tula/Plavsk scenario. The second scenario that will be used by the IWG is the Warsaw scenario, but calculations for this scenario will be carried out after the completion of the Group's work on the Tula/Plavsk scenario. Data to be used for the validation are those relevant to the Plavsk district. At a later stage calculation of endpoints might be extended to other districts of the Tula region.

The Group agreed to carry out calculation of activity concentrations of ^{131}I in milk and thyroid burdens for both urban and rural populations of the district (to be compared with thyroid burdens measured).

Working Group 4 – Model validation for radionuclide transport in the aquatic systems: Watershed-Rivers-Estuaries

Sixteen participants attended the aquatic WG. Among the participants a core group of 11 people had their main interest in this Working Group and 8 different models were presented with respect to the type of assessment they are used for.

The WG has defined several priorities to select the scenarios for the intercomparison exercise: important radionuclides other than Cs and Sr, extreme events, physical factors dealing with remobilization, biological factors dealing with migration and modelling countermeasures. In addition, the WG agreed to significantly contribute to the EMRAS WG devoted to the revision of the IAEA-TRS report 364, a handbook of parameter values for the prediction of radionuclide transfer in temperate environments.

The WG justified the delineation of the priorities as no or very few exercises relevant to each specific topic were done in the past. All these topics are of importance from a radiological point of view and all these exercises are actually feasible.

Three scenarios have been selected to implement intercomparison exercises on selected priorities: a scenario to model the wash-off of ^{90}Sr and ^{137}Cs deposit from the Pripyat floodplain, a scenario to model the release of Pu into the Techa River and a scenario to model the discharge from Dnieper into its estuary. In addition to these 3 scenarios, the WG has decided to run a case study of ^{3}H migration through rivers, including several discharge points with transient releases and an estuary subject to strong tidal effects.

Working Group 5 – Modelling of naturally occurring radioactive materials (NORM) releases and of the remediation benefits for sites contaminated by extractive industries.

Eleven scientists participated in the WG meeting. This working group started its discussions without any previous experience or preparation, as the IAEA has not had any involvement with NORM other than on the regulatory side.

The group first discussed the differences between problems involved in modelling NORM and similarities between NORM and other radionuclides in the environment. The WG established an approach for an overall modelling program limited to the environmental transfer. The group noted that the approach to modelling NORM in the environment could be to look at the transfer processes, or at the individual pathways from source to receptor. One anticipated outcome of this program is the development of benchmark scenarios, with appropriate data for use in testing models. Since NORM is a worldwide problem, it is also desirable to develop standard scenarios for use in problems where similar environmental conditions apply.

An important application of the models developed for NORM is use in remediation issues. The group noted that modelling would be useful both for predicting the effects of proposed remediation strategies and assessing the effects of strategies after implementation.

Two important consequences of the similarities and differences between NORM and non-NORM problems are that Model developers will have to demonstrate that models that work for non-NORM radionuclides can be applied to NORM. This cannot be assumed. The working group will have to be careful to develop scenarios, for evaluating and testing models, which are appropriate to NORM issues.

The working group agreed that It will be essential to validate data sets before using them for testing and verifying models The suitability of proposed models should be assessed against agreed criteria, using the information provided by the model developer(s) The model verification

process must include the provision of values of parameters and radionuclides at intermediate steps, and a demonstration that these values are "correct". This will help to demonstrate that each model is internally consistent and aid in the checking process. An annex to the group's preliminary report could include some examples of the suggested procedure

The group agreed that there is a great deal of information available regarding NORM, but not in a form that makes it immediately useful for this program. Therefore the first step is to collect information and evaluate the available information in terms of the requirements of the program. There are three types of information required, NORM industries, available data and existing models.

Working Group 6 – Remediation assessment for urban areas contaminated with dispersed radionuclides

Seventeen participants attended the Urban Remediation Working Group. The Working Group discussed and clarified its objective to test and improve the prediction of dose rates and cumulative doses to humans for urban areas contaminated with dispersed radionuclides.

The general approach of the WG will be the characterization of representative situations and relevant processes, review of existing modelling approaches, development of an initial modelling scenario, characterization of remediation methods and corresponding modelling approaches, and development of additional modelling scenarios.

An initial modelling scenario is planned, based on Chernobyl data for three Ukrainian towns: Pripyat, which was evacuated soon after the Chernobyl accident and has remained essentially uninhabited; Polesskoe, which has remained inhabited after the accident; and Slavutich, which was built after the accident on contaminated land. This set of towns will provide an opportunity for WG participants to compare differences in redistribution processes and exposure situations for the same initial contamination event.