

EMRAS Theme 2 - Remediation of Sites with Radioactive Residues

Urban Remediation Working Group

8-11 November 2004, Vienna

The overall objective of the Urban Remediation Working Group is to test and improve the prediction of dose rates and doses to humans for urban areas contaminated with dispersed radionuclides. Specific objectives include the prediction of changes in radionuclide concentrations or dose rates as a function of location and time, identification of the most important pathways for human exposure, and prediction of the reduction in radionuclide concentrations or dose rates expected to result from specific countermeasures or remediation efforts.

At its first meeting, in September 2003, the Working Group selected an initial modelling scenario based on Chernobyl fallout data for three Ukrainian towns with different characteristics and a variety of exposure concerns. A draft version of this scenario was distributed and discussed at the Working Group's second meeting, in April 2004. In particular, the Working Group identified the endpoints to be modelled, both for model intercomparison and for comparison with test data. Table 1 summarizes the situations and endpoints to be modelled.

At the Working Group's most recent meeting, in November 2004, a complete version of the scenario description was distributed and discussed. This version consists of a text description (hardcopy and electronic) with figures, tables, and list of the endpoints to be modelled. In addition, supporting files (electronic only) have been distributed; these files include spreadsheets and Geographic Information System files. Copies of the scenario information are available from the EMRAS website. The Working Group discussed the modelling endpoints and whether any additional information was still needed. Information on particle size distribution is still wanted, to the extent that it is available. That information, as well as any corrections or revisions to the scenario description, will be made available to participants as the Working Group leader receives it.

Tom Charnock of NRPB presented preliminary modelling results for one town, based on the April 2004 version of the scenario. Several other participants described models under development or in use by their institutions for evaluating various types of contamination events. Discussions of these models are already pointing out the importance of various assumptions in the models or in the model inputs, in particular, assumptions with respect to "representative" locations in buildings, redistribution of contamination in soil over time, and type and amount of tree cover. Also, some models start with deposition or surface contamination, while others are designed to model the initial dispersion event.

The Working Group also discussed other possible activities to be carried out during the course of the program. One such activity will be the preparation of an annotated reference list on the general subject of urban remediation. This list, based on an initial list compiled during and after the September 2003 meeting, will be included as an appendix to the Working Group's report at the end of the program. The Working Group will also attempt to prepare at least one more modelling scenario, probably for a hypothetical dispersion situation. The current modelling scenario is based on a situation of atmospheric deposition following a power plant accident. Part of the scenario also deals with an urban area built on a contaminated site, and is therefore relevant to situations such as legacy wastes. Additional types of scenarios discussed include sources left or dispersed in public areas (whether accidental or intentional), detonation of a "dirty bomb," transport accidents, and accidents at waste or spent fuel storage facilities. The Working Group leader will try to prepare some draft scenario materials before the next Working Group meeting.

The November 2004 Working Group meeting was attended by fourteen people (some were there part-time depending on other Working Group schedules). The initial scenario information has been distributed to at least 6-8 others, as well. The Working Group leader anticipates receiving calculations for the initial modelling scenario from at least 5 or 6 participants or groups, possibly more.

The Urban Remediation Working Group's next meeting is scheduled for 30 May-1 June 2005 (2 1/2 days) in Vienna. Participants are asked to submit modelling results and model documentation for the initial modelling scenario (Ukrainian scenario) to the Working Group leader by 16 May 2005. At that meeting, the Working Group will compare and discuss model predictions and modelling approaches. Comparison of model predictions to test data (measurements) will occur at the fall 2005 meeting.

Table 1. Summary of modeling scenario for the Urban Remediation Working Group.

Town	Key characteristics	Locations for modeling exercise	Input information	Modeling endpoints
Pripyat	Evacuated soon after Chernobyl accident; essentially uninhabited since then	District #4 (with decontamination, young vegetation, 800 people in 1989-1994, lots of 9-story buildings) District #1 (without decontamination, similar buildings, older vegetation, no inhabitants)	Measurements from May 1986 Information about decontamination efforts (in some areas; 1986-1988)	Dose rates and contaminant distributions, with and without remediation, for 1986 (June, July, August, September, 4 th quarter) and annually for 1987-1999
Polesskoe	Remained inhabited after Chernobyl accident	Volya Street First of May Street	1986 dose rates 1988 information for individual buildings 1989 radionuclide distributions in soil (soil profile) Information about remediation activities	Dose rates and contaminant distributions, with and without remediation, annually for 1990-1998
Slavutich	Built after accident on contaminated land	A district built in 1987 with mixed soil and decontamination after the buildings were built Other districts, with decontamination before the buildings were built (both have multi-story residential areas and 1-2 story buildings with kitchen gardens)	Initial contamination of area γ radionuclides in soil and air Information types of buildings, dates of construction Information about major decontamination efforts (1988-1990) Chronology or timeline Information on surrounding areas with no decontamination	Dose rates and contaminant distributions, by season or part of year for 1988-1990 (during decontamination) and annually for 1990-1999 (after decontamination)