

9th EMRAS Urban Remediation Working Group Meeting

15–19 October 2007

IAEA Headquarters, Vienna

MINUTES

1. Introduction

The Urban Working Group (WG) has been working since 2004 on the intercomparison of models for urban environment in two main scenarios (Pripyat and a hypothetical town). After the 8th WG meeting that took place from 18 to 20 April 2007 at the IAEA, Vienna, it was recognised that significant work was undertaken that needed to be reviewed; consolidated in a draft report, and preliminary lessons learned and conclusions to be developed.

Therefore, a consultants meeting was organised from 15 to 19 October 2007 in Vienna, to review all contributions from the modellers, the results obtained and the preliminary comparison made. The meeting was attended by Tom Charnock (UK), Kasper Andersson (Denmark), Dejan Trifunovic (Croatia) and Borislava Batandjieva (IAEA Scientific Secretary of the Urban WG). The meeting followed the agenda, presented in Appendix A.

2. Work Performed

The work during the meeting was based on the draft report provided by Kathy Thiessen, Chairperson of the Urban WG and the preliminary comparison of result (in graphical mode). The following parts of the draft Safety report were further developed:

- Section 2.2. “Description of models and modelling approaches used in these exercises”;
- Section 3.4. “Results of modelling exercise” (for Pripyat scenario);
- Section 4.4. “Results of modelling exercise” (for the hypothetical scenario);
- Section 5 “Conclusions and recommendations”.

In addition a set of questions was developed for the modellers, who were not present at the meeting (see Appendix B).

It was also recommended that discussion of the progress of the WG against the objectives laid out in Section 1 is needed in Chapter 5 of the draft report.

3. Work Plan

On the basis of the work performed during the meeting, the following actions were identified for finalisation of the draft Safety report, i.e.:

- | | | |
|------|---|-----------|
| (1) | Preparation and inclusion of a paragraph about EXPURT in Section 2 of the report | Tom |
| (2) | Consolidate and send comments to modellers | Borislava |
| (3) | Consolidate a revised draft report and send to Kathy for review | Borislava |
| (4) | Link Table on countermeasures to Chapter 2 of the draft report | Kathy |
| (5) | Response on the questions in the Table of countermeasures | modellers |
| (6) | Link between Section 2 and appendices on detailed description of models | Kathy |
| (7) | Check of the comparison of models in Chapter 3.4. | modellers |
| (8) | Add description of Hotspot model | Dejan |
| (9) | Revised text on Chapter 4.4.2 | Kasper |
| (10) | Revision of Chapter 5 – conclusions consistent with the main objectives of the Urban WG | Kathy |
| (11) | Preparation of minutes of meeting | Borislava |
| (12) | Preparation of a final WG meeting in Feb 2008 (tentative venue – Croatia) | Borislava |

4. Proposals for a follow-up project

The need and topics for follow-up activities was discussed at the meeting. It was suggested to consider more detailed and precise scenarios with difference radionuclides, particle size, etc. It was also recommended to include in the scenarios only the information that is to be used in the modelling intercomparison.

Kasper Andersson also suggested that considering the outcome of the EMRAS urban work group work, this has clearly been valuable in initiating a world wide discussion forum, disseminating results, methodology descriptions and viewpoints, which will be further disseminated through the final report, as well as through a journal paper. Different types of scenarios have been applied in the calculations, reflecting major concerns of today that could have serious implications for urban populations: nuclear power plant accidents and attacks involving malicious airborne dispersion of radioactive matter. The modellers participating in the exercise have had a wider expert forum in which to demonstrate their different models and obtain feedback from, which could be applied to correct and improve calculations, and the increased understanding among all project participants, and even beyond, is believed to constitute a significant step towards enabling improved emergency decision support in a wide range of countries. All this will be documented in the final project report, for others to learn from. However, improved contextualisation is an important key to improved model performance. For instance the contamination in Pripjat occurred to a great extent as large insoluble particles with very different characteristics from those recorded at greater distances, and this determines both pre and post deposition behaviour in the environment, as demonstrated by Roed & Andersson (1996). This resulted in major deviations in both deposition velocities and migration characteristics in Pripjat compared with the more distant areas, where practically all the available model parameters originate from. Measurement data from the Pripjat area thus represents a special case and is not ideally suited for testing of the current urban contamination models that were derived for prediction of long range effects in large cities that might be affected by an accident. However, contamination level and dose rate measurement datasets exist (e.g., from Russia and Sweden) for other areas that would be ideal for testing of such models, and could form the key material for a new modelling exercise. The current EMRAS urban exercise has in general demonstrated that in order to test model performances it is of utmost importance to use clearly defined scenarios that can provide a uniform and, as far as possible, correct starting point with respect to the most important parameters to be applied. The current exercise gave highly detailed scenario descriptions, but many of the details given were for various reasons not useful for implementation in the rigid structures of the various existing models to be investigated. However, a range of parameters that the current exercise revealed to be crucial were not described and thus open to interpretation by the modellers. The high overall deposition velocity and fraction of particles greater than 10 μm assumed in the description of the hypothetical scenario seems on average to imply a dominant physical fragmentation into large aerosol, but the aerosol size distribution is not described, and differences in interpretation by individual modellers of this could easily explain order-of-magnitude differences in endpoints. To increase the awareness of modellers of getting the crucial parameters to match the specific case, it would therefore be valuable to run one or two future scenarios with much more clearly defined parameters for, e.g., RDD scenarios. One of these could perhaps be a scenario with a liquid Cs source, evaporating and resulting in submicroneous condensation particles, whereas the other might result in a physical fractionation of a ceramic Sr-90 source. This would also show the importance of taking into account different dose contributions for different scenarios. In the current exercise, only gamma doses from outdoor contamination were calculated, although it was clear that for instance dose contributions from indoor contamination, which was considered by one of the models, could in some cases play an important role. In decision support for emergencies it is crucial to enable calculation of all important dose pathways, and in some cases, inhalation doses and doses received from contamination of humans can be dominant, and should thus also be implemented in the various models. It would be interesting to quantify the importance of this for a number of selected scenarios, in a new exercise. A considerable part of the exercise would thus be for the project group to define case-specific parameter sets and disseminate knowledge on methodologies for calculation of the dose contributions that were not considered in the first exercise.



9th Meeting of the EMRAS Urban Remediation Working Group

Meeting Room C0743, IAEA Headquarters, Vienna
15-19 October 2007

AGENDA

Monday, 15th October 2007

09:30–12:30	1. Welcome	Borislava Batandjjeva,
	2. Overview of meeting	WG Scientific Secretary
	2.1. Progress since Nov 2006	(IAEA)
	2.2. Scope, objectives and expected outcomes	
	3. Draft Urban WG Report - review of current status	Dejan Trifunovic
	3.1. Introduction	(Croatia)
	3.2. Modelling of contamination of urban environment	Dejan Trifunovic
		(Croatia)
	3.3. Scenario 1 (Pripyat)	Tom Charnock (UK)
	3.4. Scenario 2 (Hypothetical scenario)	Kasper Andersson
		(Denmark)
	3.5. Conclusions and recommendations	Kasper Andersson
		(Denmark)
	Discussion	All
12:30–13:30	<i>Lunch break</i>	
13:30–17:30	4. Development of the report (in groups)	All
17:30	<i>Close</i>	

Tuesday, 16th October 2007

09:00–09:30	5. Plenary session	All
09:30–12:30	4. Development of the report (cont.)	All
12:30–13:30	<i>Lunch break</i>	
13:30–17:30	4. Development of the report (cont.)	All
17:30	<i>Close</i>	

Wednesday, 17th October 2007

09:00–09:30	6. Plenary session	All
09:30–12:30	4. Development of the report (cont.)	All
12:30–13:30	<i>Lunch break</i>	
13:30–17:30	4. Development of the report (cont.)	All
17:30	<i>Close</i>	

Thursday, 18th October 2007

09:00–09:30	7. Plenary session	All
09:30–12:30	4. Development of the report (cont.)	All
12:30–13:30	<i>Lunch break</i>	
13:30–16:30	4. Development of the report (cont.)	All
16:30–17:30	8. Consolidation of the revised report	All
17:30	<i>Close</i>	

Friday, 19th October 2007

09:00–12:30	9. Review and discussion of revised report	All
	10. Summary of remaining tasks and development of a work plan:	All
	- 5 th EMRAS Meeting (Nov. 2007)	
	- Finalization of the report	
	- Ideas for a follow-up project	
12:30	11. Close of Meeting	Borislava Batandjieva, WG Scientific Secretary (IAEA)

QUESTIONS FOR MODELLERS

1. Questions for individual modelers

CPHR

1. Is the initial deposition the same for all surfaces?
2. Is the DCF the same for each surface?
3. Does deep soil contribute to dose?
4. Are the results for surface contamination (Bq m²) for paved or for soil or does it depend on location? If the surface contamination is for soil does it include deep soil?
5. What relative proportions are assumed for different surfaces at different locations? i.e. cluster definitions.
6. What DFs or DRFs are used for Pripyat
7. Can you explain more about how you represented short lived radionuclides?
8. You revised the DCF for the hypothetical scenario, according to a method described by Zahringer et al. Could you give a reference, and explain which method is applied here?
9. To Juan Tomas: Please could you give a reference for the data source of the decontamination factors that you used?

METRO-K

1. Is transfer between surface modelled?
2. Are your results for surface contamination (Bq m²) for paved or for soil or does it depend on location?
3. The predictions of migration curves have been changed for this model after April, and are now in better agreement with RESRAD-RDD predictions. What was actually done to get this effect in METRO-K?

EDEM

1. How is contribution from different surfaces calculated?
2. Do the time dependent location factors implicitly include material deposited indoors

RESRAD-RDD

1. Does RESRAD-BUILD use monte carlo modelling to calculate shielding factors?
2. To Sunita Kamboj: Were no revisions made after the calculations in April 2007 for RESRAD-RDD?

2. Questions to all modellers

To al.: For the predictions of contamination densities on surfaces, have you generally considered one surface at a time, or have you considered the surface in some of the locations to be a 'mix' of, e.g., paved and grassed surfaces?