

**The IAEA's Programme on
Environmental Modelling for Radiation Safety
(EMRAS II)**

**EMRAS II
Approaches for Assessing Emergency Situations
Working Group 9
"Urban" Areas**

MINUTES

**of the 2nd Working Group Meeting held at
SURO Headquarters, Prague, Czech Republic
13–15 July 2009**

IAEA Scientific Secretary	Working Group Leader
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Background

The EMRAS II Theme entitled "Approaches for Assessing Emergency Situations", includes three areas of interest in connection with emergencies or accidental releases of radionuclides. These areas include urban situations (dispersion and retention of radionuclides in urban environments), environmental sensitivity of various non-urban or rural situations, and tritium accidents. The Urban Areas Working Group (WG 9) intends to continue with and build on the work done by the Urban Remediation Working Group of the first phase of the EMRAS Programme. In particular, the WG 9's goal is to test and improve the capabilities of models used in assessment of radioactive contamination in urban settings, including dispersion and deposition events, short- and long-term contaminant redistribution following deposition events, and potential countermeasures or remediation efforts for reducing human exposures and doses.

At its initial meeting in January 2009, the Working Group WG 9 identified three modelling exercises to be developed and carried out by the group:

- (a) Atmospheric dispersion, short-range;
- (b) Atmospheric dispersion, mid-range; and
- (c) Contaminant transport and countermeasures.

Draft descriptions of each modelling exercise were prepared and distributed to participants prior to the July 2009 meeting.

Working Group Attendance

The meeting was hosted by the National Radiation Protection Institute of the Czech Republic (Státní Ústav Radiační Ochrany, SÚRO) at their headquarters in Prague, Czech Republic. Sixteen participants from 11 countries attended the second meeting of WG 9, plus staff members from SÚRO and two persons from Charles University. The sessions were moderated by Kathleen Thiessen (USA), and Volodymyr Berkovskyy served as the IAEA's Scientific Secretary. A list of the attending participants is provided at the end of these minutes.

Scope and Objectives of the Meeting

The main objectives of the meeting were to:

- (1) discuss the draft scenario descriptions for three modelling exercises, identify information needed for their completion, and establish appropriate schedules; and
- (2) discuss field experiments being performed by SÚRO and observe the experimental setup.

A copy of the provisional agenda for the meeting is provided at the end of these minutes.

Work Performed

Most of the meeting time was spent discussing the status of the three modelling exercises and plans for their completion. Several participants provided presentations about the exercises, their models or modelling approaches, or experimental work of interest to the group. One meeting day was spent travelling to the National Institute for NBC Protection (SÚJCHBO) in Kamenná, about 50 km from Prague, which was the site of the field experiments. The WG had opportunity to examine the setup and equipment for the field experiments and to discuss the experiments with the people who are conducting them. The WG watched a video of a field experiment conducted that day, but did not directly observe the experiment.

Outcomes of the Meeting

Short-range atmospheric dispersion exercise

The short-range atmospheric dispersion exercise is based on data from experimental explosions contributed by Jiří Hůlka (Czech Republic) and colleagues at SÚRO and SÚJCHBO. This exercise will permit comparison of model predictions with measurements for several endpoints, including surface contamination, time-integrated air concentrations, and dose rates. Intercomparisons of model predictions are possible for additional endpoints, including estimates of a 95% contamination zone, the effects of structures on the predicted dose rates, and validation of location factors.

The scenario description as distributed to WG participants called for blind modelling tests of two explosion events (December 2007 and May 2008). During the meeting it was decided to use these two events for model calibration purposes and to do blind testing of models for two subsequent explosion events (May 2009 and July 2009). The scenario description will be revised accordingly, and the available measurement data from the first two explosions will be distributed to WG participants.

The revised scenario description will be distributed when the information is available for its completion, the goal being before the end of October 2009. The information itself will be distributed to participants as it becomes available, starting with the measurement data for the December 2007 and May 2008 experiments. Preliminary calculations for the May 2009 and July 2009 explosion events are requested by 8 January 2010, in advance of the next EMRAS II meeting.

Mid-range atmospheric dispersion exercise

The mid-range atmospheric dispersion exercise is based on a hypothetical NPP accident and the resulting predicted deposition in an urban environment. Emilie Navarro (France) has provided an accident scenario previously developed in France for use as source term information, and Raúl Periañez (Spain) has provided relevant geographic data for the Trillo NPP in Spain, including nearby urban areas. This is a model intercomparison exercise for all endpoints, including deposition on a reference lawn surface, deposition on specified urban surfaces and selected locations, and time-integrated air contamination.

The WG considered two accident scenarios developed in France and decided to use a scenario based on a 1 hour release duration from a hypothetical rupture of a steam generator tube. Although several radionuclides would be released, the modelling exercise will concentrate on I-131 and Cs-137. Modellers may use the release data either in terms of the time-dependent release or the total release.

The revised scenario description will be distributed in August 2009. Preliminary calculations are requested by 8 January 2010, in advance of the next EMRAS II meeting.

Contaminant transport and countermeasures exercise

The contaminant transport and countermeasures exercise will consider two situations, a defined (hypothetical) radionuclide deposition in part of a city for which detailed geographic and building information is available, and predicted deposition in an urban area from the NPP dispersion exercise. The latter situation will be considered later, when the model predictions from the NPP exercise are available.

For the first situation, Won Tae Hwang (Republic of Korea) is providing detailed geographic information for an area of Seoul. This is a model intercomparison exercise for all endpoints, including dose rates, countermeasure effectiveness, and doses for specified reference individuals. A number of issues were discussed that will require clarification in the scenario, before the modelling exercise is conducted. A revised scenario description will be distributed before the January 2010 meeting.

Other activities

Josef Brechler and Vladimír Fuka (Charles University, Prague) described their work in modelling the experimental explosions.

Juraj Duran (Slovak Republic) described his work involving wind tunnel simulations of NPP accidents. This information could be used for a future model testing exercise if the WG has sufficient time and interest.

Future Plans and Next Meeting

The next WG meeting will take place as part of the second EMRAS II Technical Meeting, to be held at IAEA Headquarters in Vienna, 25–29 January 2010. As described above, preliminary calculations for two modelling exercises are requested prior to that meeting for discussion at the meeting. A revised scenario description for the third modelling exercise will be distributed prior to that meeting.

List of Participants	
Name / Email	Organization / Country
Josef Brechler (Josef.Brechler@mff.cuni.cz)	Charles University, Czech Republic
Mr Thomas Charnock (tom.charnock@hpa.org.uk)	Health Protection Agency (HPA), United Kingdom
Mr Sohan Chouhan (chouhans@aecl.ca)	Atomic Energy of Canada Limited (AECL), Canada
Mr Govert de With (g.dewith@nrg.eu)	Nuclear Research & Consultancy Group (NRG), Netherlands
Mr Juraj Duran (duran@vuje.sk)	VÚJE Trnava, Inc., Slovak Republic
Vladimír Fuka (c/o Josef.Brechler@mff.cuni.cz)	Charles University, Czech Republic
Mr Jan Helebrant (jan.helebrant@suro.cz)	National Radiation Protection Institute (SÚRO), Czech Republic
Mr Jan Horyna (jan.horyna@sujb.cz)	State Office for Nuclear Safety (SÚJB), Czech Republic
Mr Jiří Hůlka (jiri.hulka@suro.cz)	National Radiation Protection Institute (SÚRO), Czech Republic
Mr Won Tae Hwang (wthwang@kaeri.re.kr)	Korea Atomic Energy Research Institute (KAERI), Republic of Korea
Mr Jan Christian Kaiser (christian.kaiser@helmholtz-muenchen.de)	Helmholtz-Zentrum München GmbH, Germany
Ms Irena Malátová (irena.malatova@suro.cz)	National Radiation Protection Institute (SÚRO), Czech Republic
Mr Charles Miller (cmiller1@cdc.gov)	Centers for Disease Control & Prevention (CDC), United States of America
Mrs Emilie Navarro (emilie.navarro@irsn.fr)	Institut de Radioprotection et de Sûreté Nucléaire (IRSN), France
Mr Raúl Periañez (rperianez@us.es)	University of Seville, Spain
Mr Gert Sdouz (gert.sdouz@arcs.ac.at)	Austrian Research Centers GmbH (ARC), Austria
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“Urban Areas”
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PROVISIONAL AGENDA

Monday, 13 July 2009

09:30–12:30	1. Welcome	Jiří Hůlka, SURO host (Czech Republic) Kathy Thiessen, WG Leader (USA) Volodymyr Berkovskyy, WG Scientific Secretary (IAEA)
	2. Overview of meeting Scope, objectives & expected outcomes	Kathy Thiessen
	3. “Short-range” scenario	Jiří Hůlka & colleagues
	3.1. Current status	
	3.2. Preliminary modeling results	Jiří Hůlka & colleagues
	3.3. Identification of information needed for completion	All WG Participants
	3.4. Plans & schedule for “short-range” modelling exercise	All WG Participants
12:30–14:00	LUNCH BREAK	
14:00–17:30	4. “NPP” scenario	Raul Periañez (Spain), Emilie Navarro (France)
	4.1. Current status	All WG Participants
	4.2. Identification of information needed for completion	All WG Participants
	4.3. Plans & schedule for “NPP” modelling exercise	All WG Participants
	5. Wind tunnel simulations for NPPs (presentation)	Juraj Duran (Slovak Republic)
17:30	CLOSE	

Tuesday, 14 July 2009

08:00	Meet at SURO; departure from Prague for site of field experiment (by special bus)	
	6. Discussion of field experiment	Jiří Hůlka & colleagues
<i>approx. 11:00</i>	7. Field experiment	Jiří Hůlka & colleagues
	8. Further discussion of field experiment	Jiří Hůlka & colleagues, all WG Participants
~ 19:00	Return to Prague	

Wednesday, 15 July 2009

09:00–12:30	9. “Countermeasures” scenario, part 1 (Seoul)	Won Tae Hwang (Republic of Korea)
	9.1. Current status	All WG Participants
	9.2. Identification of information needed for completion	All WG Participants
	9.3. Plans & schedule for “Countermeasures” modelling exercise	All WG Participants
12:30	CLOSE OF MEETING	
		Kathy Thiessen Volodymyr Berkovskyy