

**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 Third WG9 Meeting held at IAEA Headquarters, Vienna
25–29 January 2010
(during the Second EMRAS II Technical Meeting)**

IAEA Scientific Secretary	Working Group Leader
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Attending	
Name / Initials* / Email	Organization / Country
Mr Kasper G. Andersson (KGA) (kasper.andersson@risoe.dk)	Technical University of Denmark (DTU), DENMARK
Ms Souad Baccouche (SB) (souad.baccouche@cnsn.rnrt.tn / souad_2000_tn@yahoo.fr)	Centre National des Sciences et Technologies Nucleaires (CNSTN), TUNISIA
Mr Tom W. Charnock (TWC) (tom.arnock@hpa.org.uk)	Health Protection Agency (HPA), UK
Mr Sohan Chouhan (SC) (chouhans@aecl.ca)	Atomic Energy of Canada Limited (AECL), CANADA
Mr Govert de With (GDW) (g.dewith@nrg.eu / dewithgovert@yahoo.co.uk)	Nuclear Research & Consultancy Group (NRG), NETHERLANDS
Mr Juraj Duran (JD) (duran@vuje.sk / juraj.duran@ttonline.sk)	VÚJE Inc. - Engineering, Design & Research Organization, SLOVAK REPUBLIC
Mr Vladimir Fuka (VF) (vladimir.fuka@gmail.com)	Charles University, CZECH REPUBLIC
Mr Jan Helebrant (JH) (jan.helebrant@suro.cz)	National Radiation Protection Institute (SÚRO), CZECH REPUBLIC
Mr Jiri Hulka (JHu) (jiri.hulka@suro.cz)	National Radiation Protection Institute (SÚRO), CZECH REPUBLIC
Mr Won Tae Hwang (WTH) (wthwang@kaeri.re.kr)	Korea Atomic Energy Research Institute (KAERI), REPUBLIC OF KOREA
Mr Petr Kuca (PK) (petr.kuca@suro.cz)	National Radiation Protection Institute (SÚRO), CZECH REPUBLIC

* Initials used to refer to participants within minutes and actions as appropriate.

Attending	
Name / Initials* / Email	Organization / Country
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Mr Francesco Mancini (FM) (fmancini@sogin.it)	SOGIN S.p.A, ITALY
Mr Giuseppe Marella (GM) (giuseppe.marella@isprambiente.it)	Institute for Environmental Protection & Research (ISPRA), ITALY
Mrs Emilie Navarro (EN) (emilie.navarro@irsn.fr)	Institut de Radioprotection et de Sûreté Nucléaire (IRSN), FRANCE
Mr Raúl Periañez (RP) (rperianez@us.es)	University of Seville, SPAIN
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Ms Laura Urso (LU) (Laura.Urso@helmholtz-muenchen.de)	Helmholtz-Zentrum München GmbH, German Research Center for Environmental Health, GERMANY
Mr Hartmut Walter (HW) (hwalter@bfs.de)	Bundesamt für Strahlenschutz (BfS), GERMANY
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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 (WG9) is continuing with and building on the work done by the Urban Remediation Working Group of the first phase of the EMRAS Programme. In particular, WG9’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 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.

At this meeting, WG9 discussed each modelling exercise, including progress to date and plans for continuing work.

Working Group attendance

Twenty-two participants from 16 countries attended the third meeting of WG9. The sessions were moderated by **KMT** and **VB** served as the IAEA’s Scientific Secretary. A list of the attending participants is provided above.

Scope and objectives of the meeting

The main objectives of the meeting were to:

- (1) discuss the status of each of the three modelling exercises and identify any remaining information needs;
- (2) present and discuss modelling approaches and preliminary modelling results for each of the exercises; and
- (3) establish appropriate schedules for completing the modelling exercises.

A copy of the WG9 Agenda for this 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 for a given exercise, or preliminary modelling results.

Outcomes of the Meeting

Short-range atmospheric dispersion exercise

The short-range atmospheric dispersion exercise is based on data from experimental explosions contributed by **JHu** and colleagues. This exercise will permit comparison of model predictions with measurements for several endpoints, including surface contamination, time-integrated air concentrations, and dose rates, up to 50m downwind. Intercomparisons of model predictions are possible for additional endpoints, including surface contamination, time-integrated air concentrations, and dose rates at distances greater than 50m; estimates of a 95% contamination zone; the effects of structures on the predicted dose rates; and validation of location factors.

The initial version of the Scenario Description requested blind modelling tests of two explosion events (December 2007 and May 2008). During the Second WG9 Meeting (held at SURO Headquarters, Prague, Czech Republic, 13–15 July 2009), it was decided to use these first two events for model calibration purposes and to carry out blind testing of models for two subsequent explosion events (May 2009 and July 2009). During this current meeting (third), the modelling domain was extended beyond the range for which measurements are available (50m downwind), out to 2000m downwind and 100m upwind.

Presentations (see Agenda) of modelling approaches or preliminary calculations for the short-range scenario were made by **RP**, **HW**, **GDW**, **TWC** and **VF** and provided a basis for considerable discussion. The WG also viewed and discussed videos of the four explosion events.

The Scenario Description is being revised in accordance with the discussions of the Second and Third WG9 Meetings (July 2009 and January 2010), including additional information that was recently provided. The revised Scenario Description will be distributed to WG9 members by early March 2010. Calculations for the May 2009 and July 2009 explosion events are requested by 15 May 2010, in advance of the next (fourth) WG9 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. **EN** has provided an accident scenario previously developed in France for use as source term information, and **RP** 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 at selected locations and time-integrated air contamination.

The scenario is based on a 1 hour release from a hypothetical rupture of a steam generator tube. Although several radionuclides would be released, the modelling exercise will concentrate on ^{131}I and ^{137}Cs . Modellers may use the release data either in terms of the time-dependent release or the total release.

Presentations (see Agenda) of modelling approaches or preliminary calculations for the mid-range scenario were made by *RP*, *EN* and *SC*. Based on the WG's discussions, an additional geographical location for model predictions was added to the scenario. In addition, the chemical form of ^{131}I (molecular iodine) to be considered was clarified.

A revised Scenario Description was distributed soon after the January 2010 meeting. Calculations for the exercise are requested by 15 May 2010, in advance of the next (fourth) WG9 Meeting.

Contaminant transport and countermeasures exercise

The contaminant transport and countermeasures exercise starts with a defined (hypothetical) radionuclide concentration in air, in parts of a city for which detailed geographic and building information is available. Initial plans included a 2 part exercise, with one part based on predicted deposition in an urban area from the NPP dispersion exercise. Discussion during this current WG9 meeting suggests that one scenario might suffice.

For the contaminant transport and countermeasures exercise, *WTH* has provided detailed geographic information for an area of Seoul. The scenario starts with a radionuclide concentration in air (^{60}Co or ^{239}Pu), with deposition for each site to be predicted based on weather conditions (i.e., dry, light rain, heavy rain). 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 during the Second WG9 Meeting (July 2009) that have since been clarified in the scenario, and a revised Scenario Description was distributed prior to the current (third) WG9 Meeting.

Presentations (see Agenda) of models or modelling approaches were made by *TWC* and *SC*, and interest in modelling was expressed by additional participants. The main revision to the scenario based on the WG's recent discussion is the inclusion of an additional countermeasure in the list.

A revised Scenario Description was distributed soon after this current (third) WG9 Meeting. Calculations for the exercise are requested by 15 May 2010, in advance of the next (fourth) WG9 Meeting.

Future plans and next meeting

The next (fourth) WG9 Meeting is planned for 8–10 June 2010, at the University of Seville, in Spain. As described above, calculations for all three modelling exercises are requested prior to that meeting for discussion at the meeting. Revised Scenario Descriptions for the modelling exercises have been distributed (mid-range and countermeasures scenarios) or will be distributed by early March 2010 (short-range scenario). At least four or five participants are expected to submit calculations for each scenario, and additional participation in modelling is encouraged.

WG9 MEETING AGENDA

Monday, 25 January 2010

09:30–13:00	Plenary Session	
13:00–14:00	LUNCH BREAK	
14:00–17:30	Welcome	Kathy Thiessen, WGL (SENES Oak Ridge, USA) Volodymyr Berkovskyy (IAEA Scientific Secretary)
	Overview of meeting: Scope, objectives and expected outcomes	Kathy Thiessen, WGL
	“Short-range” scenario – Current status	Jiří Hůlka / Jan Helebrant (SURO, Czech Republic)
	Discussion of July 2009 field experiment	All Participants

Tuesday, 26 January 2010

<i>Modelling approaches and preliminary modelling results for the "short-range" exercise:</i>			
09:30–13:00	*Dispersion of ^{99m} Tc in the atmosphere from a detonation	Govert De With (NRG, Netherlands)	
	Short-range radionuclide dispersion and deposition modelling (*USEV)	Raúl Perriáñez (EUITA, Spain)	
	Simulation of “Kamenna-Experiments” with the decision support model *LASAIR	Hartmut Walter (BfS, Germany)	
	*Simple ORNL model	Tom Charnock (HPA, UK)	
		Other WG Participants	
	Identification of information needed for completion	All WG Participants	
	Plans and schedule for “short-range” modelling exercise	All WG Participants	
13:00–14:00	LUNCH BREAK		
<i>“NPP” scenario – Current status:</i>			
14:00–17:00	Modelling mid-range radionuclide dispersion and deposition from an hypothetical NPP accident: *Trillo NPP scenario	Raúl Perriáñez (EUITA, Spain)	
	*Proposed scenarios and initial modelling	Emilie Navarro (IRSN, France)	
	<i>Modelling approaches and preliminary modelling results for the "NPP" exercise:</i>		
	*Proposed scenarios and initial modelling	Emilie Navarro (IRSN, France)	
	Modelling mid-range radionuclide dispersion and deposition from an hypothetical NPP accident: *Trillo NPP scenario: Preliminary modelling results	Raúl Perriáñez (EUITA, Spain)	
	*ADDAM (Atmospheric Dispersion and Dose Analysis Method)	Sohan Chouhan (AECL, Canada)	
	Other WG Participants		

Wednesday, 27 January 2010

09:00–12:00	Plenary Session	
12:00–13:30	LUNCH BREAK	
13:30–17:00	Identification of information needed for completion	All WG Participants
	Plans and schedule for “NPP” modelling exercise	All WG Participants

* Indicates the name of the presentation given on the WG9 web page
(<http://www-ns.iaea.org/projects/emras/emras2/working-groups/working-group-nine.htm>).

Thursday, 28 January 2010

<i>Modelling approaches for the "countermeasures" exercise:</i>		
10:00–13:00	*Rainfall effects on radioactive contamination in an urban environment	Won Tae Hwang (KAERI, Rep. of Korea)
	Current status of scenario for modelling contaminant transport and *Countermeasures	Won Tae Hwang (KAERI, Rep. of Korea)
	*CHERURB (Chalk River Environmental Research Branch Urban Contamination and Dose Model)	Sohan Chouhan (AECL, Canada)
	European Model for Inhabited Areas (*ERMIN)	Tom Charnock (HPA, UK)
		Other WG Participants
13:00–14:00	LUNCH BREAK	
14:00–17:00	Identification of information needed for completion	All WG Participants
	Plans and schedule for “countermeasures” modelling exercise	All WG Participants
	Summary of WG meeting and future plans	All WG Participants

Friday, 29 January 2010

09:00–13:00	Plenary Session and Closing of the Meeting	
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