

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

**EMRAS II
Approaches for Assessing Emergency Situations
Working Group 7
"Tritiu," Accidents
MINUTES
of the 4th Meeting hosted by IRSN Cadarche and held at the
Aquabella Center, Aix-en-Provence, FRANCE
6-9 September 2010**

IAEA Scientific Secretary	Working Group Leader
<p>Mr Volodymyr Berkovskyy (<i>VB</i>) Assessment & Management of Environmental Releases Unit Waste & Environmental Safety Section (Room B0764) Division of Radiation, Transport & Waste Safety International Atomic Energy Agency (IAEA) Vienna International Centre PO Box 100 1400 VIENNA AUSTRIA Tel: +43 (1) 2600-21263 Fax: +43 (1) 2600-7 Email: V.Berkovskyy@iaea.org</p>	<p>Mr Dan Galeriu (<i>DG</i>) Senior Researcher/Project Manager Department of Life & Environmental Physics "Horia Hulubei" National Institute of Physics & Nuclear Engineering IFIN-HH, Section 5 407 Atomistilor Street P.O. Box MG-6 RO-077125 BUCHAREST-MAGURELE ROMANIA Tel: +40 (21) 404-2359 Fax: +40 (21) 457-4440 Email: galdan@ifin.nipne.ro / dangaler@yahoo.com</p>

Attending	
Name / Initials* / Email	Organization / Country
Mr Pierre Cortes (<i>PC</i>) (pierre.cortes@iter.org)	ITER Organization, FRANCE
Mr Juraj Duran (<i>JD</i>) (duran@vuje.sk / juraj.duran@ttonline.sk)	VÚJE Inc. - Engineering, Design & Research Organization, SLOVAK REPUBLIC
Mr Philippe Guetat (<i>PG</i>) (philippe.guetat@cea.fr)	Commissariat à l'Energie Atomique (CEA) – Valduc, FRANCE
Mr Markus Iseli (<i>MI</i>) markus.iseli@iter.org	ITER Organization, FRANCE
Mr Sang Bog Kim (<i>SBK</i>) (kimsb@aecl.ca)	Atomic Energy of Canada Limited (AECL), CANADA
Mr Vladimir Korolevych (<i>VK</i>) (korolevv@aecl.ca / korolevychv@aecl.ca)	Atomic Energy of Canada Limited (AECL), CANADA
Mr Francisco F. Lamego Simões Filho (<i>FFL</i>) (flamego@ien.gov.br)	Instituto de Engenharia Nuclear (IEN/CNEN), BRAZIL
Ms Séverine Le Dizès-Maurel (<i>SLDM</i>) (severine.ledizes@irsn.fr)	Institut de Radioprotection et de Sûreté Nucléaire (IRSN), FRANCE
Ms Anca Melintescu (<i>AM</i>) (ancameli@ifin.nipne.ro / melianca@yahoo.com)	"Horia Hulubei" National Institute of Physics & Nuclear Engineering, ROMANIA
Mr Haruyasu Nagai (<i>HN</i>) (nagai.haruyasu@jaea.go.jp)	Japan Atomic Energy Agency (JAEA), JAPAN
Mr Luc Patryl (<i>LP</i>) (luc.patryl@cea.fr / luc.patryl@free.fr)	Commissariat à l'Energie Atomique (CEA), FRANCE
Mrs Françoise Siclet (<i>FS</i>) (francoise.siclet@edf.fr)	Electricité de France (EDF) - Département Environnement (R&D), FRANCE

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

Background

The EMRAS II Working Group 7 (WG7) “Tritium” Accidents, includes certain areas of interest in connection with accidental releases of tritium in the environment, i.e. to:

- develop a standard conceptual dynamic model for tritium dose assessment for acute releases to the atmosphere and water bodies;
- drive the new model with given air or water concentrations (HT or HTO) and the duration of the exposure. These concentrations will be obtained by each major user from the best available atmospheric and aquatic transport models for the site in question. The question of tritium washout, which is not specifically addressed in atmospheric dispersion models, needs to be further investigated;
- agree on common submodels for specific transfers or processes, based on an interdisciplinary approach involving the understanding of the processes and key parameters, based on recent findings in all Life Sciences;
- define the framework for an operational model (requirements for meteorological data, atmospheric transport, site specific data);
- obtain or develop quality assured submodels that will result in predictions with a moderate degree of conservatism; and
- have the capability to assimilate real measured data into the models.

Working Group Attendance

The meeting was hosted by IRSN Cadarache and held at Aquabella Centre, Aix-en-Provence, France. Twelve participants from 6 countries attended the fourth meeting of WG7. The sessions were moderated by Dan Galeriu (Romania), and Volodymyr Berkovskyy served as the IAEA’s Scientific Secretary.

Scope and Objectives of the Meeting

The main objectives of the meeting were to:

- discuss and harmonize the views of participants concerning the approaches for developing the conceptual model for tritium accidents (atmospheric and aquatic);
- agree on the structure and scope of the conceptual model;
- identify potential gaps in knowledge and expertise, which should be addressed during the model development;
- define the structure of the technical document and share tasks according to the expertise of each participant and the interests of his/her organization or institute;
- elaborate the work plan for developing the conceptual model; and
- distribute specific tasks to be accomplished and reported during the next (Third) EMRAS II Technical Meeting, being held at IAEA Headquarters in Vienna, 24–28 January 2011.

Work Performed

The meeting started with two short presentations about dose assessment of routine tritium release, emphasizing both the role of reactors’ cooling towers and the differences between the new Canadian Standard for derived released limits and the IAEA Handbook. The development of the complete interaction matrix for terrestrial pathways of tritium transfer was discussed. For wet deposition of tritium, a revision of the actual status and the proposal for an associated database was presented. Various participants made presentation on the status of tritium modelling for accidental tritium releases at IRSN, AECL, CEA, and IFIN. A special session was dedicated to tritium aquatic pathways, with an introduction about fish bioenergetics models and then, descriptions of different approaches for modelling purposes and the subsequent models’ applications to tropical environments. The status of current fish experiments and preliminary results of fish scenario were also presented. During the meeting, the specific needs for tritium modelling at the ITER site at Cadarache were pointed out. Another special session was dedicated to tritium transfer for terrestrial pathways. The experimental data and the modelling hypotheses for HTO transfer and the subsequent conversion to OBT were

presented based on research carried out by both CEA and AECL. A complex research grade model (SOLVEG model, developed by JAEA) was presented and discussed to be further applied in order to assess the potential simplifications without significant loss of predictive power. A briefing of experiments and modelling trials of OBT formation during the night time have been revised, as well as the key aspects which must be considered in models dedicated to tritium transfer from soil to plants. At many stages of the discussions, participants were asked to contribute with specific tasks and written documents for the next meeting. Details of these tasks are provided below. During the last day of the meeting, the WG7 members visited the Environmental Modelling Laboratory and Radioecology and Ecotoxicology Laboratory from IRSN Cadarache and the ITER site at Cadarache.

Future Work Programme

Action	Person	Date
Final document on tritium interaction matrix	S. Le Dizès-Maurel	Before 10 January 2011 – draft to be circulated to all WG7 members Final document – next meeting in Vienna [#]
Final document on tritium washout	L. Patryl	Before 10 January 2011 – draft to be circulated to all WG7 members Final document – next meeting in Vienna [#]
Accessing the Indian data on washout ratios	P. Ravi, D. Galeriu, V. Berkovskyy	Mid November 2010
Accessing the Japanese data on washout ratios	H. Nagai	Mid November 2010
Final document on tritium transfer in aquatic environment	F. Siclet	Before 10 January 2011 – draft to be circulated to all WG7 members Final document – next meeting in Vienna [#]
Experimental data about fish food, HTO in fish dynamics, and preliminary results for OBT feeding	S.B. Kim	End of October 2010 to send to WG Leader
Final document on OBT formation in night time; data and modelling trials	D. Galeriu, A. Melintescu, S.B. Kim	Next meeting in Vienna [#]
Recovering the Japanese experimental conditions about OBT formation in night time	H. Nagai	End of October 2010 to send to WG Leader
Recovering the Canadian experimental conditions about OBT formation in night time	S.B. Kim	End of October 2010 to send to WG Leader
Description of the new Canadian OBT experiments in night time (2009)	V. Korolevych	End of October 2010 to send to WG Leader
Final document on exchange velocity and OBT formation during the daytime	A. Melintescu	Next meeting in Vienna [#]
The role of photosynthesis in canopy resistance modelling (AECL approach)	V. Korolevych	End of November 2010 to send to A. Melintescu in order to be included in the final document
Final document on critical parameters of tritium transfer from atmosphere to plants	P. Guetat	Next meeting in Vienna [#]
Final document on models uncertainty and sensitivity. Application for tritium	J. Duran	Next meeting in Vienna [#]
Numerical exercises using SOLVEG model for different soil types and in case of rain during the daytime and night time	H. Nagai	Next meeting in Vienna [#]

Next Meeting[#]

The next (fifth) Working Group 7 Meeting is scheduled to take place during the next (Third) EMRAS II Technical Meeting, being held at IAEA Headquarters in Vienna, 24–28 January 2011.

WG7 MEETING AGENDA

Monday, 6 September 2010

09:30–10:00	Opening and adoption of Agenda	Volodymyr Berkovskyy (IAEA Scientific Secretary) & Meeting Hosts/Organizers
10:00–10:30	Follow up of EMRAS Phase I: Dose assessment for tritium release during normal operation of *Czech NPP	Juraj Duran (VÚJE Inc., Slovakia)
	*Updated Derived Release Limits for tritium	Dan Galeriu, WGL (IFIN-HH, Romania), et al.
10:30–10:45 COFFEE BREAK		
10:45–12:30	*Tritium interaction matrix . Full expanded interaction matrix and *associated processes for Terrestrial pathways of tritium transfer (Please concentrate on processes, main parameters and variability and consider all climates, important plants and agricultural practices.)	Severine Le Dizez-Maurel (IRSN, France) & All Participants
13:00–14:00 LUNCH BREAK		
14:00–16:30	*Wet deposition of tritium	Luc Patryl (CEA, France) & All Participants
	Briefing on the *Russian work	Dan Galeriu, WGL
16:00–16:15 COFFEE BREAK		
16:15–17:30	*Status of tritium modelling for accidental release at IRSN, AECL, CEA and IFIN	All Participants

Tuesday, 7 September 2010

09:30–12:30 (including COFFEE BREAK)	<i>Aquatic Pathway:</i>	
	Introduction to *Fish Bioenergetics	Dan Galeriu
	Draft on *aquatic pathways in OURSON model	Francoise Siclet (EDF R&D, France)
	Draft on *aquatic processes which must be considered in modelling approaches. Needs for adaptation to tropical Environments	Fernando Lamego (IEN/CNEN, Brazil)
	*Updated AQUATRIT as for users	Anca Melintescu (IFIN-HH, Romania) & Dan Galeriu
12:30–14:00 LUNCH BREAK		
14:00–15:00	<i>Aquatic Pathway (continued):</i>	
	Upgrade of *fish experiments in order to have OBT loss rate	Sang Bog Kim (AECL, Canada)
	Discussions on *fish scenario and modelling attempts	Dan Galeriu, Sang Bog Kim & Anca Melintescu
15:00–15:15 COFFEE BREAK		
15:15–close	Short presentation on “ *SU methods for tritium transfer models”	Juraj Duran
	Experimental data base for tritium in *farm animals	Anca Melintescu
	First attempt for uncertainty and sensitivity for MAGENTC	Juraj Duran
	<i>Terrestrial Pathway:</i>	
	*Specific needs for modelling tritium transfer at Cadarache site	Pierre Cortes (ITER Organization, Switzerland)
	Briefing of *experimental data and modelling hypothesis for HTO transfer and conversion to OBT during the *daytime and night time	Philippe Guetat (CEA, France)
	Modelling and validation of updated parameterization of tritium uptake, re-emission and OBT formation in *tomato and potato plants at CRL	Vladimir Korolevych (AECL, France)

* Indicates the name of the presentation given on the WG7 web page
(<http://www-ns.iaea.org/projects/emras/emras2/working-groups/working-group-seven.asp?s=8>).

Wednesday, 8 September 2010		
09:30–12:30 (including <i>COFFEE BREAK</i>)	OBT dynamics in plants using the *SOLVEG code after an accidental tritium release and Numerical Simulation system for Environmental Studies: *SPEEDI-MP	Haruyasu Nagai (JAEA, Japan)
	OBT formation at night time, data and modelling trials	Sang Bog Kim, Dan Galeriu & Anca Melintescu
	*Modelling optimisation of HTO transfer from soil to plants	Dan Galeriu & Anca Melintescu
12:30–14:00	LUNCH BREAK	
14:00–16:00	Presentation and approval of draft documents on Wet Deposition, Aquatic Pathway and Tritium Interaction Matrix	
16:00–16:15	COFFEE BREAK	
16:15–18:00	Work plan for the next period Debate on final document	All Participants

Thursday, 9 September 2010	
<i>Morning</i>	VISIT TO IRSN
<i>Afternoon (approx. 13:45–15:15)</i>	VISIT TO ITER

* Indicates the name of the presentation given on the WG7 web page
(<http://www-ns.iaea.org/projects/emras/emras2/working-groups/working-group-seven.asp?s=8>).