

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

**EMRAS II  
Reference Approaches for Human Dose Assessment  
Working Group 7  
"Tritium" Accidents  
MINUTES  
of the Third WG7 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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\*Initials used to refer to participants within minutes and actions as appropriate.

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## **Background**

The EMRAS II WG7 entitled “Tritium Accidents” includes certain areas of interest in connection with accidental releases of tritium into the environment, including:

- Developing a standard conceptual dynamic model for tritium dose assessment for acute releases to the atmosphere and water bodies;
- Driving 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;
- Agreement on common sub-models 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;
- Defining the framework for an operational model (requirements for meteorological data, atmospheric transport, site specific data);
- Obtaining or developing quality assured sub-models that will result in predictions with a moderate degree of conservatism; and
- Achieve the capability to assimilate real measured data into the models.

## **Working Group Attendance**

This 3<sup>rd</sup> meeting of WG7 was held as part of the 2<sup>nd</sup> EMRAS II Technical Meeting, held at IAEA Headquarters, Vienna, 25–29 January 2010, and was attended by 22 participants from 11 countries. The sessions were moderated by *DG*, and *VB*.

## **Scope and Objectives of the Meeting**

The main objectives of the WG7 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;
- Distribute specific tasks to be accomplished and reported at the next WG7 (4<sup>th</sup>) meeting (provisionally set for 7–10 September 2010, IRSN, Aix-en-Provence, France).

## **Work performed**

The WG7 meeting began with a short overview of the conclusions and the work plan agreed at the previous (2<sup>nd</sup>) meeting held at EDF/R&D Headquarters, Chatou, France (28–29 September 2009). It was pointed out that the main tasks of WG7 are to provide modelling support for operational cases, which have been exemplified by comparisons between various models applied for licensing purposes or for accident management and preparedness. Some of the key presentations were dedicated to explaining how the user can apply different models. Discussions were held on the development of the complete interaction matrix for terrestrial pathways of tritium transfer, as well as the specific topics for modelling the tritium transfer from air to crops, soil to crops, and the subsequent conversion to OBT. For wet deposition of tritium, a revision of the actual status and the further steps needed for improvement was presented. The need to adapt the actual aquatic models to tropical conditions, in order to be implemented in Brazil and India, was emphasized. Preliminary discussions were held in order to perform specific experiments concerning tritium transfer in animals and crops at the Institute for Radiation Safety and Ecology, National Nuclear Center of the Republic of Kazakhstan. Participants were asked numerous times to contribute with specific tasks for the next WG7 meeting. Details of these tasks are provided below. It was agreed that before the next WG7 meeting, the WG Leader (*DG*) will gather suggestions from WG7 members in order to establish the final content of the next document which must be agreed before the next meeting.

## Future Work Programme

Action	Person	Date
Draft on derivation of simple models for transfer in farm animals and uncertainty analysis	J. Duran	End of July 2010 to be sent to WGL
Draft on aquatic pathways in OURSON model	F. Siclet	End of July 2010 to be sent to WGL
Draft on aquatic processes which must be considered in modelling approaches. Needs for adaptation to tropical environments	F. Lamego	End of July 2010 to be sent to WGL
Draft on aquatic transfer of tritium in AQUATRIT model and user documentation	A. Melintescu D. Galeriu	End of July 2010
Upgrade of fish experiments in order to have OBT loss rate	S. B. Kim	7–10 September 2010
Experimental data base for tritium in farm animals	A. Melintescu	May 2010 to disseminated to all WG7 members
Full expanded interaction matrix and associated processes for terrestrial pathways of tritium transfer	S. Le Dizès-Maurel	End of July 2010 to be sent to WGL
Washout rates for typical rain pathways	L. Patryl A. Melintescu D. Galeriu	7–10 September 2010
Briefing of experimental data and modelling hypothesis for HTO transfer and conversion to OBT during the daytime and night time	P. Guetat	7–10 September 2010
Specific needs for modelling tritium transfer at Cadarache site	P. Cortes	7–10 September 2010
OBT formation in night time, data and modelling trials	S.B. Kim D. Galeriu A. Melintescu	End of July 2010
OBT dynamics in plants using SOLVEG code after an accidental tritium release	H. Nagai	7–10 September 2010
Discussions on fish scenario; preliminary data	D. Galeriu	May 2010 to disseminate to all WG7 members
Modelling optimisation of HTO transfer from soil to plants	D. Galeriu A. Melintescu	End of August 2010
Upload on the WG7 EMRAS 2 web page of a list of existed documents / papers in each laboratory / site to be circulated between WG members	All WG members	May 2010
Proposals for the content of working documents concerning wet deposition and aquatic pathways	D. Galeriu	7–10 September 2010

## Next Meeting

The next (Fourth) Working Group Meeting of WG7 is provisionally scheduled to be held at IRSN, Aix-en-Provence, France, 7–10 September 2010.

## WG7 MEETING AGENDA

### Monday, 25 January 2010

09:30–13:00	Plenary Session	
13:00–14:00	<b>LUNCH BREAK</b>	
14:00–15:30	IAEA introduction and welcome	Volodymyr Berkovskyy (IAEA Scientific Secretary)
	Presentation (short), overview of the conclusions and work plan agreed in Paris and IAEA introduction	Dan Galeriu, WGL (IFIN-HH, Romania)
	Comparison between UFOTRI and CERES models for 1g of HTO and 1g of HT and discussions	Pierre Cortes (*ITER Organization)
15:30–16:00	<b>COFFEE BREAK</b>	
16:00–17:30	UFOTRI principles and regulatory body requirements; personal opinion on modelling approach and TECDOC in WG7 and discussions	Wolfgang Raskob (*KIT, Germany)
	Suggestions for modelling approach and TECDOC content and discussions	Dan Galeriu, WGL (IFIN-HH, Romania)

### Tuesday, 26 January 2010

09:30–10:45	OBT formation in *night experiments and modelling trials; Experiments with *fish and discussions	Sang Bog Kim (AECL, Canada)
10:45–11:00	<b>COFFEE BREAK</b>	
11:00–12:00	*SOLVEG HTO transport from atmosphere to bare soil; how to model crops	Haruyasu Nagai (JAEA, Japan)
	Discussion on best practical approach soil crops	All Participants
12:00–13:00	Availability of *soil-water models (revision done by Philippe Ciffroy) and discussions	Laura Marang (EDF, France)
	IFIN-HH planned work on *plant-soil modelling and discussions	Dan Galeriu, WGL Anca Melintescu (IFIN-HH, Romania)
13:00–14:00	<b>LUNCH BREAK</b>	
14:00–15:30	User approach of expanded *MAGENTC for animals; parsimonious modelling trials and discussions	Anca Melintescu (IFIN-HH, Romania)
15:30–16:00	<b>COFFEE BREAK</b>	
16:00–17:00	Full expanded *interaction matrix for terrestrial pathways of tritium transfer and discussions	S��verine Le Diz��s-Maurel (IRSN, France)
	Potential improvements of plant sub-model in *OURSON code: detailed sub-model description and sensitivity tests and discussions	Francoise Siclet (EDF, France)

### Wednesday, 27 January 2010

09:00–12:00	Plenary Session	
12:00–13:30	<b>LUNCH BREAK</b>	
13:30–15:30	<b>Wet deposition of tritium, modelling approach and TECDOC:</b>	
	Review of *tritium washout, what to do more and include in WG7; with contribution from others	Luc Patryl (CEA France), Anca Melintescu / Dan Galeriu (IFIN-HH Romania)
	Retention and dispersion of HTO in *snow	Dan Galeriu (IFIN-HH, Romania) and AECL
	Correlation between *air and rain HTO concentration (experimental data)	Philippe Guetat (CEA, France)
	Final modelling harmonization and plans for WG7 wet deposition TECDOC, dissemination of tasks	All Participants
	Conclusions	Volodymyr Berkovskyy (IAEA Scientific Secretary)

\* 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.htm>)

<b>Wednesday, 27 January 2010 (Continued)</b>		
<b>15:30–16:00</b>	<b>C O F F E E B R E A K</b>	
<b>16:00–17:00</b>	<b>Fixing aquatic pathway in WG7:</b>	
	*Brazilian concern	Fernando Lamego (IEN/CNEN/MCT, Brazil)
	Update of *AQUATRIT, USER approach, what to do with irrigation, and discussions	Dan Galeriu, WGL (IFIN-HH, Romania)
<b>16:00–17:00</b>	*Fish scenario, preliminary results and follow-up and discussions	Dan Galeriu (IFIN-HH, Romania), Sang Bog Kim (AECL, Canada)
	Harmonization of views on modelling approach and TECDOC content, dissemination of tasks	All Participants
	Conclusions	Volodymyr Berkovskyy (IAEA Scientific Secretary)
<b>Thursday, 28 January 2010</b>		
<b>10:15–13:00</b>	<b>WG 7 Terrestrial pathway after atmospheric release:</b>	
	Approached in modelling tritium *uptake by crops and discussions	Dan Galeriu, WGL Anca Melintescu (IFIN-HH Romania)
	*Crop growth modelling and OBT and discussions	Dan Galeriu, WGL Anca Melintescu (IFIN-HH Romania)
	OBT formation versus available energy in plants and discussions <sup>^</sup>	Laurent Vichot (CEA, France)
	Re-Evaluation of *ONTARIO HYDRO Report 84-69-K (1984): Tritiated Water Uptake Kinetics in Tissue-Free Water and Organically Bound Tritium (*OBT) of Tomato Plants, and discussions	Franz Baumgaertner (Institut für Radiochemie, Germany)
	*Tritium experiments in IRSN and potential benefit	Denis Maro (IRSN, France)
	Common data base for models testing	All Participants
<b>13:00–13:45</b>	<b>L U N C H B R E A K</b>	
<b>13:45–15:30</b>	Draft on uncertainty and sensibility needed in the quality assurance of the models (not presented)	Juraj Duran (VUJE, Slovakia)
	Free discussion on the need of robust models and regulatory body simple desires...	All Participants
	Environmental modelling of tritium in *India	Pazhayath M. Ravi (BARC, India)
	Discussions	All Participants
<b>15:30–16:00</b>	<b>C O F F E E B R E A K</b>	
<b>16:00–17:30</b>	Harmonization on views on modelling crop contamination, TECDOC content, review of the planed activities and responsibilities of each of participant	All Participants
	IAEA observations and conclusions	Volodymyr Berkovskyy (IAEA Scientific Secretary)

### **Friday, 29 January 2010**

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

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<sup>^</sup> This presentation is unavailable due to copyright issues.