

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

**EMRAS II
Reference Approaches for Biota Assessment
Working Group 4
"Biota Modelling"**

MINUTES

**of the Fourth WG4 Meeting, held jointly with WGs 5 & 6 at IAEA Headquarters, Vienna
7 & 9 September 2010**

IAEA Scientific Secretary	Working Group Leader
<p>Mr Sergey Fesenko (<i>SF</i>) Radioecologist, Chemistry Unit, NAEL International Atomic Energy Agency Laboratories A-2444 SEIBERSDORF AUSTRIA Tel: +43 (1) 2600-28247 Fax: +43 (1) 2600-28222 Email: S.Fesenko@iaea.org</p>	<p>Mr. Nicholas A. Beresford (<i>NAB</i>) Centre for Ecology & Hydrology (CEH) Lancaster Environment Centre, Library Avenue, Lancaster University BAILRIGG, LANCASTER LA1 4AP UNITED KINGDOM Tel: +44 (1524) 595-856 Fax: +44 (1524) 61536 Email: nab@ceh.ac.uk</p>

Attending	
Name / Initials* / Email	Organization / Country
Mr Pal Andersson (<i>PA</i>) (pal.andersson@ssm.se)	Swedish Radiation Safety Authority (SSM), SWEDEN
Mr Andreas Bollhoefer (<i>AB</i>) (andreas.bollhoefer@environment.gov.au)	Supervising Scientist Division, Department of the Environment, Water, Heritage & the Arts (DEWHA), AUSTRALIA
Mr Justin Brown (<i>JB</i>) (J.Brown@nrpa.no)	Norwegian Radiation Protection Authority (NRPA), NORWAY
Mr Paul Dale (<i>PD</i>) (paul.dale@sepa.org.uk)	Scottish Environment Protection Agency (SEPA), Scotland, UK
Mr Rudi Helling (<i>RH</i>) (heling@nrg.eu)	Nuclear Research and Consultancy Group (NRG), THE NETHERLANDS
Mr Ali Hosseini (<i>AH</i>) (Ali.Hosseini@nrpa.no)	Norwegian Radiation Protection Authority (NRPA), NORWAY
Ms Brenda J. Howard (<i>BJH</i>) (bjho@ceh.ac.uk)	Centre for Ecology & Hydrology (CEH), UK
Mr Matt Johansen (<i>MJ</i>) (mjo@ansto.gov.au)	Australian Nuclear Science & Technology Organisation (ANSTO), AUSTRALIA
Ms Sunita Kamboj (<i>SK</i>) (skamboj@anl.gov)	Argonne National Laboratory (ANL), USA
Mr Dong-Kwon Keum (<i>DKK</i>) (dkkeum@kaeri.re.kr)	Korea Atomic Energy Research Institute (KAERI), REPUBLIC OF KOREA
Ms Maria Psaltaki (<i>MP</i>) (rams11@hotmail.com / n.markatos@ntua.gr)	Technical University of Athens (NTUA), GREECE
Ms Katerina Maroudi (<i>KM</i>) (katerinamar@hotmail.com)	National Center of Scientific Research "Demokritos", GREECE

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

Participated via on-line link.

Attending	
Name / Initials* / Email	Organization / Country
Helmendra Mulye (HM) (Helmendra.mulye@cnscccsn.gc.ca)	Canadian Nuclear Safety Commission (CNSC), CANADA
Ms Marcelle Phaneuf (MP) (M.phaneuf@iaea.org)	International Atomic Energy Agency (IAEA)
Mr Gerhard Proehl (GP) (G.Proehl@iaea.org)	International Atomic Energy Agency (IAEA)
Ms Tatiana Sazykina (TS) (ecomod@obninsk.com)	Scientific & Production Association (SPA) "Typhoon", RUSSIAN FEDERATION
Ms Karoline Stark (KS) [#] (Karolina.stark@ecology.su.se)	Stockholm University (SU), SWEDEN
Ms Keiko Tagami (KT) (k_tagami@nirs.go.jp)	National Institute of Radiological Sciences (NIRS), JAPAN
Mr Shigeo Uchida (SU) (s_uchida@nirs.go.jp)	National Institute of Radiological Sciences (NIRS), JAPAN
Ms Hildegard Vandenhove (HV) (hvandenh@sckcen.be)	Belgian Nuclear Research Centre (SCK·CEN), BELGIUM
Ms Christine Willrodt (CW) (cwillrodt@bfs.de)	Bundesamt für Strahlenschutz (BfS), GERMANY
Ms Tamara L. Yankovich (TY) (tamara.yankovich@src.sk.ca)	Saskatchewan Research Council (SRC), CANADA

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

Participated via on-line link.

1. Objective of the meeting

The main objectives of this (the fourth) meeting of WG4 were to review progress and agree future work programme with regard to:

- Little Forest Burial Ground scenario
- Beaverlodge Lake scenario
- Wetlands scenario

A short update of the task considering the estimation of dose rates in heterogeneous sediment profiles was also made by **AH** [ACTION: **NAB** to discuss with **AH** and Karine Beaugelin-Sellier by 30/09/2010]. **AH** noted that **KM** had offered to run her model and help with this task.

Time was also allowed within the agenda to demonstrate the revised RESRAD-BIOTA released and K-BIOTA (note the updated RESRAD-BIOTA version is not yet freely available but has been released to the WG for their comment and use). The agenda is appended below.

1.1. Updates

The papers describing the EMRAS I Perch Lake and Chernobyl scenarios have now both been published in an issue of Journal of Radiological Protection (JRP) which also contains outputs of the EC funded PROTECT project. The papers have been made freely available for download from the JRP website (<http://iopscience.iop.org/0952-4746/30/2>) until the end of the year. The issue also contains a paper considering screening tier applications of different models the outputs of which were discussed during the last WG4 meeting held in January 2010.

Jordi Vives i Batlle has submitted the paper reporting 'Exercise 3' (extended consideration of DCC values) to Radiation Environmental Biophysics (REB).

NAB noted he needed to discuss with David Copplestone how WG4 would progress interaction with WG1. [ACTION **NAB** by 31/10/2010].

2. Little Forest Burial Ground scenario

Six sets of results have been received for the Little Forest Burial Ground (LFBG) scenario; two additional inputs are anticipated. The approaches used were described; **MJ** then presented a comparison of the results received. There was some discussion of how to analyse the results and **NAB** offered to discuss with Jordi Vives i Batlle. However, it was suggested that there should be some focus on looking at the influence of decisions taken by the participants (e.g. how to assess the tree growing on/in the waste trench; grass on soil surface only or in soil etc.).

A programme of work to progress the scenario forward such that a draft paper will be available for discussion in January 2011 was agreed (see actions). **MJ** has also drafted an abstract on the LFBG scenario to be submitted to the 2011 Hamilton conference and will circulate this for comment.

Actions for LFBG scenario:

Action	Responsible	Due date
Circulate abstract for comment	MJ	10/09/2010
Comment on abstract	All co-authors	14/09/2010
Circulate summary presentation and request posted on IAEA website	NAB	14/09/2010
Contact M. Čerme for clarification on some aspects of approach used	NAB	17/09/2010
Identify who is applying isotope specific CRs for Pu and U and ask authors to explain	MJ	20/09/2010
Discuss potential data analyses with J. Vives i Batlle	NAB	04/10/2010
Provide short text (c. 3 pages) describing your approach to the scenario and justify your actions ^a	All participants	30/11/2010 ²
QA results	All participants	30/11/2010 ^b
If possible provide short text with some suggestions as to why your results may differ from others (see summary presentation)	All participants	30/11/2010 ^b
Provide draft paper for comment	MJ	14/01/2011

¹ Try to produce this in a manner which will be useful to **MJ** when preparing draft paper.

² Please send these earlier if possible as would be helpful to **MJ**.

3. Beaverlodge scenario

Seven sets of results have been received for this scenario and one additional was presented at the workshop; two further inputs are anticipated and one additional group is considering participating. One set of results (submitted by Laura Newsome, England & Wales Environment Agency) enable a comparison of the predictions of the draft TRS CR_{wo-water} values with the available measured data. The approaches used were described; **HM** then presented a comparison of some the results received which had been prepared by Richard Goulet (**RG**).

As with LFBG there was then a discussion of how to progress the scenario forwards to publication. It was noted that the presentation of scenario occupancy factors in a manner not used by any of the models had led to some difference in how external exposure had been assessed. It was agreed that this was an unnecessary complication in the analyses of the scenario and that the occupancy factors as used by **HV** would be used by all participants (see Table 1 below).

Table 1. Revised occupancy factors to be used in the Beaverlodge scenario.

	Geometry (cm)	Mass (g ww)	Occupancy %
	Length × height × width		in water column/ sediment-water interface/in sediment
Pelagic (e.g. Northern pike & Lake Trout)	50 × 15 × 10	1200	75/25/0
Benthic Fish - Large (White sucker & Lake whitefish)	45 × 15 × 10	1191	30/70/0
Benthic Fish - Small (Lake chub)	6.8 × 1.5 × 1	4.5	80/20/0
Benthic Invertebrates (<i>Chironomus riparius</i>)	0.34 × 0.17 × 0.15	0.12	50/25/25
Benthic Invertebrates (<i>Pisidium sp.</i>)	2.5 × 1.5 × 1	1.6	50/50/0
Benthic Invertebrates (Caddisfly, <i>Nemotaulius sp.</i>)	3.5 × 1.5 × 1.5	1.75	50/50/0

Note: Values presented for invertebrates are not the same as those in the draft minutes.

Some of the assessment sites had an incomplete set of input data. In these circumstances some participants had attempted to estimate input values (i.e. sediment and/or water activity concentrations) whilst others had not. It was agreed that all participants should have the opportunity to revise their results to enable a more complete assessment; if participants choose not to do this then their results will not be included in all evaluations (e.g. of total dose rate). Furthermore, some participants had chosen to try to estimate the activity concentrations of U-238 daughter products Th-234 and U-234 which were not included in the scenario. Again it was agreed that participants who had not considered including Th-234 and U-234 should be given the opportunity to reconsider this and revise their results accordingly. If they choose not to consider Th-234 and U-234 participants should justify their actions.

At least 1 participant had included U-235 in their assessment. There was some discussion as to if all participants should do this. However, it was generally felt that the contribution for U-235 (and daughters) would be comparatively small and that we could make reference to the results from the EDEN model in the paper and report to justify this approach.

Additionally, it was noted that the two approaches applying the draft TRS CR values would require to be resubmitted once the TRS is finalised (this also applies to LFBG).

Given the requirement to resubmit results and timetable already agreed for LFBG it was agreed that a fuller discussion of the scenario results should take place in January 2011 with the aim of submitting a publication before the summer/autumn 2011 meeting.

Whilst some participants had considered estimated dose rates against ICRP DCRL values or national 'limits' others had compared to the 10 µGy h⁻¹ screening dose rate derived by recent EC EURATOM projects (ERICA and PROTECT). The screening dose rate is not applicable to the scenario and will not be the primary benchmark used in interpreting results. It was felt that the group should be considering the outputs of WG6 and their assessment of 'Canadian benthic invertebrate dataset'. A summary presentation of WG6 activities was requested for the next WG4 meeting and *NAB* agreed to discuss this with Tom Hinton (WG6 Leader).

Actions for Beaverlodge scenario:

Action	Responsible	Due date
Revise scenario occupancy table to reflect Table 1 in minutes and send to WG members	RG	17/09/2010
Circulate summary table of Phase 1 results	RG	30/09/2010
Ensure Indian group (Bhabha Atomic Research Centre) wish to continue to participate in the scenario	NAB	01/10/2010
Discuss EDEN U-235 results with Karine Beaugeline-Sellier	NAB	15/10/2010
Resubmit results together with short description/justification (c. 3 pages) of approach	All participants	30/11/2010
Discuss with TH presentation by WG6 at next WG4 meeting	NAB	01/12/2010
Present extended discussion of results	CNSC	January 2011, 3 rd EMRAS II TM

4. Wetlands scenario

KS presented a potential wetlands scenario based on data from Sweden, Canada and the USA and put together with the help of **TY** and Mike Wood (University of Liverpool, UK). This provides the opportunity to test model application for a more complex ecosystem type for a range of organisms and radionuclides (including C-14 an aspect of the models we have previously not attempted to validate). There was sufficient interest to take this scenario forward (see actions for timetable) with CEH, SCK, ANSTO and SSM at least saying that they would run the scenario or discuss with others who may do so (NRPA and ANL will consider). **HV** suggested adding U-mine wetlands data if possible and **PA** offered to help **KS** run the exercise.

Action associated with the wetlands scenario:

Action	Responsible	Due date
Ask for Wetlands scenario presentation to be put onto WG4 area of EMRAS II web pages	NAB	30/09/2010
Discuss management of scenario	NAB, PA, KS	30/09/2010
Investigate U-mine site data	HV	30/10/2010
Prepare and circulate scenario	KS	01/12/2010
Agree to participate	All participants, as appropriate	January 2011, 3 rd EMRAS II TM

Future plans and next meeting

The next (fifth) WG4 Meeting will take place as part of the Third EMRAS II Technical Meeting, being held at IAEA Headquarters in Vienna, 24–28 January 2011.

WG4 MEETING AGENDA

Tuesday, 7 September 2010

09:00–09:15	Welcome, meeting objectives, updates	N.A. Beresford, WGL (CEH, UK)
09:15–09:30	Update on modelling dose rates in heterogeneous sediment profiles	A. Hosseini (NRPA, Norway)
09:30–09:50	*Little Forest Burial Ground scenario - introduction	M. Johansen (ANSTO, Australia)
	RESRAD-Biota application	S. Kamboj (ANL, USA)
	K-Biota application	D-K. Keum (KAERI, Rep.of Korea)
10:30–11:00	COFFEE BREAK	
11:00–12:30	ERICA application with draft TRS CR values	B.J. Howard (CEH, UK)
	FASTERlite application	J. Brown (NRPA, Norway)
12:30–13:30	LUNCH BREAK	
13:30–14:00	ERICA application	H. Vandenhove (SCK-CEN, Belgium)
	ERICA application (M. Cerne, Jozef Stefan Institute, Slovenia)	Presented by N.A. Beresford
14:00–15:30	Summary of results, discussion on way forward	Lead by M. Johansen & N.A. Beresford
15:30–15:45	COFFEE BREAK	
15:45–17:00	Presentation of possible *wetland scenario followed by discussion	K. Stark (Stockholm Uni., Sweden) [#]
	RESRAD-BIOTA v1.6 demonstration	S. Kamboj (ANL, USA)
	K-BIOTA demonstration	D-K Keum (KAERI, Republic of Korea)
17:00	CLOSE	

Thursday, 9 September 2010

09:00–09:15	Beaverlodge scenario - introduction	H. Mulye (CNSC, Canada)
	ERICA run with TRS draft CRs only (L. Newsome EA, UK)	Presented by N.A. Beresford
	ERICA application	N.A. Beresford
	RESRAD-Biota application	S. Kamboj (ANL, USA)
	K-Biota application	D-K. Keum
10:30:10–45	COFFEE BREAK	
10:45–11:30	EDEN application (K. Beaugelin-Seiller, IRSN, France)	Presented by H. Mulye
	ERICA application	H. Vandenhove (SCK/CEN, Belgium)
	ERICA applications by Bhabha Atomic Research Centre, India (A.K. Patra) and (Jozef Stefan Institute, Slovenia (M. Cerne))	Presented by N.A. Beresford
11:30–12:30	Summary of results, discussion on way forward	Lead H. Mulye & N.A. Beresford
12:30	END OF MEETING	

* Indicates the name of the presentation given on the WG4 web page (<http://www-ns.iaea.org/projects/emras/emras2/working-groups/working-group-four.asp?s=8>).

[#] Presentation given via video link