

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

**EMRAS II  
Reference Approaches for Biota Assessment  
Working Group 5  
"Wildlife Transfer Coefficient" Handbook**

**MINUTES**

**of the Third WG5 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 Pal Anderson ( <i>PA</i> )<br>(pal.andersson@ssm.se)                  | Swedish radiation Safety Authority (SSM), SWEDEN                                     |
| Ms Karine Beaugelin-Seiller ( <i>KBS</i> )<br>(karine.beaugelin@irsn.fr) | Institut de Radioprotection et de Sûreté Nucléaire (IRSN), FRANCE                    |
| Mr Nicholas A. Beresford ( <i>NAB</i> )<br>(nab@ceh.ac.uk)               | Centre for Ecology & Hydrology (CEH), UK   |
| Mr Yong Ho Choi ( <i>YHC</i> )<br>(yhchoi1@kaeri.re.kr)                  | Korea Atomic Energy Research Institute (KAERI), REPUBLIC OF KOREA                    |
| Mr Paul Dale ( <i>PD</i> )<br>(paul.dale@sepa.org.uk)                    | Scottish Environmental Protection Agency (SEPA), Scotland, UK                        |
| Mr Che Doering ( <i>CD</i> )<br>(che.doering@arpansa.gov.au)             | Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), AUSTRALIA       |
| Mr Ali Hosseini ( <i>AH</i> )<br>(Ali.Hosseini@nrpa.no)                  | Norwegian Radiation Protection Authority (NRPA), NORWAY                              |
| Ms Tarja Ikaheimonen ( <i>TI</i> )<br>(tarja.ikaheimonen@stuk.fi)        | Radiation and Nuclear Safety Authority, STUK, FINLAND                                |
| Mr Ross Jeffree ( <i>RJ</i> )<br>(R.Jeffree@iaea.org)                    | International Atomic Energy Agency, Marine Environment Laboratory (IAEA-MEL), MONACO |
| Mr Matt Johansen ( <i>MJ</i> )<br>(mjo@ansto.gov.au)                     | Australian Nuclear Science & Technology Organisation (ANSTO), AUSTRALIA              |
| Mr Isao Kawaguchi ( <i>IK</i> )<br>(kawag@nirs.go.jp)                    | National Institute of Radiological Sciences (NIRS), JAPAN                            |

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

| <b>Attending</b>   |  |
|--|--|
| <b>Name / Initials* / Email</b>                                      | <b>Organization / Country</b>  |
| Mr Sergey Lukashenko ( <i>SL</i> )<br>(lukashenko@nnc.kz)            | National Nuclear Center of the Rep. of Kazakhstan, KAZAKHSTAN              |
| Ms Katerina Maroudi ( <i>KM</i> )<br>(katerinamar@hotmail.com)       | National Center of Scientific Research "Demokritos", (NCSR"D"), GREECE     |
| Mr Steve Mihok ( <i>SM</i> )<br>(steve.mihok@cnsccsn.gc.ca)          | Canadian Nuclear Safety Commission (CNSC), CANADA                          |
| Ms Carmel Mothersill ( <i>CM</i> )<br>(mothers@mcmaster.ca)          | McMaster University, CANADA  |
| Ms Iisa Outola ( <i>IO</i> )<br>(iisa.outola@stuk.fi)                | Radiation and Nuclear Safety Authority, STUK, FINLAND                      |
| Ms Maria Psaltaki ( <i>MP</i> )<br>(ramps11@hotmail.com)             | National Technical University of Athens (NTUA), GREECE                     |
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| Mr Colin Seymour ( <i>CS</i> )<br>(seymouc@mcmaster.ca)              | McMaster University, CANADA  |
| Ms Keiko Tagami ( <i>KT</i> )<br>(k_tagami@nirs.go.jp)               | National Institute of Radiological Sciences (NIRS), JAPAN                  |
| Mr Shigeo Uchida ( <i>SU</i> )<br>(s_uchida@nirs.go.jp)              | National Institute of Radiological Sciences (NIRS), JAPAN                  |
| Ms Christine Willrodt ( <i>CW</i> )<br>(cwillrodt@bfs.de)            | Bundesamt für Strahlenschutz (BfS), GERMANY                                |
| Mr Michael D. Wood ( <i>MDW</i> )<br>(mwood@liv.ac.uk)               | Sustainable Water Integrated Management & Ecosystem Research (SWIMMER), UK |
| Ms Tamara L. Yankovich ( <i>TLY</i> )<br>(tamara.yankovich@areva.ca) | AREVA Resources Canada, CANADA   |
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## Meeting objective

The aim of the meeting was to discuss data input into the database underpinning the concentration ratios for the Technical Reports Series (TRS) Handbook on Transfer of Radionuclides to Wildlife and possibly the ICRP Committee 5 (C5) Transfer Report for Reference Animals and Plants. A further objective was to peer review the draft text of the Handbook.

## Meeting plan

**BJH** gave an introduction to the Transfer Handbook and the association with the EMRAS II WG5 on Transfer. **NAB** then reviewed the status of the data entries and the entry procedures and outputs of the database. **TLY** described the collation of conversion data for weights and tissue to whole body values. Some presentations were made (see the Meeting Agenda below) on methods proposed for data extrapolation and new data for some wildlife groups. There was then a session where constructive comments were received on the draft text of the Handbook which will now be revised. The new wiki<sup>1</sup> on radiological protection was introduced.

<sup>1</sup> "wiki" is a website that allows the easy creation and editing of any number of interlinked web pages via a web browser.

## **Online database**

Progress on the online database constructed by the Environment Agency (EA) in the UK was described in detail by **NAB** using a presentation prepared by David Copplestone, who was unfortunately unable to attend this meeting. The outputs will be:

- CR summary by habitat (5 high level + each individual habitat);
- CR summary by wildlife group;
- List of contributors (all, accepted and rejected data); and
- List of references.

After discussion it was agreed that the online database will be revised each year on the 1 January. A copy of all tables will be retained immediately after the revision so any referencing to the revised tables is traceable.

**TLY** and **NAB** have nearly finished compiling data on the internal partitioning of elements in biota to facilitate conversion of tissue specific data to whole body values. This would enable the use of CR values for edible tissues from monitoring programmes designed to assess radionuclide transfer to humans. Plants still need to be done.

Some online entries have been submitted. Some substantial datasets are being prepared for entry into the database from a number of countries for both terrestrial and aquatic ecosystems. These include:

- ERICA marine and terrestrial databases into on-line version after checking/correcting/formatting etc;
- Estuarine dataset (Shigeo Uchida, Hyoe Takata, Keiko Tagami, NIRS, Japan) for crustaceans, macroalgae and molluscs collected in estuaries, (n= c. 1600 entries); 31 elements – Checked/agreed/submitted for uploading;
- Terrestrial data (Mat Johansen, John Twining, ANSTO, Australia) on Natural RNs, actinides, Cs-137 for marsupial, reptile, witchetty grub (n=130) – Needs checking and agreement;
- Helcom Mors Baltic sea data (Iisa Outola, STUK, Finland) (n= c. 250), largely Sr and Cs for Crustacean, fish, mollusc, phytoplankton. Has been checked/submitted for entry/(new fish categories?);
- CANDU Operators Group (Judy Ryan, Tamara Yankovich, Canada) (n= c. 4000) for largely freshwater organisms, >30 elements. Approx 50% checked/agreed – fish categories need amending, Approx 50% needs tissue to whole body correction;
- Russian language literature CR marine data (n= 430 entries) (Sergey Fesenko, NAEL, IAEA, J. Fesenko, N. Sanzharova, E.Karpenko and I.Titov, RIARAE, Russia) received 2009. Needs checking/agreement;
- Russian language literature freshwater CR values (Sergey Fesenko, NAEL, IAEA, J. Fesenko, N. Sanzharova, E.Karpenko and I.Titov (RIARAE, Russia) received January 2010 (n= c. 1850 entries (some repeat ‘tissue’), Some lab. 35 radionuclides – Needs checking/agreement;
- Russian language literature CR forest data (tree and shrub) for Cs and NORMs (n=c. 850 entries) (A Muzalevskaya, N. Sanzharova, RIARAE and Sergey Fesenko, NAEL, IAEA) received 6 Nov 2009. Needs checking/agreement;
- Russian language literature CR data for wild grass and lichens (tundra ecosystem - Cs, Sr, Pu, Ra, Th, U and Am) (M. Shishulina, N. Sanzharova, RIARAE and Sergey Fesenko, NAEL, IAEA), received 6 November 2009 (n= c. 300 entries Needs checking/agreement;
- SCK-CEN (Hildegard Vandenhove, Belgium) Natural radionuclides ‘grasses’, (n= c. 400), Needs checking/formatting/agreement;
- Institute of Physics Lithuania (Tatjana Nedvekaite) Cs mammals, Needs reviewing/formatting;
- CEH reviews/in-house (Cath Barnett, Claire Wells, UK), Terrestrial largely reptile and mammal (n=170), Cs, Sr, Pu and natural RNs; also Freshwater natural RNs (n=180) data identified from review of Hosseini et al. (submitted).

### ***Datasets expected***

- Freshwater mining industry data – Ms Marcelle Phaneuf (CNSC, Canada);
- Reptile data – **MDW** – described in the meeting – see presentation
- Sand dune data – **MDW**
- Bat/bird/rodent Sr,Pu,Cs data – **NAB**, Sergiy Gaschak (IRL, Ukraine);
- Freshwater review database – **TLY**;
- Bird data – **BJH** et al – described in the meeting – see presentation.

### **Data inputs will be accepted until the end of May 2010**

### ***Data gap filling***

**KT** presented an extension to the data showing a correlation between stable element concentration in agricultural products and conifer needles, and demonstrated that the principle seemed to hold for datasets for other plants from independent sources, suggesting data for agricultural groups can be extrapolated to provide estimates of transfer for some wild plants.

The phylogenetic approach was described by **RJ** and further work to that described during the Monaco Meeting was shown, including data showing particularly high transfers of many radionuclides to a Cephalochordate called Amphioxus. All amphioxus were grouped together in the phylogenetic analysis and were distinct from teleosts and chondrichthyans, but closer to teleosts.

### ***Kd values***

**BJH** showed that in the output of a well developed model predicted Kds varied over orders of magnitude for many elements between pH 4 to 8 and with DOC between 1 and 10%. Some ERICA Kd values are currently higher than any of the model predictions. This matters because too high Kd values will give low water conc – low whole body conc and are therefore NOT conservative which they should be for screening values. Also they will give high sediment conc leading to higher external exposure. WG5 concluded that better guidance was needed on variation in Kd for marine and freshwaters (and soil) but could not be included in the Handbook.

### ***Special issue***

Seven Papers connected with data input to the database have been submitted to Radiation Environment Biophysics. Four more are expected and the deadline is February 2010 as the journal wants to publish the issue in April 2010.

### ***TRS Handbook text***

The draft text of the Handbook was circulated before the meeting. Peer review comments were taken and will be used to amend the text for further consideration at the next meeting. There were no major comments but a series of helpful points throughout. It was felt that the term “whole organism” was more appropriate than whole body.

### **Meetings**

The next meeting of the EMRAS II WG5 will probably be in either Vienna, Aix en Provence, France during the week of 28 June – 2 July 2010, but this is not yet confirmed. The objectives will be: (i) to review and QC the data tables for conversions and CR which will be derived from the database; and (ii) to review the amended handbook text.

The next (Third) EMRAS II Technical Meeting (TM), being held at IAEA Headquarters in Vienna, 24–28 January 2010.

**BJH** thanked all participants for their valuable contributions and willingness to contribute the discussions. The Handbook is on schedule to be completed in 2010.

**Action list (combines outstanding actions from previous items)**

| <b>Topic</b>                                 | <b>Action</b>   | <b>Responsible organization</b> | <b>Action deadline</b>   |
|--|---|---------------------------------|--|
| Online database                              | (1) provide text on the front page of the site<br>(2) provide link to the help file on the wiki<br>(3) input the conversion factors when available. | EA                              | End Feb 2010<br><br>End feb 2010<br><br>End March 2010 or when available |
| Data   | checks and data inputs as specified above   | CEH, EA                         | End May 2010   |
| Sweden                                       | Input CR mean and error values from SKB data on all three ecosystems after suitable conversion  | SSM to inquire re progress      | End May 2010   |
| Oregon forest study                          | Collate data  | OU                              | ?  |
| Central Asian data                           | Data on U mining sites being collated   | UMB to advise                   | ?  |
| Swedish data                                 | Explore potential data inputs from Sweden   | PA                              | End May 2010   |
| Phylogeny                                    | extend experiments to include 2 other marine RAPs   | IAEA-MEL                        | Summer 2010  |
| Bayesian                                     | Can we get understandable text and an example   | NRPA                            | End June 2010  |
| Internal partitioning and weight conversions | For animals   | AREVA and CEH to compile        | by end February 2010   |
|  | For plants  |                                 | by end March 2010  |
| REB issue                                    | Submit remaining papers   | IAEA/Areva/IRL                  | By end February 2010   |
| June meeting                                 | Prepare meeting plans and inform relevant parties   | CEH, IAEA, IRSN                 | March 2009   |

## WG 5 MEETING AGENDA

### Monday, 25 January 2010

|             |  |   |
|-------------|--|---|
| 09:30–13:00 | Plenary Session  |   |
| 13:00–14:00 | <i>LUNCH BREAK</i>   |   |
| 14:00–14:30 | Welcome, agree agenda and workshop objectives, report on Ottawa meeting(s), review outstanding actions   | Brenda Howard, WGL (CEH, UK)            |
| 14:30–14:45 | Briefing on handbook revision and peer review process  | Brenda Howard, WGL (CEH, UK)            |
| 14:45–15:00 | Update on *online database status  | David Copplestone (EA, UK) <sup>#</sup> |
| 15:00–15:45 | *Data inputs – update and queries  | Nick Beresford (CEH, UK)                |
| 15:45–17:30 | Update on conversion tables:<br>Progress on the Development of Parameters Values for References<br>*Animals and Plants<br>Developing a *Wetland Scenario | Tamara Yankovich (AREVA, Canada)        |

### Tuesday, 26 January 2010

|             |  |
|-------------|--|
| 09:30–17:00 | Attendance at other Working Group Meetings (WG4 and WG6) |
|-------------|--|

### Wednesday, 27 January 2010

|             |  |
|-------------|--|
| 09:00–12:00 | Plenary Session  |
| 12:00–17:00 | Attendance at other Working Group Meetings (WG4 and WG6) |

### Thursday, 28 January 2010

|             |  |                              |
|-------------|--|------------------------------|
| 09:00–12:30 | <i>Science talks on transfer:</i>  |                              |
|             | Can *elemental composition data of crop leaves be applied to tree leaves?                            | Keiko Tagami (NIRS, Japan)   |
|             | Transfers to Marine Biota: Further Developments of a Phylogenetic Bioaccumulation Model <sup>*</sup> | Ross Jeffree (IAEA-MEL)      |
|             | Update on transfer to birds <sup>*</sup>   | Brenda Howard, WGL (CEH, UK) |
|             | Update on transfer to *reptiles  | Mike Wood (LU, UK)           |
|             | *Kd discussion   | Brenda Howard, WGL (CEH, UK) |
| 12:30–13:30 | <i>LUNCH BREAK</i>   |                              |
| 13:30–16:00 | <i>Handbook</i><br>Peer review feedback  | All participants             |
| 16:00–16:30 | <i>Other information</i><br>New Wiki on radiological protection of the environment                   | Nick Beresford (CEH, UK)     |
| 16:30–17:30 | Actions re: handbook, focus for WG5 for rest of EMRAS II   | All participants             |
| 17:30       | Close  |                              |

### Friday, 29 January 2010

|             |                 |
|-------------|-----------------|
| 09:00–13:00 | Plenary Session |
|-------------|-----------------|

\* Indicates the name of the presentation given on the WG5 web page (<http://www-ns.iaea.org/projects/emras/emras2/working-groups/working-group-five.htm>)

<sup>#</sup> Not present at this meeting, presentation given by *NAB*.

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