

EMRAS

Environmental Modelling for Radiation Safety Working Group 4 – Model validation for radionuclide transport in the aquatic system “Watershed-River” and in estuaries (IAEA)

4th meeting

8–10 June 2005, IAEA, Vienna International Centre,
Vienna, Austria

MINUTES OF THE MEETING

LIST OF PARTICIPANTS

France

Mr. P. Boyer

Ingénieur, IRSN/DEI/SECRE/LME (Bâtiment 159)
Institut de Radioprotection et de Sûreté Nucléaire (IRSN)
Centre de Cadarache
B.P. 3
F-13108 Saint Paul-lez-Durance, Cedex
Tel: +33 (4) 4219-9436
Fax: +33 (4) 4219-9143
Email: patrick.boyer@irsn.fr

Ms. N. Goutal

Research Engineer, Departement LNHE
Electricité de France (EDF) - Département Environnement (R&D)
6, Quai Watier
B.P. 49
F-78401 Chatou Cédex
Tel: +33 (1) 3087-8237
Fax: +33 (1) 3087-8109
Email: nicole.goutal@edf.fr

Ms. M. Luck

Research Engineer, Departement LNHE
Electricité de France (EDF) - Département Environnement (R&D)
6, Quai Watier
B.P. 49
F-78401 Chatou Cédex
Tel: +33 (1) 3087-7666
Fax: +33 (1) 3087-8086
Email: marilyne.luck@edf.fr

Italy

Mr. G. Angeli

Researcher, PROT-CHIM
ENEA, CR Casaccia
Via P. Anguillarese 301
S.Maria Di Galeria
Casella Postale n. 2400
00100 Rome
Tel: +39 (6) 3048-4570
Fax: +39 (6) 3048-3213
Email: giacomo.angeli@casaccia.enea.it

Mr. L. Monte

Researcher, PROT-CHIM
ENEA, CR Casaccia
Via P. Anguillarese 301
S.Maria Di Galeria
Casella Postale n. 2400
00100 Rome
Tel: +39 (6) 3048-4645
Fax: +39 (6) 3048-3213
Email: monte@casaccia.enea.it

Netherlands

Mr. R. Heling

Project Leader, Department of Radiation & Environment
Nuclear Research & Consultancy Group (NRG)
P.O. Box 9035
Utrechseweg 310
6812 AR Arnhem
Tel: +31 (26) 356-2467
Fax: +31 (26) 442-3635
Email: heling@nrg-nl.com

Spain

Mr. R. Periañez

Departamento de Fisca Aplicada 1
E.U. de Ingenieria Tecnica Agricola (EUITA)
Universidad de Sevilla
Carretera de Utrera, km. 1
41013 Sevilla
Tel: +34 (954) 486-474
Fax: +34 (954) 486-436
Email: rperianez@us.es

Ukraine

Mr. V. Koshebutsyy

Research Associate, Department of Marine & River Systems
Institute of Mathematical Machine & System Problems (IPMMS)
42, Glushkova Prospekt
252187 Kiev
Tel: +380 (44) 526-6187
Fax: +380 (44) 526-3615
Email: koshik@env.kiev.ua

Mr. G. Laptev

Senior Research Scientist
Department of Monitoring of Radioactivity in the Environment
Institute of Hydrometeorology
37, Prospekt Nauki
UA-03028 Kiev
Tel: +380 (44) 525-8654
Fax: +380 (44) 525-5363
Email: glaptev@gvl.pp.kiev.ua / gv186@yahoo.co.uk

Mr. V. Maderych

Head of Department
Institute of Mathematical Machine & System Problems (IPMMS)
42, Glushkova Prospekt
252187 Kiev
Tel: +380 (44) 526-6187
Fax: +380 (44) 526-6457
Email: vlad@env.kiev.ua

The fourth EMRAS WG 4 meeting was held in Vienna (Austria) and was hosted by the IAEA (International Atomic Energy Agency).

The objectives and aims of the WG meeting were to discuss the status of the WG activities and to plan further activities.

**Scenario 1 – Floodplain (Chernobyl)
prepared by Gennady Laptev (IHM)**

The results of the models from ENEA and University of Sevilla were discussed. Among the processes influencing the behaviour of radionuclide concentration in flooding water, the most relevant is the remobilisation from contaminated soils. State-of-the-art models do not ever account properly for such a process. In general the remobilisation of ^{137}Cs is significantly overestimated. On the contrary, predictions for ^{90}Sr are in acceptable agreement with the empirical values. IMMSP and IHM expressed the intention of participating in this exercise (flooding of 1999). Before 15th July, these Institutes will send the relevant results to ENEA. The University of Sevilla will also provide new data following a calibration of the model to the inundation dynamics of the flood-plain. A draft version of a “working document” describing the scenario and the model results was prepared.

**Scenario 2 – The Techa River
prepared by Ivan Kryshev and Alexander Kryshev (TYPHOON, Russia)**

Exercises relevant to this scenario will be afforded during the third year of the project. The concerned modellers will carry out a preliminary analysis to ascertain how their models can be applied to solve the complex environmental management problem related to this scenario.

**Scenario 3 – Tritium in River Loire
prepared by Marilyne Luck and Nicole Goutal (EDF)**

The exercise was finalized and a draft version of an internal “working report” describing the scenario, the models and the results is ready.

The “working report” document in word format will be made available to the following members of the group (“sub-group 3H”):

Patrick Boyer (IRSN)

Luigi Monte (ENEA)

Giacomo Angeli (ENEA)

Mark Zheleznyak (IMMSP)

The above listed members will send comments and suggestions for the text revision to Nicole Goutal and Maryline Luck (EDF). From the “working report” the above group will extract a manuscript for open dissemination. EDF will be responsible for the management of this duty and will receive the full support from the members of the “sub-group 3H”.

ENEA showed the results of a very simple model based on transport and radionuclide dilution and demonstrated that such a model can supply results that are in a reasonable agreement with the empirical data provided that reliable measured values of the water velocity and of the water fluxes are available. It should be noticed that the application of such a simple model was done when empirical data of tritium concentration in water for testing model output were disclosed. Therefore, such an application cannot be considered as a blind exercise test.

A new exercise for testing the performances of the models was proposed. The exercise will concern different release dynamics of 3H and different water flux conditions: a) short-term release (few hours); b) long-term release (steady-state); c) minimum, average and maximum water flux.

EDF is responsible for the preparation of the relevant input data according to the following deadlines:

- Before 15th of July EDF will distribute the boundary conditions of the exercise;
- Before the end of September modelers will send results to EDF

The results will be assessed and discussed during the next combined meeting.

Scenario 4: Estuary of the Dniepr River contaminated with Sr-90 and Cs-137 from Chernobyl prepared by Gennady Laptev (IHM, Ukraine) and by Mark Zheleznyak and Vladimir Maderich (IMMSP, Ukraine)

The results of the exercise were presented and discussed. The validation of models for predicting the behaviour of ⁹⁰Sr and ¹³⁷Cs in the abiotic components of the estuary was concluded. An internal document was prepared.

NRG will participate to the exercise as “independent user” of THREETOX model to assess how the different approaches of a user and of the model developer are reflected in the model application and, consequently, in the model results.

It was decided to perform a model testing exercise for the migration of radionuclides from the abiotic to the biotic components of the estuarine environment. The WG will ask IAEA to support IHM for the production of the relevant scenario and data-set. Involved modellers will be contacted in order to obtain information about the input data they deem necessary.