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

EMRAS II
Approaches for Assessing Emergency Situations
Working Group 8
"Environmental Sensitivity"

M I N U T E S

of the Second WG8 Meeting held at IAEA Headquarters, Vienna
25–29 January 2010
(during the Second EMRAS II Technical Meeting)

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* Initials used to refer to participants within minutes and actions as appropriate.
[#] The meeting was supported by a number of visitors who contributed insight and ideas to the WG8 ideas and discussions.

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Working Group Attendance

Participants in the EMRAS II Environmental Sensitivity Working Group (WG8) met during all the available time periods allocated to individual working groups during the 2nd EMRAS II Technical Meeting (TM).

Objectives and tasks

The objective of WG8 is to explore the concept of environmental sensitivity in rural and semi-natural environments within the framework of assessments after an emergency situation. The main tasks of the WG8 are to:

— formulate the concept of environmental sensitivity;
— compile a list of sensitivity factors;
— design scenarios; and
— carry out modelling exercises.

Presentations

The following presentations on individual models and concepts were given by participants. These presentations are available on the WG8 web page (http://www-ns.iaea.org/projects/emras/emras2/working-groups/working-group-eight.htm):

— Mikhail Iosjpe – ♣Box model of the ocean;
— Luigi Monte – ♣MOIRA decision support system for freshwater ecosystems;
— Sohan Chouhan – ♣CHERPAC model (mainly agricultural, but info on other pathways);
— Jochen Tschiersch – Report from ♣Alpine subgroup meeting in Vienna, 8 October 2009;
— Brenda Howard – ♣Vulnerable ecosystems; ♣Radiological sensitivity; ♣Review of the operation use of the concept of sensitivity of the environment; and
— Franca Carini – Report from the International Union of Radioecologists (♣IUR).

Formulation of the concept of environmental sensitivity

During 2009 WG8 prepared a draft document on the ♣concept of environmental sensitivity. This document is available for downloading on the WG8 file sharing folder http://ns-files.iaea.org/fileshare/emras/default.asp?fd=353

♣ Indicates the name of the presentation/document given on the WG8 web page.

Listing of sensitivity factors

Various WG8 members were assigned tasks to draw up a list of the main sensitivity factors in the environments under consideration (agricultural, terrestrial temperate forest, freshwater aquatic, alpine and Arctic). This task should be completed by the end of February 2010. The sensitivity factors will be used to fine-tune the modelling exercises and to be used in preparation of the final report.

Scenario design and model exercises

The following scenarios and modelling exercises were decided upon:

Source term: Cs-137, I-131, and Sr-90.

Total deposition on soil, plants, rivers, lakes, coastal waters: 1000 Bq/m^2 (one run with dry deposition, another with wet deposition – heavy rain (20 mm/hr)).

Seasons: Choose deposition times depending on crop cultivation and other practices characteristic of the region under study:

— Winter: animals are on dry fodder, snow cover;
— Spring: animals are out on pasture, planting has begun, snow has melted;
— Summer: mature crops, just before harvest; and
— Autumn: crops harvested, no snow cover, ground not yet frozen.

Soil types: clay, loam, sand, organic.

Ecosystems: Agricultural, alpine, Arctic, forest, freshwater lake, and shallow marine.

Plants:

— Agricultural: forage (fresh or dry), garden vegetables, fruits, root crops, grain, rice;
— Temperate forest: berries, mushrooms;
— Alpine ecosystem: forage (fresh or dry), berries, mushrooms;
— Arctic: forage (fresh or dry), lichen, berries, mushrooms; and
— Marine: seaweed.

Animals and animal products:

— Agriculural: milk and milk products, beef, lamb (pork, chicken, eggs optional);
— Forest eco-system: big game (deer, moose, elk), small game (rabbits, birds);
— Alpine: milk, deer?
— Arctic: reindeer or caribou, milk, musk ox?
— Freshwater: fish; and
— Marine: marine fish, shellfish (crustaceans, molluscs).

Modelling parameters:

— Ecological and biological half life (weathering half life);
— Soil to plant transfer parameter;
— Plant yield;
— Plant interception factor;
— Translocation factor;
— Deposition to plant aggregated transfer factor;
— Deposition to animal aggregated transfer factors; and
— Plant to animal products transfer factors.

Food intakes: Mean human intake rates of food and water will be used (environment-specific) with 100% of the food coming from the contaminated source.

Doses:

— Ingestion Dose Coefficients will be the latest from ICRP (ICRP-72).

— Predict radionuclide concentrations in food products and ingestion doses during first year and second year after the radionuclide injection to humans (adult, 10 year old child, 1 year old infant).

— Full calculations will be done first without applying any food ban or other counter measures. Full calculations can then be repeated by applying food bans and counter measures.

Models: Modellers will use their own models. It has been ascertained that there will be at least two modellers for each scenario.

Table of contents: A table of contents was drafted for the final report.

Next meeting

An interim meeting of Working Group 8 will be held in June 2010. The exact dates and place will be decided before the end of February and communicated via email and on the EMRAS II WG8 web page.

Timetable

Task	**Deadline**
Review of the concept of environmental sensitivity	
Literature review	June 2009 (done)
Draft concept document	January 2010 (done)
List of environmental sensitivity factors	
Initial list	February 2010
Final list	2011
Scenario developments	
Design	January 2010 (done)
Modelling exercises	
Interim results	June 2010
Final results	June 2011
Final report	
Submission of final report	January 2012