[newsletter] Number 38
July 2001

IUR

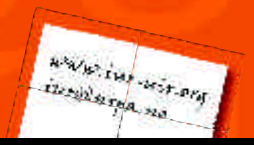
Message from the editor

I wanted to remind our IUR members and interested non-members to consider the opportunities and choices presented to you and your organizations over the next several years concerning the development of a "framework" for the protection of the environment from the effects of ionizing radiation. Internationally, we can see a resurgence in the field of radioecology, and a growing interest in the development of a framework (e.g., that could include environmental ethics and guiding principles; biota dose criteria; dose evaluation methods and models; and implementation guidance) for protection of the environment (biota and ecosystems) from the effects of ionizing radiation. From my point of view, the next three years provides a critical window of opportunity for you to have a voice in discussing the merits of such a framework, in shaping the formulation and content of such a framework, and in determining how such a framework would relate to our radiation protection framework for man.

Take a moment to think about your views on some of the relevant questions of the day concerning this topic. Is the assumption that if you protect man from the effects of radiation then other forms of biota are also likely sufficiently protected appropriate in all cases? Most cases? No longer appropriate? Is a radiation protection framework "for the environment" really needed? If so, should such a framework be separate from our radiation protection framework for man? In practice, how would it be implemented in relation to our radiation protection system for man? Can the two systems be harmonized in some fashion? Are the often-used biota dose criteria of 10 mGy/day for aquatic organisms and terrestrial plants, and 1 mGy/day for terrestrial animals protective of populations of organisms against the effects of chronic radiation? Should additional or alternative biota dose criteria/effects levels (e.g., at the population, individual, or sub-individual levels) be considered? How should these biota dose criteria or effects levels be interpreted and implemented in the context of the different types of ecosystems and impact assessment scenarios (e.g., compliance; site cleanup; prospective risk assessments for new facilities; protected species; accident conditions) encountered? What dose evaluation models or methods are available for assessing radiological impacts to biota and ecosystems, and

Editor:
Stephen Domotor , U.S Department of Energy, EH 412,
1000 Independece Ave. S.W. Washington DC 20585, USA
Tel: +1 202 586 0871 Fax: +1 202 586 3915
E-mail: Stephen.Domotor@eh.doe.gov

Co-Editor:
Dr. Barbara Rafferty, Radioecological Protection Institute Ireland
3 Clonskeagh Square, Clonskeagh Road, Dublin 14, Ireland
Tel: 353 1 604 1353 Fax: 353 1668 0187
E-mail: barbara@rpii.ie



how should they be employed within these different assessment scenarios? How will new thoughts and recommendations on these issues impact you and the way in which you, your organization, and your stakeholders make decisions concerning radiation protection of man and the environment?

There are several already ongoing or planned international initiatives that will provide significant insights, recommendations and approaches regarding the issues listed above, and the need for and content of such a framework. I encourage you to keep abreast of and become involved in these initiatives, some of which are highlighted here for your reference: (1) International Union of Radiecology (IUR) Task Group on Protetion of the Environment (see next column); (2) International Commission on Radiological Protection (ICRP) Task Group on Protection of the Environment (target date of 2003 for providing recommendations); (3) International Atomic Energy Agency (IAEA) Specialists' Meeting on Protection of the Environment from the Effects of Ionizing Radiation: International Perspectives (to be held in Vienna, Austria 26-30 November 2001); (4) IAEA International Conference on Environmental Radiation Protection (proposed; to be held in 2003); and (5) Third International Symposium on the Protection of the Environment from Ionizing Radiation: The Development and App-lication of a System of Radiation Protection for the Environment (to be held in Darwin, Australia 22-26 July 2002; see the article included in this issue of the IUR Newsletter for more information).

From a philosophical, technical, and policy perspective regarding the protection of the environment from the effects of radiation, the next three years should prove to be one of the more exciting and rewarding times to be involved in the field of radioecology. It is important that those of you who have contributed to the historical knowledge base in the field of radioecology - and in human radiation protection, as well as those of you who are newer to the field of radioecology or who are involved in related disciplines (e.g., ecological risk assessment; environmental ethics; risk assessment for non-radiological stressors) participate in these initiatives to ensure that we have a balanced, informed process concerning radiation protection of the environment.

Radiation Protection in the 21st Century

Ethical, Philosophical and Environmental Issues

Consensus Conference on Protection of the Environment

22nd -25th October 2001
Oslo, Norway

The 21st century is likely to bring fundamental changes in radiation protection policy. IUR has an ongoing work in the task group of Environmental Protection and the next milestone in this work will be the Consensus Conference in October this year. The ICRP is currently revising its recommendations, and a number of other international bodies are developing systems for protection of the environment from ionising radiation. The nuclear industry, authorities and regulators are faced with increasing challenges on the practical application of policy, notably the need to address such values as transparency, autonomy and stakeholder involvement. Many of the challenges arise not only from developments in scientific knowledge, but also from evaluation of social, ethical and philosophical issues.

The proposed seminar will provide a multidisciplinary forum for a discussion of the relevance of these issues for radiation protection. Invited speakers will be asked to give presentations summarising key issues related to their field of expertise. These will include both radiation protection experts and philosophers/ specialists from other areas of risk management (e.g., biotechnology, regulation of chemical hazards, environmental ethics and law, risk perception and communication, public opinion). The aim is to give an insight into general philosophical issues in risk management, and to identify and evaluate those social and ethical issues deemed most relevant for radiation protection. Particular attention will be paid to comparison of radiation protection with regulation of other environmental pollutants.

In light of the growing international interest on the effects of ionising radiation on the environment, the final part of the seminar will consist of a «consensus conference» organised in collaboration with the International Union of Radioecologists.

The conference will aim to elucidate the main areas of consensus and conflict in development of a system of protection. To conclude, protection of the environment can be seen as a test case to illustrate how ethical and philosophical evaluation can aid in bridging the gap between science, ethical theory and practical policy.

The Chair of the seminar is Deborah Oughton (NLH and IUR) and the Chair of the Consensus is Per Strand (NRPA and IUR). The sponsors are Nordic Nuclear Safety Research (NKS) and International Union of Radioecology (IUR). The Scientific Committee (NKS) consists of Ole Harbitz (NRPA), Torkel Bennerstedt (NKS), Olli Vilkamo (STUK), Sigurdur Magnusson (GR) and Jack Valentin (SSI and ICRP).

For further information contact the IUR on iur@nrpa.no or see the website: http://www.iur-uir.org/environment

Activities and Progress in the IUR Arctic and Antarctic task force

Recently, there has been considerable interest in radioactive contamination in the Arctic. In particular, currently available information was collated under AMAP (Arctic Monitoring and Assessment Programme) and also reported in the International Conference series on Radioactivity in the Arctic, the last meeting of which was held in Edinburgh in September 1999. Such studies have shown that the Arctic and its inhabitants are particularly vulnerable to contamination, especially to radiocaesium, because of the high transfer to terrestrial foodstuffs, the long ecological half-lives and the diet of Arctic inhabitants, especially indigenous people.

In the Arctic task force, the IUR has a forum for discussion of recent research in the Arctic, co-operative studies between group participants, discussing various problems associated with nuclear facilities in the Arctic and for developing ideas for future work. The task force has also focused on studies in areas of the Arctic which were not heavily involved in the first phase of AMAP. The activities of the group can be divided into four main activities, which take into account contractual requirements and scientific interest, as follows:

1. Testing of the model for global fallout prediction developed during AMAP phase 1 The model has been tested in Iceland and the results are encouraging
2. Measurement of vulnerability in different Arctic areas, currently focusing on Iceland and the Aleutian islands in Alaska
3. Participation in AMAP phase 2 expert group on radioactivity, with a specific input to the vulnerability assessment
4. Participation in scientific and organisational issues regarding the 5th International Conference in the Arctic in St. Petersburg in June 2002.

IUR members who are interested in participating in this group are asked to contact Brenda Howard (bjho@ceh.ac.uk), Sigurður Palsson (sep@simnet.is) or Doug Dasher (Doug_Dasher@envircon.state.ak.us). We are particularly interested to hear from members who have data that can provide values for transfer parameters for both radiocaesium and radiostrontium to arctic food products and also data giving long term ecological half lives in these ecosystems.

IUR General Assembly 2001

4th September 2001
18.00 – 21.00

Aix-en-Provence, France (Congress Centre)

The General Assembly for 2001 will be arranged in Provence during the ECORAD Conference.

The agenda for the annual assembly:
1.) Moral report
2.) Status from the IUR activity
3.) Outline of the programme for 2002
4.) Financial report and budget
5.) The election process fir the next board
6.) Any other business

Further information about the Programme and on practical arrangements will be made available through the IUR e-letter and at the IUR Website **http://www.iur-uir.org**, or directly at the IUR Secretariat:
Torun Jølle (Secretary) torun.jolle@nrpa.no
NRPA, P.O.Box 55, N-1332 Østerås, Norway
Tel. + 47 67162604, Fax + 47 67145444

FINANCIAL ACCOUNTS

OPERATING STATEMENT for IUR for the Year ended 31/12/00

	1999	2000
ORDINARY		
Income		
Membership fees	8 464,52	12 129,51
Interest	868,97	6 247,40
Transactions amendements	314,82	3 125,84
Third party support	14 402,52	2 465,00
TOTAL INCOME	**24 050,83**	**23 967,75**
EXPENSE		
General Assembly	- 1 757,39	- 1 464,15
President	- 4 789,20	- 2 271,40
Secretary General	-	- 528,19
Vice President (GP)	- 3 084,34	- 789,81
Treasurer & Accountants	- 655,27	- 3 439,80
Web site	- 857,86	- 161,74
Board of Council	- 118,59	- 2 316,67
Newsletters	- 5 594,04	- 4 632,51
Bank costs & interest	- 749,87	- 278,05
Exchange difference	- 1 618,94	-
Total Expense	**- 19 225,50**	**- 15 882,32**
PROFIT ORDINARY	**4 825,33**	**8 085,43**
SPECIFIC ACTIVITIES		
Contract DG X11		
Income	55 330,05	-
Expense	- 63 778,90	- 822,73
Deficit	**- 8 448,85**	**- 822,73**
Doses to biota		
Income	1 000,00	9 000,00
Expense	- 1 437,70	- 1 836,22
Deficit/Profit	**- 437,70**	**7 163,78**
Arctic Activities		
Income	43 034,32	-
Expense	-	- 5 501,82
Surplus/Deficit	**43 034,32**	**- 5 501,82**
SURPLUS SPECIFIC ACTIVITIES	**34 147,77**	**839,23**
NET SURPLUS	**38 973,10**	**8 924,66**

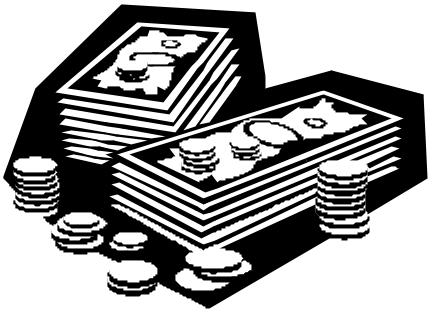
Balance Sheet 2000

	31.12.99	31.12.00
ASSETS		
Current assets		
Income to receive from 1999 DG XII Activity	29 229,00	-
Cash	60 792,07	77 699,10
Total Current assets	**90 021,07**	**77 699,10**
TOTAL ASSETS	**90 021,07**	**77 699,10**
DEBTS & ACCRUALS		
Outstanding payments to be made for previous years	16 248,45	4 469,07
Total Debts	**16 248,45**	**4 469,07**
Accruals		
Income carry over	9 467,25	-
Total Accruals	**9 467,25**	**-**
TOTAL LIABILITIES	**25 715,70**	**4 469,07**
NET	**64 305,37**	**73 230,03**
Fund Balance		
Beginning balance	- 2 619,00	64 305,37
Prior year's adjustment	27 951,27	
Year's Result	38 973,10	8 924,66
Total Fund balance	**64 305,37**	**73 230,03**

Anticipated budget 2001

Income	Item		Euros	Euros
	Total fund balance		73230,03	
	fees		10000	
	interest		4000	
		total	**87230**	
Costs				
	management			
	president			2000
	vice presidents			2000
	treasurer and accountants			2500
	Board of Council and General assembly			3000
	Newsletters			8000
	publications, web site etc			1000
	task forces			
	Arctic and Antarctic (incl conference)			10000
	doses to biota			1083
	aroc			1000
	task forces initiated by members			5000
Totals			**87230**	**35583**
Projected balance at end of 2001			**51647**	
Allocated expenditure for 2002				
	remaining ring fenced money for Arctic activities			18779
	support for Monaco conference			10000

Fees 2001



Most members have been contacted about payment of the fees for 2001. If you have not paid, please could you do so, preferably by providing the treasurer with credit card details. If you want to arrange other methods of payment please contact the treasurer Brenda Howard,
e-mail: bjho@ceh.ac.uk Fax: +44 1 5395 35941.

Membership grade	CIS, China Cuba, Colombia	Central Europe	Other countries			
	$	**$**	**EURO**	**$**	**BEF**	**£**
Student	7	10	20	21	800	13
Regular	14	20	50	53	2000	32
Senior	21	30	70	74	2800	45
Fellow	21	30	70	74	2800	45
Emeritus	7	10	20	21	800	13
Honorary	0	0	0	0	0	0
Supporting	>140	>200	>400	>420	>16000	>260

New members

From February 2001, the Executive Committee has accepted 9 new members to IUR:

Janos Somlai, Hungary
Anna Nalbandyan, Republic of Armenia
Daniel G. Robeau, France
Mark Dowdall, Ireland
Terry Hamilton, USA
Richard V.Graham, USA
Irene Gize, UK
Vladislav Golikov, Russia
Rob N.J. Comans, The Netherlands

Obituary

Nikolay Kulikov
08.10.1929-10.08.2000

Nikolay Kulikov, Professor, one of the founders of Radioecology in Russia, member of International Union of Radioecologists, died on 10th August 2000 at the age of 71.

He studied agricaltural sciences at the Institute of Agricalture in St. Petersburg. After finishing it as a young specialist he spent few years in the Far East, then at a secret scientific laboratory in the South Urals. There he worked under guidance of the eminent geneticist and radiobiologist N. W. Timofeeff-Ressovsky. Later N. Kulikov continued his research at the Institute of Plant and Animal Ecology Urals Division Russian Academy of Science (Ekaterinburg).There he headed the Department of Continental Radioecology during all his creative period of life. His main interests are directed to the behaviour of the natural and artificial radio-nuclides in the components of terrestrial and water ecosystems, radiobiology of plants, radiobiology of forest ecosystems, radio-ecological monitoring of NPPs. He was awarded the Medal Russia for his participation to the liquidation of the Chernobyl accident consequences.

N. Kulikov's pupils and followers in Ekaterinburg and Zarechny have carried out and continue beginning him studies.

His memory will remain with us forever. Nikolay is greatly missed by all his colleagues at home and abroad.

Inna Molchanova, Yelena Karavaeva

Environmental and Socio-Economic Consequences of Countermeasures

Carol Salt, Department of Environmental Science, University of Stirling, UK.
Email: c.a.salt@stir.ac.uk

Radioecology has been gradually moving towards a more holistic approach towards the environmental application of countermeasures. One key aspect of this trend has been the consideration of so-called side-effects or secondary effects. For agricultural systems these have been broadly categorised into environmental, radioecological, economic and social effects (Salt & Rafferty, in press). They may include impacts such as soil erosion, eutrophication, leaching of radionuclides, yield depression with subsequent loss of profits or poor acceptability of chosen measures by farmers or consumers. Such negative effects need to be balanced against the radiological benefits.

The CESER project (Countermeasures: Environmental and socio-economic responses - a long-term evaluation), funded under the European Fourth Framework Programme from 1997 to 1999, was dedicated to the evaluation of countermeasure side-effects in agricultural systems. Given the paucity of previous research in this field, the project team initially had to identify and prioritise the side-effects to be closely investigated, as well as selecting a sub-set of realistic countermeasures. This was tackled via a case study approach, focusing on representative agricultural systems in Austria, Finland and Scotland. The following impacts were quantified:

- ✓ Soil Erosion and Sedimentation
- ✓ Soil Organic Matter
- ✓ Soil Nutrient Transport to Water
- ✓ Soil Pollutant Transport to Water
- ✓ Ammonia Emissions
- ✓ Biodiversity
- ✓ Landscape Quality
- ✓ Agricultural Product Quality
- ✓ Agricultural Product Quantity
- ✓ Animal Welfare

using a combination of modelling, calculations, experimentation, economic valuation (Hanley et al., in press), landscape structure analysis (Luoto et al., 2001) and expert judgement. This was complemented by detailed work on the direct costs of countermeasures. Social impacts were studied via a consumer questionnaire survey, run in parallel in Norway and Scotland and designed to assess risk attitudes and behaviour, related to countermeasures and radioactive contamination of food.

To formalise the assessment of side-effects and make it more accessible for decision makers, two types of decision support system were designed: one for farm-scale assessment and a second for regional assessment applying GIS techniques (Salt & Culligan Dunsmore 2000). The software for the farm-scale 'CeserDSS' can be downloaded free of charge at this address: http://www.stir.ac.uk/envsci/ceser/ceser.htm. At the same web site all project reports are available in pdf format.

Much work still remains to be done in this novel research area, to integrate the assessment of side-effects into countermeasure decision-making alongside considerations of radiation protection, feasibility and practicability. Future studies should in particular focus on how to mitigate the side-effects of countermeasures. It is hoped that the results of CESER will stimulate the debate on the importance of environmental and socio-economic impacts of countermeasures.

The CESER project was a collaboration between the Universities of Stirling (UK), Bremen (Germany) and Salzburg (Austria), the Nord-Trøndelag College (Norway) and the Finnish Environment Institute.

References

Hanley, N., Salt, C.A., Wilson, M.D. & Culligan Dunsmore, M. (in press). Evaluating alternative "countermeasures" against food contamination resulting from nuclear accidents.. Journal of Agricultural Economics.

Luoto, M., Rekolainen, S., Salt, C.A. & Hansen, H.S. (2001). Managing radioactively contaminated land - implications for habitat diversity. Environmental Management, 27, 595-608.

Salt, C.A. & Rafferty, B. (in press). Assessing potential secondary effects of countermeasures in agricultural systems. A review. Journal of Environmental Radioactivity.

Salt, C.A. & Culligan Dunsmore, M. (2000). Development of a spatial decision support system for post-emergency management of radioactively contaminated land. Journal of Environmental Management. Journal of Environmental Management, 58, 169-178.

Works of OINPE and RRC KI within the PRANA project.

Boris I.Yatsalo, Manager of the PRANA project, OINPE - RRC KI
yatsalo@prana.obninsk.org ,
www.prana.obninsk.org

OINPE – Obninsk Institute of Nuclear Power Engineering, Obninsk, Kaluga region, Russia, http://www.iate.obninsk.ru/
RRC KI – Russian Research Centre "Kurchatov Institute", Moscow, Russia, http://www.kiae.ru/

PRANA project is the name of the ISTC project #1224 (1999 – 2002):
"Development of GIS-DSS systems for rehabilitation of radioactive contaminated territories".
(GIS - Geographic Information System; DSS - Decision Support System). Project was supported by NRPA (Norway), GSF (Germany), CEPN (France), NRPB (UK) and RISO (Denmark); financing parties: EU and Norway. PRANA means Protection and Rehabilitation of environment After Nuclear Accident, and it is the name of Decision Support System(s) developed and being developed within the ISTC project #1224, www.prana.obninsk.org . PRANA project is carried out by OINPE & RRC KI in close contacts with leading scientists from Institute of Radiation Hygiene (St.-Petersburg), Institute of Biophysics (Moscow), Nuclear Safety Institute (Moscow) and Bryansk Centre of Agrochemical Radiology (Bryansk).

It should be stressed that primary steps in developing a prototype of GIS-DSS for such tasks were undertaken by key participants of PRA*NA* project in collaboration with NRPB and CEPN in 1994-1995 within the International Chernobyl project JSP2. A prototype of *PRANA* on the basis of *raster* GIS was developed. However, approbation of such a system demonstrated a necessity of development of DSS based on the *vector* GIS and realisation of many additional models and tools to be useful both for correct scientific and practical implementation.

The purpose of the current *PRANA*/ISTC #1224 project is development of approaches, methods and creation of computer systems for decision-making support on liquidation of the long-term consequences of a nuclear accident and rehabilitation of contaminated territories with consideration of radiological, ecological and socio-economic factors. On the basis of integration of original methods, math models and computer modules along with the use of up-to-date GIS and Internet technologies the following prototypes of the GIS-DSSs are under development.

✓ PRANA-P GIS-DSSs for Practical use (with introduction at appropriate local Centres in Bryansk region and Authorities and Ministries) - for purposes of site specific decision-making support on rehabilitation of radioactive contaminated territories. PRANA-P includes several different version of GIS-DSS:

- PRANA-DB-Analysis – for support of monitoring networking in agriculture and analysis of monitoring data;
- PRANA-P-Agro – for countermeasure (CM) analysis on agriculture areas;
- PRANA-P-Dose - for assessing doses to the local population and CM analysis. This system comprises also the main possibilities of PRANA-P-Agro.

✓ PRANA-R GIS-DSS for Research and for scientific and practical estimations. This version of PRANA includes all the basic possibilities of PRANA-Ps along with additional blocks (which can be operated by specialist-researched) on risk analysis, optimisation of CMs structure with financial restrictions, uncertainty analysis and some others.

✓ PRANA-E/T GIS-DSS for training and education of the specialists and students includes the main items of radiation protection, dose and risk assessments.

✓ In addition, elements of distributed systems and remote access to components of GIS-DSS (*PRANA-Remote*) is developed for

website purposes as well as for subsequent practical use as database server and remote training and education.

It should be pointed out that the GIS-DSSs indicated above are considerable different from other computer system intended for close goals, including RODOS and EDSS. The main features of *PRANA* prototype have been presented, see also items of R&D below. New *PRANA* versions and their possibilities and implementation will be presented in detail in new publications that are under preparation (some approaches and preliminary results have been partly reflected in publications indicated below).

Work within the *PRANA*-project consists not only of developing indicated DSSs. They comprise a wide range of R&D, which are briefly presented below.

✓ Information support of R&D carried out:
- databases on monitoring data for contaminated territories of Bryansk region (agricultural fields, farms, settlements, forests);
- library of vector electronic maps (based on landuse maps) for contaminated territories of Bryansk region. At present this library includes 5 contaminated districts and 80 farms and comprise all the main categories of land use (arable lands, pastures and hayfields, forests, swamps and water bodies, gardens, settlements and other plots of landuse) - in total more then 20000 of source polygons of vector maps. Layers of vector maps include: landuse, surface density contamination with ^{137}Cs and ^{90}Sr, administrative division and different derived maps based on landuse map and attributive information on polygons (soil types and chemical composition, population doses, etc.).
- database (knowledge base) on all main agricultural and administrative CMs in long-term period of liquidating the consequences of a nuclear accident.

✓ GIS-adapted models and computer modules, as well as stand-alone computer systems:
- for assessing contamination of agri cultural products and results of CMs implementation, (CMAN);
- for estimating doses to the local population from ^{134,137}Cs and ^{90}Sr before/after CMs implementation (PRANA-Dose);
- for assessing doses to the agricultural workers from transuranium radionuclides (TU-Dose);
- for optimisation of CMs structure on contaminated territories when solving direct and inverse (i.e. with financial restrictions) tasks.

✓ Development of methodological approaches, models, computer modules and stand-alone computer system for assessing radiological risks (PRANA-Risk, BARD);

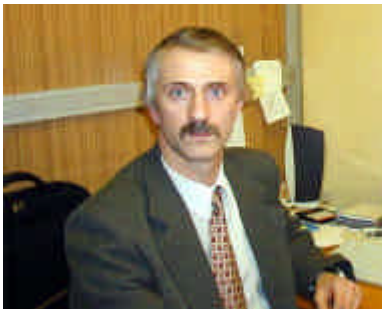
✓ Realisation of radiation protection principles as well as existing requirements of international and national standards and legal regulations): methods and algorithms, strategies of rehabilitation and intervention levels adjusted ;

✓ Multi-criteria assessment of CMs effectiveness and decision-making support on protection of the population and rehabilitation of radioactive contaminated territories both on local and regional/district levels (from separate settlement/field up to group of settlements/farms and region as a whole);

✓ Development of an application in ArcView GIS environment (PRANA-ArcV) for analysis and presentation of attributive information and various vector electronic maps;

✓ Spatial Data Analysis;

✓ Implementation of probabilistic methods for applied estimations. Module Randfunct for estimating distribution of functions of random variables. Uncertainty analysis when assessing contamination of agricultural production, internal and external doses to the local population, radiological risk and CM effectiveness.


Dr. Boris Yatsalo

Items indicated above present main directions of R&D within the project. More then 25 scientists are involved in their realisation, and almost 15 of them (including 5 post-graduate students) are dealt with modelling and developing computer modules and GIS-DSSs. Within the project one Ph.D. thesis was prepared and 5 will be prepared to the end of the project.

At present stepwise GIS-DSSs implementation for practical needs on rehabilitation of contaminated territories is carried out in collaboration with Ministry of Agriculture and Bryansk authority. Other versions of PRANA will be introduced at the Minatom and Emercom of Russia as well as at the several Institutes and Centres.

Additional information on PRANA project and team as well as an extended list of publications for the last years are available on the PRANA website
(www.prana.obninsk.org ;
www.prana.obninsk.org/Aeng/framesete.htm) .

Study of radionuclides mobility and transport mechanisms during the hydric erosion process

By David Claval

French Institute for Agronomy Research (IPSN / DPRE / SERLAB)
CE Cadarache, Bat 186
13108 Saint Paul Lez Durance Cedex
FRANCE

On radioactively polluted land, water erosion is responsible for the spread of radioactive radionuclide contaminants through the agricultural catchment area, their redistribution, possible concentration and export towards the aquatic environment, and also for the post-accident contamination of plants through splash of water. The aim of this work is to offer, or improve, values for the proper functioning of calculation codes designed for operational use. Currently, such calculation codes do not take into account the spread of contamination after its release.

Modelling these transfers requires initially the knowledge acquisition on the capacity for spread of the contamination at decimetric scale. To this end, we have reproduced dry and wet on-soil deposits of radioactive aerosols of caesium and strontium, at various stages within the hydric and structural history of the soil, as a function of various slopes of the land. The exchanges of caesium and strontium at the water-soil interface has been quantified by means of millimetric experimentations in batch, by taking particular account of the various phases of the mobilisation of soil particles which have been simulated on calibrated blocks of aggregates.

Working on a single soil type has enabled us to establish a scheme of the general functioning, a feature which deserves now a full validation for various types of soil while increasing the complexity of the hydric history.

Towards the end of this study, it has appeared that the caesium migrates horizontally at an appreciably faster rate, and in greater proportions, than the strontium which in turn poorly binds to particles and tends to penetrate into the first centimetres layer of the soil. The key parameter to be taken into account in modelling would appear to be the initial moisture of the soil. In addition, the migration of the caesium appeared to be particularly sensitive to the development of sedimentary crusts. Where the soil is dry or slaking crusted at the time of contamination, the first run-offs are very efficient in carryingiers of contamination over. By preventing infiltration, the sedimentary crust favours the exportation of caesium and strontium while trapping in the mean time part of the contamination on its immobile particles. On steep slopes, the structure of the sedimentary crusts is less continuous, they are less extensive and, the macro-aggregates, then, persist on the surface; by inhibiting exportation by run-off, they favour the local dispersion of the contamination. Also,in the case of wet discharge, the contamination of caesium tends to disperse locally.

For an operational expert study model to be further elaborated, a prior knowledge of the catchment area is a baseline requirement, but also, designing a reasonably short calculation time appears more important than reaching a high spatial resolution. of the results is not necessarily of great interest. By applying solid-liquid distribution coefficients of contaminants to erosion models such as WEPP, the calculated rate of transport in the run-off water may prove satisfac-

tory. In contrast, for the development of a research model, a more mechanistic approach with a finer time scales and better resolution of surface obstacles would no doubt provide a basis for good anticipation of possible contamination reconcentrations of contamination in the zones of deposit in the catchment area. The LISEM model is a good illustration of this approach.

Tc speciation and bioavailability in the environment

George Shaw.
Imperial College of Science,Technology and Medecine (ICSTM)
Centre for Anal.Res. in Envir.
Buckhurst Road, Silwood Park
Ascot SL5 7TE Berkshire, UK

Notes from a one day workshop at the Interfaculty Reactor Institute, Department of Radiochemistry, University of Delft, Holland (2nd May 2001)

The purpose of this meeting was to bring together radioecologists within Europe who currently have an interest in the behaviour of ^{99}Tc in the terrestrial environment.

The meeting was organised and chaired by G. DESMET who introduced the objectives of the workshop and gave a brief resumé of past research on the environmental behaviour of ^{99}Tc. A recent review of literature on ^{99}Tc in the soil-plant system has indicated that, since the well-known 1986 publication of Desmet and Myttenaere (Technetium in the Environment, Elsevier) 119 papers with new information on this topic have been published. While this number is small in comparison with papers on radiocaesium, there was an increase in the publication rate of papers on ^{99}Tc in 1999 suggesting a possible renewal of interest in this radionuclide.

^{99}Tc is of interest in the context of radioactive waste disposal in geological repositories. E. LECLERC-CESSAC (Agence Nationale pour la Gestion des Déchets Radioactifs, France) explained ANDRA's interest in ^{99}Tc and introduced some of the work sponsored by ANDRA in this area. G. ECHEVARRIA and S. DENYS (ENSAIA-INRA/INPL, France) described this work in more detail. It involves the study of soil-plant transfer of ^{99}Tc from large undisturbed columns of colluvial and acid brown soils. Soil-plant transfer factors are generally high (1 – 5 in maize cobs, 1000 – 3000 in maize leaves) and variable, depending on soil characteristics, plant species and fertiliser (NB. nitrate) applications.

G. SHAW and A. BOSTOCK (Imperial College, UK) presented work carried out on behalf of United Kingdom Nirex Limited. A lysimeter experiment which ran from 1990 to 1993 aimed to determine whether low redox potentials in the sub-soil are sufficient to present a significant barrier to technetium migration towards the more oxidising conditions in the surface soil. ^{99}Tc was transported readily from deeper parts of the lysimeters with redox potentials as low as –250 mV to the more oxic upper soil. Over the course of the experiment weighted soil-plant transfers for wheat of 10 to 1000 were observed. Current experiments are investigating the effects of a fluctuating water table on technetium mobility/ bioavailability in soils and possible losses due to volatilisation.

S. WEBSTER and C. SALT (Stirling University, UK) described a new study to evaluate the potential transfer of ^{99}Tc from seaweed obtained from the Irish Sea to agricultural soil when the seaweed is used as a fertiliser. The activity concentration of ^{99}Tc in seaweed sampled from the Cumbrian coast is approximately 60 kBq/kg and initial measurements indicate that after 19 days some 20% of this ^{99}Tc is transferred to the soil. This could represent a significant sea-to-land transfer mechanism in locations where seaweed is commonly used as a soil conditioner.

S. STAUNTON (INRA, France) presented plans for new experiments to be carried out as part of the EU funded BORIS project in which the soil chemistry of technetium is being investigated in relation to microbial activity. The importance of heterogeneity of soil redox potential at the micro-scale was stressed and the question of hysteresis in oxidation and reduction of technetium was raised.

L. VAN LOON (Paul Scherrer Institut, Switzerland) and J. LEMBRECHTS (RIVM) reviewed work carried out in the 1980s the

former ITAL (Wageningen, Nl) and at the Universities of Leuven and Antwerp (Belgium) in which the behaviour of technetium in both soils and plants was studied in detail in parallel programmes. These studies determined that the nitrate status of soils is a major determinant of technetium uptake by plants in both hydroponic systems and in natural soils. Technetium uptake is also strongly linked to plant growth and photosynthesis. It is taken up in the pertechnetate form (TcVII) and then reduced to TcV, in which form it is less available for uptake by animals subsequently consuming the contaminated plant material.

Finally, H. WOLTERBEEK (University of Delft, Holland) summarised several recent doctoral studies on technetium uptake by tomato, spinach and duckweed. These studies have addressed the kinetics and biochemistry of technetium assimilation from soils and hydroponic solutions as well as developing novel 1D and 3D imaging systems using a gamma camera in conjunction with ^{99m}Tc and ^{75}Se as tracers of technetium in the transpiration stream of tomato plants.

Discussions following the presentations of individual speakers raised the following questions which provide suggestions for future studies.

· Possible variability in the chemical speciation and distribution of technetium in the soil profile can lead to difficulties in quantifying and interpreting Tc uptake by plants in experiments. In reporting soil-plant transfer factors it essential to describe in full the experimental conditions under which data were obtained.

· Is there a critical soil redox potential for reduction of pertechnetate to the less bioavailable Tc(IV) form?

· Does soil organic matter play a key role in the reduction of pertechnetate. Are other substances and/or soil microbes involved?

· Once reduced to Tc(IV), does re-oxidation to Tc(VII) occur readily under suitable conditions?

· Problems with analysis of ^{99}Tc in soil and plant materials: ^{99m}Tc can be used as a short-lived internal yield monitor, but ashing of samples at high temperature may lead to losses of technetium by volatilisation.

· Does volatilisation and leaching of technetium occur from plant leaves under normal environmental conditions?

International Union of Radioecology and Society of Environmental Toxicology and Chemistry

IUR-SETAC
University of Antwerp

Joint International Seminar on Exposure and Effects, Modelling in Environmental Toxicology

- a first dialogue between nuclear and non-nuclear environmental scientists and managers.

Antwerp, 4 - 8 February 2002

In radioecology (radiation ecology) and in environmental toxicology numerous endeavours to developing models for assessing the consequences of the presence of radionuclides and other pollutants in the environment have been counted. These bordering scientific disciplines have rather lived in separate worlds and little effort has been observed to compare the models and to search for common useful features in their modelling approaches. Financial and intellectual resources are to be optimally used, as there is also a continuously increasing demand for environmental engineering capacities considering the continuous growth of the world's economy and industry.

The aim of this joint Seminar is to bring together experts involved in experimental research and model development in closely related areas of environmental chemistry and toxicology. This Seminar wants, however, not only to attract the interest of specialised scientists but equally the interest of user groups in the world of environmental engineering and decision taking.

The application of predictive models for the effects of exposure to micro-contaminants in aquatic and terrestrial ecosystems is a central issue in environmental risk assessment. The development of these models requires a thorough understanding and integration of processes taking place at different levels of organisation (e.g. environmental transport, chemical speciation, biological availability, cellular toxicology, population ecology).

The different themes will thence be discussed in a comparative perspective confronting, for example, recent advances in the risk assessment of heavy metals, radionuclides and persistent organic pollutants.

Main Themes

✓ Exposure and accumulation monitoring and modelling

✓ Ecotoxicological and human health effects monitoring and modelling

✓ Strategies and procedures of hazard and risk assessment

✓ Strategies for application of these optimised models for environmental engineering

Pre-registration and expression of interest

f you are interested in participating in this Seminar, please mail or fax the following information to the Seminar secretariat by 30th Sep 2001:

Surname:
First Names:
Institute/Organisation/Company:
Mailing address:
Country:
Tel:
Fax:
E-mail:

I intend to present an oral presentation with the following title:

Address

Mrs. R. Hermans, secretary
Department Biology, University of Antwerp
Groenenborgerlaan 171 U7
B-2020 Antwerp, Belgium
Fax + 32 3 218 04 97
Email: hera@ruca.ua.ac.be

Visit also the IUR Website address:
http://www.iur-uir.org

7th SPERA Environmental Radioactivity Conference

First Circular
Expression of interest

Environmental Radioactivity:
Migration, Measuring and Monitoring in the South Pacific

Lucas Heights Science and Technology Centre
13 – 17 May 2002
Sydney - Australia

On behalf of the South Pacific Environmental Radioactivity Association (SPERA), it is with great pleasure that the Organising Committee invites you to join us for our 7th biennial Conference: SPERA-2002.

The Conference titled **"Environmental Radioactivity: Migration, Measuring and Monitoring in the South Pacific"** will be hosted by the Australian Nuclear Science and Technology Organisation (ANSTO) and the Australian Institute of Nuclear Science and Engineering (AINSE) and held at Lucas Heights in Sydney, Australia.

SPERA's primary objective is to foster communication among scientists in the South Pacific region who are using environmental radioactivity to study natural processes and human impacts. Researchers around the world share those interests and the biennial SPERA conference is becoming a favourite venue for scientists, from within the region and across the globe, to discuss widely relevant issues with a South Pacific perspective. The meeting is renowned for its scientific rigour in a friendly setting. Sydney is still glowing from its wonderful Olympic Games and this beautiful harbour city will provide many picture-perfect memories for those who join the conference.

Internationally respected authors will give our keynote presentations. Planning is under way to have papers from the proceedings published in a leading international journal as a special edition. It is therefore essential that people wishing to submit presentations consider that quality will be the major factor affecting acceptance. There will also be significant attention given to poster sessions, as the number of oral presentations will be limited.

The conference will cover the following themes:

- Climate & Atmosphere;
- Sedimentation & Erosion;
- Wide Area Environmental Monitoring;
- Uranium Mining & Technically Enhanced Naturally Occurring Radioactive Materials (TENORM);
- Radioecology;
- Coastal & Marine Processes;
- Soils & Regolith.

The overall focus (as captured in the conference title) is: Environmental Radioactivity: Migration, Measuring and Monitoring in the South Pacific.

We look forward to welcoming you to Sydney in May 13-17, 2002.

CONFERENCE ORGANISER

SPERA-2002
John Twining
ANSTO – Environment Division
PMB 1, Menai
NSW – Australia

Phone: +61 2 9717 3060
Fax: +61 2 9717 9260
Email: spera2002@ansto.gov.au

Website:
http://hazel.cc.ansto.gov.au/spera/index.html

JUNE 2002

First announcement and call for papers

International symposium
In situ nuclear metrology as a tool for radioecology

Fleurus – Belgium
I.R.E.
10 – 12 june 2002

With the participation of IAEA and EC

Aims
This symposium has a dual purpose.
First of all, it wants to bring together Radioecologists, Regulatory Authorities as well as Radiological Monitoring System Operators, in order to allow a wide exchange of information regarding practical experience and difficulties encountered in daily radiological monitoring of environment.

On the other hand, the symposium intends to focus on the modern nuclear metrological tools, which could be used nowadays to ease the direct remote surveillance of the radiological status of seas, rivers, lakes and earth surface. In the past, these tools were suffering from a lack of sensitivity and reliability and were for that reason mainly used for health physics control that did'nt require such a high accuracy. New systems are now at the disposal of mathematical model users and radioecologists for investigating radioactive contaminants dispersion in normal conditions as well as in case of incidents.

On basis of acquired experience and metrology progress, the final object of the symposium is to help the environment radioprotection world, to harmonise its rules, and thus to perform in the future a realistic and useful radiological monitoring.

Themes of the symposium
I. Human activities impact on the radioactivity of terrestrial and aquatic ecosystems
II. Concepts for environment radioprotection : point of vue and requirements of international institutions.
III. Expectations of the scientific community and new trends in nuclear metrology.
IV. Panel session

Contribution of authors
The oral sessions will be devoted to invited presentations followed by contributions chosen on the basis of their broad scope. The posters will promote communication between participants and will deal with more specialised results.
A camera-ready text will be required for every presentation.

Exhibition
An exhibition area will be available to organizations and industrials dealing with environmental radiation protection.

Contact us
For further information,by mail to :
IRE-Radioprotection de l'Environnement «2002» - Zoning Industriel - B-6220 Fleurus (Belgium).
Tél. : +32.71.82.94.00
Fax : +32.71.81.38.12
E-mail : generalmail@ire.be

The 5th International Conference on Environmental Radioactivity in the Arctic and Antarctic

ORGANISATION
The conference is organised by:
Norwegian Radiation Protection Authority (**NRPA**) and Russian Federal Service of Hydrometeorology and Environmental Monitoring (**ROSHYDROMET**)
in co-operation with: International Union of Radioecology (**IUR**), Arctic Monitoring and Assessment Programme (**AMAP**) and International Atomic Energy Agency (**IAEA**)

TIME AND VENUE
This Fifth International Conference on Environmental Radioactivity in the Arctic and Antarctic will take place in:

St. Petersburg, Russia
16 - 20 June 2002

BACKGROUND
During the last decade, the threat of possible radioactive contamination especially of arctic regions has attracted increasing international interest. Awareness of the environmental vulnerability of the Polar regions from radioactive pollution has led to the development of national and international scientific programs to describe the possible future situation and the resulting consequences. Several scientific expeditions have been carried out in the Arctic to monitor radioactivity from various sources and action programmes for risk reduction are initiated by several countries.

TOPICS OF THE CONFERENCE
The conference will focus on radioactive contamination in the Polar regions - the transport and fluxes of radioactive elements, both anthro-pogenic and natural, through atmospheric, terrestrial and marine environments; consequences of nuclear accidents; nuclear safety, waste and risk management and risk assessment.

The conference will be an important follow up to the AMAP work, both regarding the scientific work and the scientific report for the Ministers of the Arctic countries due in the Autumn of 2002. Reports from other international projects will also be presented.

The main topics will be:
- ✓ Polar radioecology and vulnerability
- ✓ Remobilisation: The role of temporal sinks and remobilisation in the long distance transport of radionuclides.
- ✓ Exposure and impact on humans
- ✓ Exposure, effects and protection of flora and fauna from radiation
- ✓ Nuclear safety and waste management
- ✓ Risk assessment and risk management

CONFERENCE STRUCTURE AND DEADLINES
The conference will be structured in the form of oral and poster presentations selected from submitted abstracts. The meeting sessions will allow short (ca. 3-5 min.) oral presentations of posters. A volume of proceedings will be produced.

The conference will also address the implications of the results presented. The objectives will be to give input to the planning of the further scientific work in the Polar regions and to provide a basis for scientific input to decision-makers. A block booking for accommo-dation has already been made and further information on conference registration, hotel reservations and booking for optional excursions, etc. will be provided. The meeting programme will be circulated later. To receive this information please be sure to complete the reply slip attached to this announcement.

If you intend to participate, please complete and return the reply-slip to the conference secretariat.

If you wish to submit a **presentation**, please provide short abstract (ca. 300 word) before **1st September 2001**.

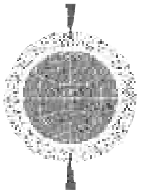
Authors selected to give oral presentations/posters will be notified during autumn 2001.

CONFIRMED SPONSORS
- ✓ The Norwegian Royal Ministry of Foreign Affairs
- ✓ The Norwegian Radiation Protection Authority
- ✓ International Union of Radioecology
- ✓ U.S. Department of Energy
- ✓ Arctic Monitoring Assessment Programme

CONGRESS SECRETARIAT FOR THE SCIENTIFIC PARTS OF THE CONFERENCE

Norwegian Radiation
Protection Authority (NRPA)
Att: Radioactivity Conference 2002, P.O.Box 55
NO-1332 Østerås, NORWAY

Contact person:
Torun Jølle
Telephone: +47 67 16 26 04
Telefax: +47 67 14 54 44
E-mail: **arctic@nrpa.no**



We look forward to seeing you in St. Petersburg in June 2002!

On behalf of the scientific and organising committee
Per Strand & **Yuri Tsaturov**

First Announcement and Call for Papers:

Third International Symposium on the Protection of the Environment from Ionizing Radiation

By: Stephen Domotor, Editor, IUR Newsletter

Overview and Focus of the Symposium –
On behalf of the Scientific and Organizing Committee, I would like to bring to your attention the first announcement and call for papers regarding the Third International Symposium on the Protection of the Environment from Ionizing Radiation. The theme for the Symposium is "The Development and Application of a System of Radiation Protection for the Environment". The Symposium will be held in Darwin, Australia, from 22 – 26 July 2002. The Symposium is being organized by the Supervising Scientist Division of Environment Australia and the Australian Radiation Protection and Nuclear Safety Agency in cooperation with the International Atomic Energy Agency. Various external organizations and government agencies are also providing support to the Symposium, to include: the U.S. Department of Energy; European Commission; Swedish Radiation Protection Institute; Canadian Nuclear Safety Commission; and Dublin Institute of Technology.

Preliminary Program -
The first day will be devoted to ongoing research in relation to "Ionising Radiation and Biota: Effects, Responses and Mechanisms". The second day will address policy, and ethical dimensions together with scientific considerations in the context of "Frameworks for Environmental Radiation Protection". The third day will focus on the tools required to implement an environmental radiation protection system: "Methods, Models and Guidance for Evaluating Radiation as a Stressor to the Environment". On day four there will be workshops integrating material presented during the previous three days, and discussions on activities required to move the agenda forward, including preparatory meetings to discuss the organization of an IAEA International Conference on Environmental Radiation Protection to be held in late 2003. Day five provides an opportunity for an optional tour of the Ranger uranium mine, a three-hour drive from Darwin. The tour has been kindly sponsored by the mine operator, Energy Resources of Australia Ltd.

Critical Dates -
Submission of abstracts, at a maximum of one page, double-spaced, are to arrive at the Secretariat by 26 October 2001. Notification on acceptance of abstracts will be made 30 November 2001. Submissions of full papers are due 28 March 2002.

Fee -
The Symposium fee including the welcome reception, conference dinner, lunches & coffee breaks, will be A$700 (currently approximately US$360).

Venue -
The venue for the Symposium is the Carlton Hotel, Darwin.

Further Information and Registration –
Register your interest in the Symposium by Email: symposium@eriss.erin.gov.au.
For complete details on the first announcement, call for papers, and preliminary program go to the Symposium web site at: www.environment.gov.au/ssg/symposium/index.html.

You may fax information at: + 61 (0)8 8981 4316 or write to: Symposium Secretariat, GPO Box 461, Darwin, NT 0801, Australia.

Postdoctoral position Aquatic Physics/Modelling

The Applied Aquatic Ecology department (http://www.eawag.ch/ research_e/ apec/e_index.html) of EAWAG (http://www.eawag.ch/), in Kastanienbaum/ Lucerne Switzerland (http://www.eawag.ch/research/kastanienbaum/d_kastan.html) is seeking an aquatic modeler (Postdoctoral position) to conduct research on the bio-geochemical cycling in lakes, reservoirs and dams and related physical phenomena. Special emphasis will be on the impact of hydro-electrical power production on up- and down-stream (such as nutrients, water quality, particles, turbidity, hydrology, temperature, pump/storage-induced turbulence, and reservoir oxygenation). River modeling will be the focus in certain applications as well. A minor focus (but no excluded) will be the study of purely physical (turbulence) phenomena.

The temporary position (two years with the potential option of prolongation) is linked to two in-house funded interdisciplinary projects (environmental-friendly use of hydro-power and river restoration) and on two externally funded applied projects.

The candidate is expected to develop, validate and set-up tools based on existing models such as k-e modeling (http://www.gotm.net/), one-dimensional aquatic system modeling (http://www.aquasim.eawag.ch/), dam/reservoir modeling (http://www.ce.pdx.edu/~scott/w2/) and lake/reservoir modeling (http://www.cwr.uwa.edu.au/~ttfadmin/model/dyresm1d/) and apply them within the ongoing projects. Also large existing data sets are available, including microstructure profiles. Minor services for the entire group (software, courses and internal education, etc.) is expected. Also expected is a strong interest in collaboration and communicative abilities and openness towards an interdisciplinary environment (including social sciences).

Candidates must have a Ph.D. in hydrology, Fluid dynamics, civil or environmental engineering, or a related discipline with a special interest in modeling. For more information, please contact Alfred Johny Wüest, Applied Aquatic Ecology (APEC), EAWAG; CH-6047 Kastanienbaum, Switzerland (alfred.wuest@eawag.chor andreas.lorke@eawag.ch).

Interested applicants should send curriculum vitae (including the list of publications and three references) to Alfred Wüest. The position will remain open until filled.

JER SPECIAL ISSUE: Remediation Strategies

Journal of Environmental Radioactivity
Special Issue: Remediation
Strategies - Guest Editor, G. Voigt (vol 56/1-2, 2001)

For further information about this issue, which can be purchased at the reduced price of US $ 40/76 Dutch Guilders, please contact Simon Richert (s.richert@elsevier.co.uk)

Executive Committee

Publisher:
IUR Secretariat
P.O.Box 55
N-1332 Østerås
Norway
Tel. +47 67 162604
Fax +47 67 145444
E-mail: iur@nrpa.no

Layout:
Vitho Design
E-mail: vithod@online.no