

The logo for IRSN (Institut de Radioprotection et de Sûreté Nucléaire) features the acronym 'IRSN' in a bold, sans-serif font. The letters 'I', 'R', and 'S' are red, while the 'N' is blue. The letters are closely spaced and partially overlap.

INSTITUT
DE RADIOPROTECTION
ET DE SÛRETÉ NUCLÉAIRE

EUROPEAN MASTER PROGRAMMES IN RADIOECOLOGY, RADIATION PROTECTION AND ADVANCED RADIOCHEMISTRY TO MEET THE STAKEHOLDERS NEEDS FOR RECRUITMENT

L. Skipperud, B. Salbu, H. Garelick, H. Jones,
C. Tamponnet*, P. Mitchell

**Institute of Radioprotection and Nuclear Safety, Scientific Direction,
C.E. Cadarache, B. P. 3, 13115 Saint-Paul-lez-Durance Cedex, FRANCE,*

christian.tamponnet@irsn.fr

Introduction

In 2000 the OECD Nuclear Energy Agency produced a report: Nuclear Education and Training: Cause for Concern? This document was compiled using information supplied by 200 organizations in 16 member countries. The agency demonstrated that it was possible that many nations were training too few scientists to meet the needs of their current and future nuclear industries. In addition, a number of studies over the past five years, by different European governments, have also identified that too few scientists were being trained to meet the needs of their current and future nuclear industries. This has been attributed to decreased student interest, decreased course numbers, aging faculty members and aging facilities.

Consequently, the European education skill base has become fragmented to a point where universities in most countries lack sufficient staff and equipment to provide education in all, but a few, nuclear areas.

Of particular concern appeared to be special skill-base deficits within nuclear radiological protection, radioecology and radiochemistry at master and doctorate levels.

Introduction

Skills in these areas are required not only to deal with currently installed nuclear capacity and decommissioned facilities, but also to meet the needs presented by likely new-build nuclear capacity.

As recently stated by several EU politicians and experts, there are increasing pressures to build new nuclear power stations in many EU member nations. This pressure comes from the need to meet Kyoto greenhouse gas emission targets at a time when many currently installed, CO₂-clean, nuclear power stations are coming to the end of their useful lives. They also come from the decreasing stocks of domestic fossil fuels, with an increasing reliance upon politically unstable nations for the provision of oil and gas and from the increasing prices of domestic and imported fuels.

Finally, the pressures are facilitated by new improved reactor systems that are being developed in Europe and USA. Therefore, the need for nuclear competence is greater now than earlier anticipated.

Introduction

- The EU 6th FP funded EURAC and the ENEN-II projects have aimed to assess the current and potential levels of postgraduate provision in selected linked disciplines associated with radiological protection and radioecological competence within universities and other higher education institutes within the EU in the context of demand.
- Based on consultations with European stakeholders, EURAC recommended actions that could be taken by European Institutions and relevant organizations in Member States to secure the future of nuclear radiological protection, radiochemistry and radioecology postgraduate education in an expanded EU .

Existing Competence

- The provision of postgraduate training at Master's level, specifically designed to meet the requirements is diffuse and insufficient in most of the Member States of the EU.
- It is evident that competence in these fields at training level is being eroded through natural wastage and is not being replaced at a rate adequate to satisfy expected future demand for these specialised skills.
- Finally, the survey evidences strong support for a EU-wide Master's training programme in radiation protection and allied fields, as well as considerable willingness to participate in and/or host such a programme/s.

Future Needs

The survey of European Stakeholders confirms that there is a significant current and future need for personnel trained to masters-level and beyond in the broad area of radiological protection.

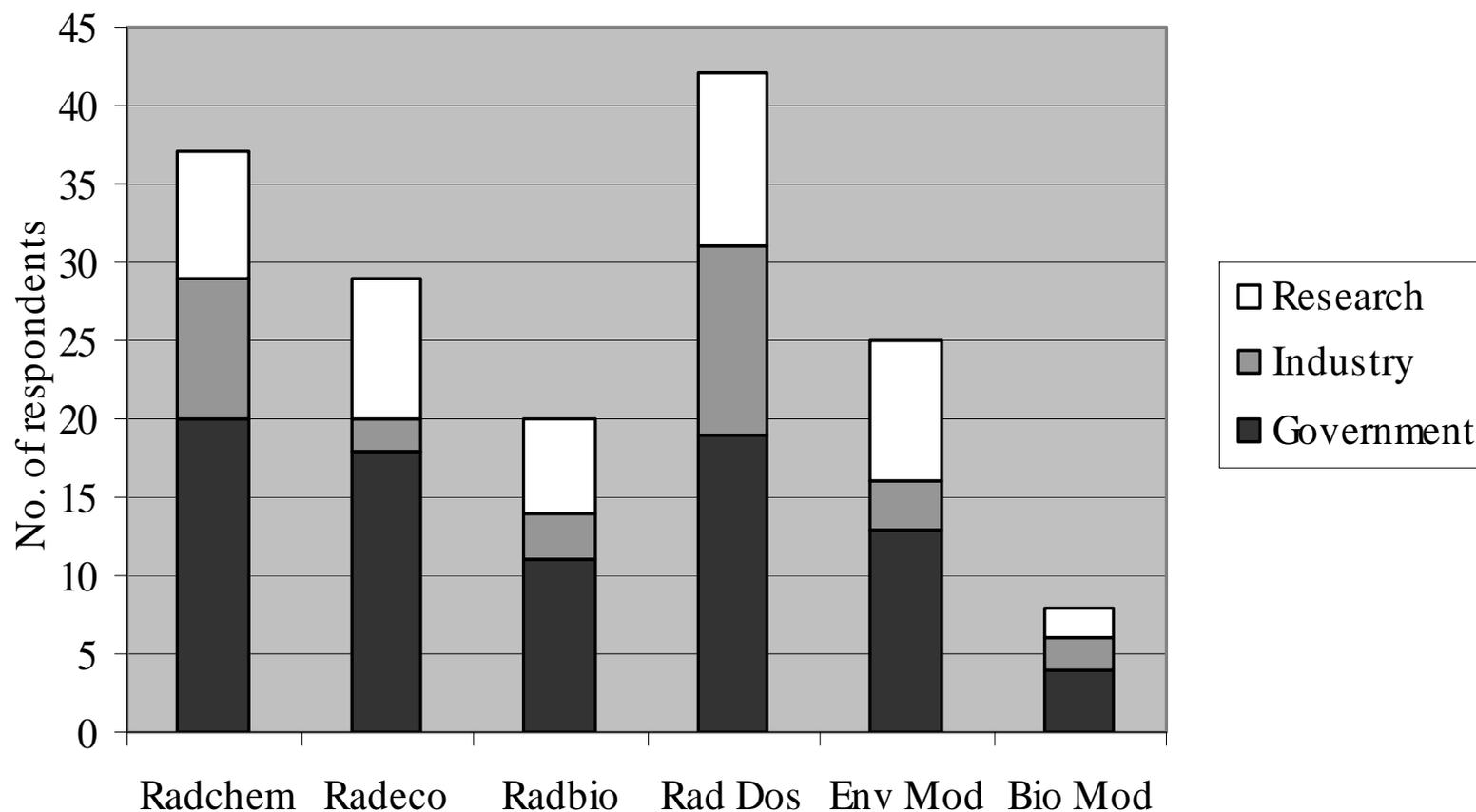
There appears to be a consensus that recruits will have to be obtained from other than the traditional engineering route.

The implications of this are that 'nuclearisation' of programmes in other areas such as environmental science would attract sufficient numbers of students to make them viable - provided that careers in the nuclear sector were made sufficiently attractive and/or were seen to offer a secure future career.

Furthermore, it suggests that 'nuclear-related' masters programmes would have a ready market given that much of the recruitment to the nuclear sector is made at this level.

Future Needs

Stakeholder requirements: Areas of preferred expertise for recruits within radiochemistry, radioecology, radiobiology, radiation dosimetry, environmental modelling and biological modelling.



Potential solutions

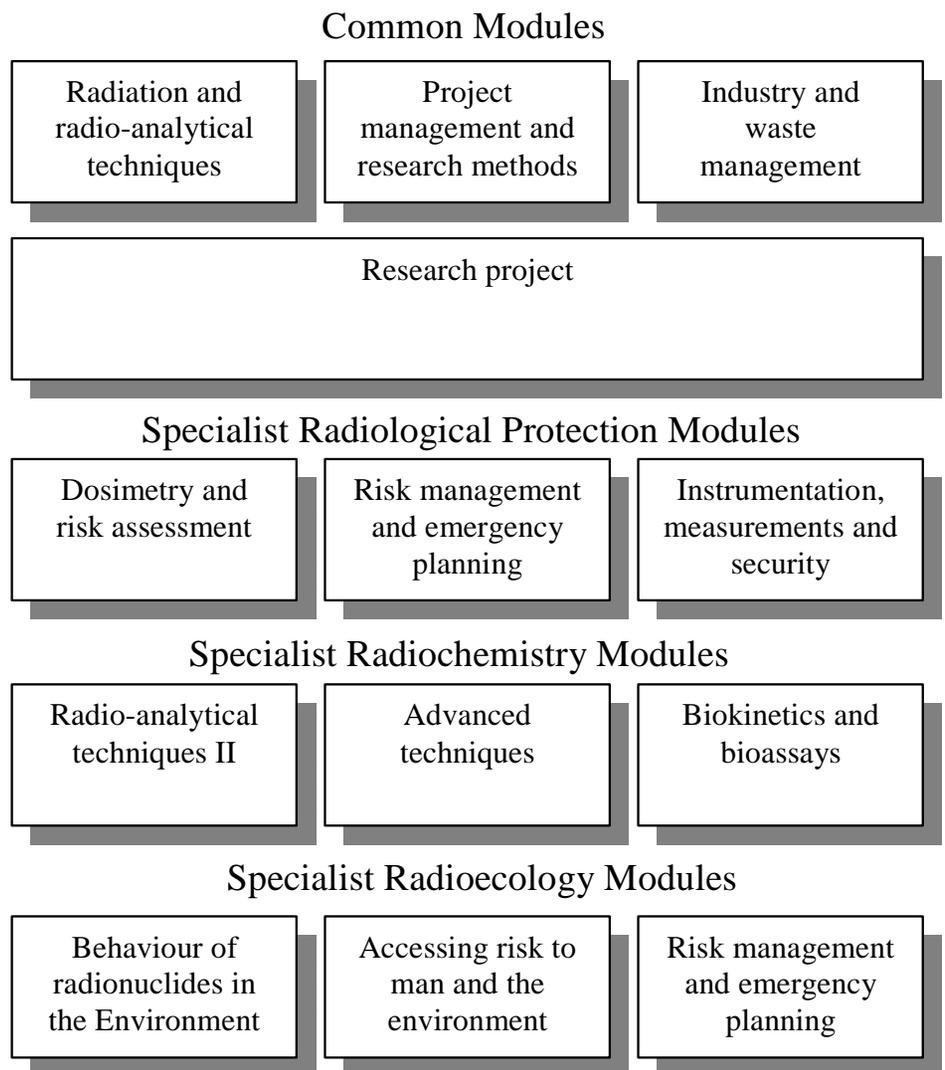
- The outputs from Existing competence and infrastructure and Future Needs were used to guide the development of a European educational solution to meet the stakeholder needs.
- It was concluded that the needs identified would be most efficiently met by three new courses:
 - European MSc Radiation Protection
 - European MSc Advanced Analytical Radiochemistry
 - European MSc Radioecology
- All three masters programmes should be developed using the framework provided by the Bologna Convention and then would be taught within a network of collaborating universities.

Programme structure and assessment

Bologna agreement compliant course structures in radiochemistry, radioecology and radiological protection have been developed for each degree.

European Masters, common and specialist modules

The courses should be aimed, not only to fill the identified European postgraduate education gap in radiological sciences, but also to provide a modular structure that is easily accessed by stakeholders.



A Pilot European Master of Science in Radioecology

The MSc in radioecology is built with 3 common modules and 3 specialist modules giving 10 ECTS credits each and a research project giving 60 ECTS credits plus a minimum 5 ECTS special syllabus (according to Bologna), giving the total of 125 ECTS. Four of the courses are to be held in Norway in collaboration with UK, Ireland, Spain etc., while two other courses are to be held in France.

STUDYPLAN

EUROPEAN MASTER IN RADIOECOLOGY, COURSE MODULES AND TIME SCHEDULE			
MODULES	COURSE ID	TITLES OF COURSE MODULES	YEAR/SEMESTER AND TIME
RESEARCH PROJECT	M-RAD	RESEARCH PROJECT + SPECIAL SYLLABUS (MINIMUM 5 ECTS)	YEAR 2/ AUTUMN AND SPRING
MODULE 6	RAD301	RADIATION PROTECTION AND WASTE MANAGEMENT	YEAR 1/ FEBR – MAY IN FRANCE
MODULE 5	RAD300	RISK MANAGEMENT AND EMERGENCY PLANNING	YEAR 1/ FEBR – MAY IN FRANCE
MODULE 4	KJM360	ACCESSING RISK TO MAN AND ENVIRONMENT, ETHICS	YEAR 1/ JANUARY
MODULE 3	MINA310	PROJECT MANAGEMENT AND RESEARCH METHODS	YEAR 1/ SEPT – NOV WITH EXAM IN DEC
MODULE 2	KJM351	RADIOECOLOGY -BEHAVIOUR OF RADIONUCLIDES IN THE ENVIRONMENT	YEAR 1/ SEPT – NOV WITH EXAM IN DEC
MODULE 1	KJM350	RADIATION AND RADIOCHEMISTRY	YEAR 1/ AUG-SEPT WITH EXAM IN DEC

Courses are held in collaboration with Institut de Radioprotection et de Sûreté Nucléaire, France att/ Dr. Cristian Tamponnet and Middlesex University, UK att/Dr. Hemda Garelick and Dr. Huw Jones.

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A Pilot European Master of Science in Radioecology

The learning goals for the program are as follows:

- The students will be trained in radioecology and be able to conduct experimental radioecological studies. The students will have knowledge on radioactive sources and understand the transport and spreading of radioactive substances in various ecosystems.
- They will understand the basis for assessing environmental impact and risks, and will be able to conduct radioecological studies using tracer techniques, radiochemical separation techniques and advanced measurement methods.

A Pilot European Master of Science in Radioecology

- The students will after the courses be able to assess environmental impact and risks from radioactive contamination and be able to evaluate alternative countermeasures and clean-up strategies, and thereby contribute to national preparedness associated with nuclear accidents and contamination of different ecosystems
- The courses will provide the students with working permission related to the use of open, ionizing radiation sources in their future work.

Conclusion

- Previous EU funded project has clearly identified a significant need of future nuclear competence in Europe.
- The need of MSc in Radiochemistry, Radioecology and Radiation Protection has been well documented.
- For now, a pilot MSc course program in Radioecology has been funded by the EC commission, and will run at the Norwegian University of Life Science. The course modules are to be held in Norway and in France in collaboration with other European universities and research institutes.
- The students will have the opportunity to do their research projects in collaboration with other partners with supervision from the best teachers in Europe because it has the support of the European Radioecology Community.