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**ENETRAP**

European Network on Education and Training in Radiological Protection

Coordination Action

EURATOM Research and Training on Nuclear Energy

**WD.02 Proposal of the ERASMUS Universities Consortium**

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Version 1

SCK•CEN / Studiecentrum voor Kernenergie • Centre d'Etude de l'Energie Nucléaire

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
<b>PU</b>	Public	
<b>PP</b>	Restricted to other programme participants (including the Commission Services)	x
<b>RE</b>	Restricted to a group specified by the consortium (including the Commission Services)	
<b>CO</b>	Confidential, only for members of the consortium (including the Commission Services)	

WP8 : Proposal of the Universities Consortium for a EMRP

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**Work package nr 8** : Establishment of an Erasmus Universities Consortium for developing a European Master in Radiation Protection (EMRP)

**Members of work package nr 8 :**

- Institut National des Sciences et Techniques Nucléaires – France (WP 8 coordinator)
- North Highland College – UK
- Université Joseph Fourier – France
- Université Catholique de Louvain – Belgium *Retired from ENERAP project in October 2005.*

**I. Objectives of WP nr 8**

The aim of the WP8 was to establish a consortium of universities in order to prepare and submit a project of **European Master in Radiation Protection**. The main deliverable of this work package is the submission of a proposal to the DG EDUCATION of the European Commission within the ERASMUS programme.

This has been realized and a project called “**EMRP**” has been submitted by the consortium to the EC the 28<sup>th</sup> of February 2006, before the dead line of submission for 2006 (1<sup>st</sup> March).

**II. Description of the consortium of universities**

The minimum number of participants required for a ERASMUS Curriculum Development (see § III) is 3, coming from 3 different European countries. A consortium of four European universities, all of them already involved in E&T in Radiation Protection at national level, has been established. Its members are described below.

One of the priorities for all these partner universities, as mentioned in their ERASMUS Charters, is to develop their education offer at the European level. They are all already involved in other ERASMUS programmes.

- **Joseph Fourier University (UJF)** is a large scientific university (over 17000 students registered in Mathematics, Physics, Biology, Medicine, Pharmacy, Computer Science, Earth Sciences, etc). It is located in Grenoble in the Rhône-Alpes Region of France. It has a SOCRATES Charter and a long tradition of student mobility through different international programmes including SOCRATES/ERASMUS ones. UJF is also associated to several important European research centres in physical sciences (ESRF, CEA/Minatec, LPSC, ILL...). Since 1995 the unique French education programme for highly skilled radiation protection specialists is run by UJF and INSTN and has so far trained more than one hundred students today working in all fields of radiation protection in France. This course gained the Master structure in 2003 and already fulfils most of the Bologna requirements except the European dimension.

If accepted by the DG Education, this EMRP project will be coordinated by UJF. The coordinator of EMRP would be in that case the present chair person of the French Radiation Protection Master of UJF.

- **Institut National des Sciences et Technique Nucléaires (INSTN)** (700 students and 7000 professionals approx) is a higher education institution placed within the French nuclear research organization, CEA and has a SOCRATES Charter. It provides education and training in radiation protection at all levels to French and foreign students and professionals: for instance, it is involved in the education and training of nuclear physicians and medical physicists. It has been collaborating with UJF (see above) in the Master degree in radiation Protection for 10 years. The organization from 2000 to 2003 of a European Radiation Protection Course is also an important experience in teaching radiation protection at the European scale. Its teachers are experts coming from the CEA, from the universities, from companies involved in the relevant sectors and from public authorities.

- **North Highland College**, (8000 students approx) a partner college within the UHI which is currently seeking University Title with the expectation this will be achieved in 2007. The College is made up of 4 main centres of which the largest is situated only 15 kilometres from UKAEA, Dounreay. It was established to deliver science, engineering and management training and education for the nuclear site in 1956 and for the past ten years this has included both first degree and post graduate courses, and research in science and engineering. The College is the responsible partner for Engineering Honours programmes in Engineering for the UHI. The Institute hosts both Masters and Doctorate students. In April 2003 the College received ERDF funding to establish a Decommissioning Centre which provides a venue for the delivery of the Masters and Post Graduate research programmes, with access for the students to the Test, Trials and Training facility which will be used by decommissioning contractors adjacent. UHI has established a Health Sciences faculty which is working with Aberdeen university and in particular the Raigmore Hospital medical training centre in Inverness. The College has been involved in European projects, Socrates, Leonardo, ESF, ERDF etc for many years. In particular, the NHC has been developing a European Masters in Nuclear Technology, Decommissioning, Waste Management and Non Power Applications with European partners among them UJF and INSTN.

- **Czech Technical University in Prague** (approx. 22000 students, 1500 academic staff) is the oldest (established 1707) and largest technical university in the Czech Republic. It consists of 7 faculties and a few university institutes. It has very extensive international contacts including SOCRATES exchanges. The **Faculty of Nuclear Sciences and Physical Engineering**, which will carry out the work on the EMRP project, was founded in 1955 with the start of the Czechoslovak nuclear programme as the key educational institution (with high proportion of research) for this programme. During its fifty years lasting history the Faculty extended its program also to other non-nuclear branches of exact sciences. Nowadays it has about 1/3 of its programme oriented to nuclear fields, 1/3 to other areas of physics and applied physics and 1/3 to applied mathematics. The Faculty has about 1200 students and an academic staff of about 150 persons. Nuclear studies are divided into five basic specialisations: a) nuclear reactors, b) dosimetry and application of ionising radiations, c) radiological physics in medicine, d) nuclear chemistry, e) experimental nuclear physics. Most of radiation protection workers in the country, including the Chairperson of the State Office for Nuclear Safety, are graduated from the Faculty. Teams from the Faculty participate in international projects of CERN and others. CTU also has been increasingly involved in life-long learners training in nuclear fields during the recent years, following the demands of the new Czech "Atomic Act".

### **III. ERASMUS Programme and Bologna Declaration**

**ERASMUS** is the higher education action of SOCRATES II programme. It seeks to enhance the quality and reinforce the European dimension of higher education by encouraging transnational cooperation between universities, boosting European mobility and improving the transparency and full academic recognition of studies and qualifications throughout the European Union. ERASMUS consists of many different activities as student and teacher exchanges, joint development of study programmes (curriculum development), international intensive programmes, thematic networks between departments and faculties across Europe... The EMRP project has been proposed as a **Curriculum Development**. The application form for this type of action is available on the Internet site of the European Commission [1].

It follows the guidelines established in the **Bologna Declaration** by the European Ministries of Education in order to construct a European area of higher Education by 2010 :

1. a system of academic grades which are easy to read and compare, including the introduction of the diploma supplement (designed to improve international "transparency" and facilitate academic and professional recognition of qualifications);
2. a system essentially based on two cycles : a first cycle geared to the employment market and lasting at least three years and a second cycle (Master) conditional upon the completion of the first cycle;
3. a system of accumulation and transfer of credits (ECTS)
4. mobility of students, teachers and researchers;
5. cooperation with regard to quality assurance;
6. the European dimension of higher education.

The aim of the process is thus to make the higher education systems in Europe converge towards a more transparent system in which the different national systems would use a common framework based on three levels :Bachelor, Master and Doctorate (**BMD system**).

The EMRP will even go beyond these guidelines as it aims at awarding a **joint diploma**, that is a diploma fully recognized at the national level in all participating countries. This will thus allow for **the mobility of the graduates**, that is the future workers, across Europe.

### **IV. Proposition of European Master Course in Radiation Protection submitted to the DG Education**

#### 1. Summary of the EMRP project

The EMRP project aims at building **an second year Master course in radiation protection**, to meet the current and increasing needs for skilled personnel in sectors using ionizing radiations (medicine, research, industry).

The expected output of the project is a **joint European Masters degree recognized in all partner countries**, promoted and supported by the stakeholders, which will address the current deficit in high level education in radiation protection across Europe.

Within this course, a harmonized curriculum for Qualified Experts in radiation protection will be proposed, fulfilling the requirements of the EURATOM Directive 96/29, thus favouring the mobility of workers across Europe.

Target groups of this Master course are both :

- undergraduates having at least a validated 180 ECTS university diploma with an additional 60 ECTS in science, engineering or other relevant thematic;
- lifelong learners, professionals of the sectors, wishing to improve or change their position.

This project has been initiated with a small number of participants in order to facilitate the construction of the course. It is nevertheless anticipated that other interested universities could join the consortium as soon as the EMRP has shown its viability.

## 2. Time schedule of the EMRP project

The consortium has applied for a financial support of two years:

- one year to develop the project,
- one year to implement a pilot course and to evaluate it.

If accepted by the DG Education, the contractual period is likely to start on 1/10/2006. The pilot session of the Master is thus expected to start in September 2007.

## 3. European Context

The benefits of ionizing radiations are widely acknowledged, for medical treatment, research, industry (both nuclear and non nuclear). However their adverse impacts have long since been recognized together with the paramount importance of their safe use by skilled personnel. In recognition of both the beneficial and adverse effects of ionizing radiations, the European Commission published in 1996 a European Directive (96/29/Euratom) laying down basic safety standards for the protection and the health of workers and the general public against the dangers arising from ionizing radiations. This directive refers to the concept of a "Qualified Expert" (QE), defined as :

**Qualified Experts** : *"Persons having the knowledge and training needed to carry out physical, technical or radiochemical tests enabling doses to be assessed, and to give advice in order to ensure effective protection of individuals and the correct operation of protective equipment, whose capacity to act as a qualified expert is recognized by the competent authorities. A qualified expert may be assigned the technical responsibility for the tasks of radiation protection of workers and members of the public"*.

In recognition of the fact that this definition is subject to different interpretation by the various national authorities within Europe, the European Commission published in 1998 a basic syllabus listing the knowledge's the qualified expert in radiation protection should have (communication 98/0133/03).

In this context, some universities in Europe have established national Master's degree programmes or Certificates in Radiation Protection, while at some other universities radiation protection is part of related programmes on medical physics, dosimetry, etc. Although some of them have incorporated the basic syllabus within the national programme, the lack of agreed curriculum content and mutual recognition between member states of these programmes is an obstacle to the free movement of European Qualified Experts in radiation protection.

The EMRP project will gather European expertise in this field in order to develop a high level education Master's programme following the Bologna declaration requirements. This will ensure the future supply of appropriately educated and skilled personnel for the users of ionizing radiations across Europe. The EMRP project will thus respond to both the increasing demand and decreasing number of radiation protection experts available in Europe.

Finally, an important part of the Masters programme will allow candidates to achieve the status of a Qualified Expert as defined in the 96/29 European directive.

The new qualification will ultimately allow a **greater mobility** to the future workers in this field across Europe.

#### 4. Structure of the course

The project proposed will define the curriculum of the Masters programme, in a **modular structure**, according to the Bologna declaration:

- **A common “core”**, organized by all the partner universities, in which the following topics will be taught:
  - Atomic and nuclear physics,
  - Detection and measurement methods, dosimetry
  - Biological effects
  - Legal and regulatory basis
  - Operational radiation protection
  - Radiation Protection of the public and the environment
  
- **Specific modules**, organized by the partners according to their field of expertise, i.e.:
  - General industry, using sealed or unsealed sources
  - Medical installations
  - Nuclear installations
  
- **A training period**, organized within an institution or industry using ionizing radiations (research centre, hospital, nuclear plant...) under the supervision of a mentor.

Making use of the **European Credit Transfer System (ECTS)**, it is anticipated that 30 ECTS will be assigned to the theoretical part, and 30 ECTS to the practical part of the Master.

#### 5. Innovative aspects

The project partners intend, not only to define the curriculum of the Master course, but also to define a new shared delivery strategy which will include the development of curriculum online, shared specialist lectures using video conferencing and exchange placements for students. In this way, the graduates will have the opportunity to acquire a joint Master qualification and experience working in at least one other member state.

To address the needs of life-long learners of the relevant sectors, the use of distance learning/online learning will be a key consideration in the design of this programme.

The project will also establish procedures for the selection of the students and allow for the mutual recognition of learning and training periods using the **ECTS system**. A quality assurance system would also be defined for the delivery of a Joint Diploma. The project will thus ensure that the European dimension is embedded in the programme through a structured system which allows for the mobility of both lecturers and students and will allow for the mobility of the future workers graduated from this programme.

To promote the European dimension, a **European seminar** will be organized each year at a different location, where all EMRP students from the different partners will be registered together.

#### 6. Involvement of stakeholders

A steering committee will be established, comprising members of representing stakeholders,

academia and industry to advise on both the organization and the content of the programme. The stakeholders may also be asked to directly take part in the delivery of the course, by giving lectures or conferences, and also by providing On-the-Job training periods for the students. It is thus expected to have the entire agreement of the stakeholders on the EMRP, and then to be sure that the graduated students would find easily their first job.

#### 7. Self sustainability after the end of the programme funding

It has been agreed that following validation of the EMRP, each participating university will substitute the new programme for existing national courses in this field. Therefore, following development, the delivery of the new programme will attract the normal state education funding for the delivery of higher education.

The Master will also rely on tuition fees and benefit from vocational education and industrial support through regulated way.

The stakeholders themselves, involved in the steering committee of the programme, may subsidize the Master, for example, through the payment of full cost fees in recognition of the value of the programme for future recruitment of staff.

#### 8. Work methodology

A work plan has been established, organizing the whole work to do within the 2 years in different work packages :

- Definition of expected skills and competences ;
- Definition of the EMRP regulations after verification of their accordance with the existing administrative constraints ;
- Determination of the course structure ;
- Elaboration of the program ;
- Definition of the training period ;
- Submission to the national authorities and to stakeholders for advise/comments;
- Implementation of a pilot session ;
- Evaluation of the pilot session ;
- Definition of the "validated" EMRP.

Each work package will be assigned to a responsible partner. The project will be managed by the Project coordinator who will assume overall responsibility and ensure that each partner carries out the work according to the objectives defined and in the schedule set out by the consortium. Each partner will be asked to produce a report as each work package is achieved describing the outputs.

The partners will meet 3 times per year and organize one audio conference per month to develop the project and to evaluate progress.

#### 9. Next step

The answer of the DG EDUCATION is expected by July or August 2006, certainly with a phase of financial negotiation.

[1] <http://europa.eu.int/comm/education/socrates.html>