

## Education and training activities of ENEA – Radiation Protection Institute: national needs of education to harmonisation and harmonisation of training

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**ENEA**

ENEA – Radiation Protection Institute  
Bologna, Italy

Brussels, 23 November 2005

### Presentation of ENEA - Radiation Protection Institute

ENEA (*Italian National Agency for New Technologies, Energy and the Environment*) is a public research institution operating in the fields of energy, the environment and new technologies to support competitiveness and sustainable development.

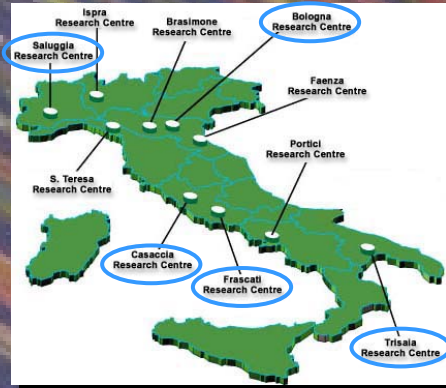
ENEA is mainly called upon :

- to carry out basic and applied research and innovation technology activities
- to disseminate and transfer technologies for their use in productive and social sectors
- to provide both public and private bodies and enterprises with high-tech services, studies, tests and evaluations
- to sustain education and training in its specific fields of activity

At the moment about 2,500 people are employed in ENEA

ENEA is organized in Divisions and Projects. It is present all over the country with 10 Research Centres

The **Radiation Protection Institute (RPI)** belongs to the Division of "Protection from Ionizing Radiations" and is present in 5 ENEA Research Centres with its own staff (about 70 people).



The **Radiation Protection Institute (RPI)** carries out activities to fulfil the law obligation for ENEA :

- Gives advice by means of its **Qualified Experts**;
- Assures **individual monitoring** and the **environmental surveillance**;

**Bologna R.C.** : calibration facilities, closed research reactor (under decommissioning): ENEA

**Saluggia R.C.** : *EUREX* pilot reprocessing facility for treating liquid wastes produced (SOGIN Spa)

**Casaccia R.C.** : 4 Research reactors (TRIGA and TAPIRO: ENEA / IPU and OPEC: SOGIN Spa), storage and treatment (NUCLECO)

**Frascati R.C.** : Nuclear fusion facilities (Frascati Tokamak Upgrade): ENEA

**Trisaia R.C.** : ITREC pilot reprocessing facility (cementation of the HLW from reprocessing U-Th fuel) (SOGIN Spa)

- Operates **laboratories** (secondary laboratory in the national calibration system for radiation protection quantities) and **services** (individual monitoring of the internal contamination, personal monitoring for external exposure, radon concentration)

#### External Dosimetry Service



Automatic packing and labeling machine for dosimeters

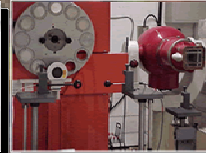


Photon Dosimeter

#### Calibration Service



Calibration Facility for radiation protection instruments

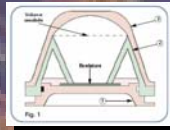


Calibration Facility for radiotherapy instruments

#### Radon Service



Radon Dosimeter



Project of Radon Dosimeter

#### Internal Contamination Laboratories



Lung counter



Skull phantom



Body Counter

The **Radiation Protection Institute (RPI)** carries also activities in:

- Research and development** : biokinetic modelling, radiation transport calculations, solid state dosimetry, radiation protection methodologies for advanced nuclear facilities
- Qualification and standardization** of measurement techniques and dose evaluation procedures (e.g. national (UNI) and international (ISO) standards, EU project aimed at harmonising procedures (IDEAS), etc.)
- Education and Training**, according to ENEA's mission, in the specific field of Radiation Protection

### Education and Training at ENEA - RPI

Researchers and Qualified Experts, engaged in the aforementioned activities, organize and carry out formation activities. This has allowed implementing into formation programmes the latest developments in the radiation protection field.

In recent years, RPI has been more and more engaged in harmonisation and standardization actions. This reflects in:

- Providing education programmes based on updated standardized methodologies (e.g. ISO, IEC, Eurados, proposed in the frame of ad hoc intercomparison exercises, etc.)
- Developing harmonised approaches for education and training in radiation protection (e.g. the project ENETRAP, training programmes according to the national syllabus, etc.)

The **education to harmonised and standardised methodologies** and the **harmonised approaches to education and training** are the **additional values** of the education and training activities of RPI, in respect to other national initiatives

### Education to harmonised and standardised methodologies :

- UNI/CEN/Sc2/WG24 "Methods of measurements of internal contamination"
- UNI/CEN/Sc4/WG28 "Radiometric methods of measurements of water for human consumption"
- UNI/CEN/Sc4/WG11 "Measurements of radon in the environment"
- ISO/TC85/Sc2/WG13 "Performance requirements for internal dose evaluation of bioassay results"
- "Quality Assurance of Computational Tools for Dosimetry" :  
*Intercomparison on the usage of Computational Codes in Radiation Dosimetry (Bologna July 14-16 2003)*
- "Use of MCNP in Radiation Protection and Dosimetry. Proceedings of a Training Course" (EC, ERPET, EURADOS, ENEA and OECD-NEA)  
*(Bologna 13-16 May 1996)*
- "General Guidelines for the estimation of the committed dose from incorporation monitoring data"
- IEC/TC45 "Instrumentation for radiation protection"



**Harmonised approaches to education and training :**

- “European Network on Education and Training in Radiological Protection”  
(EU funded project, coordinarted by Michele Coeck SCK.CEN; ENEA - RPI is on of the 11 participants)



- Programmes of on-the-job training of Qualified Experts, according to national syllabus



Ministry of Labour  
and Social Policies

Examples of **Radiation Protection Institute (RPI)** activities related to:

Education to harmonised and standardised methodologies

Harmonised approaches to education and training

Presentation of ENEA - Radiation Protection Institute		
Programme	Organizer (Year)	Harmonisation items
Individual internal dosimetry: methodologies, skills, practice	ENEA - RPI AIRP (2004)	Measurements techniques of internal contamination Procedures for intake and dose calculation
Intercomparison on the usage of Computational Codes in Radiation Dosimetry	ENEA - RPI QUADOS (2003)	Use of numerical calculation tools
Italian intercomparison on internal dose assessment (VALDOSE) final workshop	ENEA - RPI(2001)	Procedures for intake and dose calculation
Use of MCNP in Radiation Protection and Dosimetry	ENEA - RPI EC, ERPET, EURADOS, OECD-NEA (1996)	Use of numerical calculation tools
Training-on-the-job for Qualified Expert	ENEA - RPI(when required)	Syllabus given in national legislation
European Radiation Protection Course (ERPC)	Institutions from 7 European countries (2000 - 2003)	Radiation protection E&T in accordance with EC requirements for the qualified experts training's
European Network on Education and Training in Radiological Protection (ENETRAP)	Institutions from 7 European countries (2005 - 2007)	Harmonised approaches for E&T Recognition of courses and competencies of RP experts

**Education to harmonised and standardised methodologies**

The Italian Association for Radiation Protection (IRPA affiliate) in 2004, in collaboration with RPI, organized the course:

**Individual internal dosimetry: methodologies, skills, practice**

The programme of the course, the local organization, the subject of the lectures were proposed by RPI.


**41° CORSO DOSIMETRIA INDIVIDUALE DA CONTAMINAZIONE INTERNA: CONOSCENZE, METODOLOGIE, PRATICA**

Centro Ricerca ENEA Casaccia, 10-22 ottobre 2004

Organizzato da:  
Scuola Superiore di Radioprotezione "Carlo Poletti"  
dell'Associazione Italiana di Radioprotezione (AIRP)

Coordinatore: Giuseppe Tarnati

- Finalità
- Programma
- Lezioni
- Docenti
- Approfondimenti



The course was addressed to post-graduated students, qualified experts and other professionals with limited expertise in internal dose assessment.

### Individual internal dosimetry: methodologies, skills, practice (2)

The practical activities were performed in the Institute laboratories at the ENEA Research Centre in Casaccia (Rome) where the course took place.

The course was structured in theoretical **lectures**, **practical exercises in the laboratory** with individual monitoring equipments (whole body counters, alpha- and mass-spectrometers for urine samples) and **classroom exercises** with software tools for assessing the committed internal dose.



### Individual internal dosimetry: methodologies, skills, practice (3)

The course was officially recognized by the Ministry of Health as part of the National Programme for the “**Continuing medical education**” (CME). The thirty participants took a final examination to verify their level of learning and awarded CME accreditation points.

Ministry of Health



National Programme of Continuing Education in Medicine (E.C.M.)



### Individual internal dosimetry: methodologies, skills, practice (4)

The course was the occasion to continue the harmonisation actions on internal dose assessment carried out with the **VALDOSE intercomparison**. The lectures provided the attendees with the last developments from the **EU-funded project IDEAS**, aimed at developing European guidelines for internal dose estimation.



<http://www.ideas-workshop.de/>

“General Guidelines for the estimation of the committed dose from incorporation monitoring data”

### VALDOSE National Intercomparison on Dose Assessment from Internal Contamination

Interconfronto sulla valutazione di dose da contaminazione interna  
ESERCIZIO 2001

Giornata di studio  
30 Ottobre 2001

Sede ENEA - Bologna  
Arcoveggio

Presentazioni



ENEA - Istituto per la Radioprotezione

### Programmes of on-the-job training for Qualified Experts

#### 3 Levels of Expertise for Qualified Experts

- 1° Level : X ray generator < 400 kV
- 2° Level : as 1° Level + generator of electron energy from 400 keV to 10 MeV, radioactive sources and neutron generator with emission rate < 10<sup>4</sup> n/s
- 3° Level : as 2° Level + nuclear facilities, neutron sources with emission rate > 10<sup>4</sup> n/s, ion accelerator, other large radioactive sources not included in the 2° Level

Minimum **education levels** for each level of expertise are 3 years of Engineering, or Physics, or Chemistry or Industrial Chemistry for 1° and 2° Levels, 5 years for 3° Level

Recognition as Qualified Expert by means of an examination at the Ministry of Labour.

The **education levels**, together with the knowledge based on a **syllabus** (Communication 98/C 133/03) and the **on-the-job-training (OJT)**, are the minimum requirements.



### Programmes of on-the-job training for Qualified Experts (2)

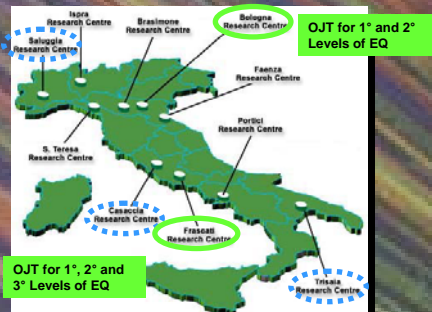
The programme of OJT is carried out under the direction of the qualified expert of the facility:

- 1° Level : 120 days at an infrastructure appropriate for 1° Level
- 2° Level : as 1° Level plus 120 days at an infrastructure appropriate for 2° Level - total 240 days
- 3° Level : as 2° Level plus 120 days at only two specific infrastructures appropriate for 3° Level: nuclear plant and facilities with accelerator - total 360 days

### Programmes of on-the-job training for Qualified Experts (3)

The RPI organizes OJT programmes in its laboratories under the direction of its local Qualified Experts (13 employees in RPI have the recognition as Qualified Experts, on about 70 employees, and 7 are officially in charge of ENEA plants)

The Institute, thank to its presence in the ENEA centres where a large variety of facilities using ionizing radiation are present (X-tubes, accelerators, unsealed sources, research reactors, etc.) is able to organize OJT for all the level of expertise.



#### Programmes of on-the-job training for Qualified Experts (4)

The national legislation gives also a basic syllabus for the qualified expert, based on the topics addressed by European Commission's syllabus (Commission Communication C133/03. Official Journal of the European Communities L-133, 30 April 1998).

During the training, Institute's Qualified Experts provide the students also with theoretical knowledge on radiation protection based on this syllabus and appropriate for the Level of Qualification for which they are applying.

The Institute's Qualified Experts share information, methodologies, calculation tools, professional experiences on the base of either personal direct contacts and of periodical meetings addressed to all of them and organized by the direction of the Institute.

This assures that the competencies of the Qualified Experts providing the OJT are continuously updated, shared and harmonised with significant benefits for the applicants to Qualified Expert examination.



Thanks!