EUROPEAN COMMISSION

Community Research

ENETRAP-II

SEVENTH FRAMEWORK PROGRAMME

WD6.1 REPORT ON TRAINING EVENTS AND TRAINING PROVIDERS. DEGREE OF CONFORMITY WITH THE AGREED STANDARDS (DRAFT)

September 2010

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Project Acronym:	ENETRAP II
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WP 6 duration:	30 months
WP 6 leader:	7 CIEMAT
WP 6 partners:	2 CEA , 3 FZK-FTU, 5 ENEA, 6 NRG, 9 ENEN

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ENETRAP II: EUROPEAN NETWORK ON EDUCATION AND TRAINING IN RADIOLOGICAL PROTECTION.

1. INTRODUCTION

Radiation protection is a major challenge in the industrial applications of ionising radiation, both nuclear and non-nuclear, as well as in other areas such as the medical and research area. As is the case with all nuclear expertise, **there is a trend of a decreasing number of experts in radiation protection** due to various reasons. On the other hand, **current activities in the nuclear domain are expanding**: the nuclear industry faces a so-called "renaissance", high-tech medical examinations based on ionising radiation are increasingly used, and research and non-nuclear industry also make use of a vast number of applications of radioactivity.

Within this perspective, **maintaining a high level of competency in radiation protection is crucial to ensure future safe use of ionising radiation and the development of new technologies in a safe way**. Moreover, the perceived growth in the different application fields requires a high-level of understanding of radiation protection in order to protect workers, the public and the environment of the potential risks. **A sustainable Education and Training (E&T) infrastructure for radiation protection is an essential component to combat the decline in expertise and to ensure the availability of a high level of radiation protection knowledge which can meet the demands in the future**.

Although radiation protection professionals have a variety of responsibilities and specific professional aims, there is a common need for:

- basic education and training providing the required level of understanding of artificial and natural radiation;
- the opportunity to update and test acquired knowledge on a regular basis (Continuous Professional Development); and
- a standard for the recognition of skills and experience,

In addition, complying with specific European directives concerning the implementation of a coherent approach to education and training becomes crucial in a world of dynamic markets and increasing workers' mobility.

Today's challenge involves measures to make the work in radiation protection more attractive for young people and to provide attractive career opportunities, and the support of young students and professionals in their need to gain and maintain high level radiation protection knowledge. This can be reached by the development and implementation of a high-quality European standard for initial education and continuous professional development for Radiation Protection Experts (RPEs) and Radiation Protection Officers (RPOs).

For the purposes of this project, the Radiation Protection Expert can be defined as:

"*A person having the knowledge, training and experience needed to give radiation protection advice in order to ensure effective protection of individuals"*

and the Radiation Protection Officer as:

"*An individual technically competent in radiation protection matters relevant for a given type of practice who is given the role of overseeing the application of relevant radiation protection standards in the workplace".*

With respect particularly to the RPE a methodology for mutual recognition on the basis of available EU instruments, such as the European Qualification Framework (EQF) and/or the Directive 2005/36/EC is also seen as enhancing the profile of such professionals.

2. OBJECTIVES

The overall objective of this project is to **develop European high-quality "reference standards" and good practices for education and training (E&T) in radiation protection (RP)**, specifically with respect to the RPE and the RPO.

- ✓ These "**standards**" will reflect the needs of the RPE and the RPO in all sectors where ionising radiation is applied (nuclear industry, medical sector, research, non-nuclear industry).
- ✓ The introduction of a **radiation protection training passport** as a mean to facilitate efficient and transparent European mutual recognition is another ultimate deliverable of this project.

- In the field of RPE training the ultimate goal is the **development of a European mutual recognition system for RPEs**. Hereto, the ENETRAP Training Scheme initiated as part of the ENETRAP 6FP will be used as a basis for the development of a European Radiation Protection Training Scheme (ERPTS), which includes all the necessary requirements for a competent RPE. In addition, mechanisms will be established for the evaluation of training courses and training providers. These actions will contribute to facilitate mutual recognition and enhanced mobility of these professionals across the European Union.

- With respect to the RPO role the desired end-point is **an agreed standard for radiation protection training that is recognised across Europe**. Data and information obtained from the ENETRAP 6FP will be used to develop the reference standard for radiation protection training necessary to support the effective and competent undertaking of the role.

- Furthermore, attention is given to **encouragement of young, early-stage researchers**.

It is envisaged that the outcome of this project will be instrumental for the cooperation between regulators, training providers and customers (nuclear industry, medical sector, research and non-nuclear industry) in reaching harmonization of the requirements for, and the education and training of RPEs and RPOs within Europe, and

will stimulate building competence and career development in radiation protection to meet the demands of the future.

3. WORKING PACKAGES

The specific objectives of the project are trying to be reached through the working packages:

WP1 Co-ordination of the project

WP2 Define requirements and methodology for recognition of RPEs

WP3 Define requirements for RPO competencies and establish guidance for appropriate RPO training

WP4 Establish the reference standard for RPE training

WP5 Development and apply mechanisms for the evaluation of training material, events and providers

WP6 Create a database of training events and training providers (including OJT) conforming to the agreed standard

WP7 Develop of some course material examples (text book, e-learning modules, …)

WP8 Organise pilot sessions, test proposed methodologies and monitor the training scheme effectiveness

WP9 Introduction of the training passport and mutual recognition system of RPEs

WP10 Collaboration for building new innovative generations of specialists in radiation protection

WORK PACKAGE 6: CREATE A DATABASE OF TRAINING EVENTS AND TRAINING PROVIDERS (INCLUDING OJT) CONFORMING TO THE AGREED STANDARD

1. GENERAL DESCRIPTION.

WP6 creates a database of **training event and providers conform to the agreed standards**. The database will be made public through the ENETRAP II website and is thus available for all interested parties.

Such a move would **add credibility to the recognition process** and would help to provide reassurance to RPE candidates and to employers that the training obtained satisfies an **agreed European standard**.

This database will **also incorporate an overview of institutes hosting on-the-job-training possibilities**.

Special attention will also be given to **internships in the stakeholders' organisations**, with emphasis on coaching and/or mentoring schemes, whenever appropriate. A link can be made with the existing **ENEN database**.

It is obvious that the courses organised by or at the premises of the partners can be taken as first examples. Examples of training courses that will be introduced are:

- (for Belgium) course for radiation protection expert (in Dutch and French)
- (for UK) modular Radiation Protection Training Scheme (RPTS) specifically targeted at new and developing RPEs
- (for Germany) Occupational Radiation Protection: Specifities of Waste Management and Decommissioning

Work package number	6	**Start date or starting event:**	1
Work package title	Create a database of training events and training providers (including OJT) conforming to the agreed standard		
Activity Type	COORD		
Participant id:	2-CEA 3 FZK-FTU 5 ENEA 6 NRG **7 CIEMAT Coordinator** 9 ENEN		

1.1 Objectives

Create a database of **training events** and **training providers** (including OJT-On the Job Training) conforming to the **agreed standard identified in WP 3 and WP 4**.

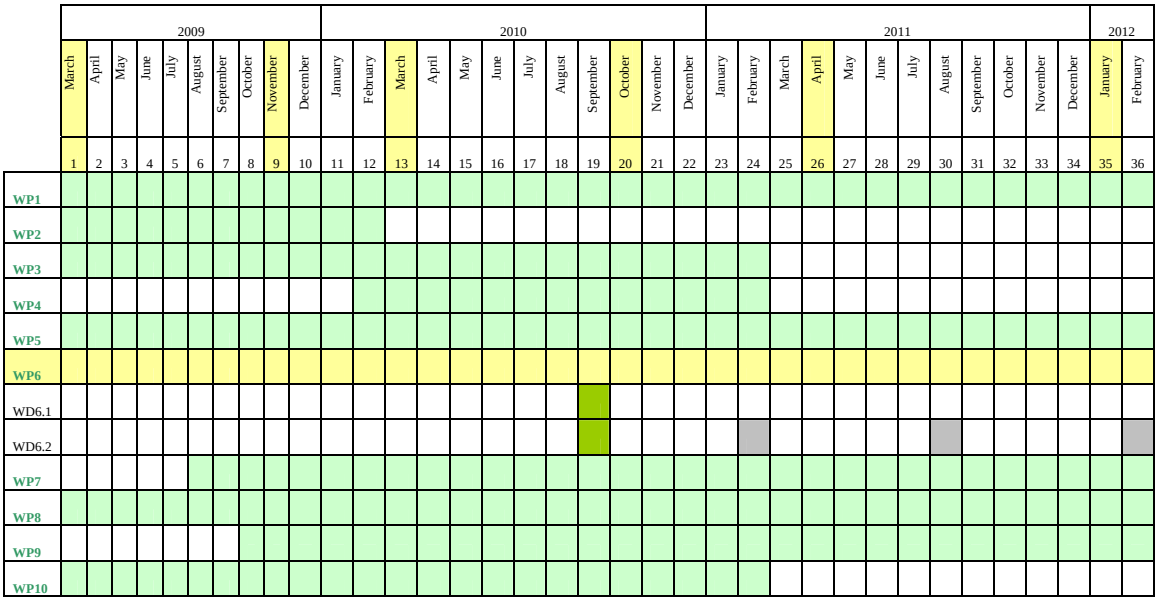
Description of work:

- Identification and collection of the information on training events, providers and OJT facilities on the base of the outcome of previous survey analysis (ENETRAP 6FP questionnaire), interaction with the Advisory Board, contact with national providers.
- To check the conformity of events and providers to the agreed standards.
- Implementation of the information in an easily accessible database.
- Dissemination of the information to promote the continuous up-date of the database (**self-supporting system**).

1.2 Deliverables and timing

WD6.1 Report on training events and training providers and degree of conformity to the agreed standard.

WD6.2 EU wide Data Base of training events and training providers on RP according the standard developed in WP3 and WP4.



1.3 List of milestones

Milestone N°	Milestone name	WP involved	Expected date	Means of validation
1	Establishment of the Advisory Board	1	6	Report, meetings
2	Project website structure	1	3	Website
3	Requirements for RPE	2	12	Report
4	Methodology for recognition of RPE	2	12	Report
5	Requirements for RPO competencies	3	18	Report
6	European reference standards for RPO training	3	30	Report
7	Statement of initial and refresher training requirements for RPE	2,4	18	Report
8	Reference standards for RPE training	2,4	24	Report
9	Methodology and quality assurance protocol for comparison and evaluation of training material	5	12	Report
10	Methodology and quality assurance protocol for comparison and of training events	5	24	Report
11	Methodology and quality assurance protocol for comparison and evaluation of training providers	5	36	Report
12	EU wide Data Base of training events and training providers	**6**	12	Database, website
13	Text book	7	24	Book
14	e-learning modules	7	24	e-learning platform
15	Selection of Pilot Sessions, Evaluation	8	6-8	Report
16	Organise and implement pilot sessions	7,8	12-28	Training sessions
17	Evaluate outcome of events	5,8	16-32	Report
18	Summarise and make recommendations	4,5,7,8	24-36	Report
19	Mutual recognition methodology	2,4,5,**6**,8,9	18	Report
20	Design of European training passport	2,4,5,**6**,8,9	24	Passport
21	Developing mechanisms for The RP Action Plan implementation	10	36	Report
22	National Initiatives for attracting young people to RP career the source of The RP Action Plan	10	12-36	Report

2. STARTING POINT AND SITUATION.

With the aim of identify the main aspects of the training events, providers and OJT facilities, the starting points have been:

- the previous survey analysis made in the framework of ENETRAP
- the analysis of the documents:
  - The "Daft EURATOM Basic Safety Standards Directive[1]"
  - The IAEA "Requirements for the training of RPOs[2]"

In order to develop and implement the database, WP6 has done the next tasks:

[1] *24 February 2010 Version*

[2] *April 2007 Version*

- The analysis of the previous ENEN database,
- The analysis of the working groups 2, 3, 4 and 5 reports.
- Participating in the workshop "European Commission Medical Physics Expert Project", April, 9th 2010 in Madrid.
- Has prepared a protocol for the implementation of the information in the database.
- Has developed a questionnaire to identify the providers.
- Has described the fields to be included in the database.

3. WORK DETAILS.

3.1 Tasks proposed

1. To analyze the ENEN database.

2. To analyze the kind of training events object of the WP6

3. To identify the kind of training providers and the availability of OJT facilities.

4. To describe the information required of each training activity in order to design the database and to be compared with the standard developed in WP3 and WP4

5. To propose the procedure to implement the information in the database.

6. To check the conformity of events and providers to the agreed standards.

7. Dissemination of the information to promote the continuous up-date of the database (self-supporting system).

3.2 Tasks developed

3.2.1 Analyzed the ENEN database.

The ENEN database is recently available for the public, and it is accessible for the public from the main page of ENEN http://www.enen-assoc.org/. It is possible to access into the database as editor-publisher. In this case it is necessary to log into the ENEN-web: http://www.enen-assoc.org/

Fig 1. Access to the ENEN database.

The ENEN Database covers in the **nuclear field**:

1. Education and Training courses
2. Master Programs
3. Proposed PhD Topics
4. Opportunities (Scholarship, Postdocs, Internship, Job opportunities) provided by the ENEN Membres and its partners.

The list of training providers is not part of the DB. It is collected in a static pdf. Potential providers can apply for an access though the email: sec.enen@cea.fr

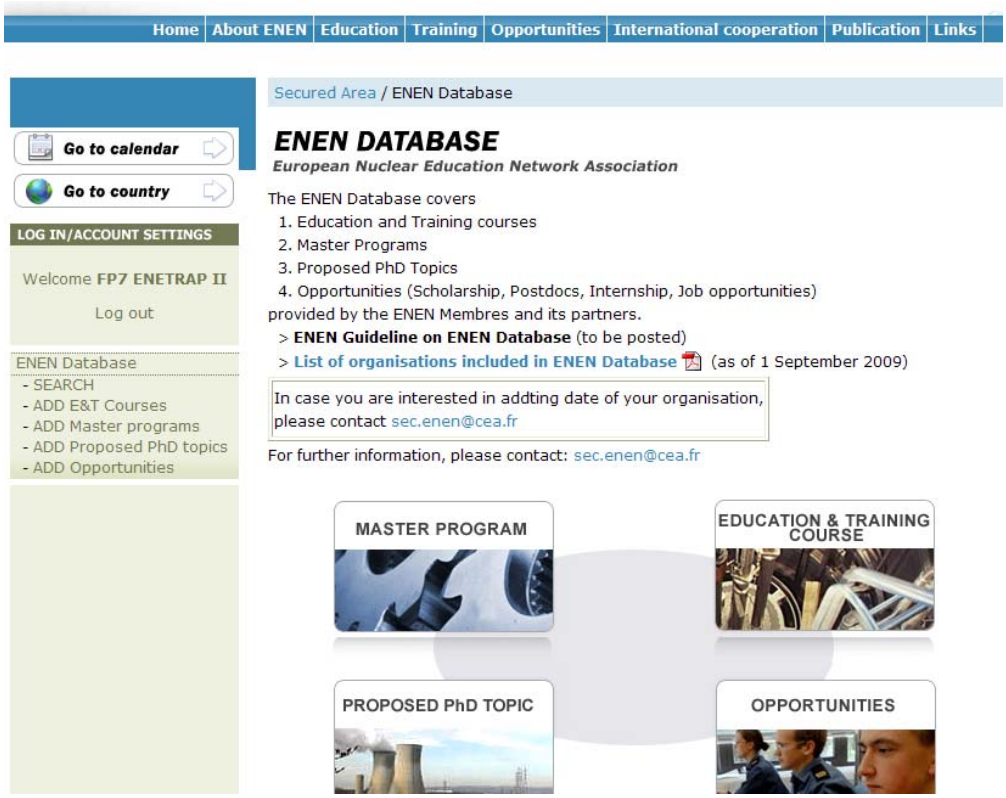


Fig 2. ENEN database

The way in which the information is presented is shown in the next figures:

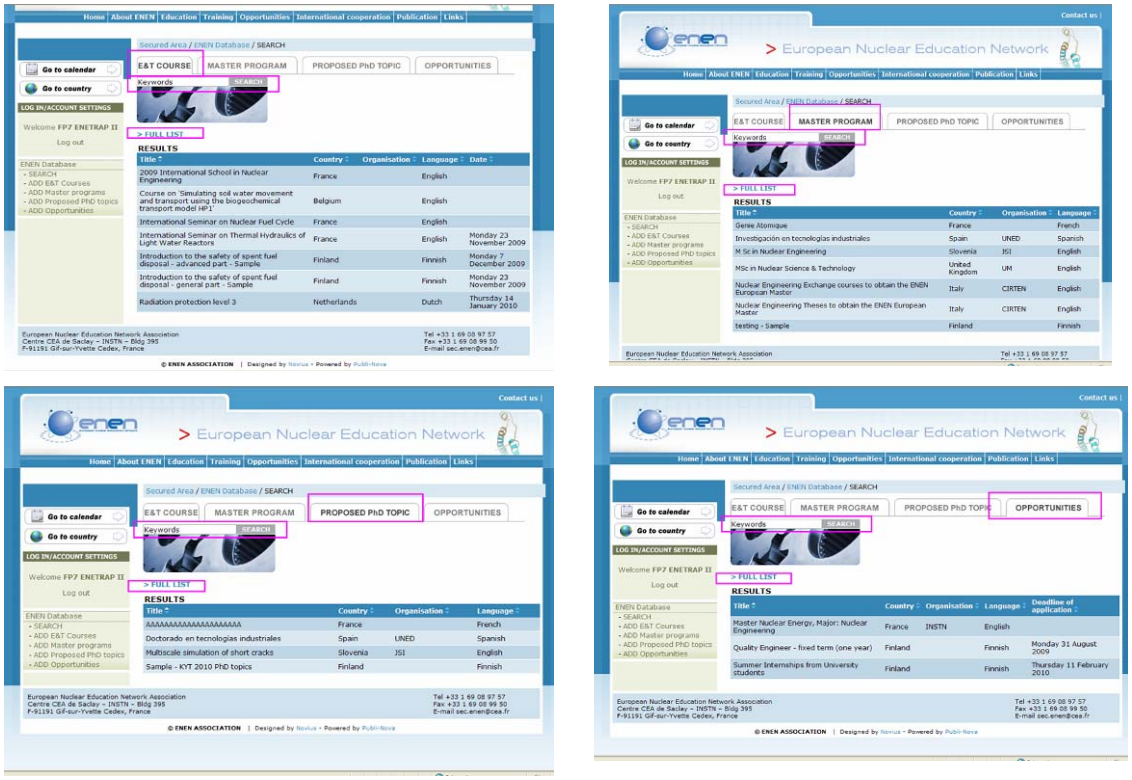


Fig3. Analysis of each kind of event covered

All the categories have:

- A search box
- A “Full list” button

The information can be organized by:

- Title
- Country
- Organization
- Language
- Date

The role of access for ENETRAP-II partners is as "editor". WP6 has analyzed the type of content that is collected in the formulary for each field:

Table 1. ENEN database E&T course

Title:	
Country	
Language	
Venue:	
Start date:	
End date:	
Level:	
Participant:	
ECTS:	
ENEN European Master:	
Course details:	(Objective, topics, lecturers, material, work load, prerequisites, etc)
Requirements to apply:	(Preliminary diploma, experience, etc)
Tuition fee:	
Additional costs:	
How to apply:	
Deadline of application:	
For further information:	(Contact persons, website, etc)
Name PDF 1:	
Name PDF 2:	
Name PDF 3:	

Table 2. ENEN database Master

Title	
Country	
Language	
Duration	
ENEN European Master	
Program details	*Objective, topics, lecturers, material, work load, prerequisites, etc*
Requirements to apply	*Preliminary diploma, experience, etc*
Tuition fee	
How to apply	
Deadline of application	
For further information	*Contact persons, website, etc*
Name PDF 1	
PDF 1	
Name PDF 2	
PDF 2	
Name PDF 3	
PDF 3	

Table 3. ENEN database Proposed PhD topic

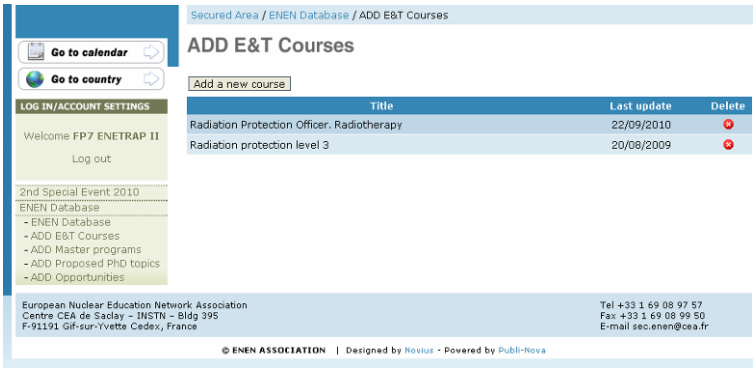
Title	
Country	
Language	
Topic details	Objective, topics, lecturers, material, work load, prerequisites, etc
Requirements to apply	Preliminary diploma, experience, etc
Tuition fee	
How to apply	
Deadline of application	
For further information	Contact persons, website, etc
Name PDF 1	
PDF 1	
Name PDF 2	
PDF 2	
Name PDF 3	
PDF 3	

Table 4. ENEN database Opportunity

Type	
Title	
Country	
Language	
Deadline of application	
Details	
For further information	*Contact persons, website, etc*
Name PDF 1	
PDF 1	
Name PDF 2	
PDF 2	
Name PDF 3	
PDF 3	

As it is mentioned, there is not a table in the database for the information of training providers. The information about their training providers is collected in a pdf.

When you add a new training event, it is very simple to do: select the type of event (course, master,…); click on *add new course;* type all the information about it in tables like the presented before; and finally click on *save*. Automatically the information is made public in the database. The information appears from the institution access as is presented in the figure 4.



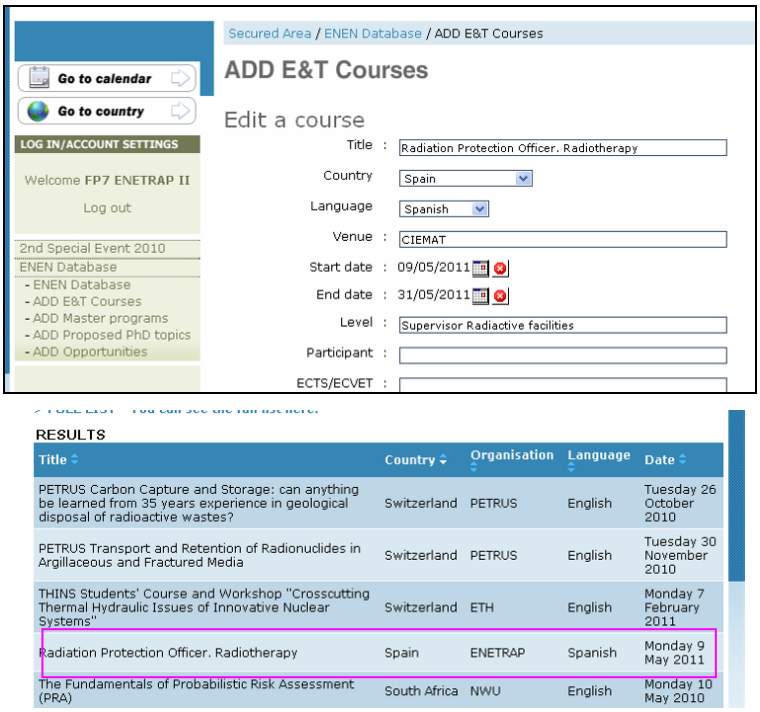


Fig. 4. Adding a new training event.

Selecting one of those events created previously you can modify it

The current ENEN database permits to make the information uploaded visible by the users automatically. When a training event is out of date, it is necessary to delete this in order to hide from the list (it is not automatically).

3.2.2 Analyzed the type of training events object of the WP6

While WP3 and WP4 are working in the development of the requirements for RPO competencies and the reference standard for the RPE training respectively, the WP6 with the purpose of have a starting point, have analyzed:

- The "Daft EURATOM Basic Safety Standards Directive (24 February 2010 Version)"
- The IAEA "Requirements for the training of RPOs (April 2007 Version)"

The results of this analysis are presented in the Annexes I and II. As result of this analysis, the database must contain training events for the RPE and RPO, and it is very adequate to include the Exposed Workers and establish a link with EFOMP to include medical physics expert events:

http://www.efomp.org/index.php?option=com_content&view=section&layout=blog&id=10&Itemid=65

RPO

The current results in the WP3 expressed the appropriate route to gaining the level of competence required to become an RPO will usually be a combination of training plus

relevant experience in the appropriate area of work. The RPOs appropriate training in radiation protection must be tailored to the specific needs to fulfil particular radiation protection tasks. Some questions have been launched to try to define the common elements in the different countries for the training needs. The details of the required competencies according to the RPO's area of work and reference standards to be established for RPO training will be presented in WD3.2.

RPE

The requirements for initial and refresh training for the RPE will be developed by WP4 in the WD4.1 and the reference standards for the RPE training in the WD4.2. Preliminary requirements for recognition of RPEs are necessary and WP4 is waiting for the results of WP2: *WD2.1 Report on requirements for RPE*

Mechanism to evaluate the training events (RPE and RPO) and training providers object of the database

The WP5 is working in the different mechanism to evaluate the training events and training providers object of the database. In its first year report, WP5 has started with an inventory of topics, items and subjects that need to be addressed in the education and training of the RPE and RPOs. These main subjects are needed to be subdivided in a reference table to come to a methodology of comparison. The table presented could be used in compliance with the European Radiation Protection Training Scheme (ERPTS). With this reference table each country can compare its own training and education methods with that of the European Standard (WP3 and WP4).

3.2.3 To identify the type of training providers and the availability of OJT facilities.

To identify the providers and its availability of OJT facilities, WP6 has developed a questionnaire (to be discussed in the next steering committee meeting) to be sent to the ENETRAP II members (Annex III).

The intention of the questionnaire is to identify the most representative providers at the national level to be including in the database and include the degree of conformity with the quality assurance protocol defined by WP5.

In the ENETRAP project, as part of the WP5, a search of different kind of RP courses (Spanish and some European) offered in the Internet was done (Annex IV).

3.2.4 Database structure needs and protocol of implementation and publishing.

After the previous analysis, WP6 has done an examination of the different possible situations through three models for the design of the database, presented in the annex IV. One of this is the ideal situation for the information implementation.

Structure.

WP6 would need the implementation of new categories for the particular necessities.

The current ENEN database has four categories for the nuclear field. The ENETRAP II database needs almost four new categories (RPO events, RPE events, EW events and E&T Providers) and a link to EFOMP- events.

CATEGORIES FOR THE RADIATION PROTECTION FIELD

- Radiation Protection Expert (RPE) E&T events
- Radiation Protection Officer E&T (RPO) events
- Exposed Workers (EW) E&T events
- Medical Physic Expert (MPE)- link

and

- E&T Providers

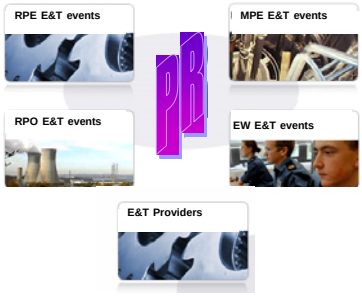


Fig. 5. Data base radiation protection section proposed.

The structure could be implemented in two sections, one for the nuclear field and another one for the radiation protection field.

The ENETRAP II data base should content different degrees of permission in order to include the degree of conformity of the training events with the standards. The lower degree, should permit to upload the information (courses and E&T Providers information) and the higher degree, should permit to make the information visible, ones the information has been checked with the mechanism for evaluation developed by WP5.

Providers.

The selected providers to be included in the database will be identified through the received questionnaires (annex III). They could be added to the database in a provisional way, not visible until they have passed the quality assurance protocol defined by WP5 for the providers in the WD5.3.

Once the providers have the "permission" to add their training events information, they must receive an email with their keys allowing the connection with the database, in the same way as in the ENEN database.

The providers with their keys can upload their training events information and can update their own information, with the lower level of permission.

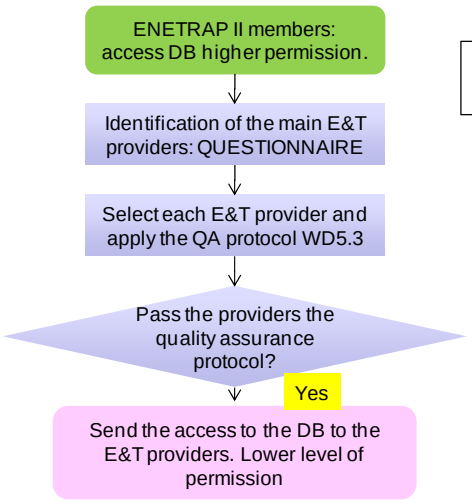
Each ENETRAP member could have the higher permission for their country, and should add the degree of conformity with the protocol defined by WP5 in the WD5.2 for each category.

The formulary for each course field could be:

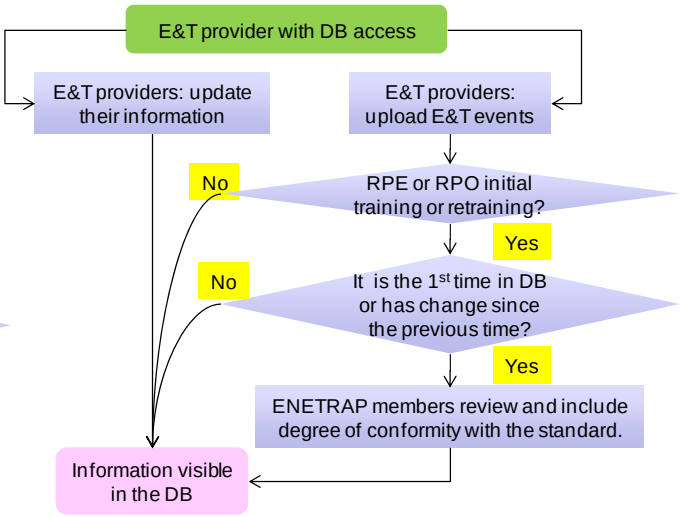
Title	
Application field	
Modality	*Face to face, online, blended learning, …*
Venue	
Country	
Language	
Duration	*Start date: End date:*
Call frequency	*Annual, biannual, twice yearly, …*
National Recognition?	
Edition number	
Degree of conformity with the standards* **To be completed after the evaluation for the first edition published*	
Type of training event?	*E&T course, Master, Proposed PhD topic, Opportunity*
Type of E&T program?	*Initial training, re-training, specialization, …*
Program details	*Objective, topics, lecturers, material, work load, prerequisites, etc*
Requirements to apply	*Preliminary diploma, experience, etc*
Tuition fee	
How to apply	
Deadline of application	
Training Provider *This field must be linked with the table about providers.*	
OJT?	
For further information	*Contact persons, website, etc*
Name PDF 1	
Name PDF 2	

Table 5. Formulary for each E&T event program

The proposed types of contents that could be collected in the formulary for each provider are collected in the annex III.



Flowchart 1. Identification of the E&T providers



Flowchart 2. Implementation of the information in the DB

4. SUMMARY AND CONCLUSIONS.

The tasks developed in the first year of the WP6 can be summarized as follows:

- WP6 has studied the previous ENEN database and has identified the particular necessities to be included in the RP training events database.
- Some documents and the first conclusions of WP 2, 3 and 4 has been analysed in order to identify the kind of training events object of the database.
- A questionnaire has been developed to identify the mail E&T national providers. This questionnaire must be discussed.
- WP6 has done an analysis of the different possible situations of the design of the database, presented in the annex IV, and the ideal situation for the information implementation.
- WP6 has developed a protocol for the incorporation of the information in the database, based in two levels of access permission.

ANNEXES

ANNEX I. THE DAFT EURATOM BASIC SAFETY STANDARDS DIRECTIVE. 24 FEBRUARY 2010 VERSION

In the **TITLE II: DEFINITIONS** are defined the target groups susceptible to be included in the Database.

- **Radiation protection expert (RPE)**: an individual having the knowledge, training and experience needed to give radiation protection advice in order to ensure effective protection of individuals, whose capacity to act is recognized by the competent authorities.
- **Radiation protection officer (RPO):** an individual technically competent in radiation protection matters relevant for a given type of practice who is designated by the undertaking to oversee the implementation of the radiation protection arrangements of the undertaking.
- **Medical physics expert (MPE)**: an individual having the knowledge, training and experience to act or give advice on matters relating to radiation physics applied to medical exposure, whose competence to act is recognized by the competent authorities.
- **Exposed worker (EW):** person, either self-employed or working under an employer, who is subject to exposure at work carried out within a practice regulated by this Directive and who is liable to receive doses exceeding one or other of the dose levels equal to the dose limits for members of the public.

Other interesting definitions are:

- **Outside worker:** any exposed worker of category A, who is not employed by the undertaking responsible for the supervised and controlled area, but performs activities in these areas, including trainees, apprentices and students.
- **Practitioner**: a medical doctor, dentist or other health professional, who is entitled to take clinical responsibility for an individual medical exposure in accordance with national requirements.
- **Undertaking:** a natural or legal person who has legal responsibility for carrying out a practice or who has legal responsibility for a radiation source (including cases where the owner or holder of a radiation source does not conduct related activities).

In the **TITLE IV, "Responsibilities for Regulatory Control"**, in the first section, devoted to the Institutional infrastructure, are defined the requirements demanded to the Member States about the recognition of different services and experts as well as the competences for that experts.

Article 16: Recognition of services and experts

1. Member States shall make the necessary arrangements for the recognition of:

- occupational health services,
- dosimetry services,
- **radiation protection experts,**
- **medical physics experts,**

Member States shall ensure that the **necessary arrangements** are in place to ensure the **continuity of expertise** of these services and experts.

2. Member States shall specify the recognition requirements and communicate these to the Commission together with the name and address of the competent authorities, entrusted with the recognition. Member States shall communicate any changes to the data referred to in this paragraph.

3. **Member States shall specify other services or experts requiring particular radiation protection qualifications and where appropriate the process for the recognition of such qualifications**.

4. The Commission shall make the information received under paragraph 2 available to the Member States.

Article 19: Radiation Protection Expert

The Radiation Protection Expert shall, on the basis of professional judgement, measurements and assessments **give competent advice to the undertaking on matters related to occupational exposure and public exposure**. The advice shall include, but not be limited to, the following:

- plans for new installations and the acceptance into service of new or modified radiation sources in relation to any engineering controls, design features, safety features and warning devices relevant to radiation protection;
- the categorization of controlled and supervised areas;
- the classification of workers;
- the content of workplace and individual monitoring programmes;
- the appropriate radiation monitoring instrumentation to be used;
- the appropriate methods of personal dosimetry;
- the optimisation and the establishment of appropriate dose constraints,
- quality assurance, including quality control;
- the environmental monitoring programme; radioactive waste disposal requirements.
- the arrangements for prevention of accidents and incidents, preparedness and response in emergency exposure situations;
- training and retraining programs for exposed workers;

Where appropriate, **the task of the Radiation Protection Expert can be carried out by a group of specialists together having the necessary expertise**.

Article 20: Medical Physics Expert

1. **Within the healthcare environment**, the Medical Physics Expert shall, as appropriate, act **or give specialist advice on matters relating to radiation physics applied to medical exposure**.

2. Depending on the medical radiological practice, the Medical Physics Expert shall take responsibility for **dosimetry**, including physical measurements related to the evaluation of the **dose delivered to the patient** and contribute in particular to the following:

- the optimisation of radiation protection of patients and other individuals submitted to medical exposure, including the establishment and the use of diagnostic reference levels;
- the definition and performance of quality assurance tests of the medical radiological equipment;
- the preparation of technical specifications for medical radiological equipment and installation design;
- the surveillance of the medical radiological installations with regard to radiation protection;
- the selection of equipment required to perform radiation protection measurements and give advice on medical radiological equipment;
- the training of practitioners and other staff in relevant aspects of radiation protection.

Where appropriate, **the task of the Medical Physics Expert can be carried out by a Medical Physics Service**.

Article 21: Radiation Protection Officer

1. Member States shall require, where appropriate**, the establishment of a radiation protection officer to perform radiation protection tasks within undertakings**. Member States shall require that the undertaking provides to the radiation protection officers the means necessary for them to carry out their duties. **The radiation protection officer shall report directly to the undertaking.**

2. Depending on the nature of the practice, the tasks of the radiation protection officer may include the following:

- ensuring that work with radiation is carried out in accordance with the requirements of any specified procedures or local rules;
- oversee the implementation of the programme of workplace monitoring;
- maintain adequate records of radioactive sources held by the practice; carry out periodic assessments of the condition of the relevant safety and warning systems;
- oversee the implementation of the personal monitoring programme;

- oversee the implementation of the health surveillance programme;
- give new employees an introduction in local rules and procedures;
- give advice and comments on work plans;
- authorise work plans;
- provide reports to the local management.
- participate in the arrangements for prevention, preparedness and response for emergency exposure situations;
- liaison with the radiation protection expert;

Where appropriate, **the task of the Radiation Protection Officer can be carried out by a radiation protection unit established within an undertaking**.

In the **Title V, "Requirements for radiation protection education, training and information",** is established that the Member States shall ensure an adequate legislative and administrative framework for providing **appropriate RP education, training and information** to all individuals whose tasks require specific competences in radiation protection.

Article 41

Member States shall ensure that an adequate legislative and administrative framework is established for providing appropriate radiation protection education, training and information to all individuals whose tasks require specific competences in radiation protection. In particular, appropriate education, training and retraining shall be in place to allow the **recognition of radiation protection experts, medical physics experts, occupational health services, and dosimetry services**. Training, retraining and information of relevant individuals shall be repeated at appropriate intervals and documented.

Article 42: Information and training of exposed workers, apprentices and students

1. Member States shall require the undertaking to inform exposed workers, apprentices and students who are subject to occupational exposure on:

(a) the health risks involved in their work:

- the general radiation protection procedures and precautions to be taken and, in particular, those involved with operational and working conditions in respect of both the practice in general and each type of work station or job to which they may be assigned,
- the emergency response plans and procedures,
- the importance of complying with the technical, medical and administrative requirements;

(b) in the case of women, the importance of early declaration of pregnancy in view of the risks of exposure for the child to be born and the risk of contaminating a nursing infant after incorporation of radionuclides.

2. Member States shall require that the undertaking provides appropriate radiation protection training and information programmes for their personnel.

3. In addition to the information and training in the field of radiation protection specified in this article, the undertaking responsible for high activity sealed sources shall ensure that such training includes specific requirements for the safe management and security of high activity sealed sources with a view to preparing the relevant workers adequately for any events, affecting their own safety or the radiation protection of other individuals. The information and training shall place particular emphasis on the necessary safety requirements and shall contain specific information on possible consequences of the loss of adequate control of high-activity sealed sources.

Article 45: Education, information and training in the field of medical exposure

1. Member States shall ensure that practitioners and those individuals involved in the practical aspects of medical exposure procedures have adequate education, information, theoretical and practical training for the purpose of medical radiological practices, as well as relevant competence in radiation protection.

For this purpose Member States shall ensure that appropriate curricula are established and shall recognize the corresponding diplomas, certificates or formal qualifications.

2. Individuals undergoing relevant training programmes may participate in practical aspects for the procedures mentioned in Article 82 paragraph 4[3].

3. Member States shall ensure that continuing education and training after qualification is provided and, in the special case of the clinical use of new techniques, the organisation of training related to these techniques and to the relevant radiation protection requirements.

4. Member States shall ensure that mechanisms are in place for the timely dissemination of appropriate information relevant to radiation protection in medical exposure on lessons learned from significant events.

5. Member States shall ensure the introduction of a course on radiation protection in the basic curriculum of medical and dental schools.

In the **TITLE VIII "Protection of patients and other individuals submitted to medical exposure**" explains about the training and recognition requirements:

[3] ***Article 82: Responsibilities.*** *4. The practical aspects of the medical exposure procedure or part of it may be delegated by the undertaking or the practitioner, as appropriate, to one or more individuals entitled to act in this respect in a recognized field of specialization.*

Article 84: Training

Member States shall ensure that training and recognition requirements, as defined in **Articles 16, 41 and 45**, are met for the practitioner, the medical physics expert and those individuals referred to in **Article 82 paragraph 4**.

ANNEX II. THE IAEA REQUIREMENTS FOR THE TRAINING OF RPOS

The IAEA, in their requirements for the training of the RPO, establishes that RPOs should have as a minimum a secondary educational level. However, it will be dependent on the skills and technical requirements of the job as well as on RP needs. For some facilities, i.e. complex situations a tertiary educational level should be considered appropriate;

It is recognised that, in some cases, diplomas are defined by the regulatory authority and depend on the national regulations and prescriptions.

A suitable qualification for RPOs will be:

- ✓ the combination of attendance at an **RPO course** (+the passing of any **associated examination**)
- ✓ and the **work experience** the person has received.

Formal recognition by the regulatory body may be required for a RPO in a specific practice, if specified in national regulations**.**

Formal training

The formal training of RPOs should involve covering a core syllabus and, as appropriate, a supplementary module pertinent to the practice in question These materials may be covered separately or combined into a single course depending on the availability of participants.

On-the-job training (probationary period)

Classroom based training is unlikely to cover all the practical radiation protection and safety aspects and skills associated with specific work tasks; hence **additional experience in the workplace and on the job training** can be very effective in the overall training programme for RPOs. In this form of training the participant works in the normal place of work either under the direct supervision of, or with indirect input from, an experienced mentor.

The duration of this additional training will be dependant on the complexities of the practice and the RPO's previous work experience. However, where it is deemed to be appropriate, it is considered important that it be provided in a systematic manner to ensure that the benefits are maximised. A training plan based on identified practical competencies and including a list of topics to be covered and tasks to be carried out should be prepared.

An example of an on-the-job training programme for industrial radiographers is given in Safety Report Series No. 20.

The suggested duration for probationary period (or OJT) is a maximum of 3 months, however, **this is flexible for each practice**. While OJT for radiotherapy may extend for 12 weeks, it may not be the same for nuclear gauges**.**

Assessment

An assessment of the competency of the participants should be made at the end of the training programme. This assessment should include **an examination** at the end of the **formal training course** and an **evaluation of the person's practical competencies in the workplace**. Further information in the designing of an assessment process is given in Safety Report Series No. 20.

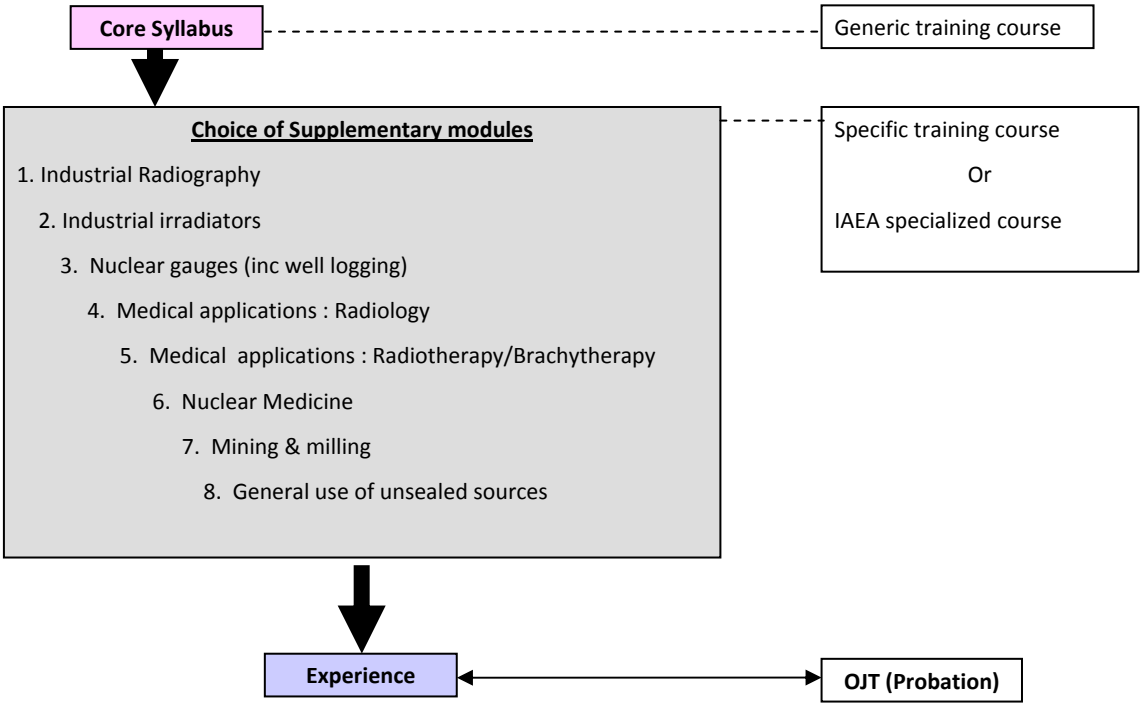


Fig 4. IAEA training process scheme

Training Providers

There is no prescription with respect to the training provider. However, it is expected that employers seek the required training from an appropriate source and that the choice of provider (along with course content) is endorsed by an individual (for example a Qualified Expert) or organisation with the appropriate expertise. It may that in some countries RPO training may only be delivered by an organisation by the national Regulatory Body to do so. Further guidance on the delivery and provision of training is available in RS-G-1.4, "Building Competence in Radiation Protection and the safe use of radiation sources".

Training duration

Type of practice	Core syllabus*(hours)	Supplementary modules		Global duration** (hours)	Minimum experience and OJT*** (weeks)
		Theory	Exercises, demo, Practical, visits		
Industrial radiography	25	9	5+ visits	47+ visits	12
Industrial irradiator facilities	25	7	4	44	6
Nuclear gauges and well logging	25	8	4	45+visits	4

Medical applications in radiology	25	7	5	45	6
Medical applications in radiotherapy and brachytherapy	25	13	8	54	12
Nuclear medicine	25	14	8	55	6
Mining and milling processing of raw materials	25	8.5	5	46.5	3
General use of unsealed sources (including research facilities and the use of tracers)	25	13	8	54	6

*Recommended additional exercise duration for core training = 8h

**Includes the duration of the core syllabus, additional exercises module and core and supplementary Module, demonstrations, exercises, practical exercises and visits. The training to be completed in 2 weeks.

*** It is important that an RPO has an understanding of the nature of the work in question. "Minimum experience" relates to the minimum amount of time that an individual should have spent working in the application before being considered as suitable for RPO appointment

The recommended duration of the on the job training component is 3 months, although there is a degree of flexibility depending on the complexity of the application

Refresher training

It is important **that RPOs keep up to date with changes in regulatory requirements and any relevant developments in the practice in which they work** (changes in safety system, procedures etc). It is recommended, therefore, that all **RPOs attend suitable refresher training courses at periodic intervals**. These courses should summarise the relevant legislative requirements, identify any changes or developments in radiation protection and source safety, and may include discussion sessions and group exercises. The frequency at which RPOs should attend these events will depend on national requirements, but it **is recommended that they undergo retraining at least once in every 5 years**.

ANNEX III. QUESTIONNAIRE TO IDENTIFY THE EUROPEAN TRAINING PROVIDERS.

E&T Training provider	*Training provider XXXXX*	
Name		
Country		
Address		
Web		
Contact point	Name:_____ Department:_____ Email: _____ Tlf:_____ Fax:_____	
Type of organization:	Public:	
	Private:	
Main activity:		
Areas of activity:	nuclear industry	
	diagnostic radiology	
	nuclear medicine	
	radiotherapy	
	research	
	industrial radiography	
	irradiators and accelerators	
	gauging techniques	
	tracer techniques	
	mining and milling	
	Others:_____	
Type of training events	Courses,	
	Masters	
	Proposed PhD topic	
	Opportunities	
	Other:_____	

Type of training programs:	RPE initial training	
	RPE refresh training	
	PRO initial training	
	RPO refresh training	
	Exposed Workers (EW) initial training	
	EW refresh training	
	Other:_____ *Specialization, introduction to a new technique, …*	
	OJT facilities	
Evaluation mechanism:	Final exam	
	Continuous assessment	
	Final project	
	Others:_____	
Certification		
National recognition:	*Regulatory body, Ministry of…, etc*	
Quality assurance system:		
Employment bureau		

Table 6. Formulary for E&T providers.

ANNEX IV. IDEAL SITUATION FOR THE IMPLEMENTATION OF THE INFORMATION IN THE ENETRAP II DATABASE AND ITS VISIBILITY.

WP6 have thought in 3 different models to implement the ENETRAP II DB that are explained and commented below.

VI.1 MODEL 1.

This model is based in two levels of permission in the implementing of the information in the DB

VI.1.1 ENETRAP database structure.

The ideal ENETRAP database has a space devoted to radiation protection with 5 fields: four categories for the database (RPO events, RPE events, EW events and E&T Providers) and a link to EFOMP- events.

CATEGORIES FOR THE RADIATION PROTECTION FIELD

- Radiation Protection Expert (RPE) E&T events
- Radiation Protection Officer E&T (RPO) events
- Exposed Workers (EW) E&T events
- Medical Physic Expert (MPE)- link

and

- E&T Providers

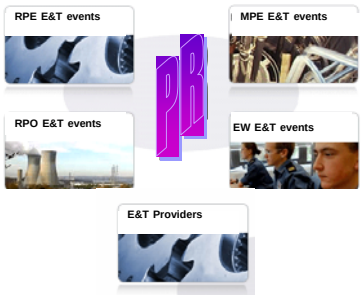


Fig. 5. Data base radiation protection section proposed.

The events for PRO, RPE and EW could belong to different type of E&T programs:

- initial training;
- refresh training;
- specialization training,
- etc,

and could belong to different type of E&T events:

- Courses,
- Masters
- Proposed PhD topic
- Opportunities
- Other

The information for each **E&T event** is the collected in a table like this:

Title	
Application field	
Modality	*Face to face, online, blended learning, …*
Venue	
Country	
Language	
Duration	*Start date: End date:*
Call frequency	*Annual, biannual, twice yearly, …*
National Recognition?	
Edition number	
Degree of conformity with the standards* **To be completed after the evaluation for the first edition published*	
Type of training event?	*E&T course, Master, Proposed PhD topic, Opportunity*
Type of E&T program?	*Initial training, re-training, specialization, …*
Program details	*Objective, topics, lecturers, material, work load, prerequisites, etc*
Requirements to apply	*Preliminary diploma, experience, etc*
Tuition fee	
How to apply	
Deadline of application	
Training Provider *This field must be linked with the table about providers.*	
OJT?	
For further information	*Contact persons, website, etc*
Name PDF 1	
Name PDF 2	

Table 5. Formulary for each E&T event program

The category devoted to **E&T Providers** should contain all the information related to the providers in a formulary like the one is presented in the annex III.

E&T Training provider	*Training provider XXXXX*	
Name		
Country		
Address		
Web		
Contact point	Name:_____ Department:_____ Email: _____ Tlf:_____ Fax:_____	
Type of organization:	Public:	
	Private:	
Main activity:		
Areas of activity:	nuclear industry	
	diagnostic radiology	
	nuclear medicine	
	radiotherapy	
	research	
	industrial radiography	
	irradiators and accelerators	
	gauging techniques	
	tracer techniques	
	mining and milling	
	Others:_____	
Type of training events	Courses,	
	Masters	
	Proposed PhD topic	
	Opportunities	
	Other:_____	
Type of training programs:	RPE initial training	
	RPE refresh training	
	PRO initial training	
	RPO refresh training	
	Exposed Workers (EW) initial training	
	EW refresh training	
	Other:_____ *Specialization, introduction to a new technique, …*	
	OJT facilities	
Evaluation mechanism:	Final exam	
	Continuous assessment	
	Final project	
	Others:_____	
Certification		
National recognition:	*Regulatory body, Ministry of…, etc*	
Quality assurance system:		
Employment bureau		

Table 6. Formulary for E&T providers.

The main E&T Providers could be identified in each country by the ENETRAP II members and uploaded by them.

VI.1.2 Process to implement the information on E&T events

In this model, E&T Provider have access to publish their E&T events in the ENETRAP II database. Previous to they have an access, they have to pass the quality assurance protocol defined in the WD 5.3. In this moment, the E&T Provider should receive a user name and a password to allow including their E&T events information (lower level of permission).

Once the E&T Provider has the user name and the password, he can include the information of their training events.

If the even uploaded is for the RPE or the RPO initial training or re-training couldn't be visible by the database public until an ENETRAP II member review it and include the degree of conformity with the agreed standards (higher level of permission). Once the event is in conformity with the agreed standard, following editions of the event could be visible immediately (self-sustainable system)

If the event is different of RPE or the RPO initial training or re-training, it could be visible immediately, like the current ENEN database.

The information of each event disappears when the end date has passed. (Self sustainable system)

VI.1.3 Appearance and use of the ideal ENETRAP II database

When you click on the link to the ENETRAP II database, on the section devoted to Radiation Protection, you could access to the sections mentioned above.

- **Situation 1**. If you click for example in RPO (the same for RPE and RW), immediately appears all the training events related to the RPO.

You can organize the information received from the consultation by different fields: organization (E&T provider), language, date, and the type of event mentioned above (course, master,…)

If you select one of them, you can click on the organization and all the information about it can be recuperated.

- **Situation 2**. If you click on MPE, the link to EFOMP will take you to the events published in their web page.

- **Situation 3**. If you click on E&T provider, immediately appears all the information about the E&T providers in the database. The information could appear organized by Name, country, type of training event and main activity

If you select one of them, you can get all the information about it and all the E&T events that are active in the moment of the search.

VI.2 MODEL 2.

The second model, **if only one level of permission in the DB is possible**, differs from the first in the way the information is managed in the DB. In other words, points 1.1 and point 1.3 are the same.

VI.2.1 ENETRAP database structure.

The same as is mentioned in point *VI.1.1 ENETRAP database structure*.

VI.2.2 Process to implement the information on E&T events

In this model, E&T Provider don't have access to publish their E&T events in the ENETRAP II DB.

ENETRAP II members:

- have to identify the national E&T Provider through the questionnaire
- have to pass to the national E&T Providers the quality assurance protocol defined in the WD 5.3.
- have to received the information E&T events information from the national E&T Providers.
- If the E&T even is for the RPE or the RPO initial training or re-training, previous to the first time it is uploaded, ENETRAP II member should review it and include the degree of conformity with the agreed standards. Subsequent times it is not necessary.

VI.2.3 Appearance and use of the ideal ENETRAP II database

The same as is mentioned in point *VI.1.3 Appearance and use of the ideal ENETRAP II database*.

VI.3 MODEL 3.

Model 3 is based in the use of the ENEN DB, without any change, for the ENETRAP II purposes.

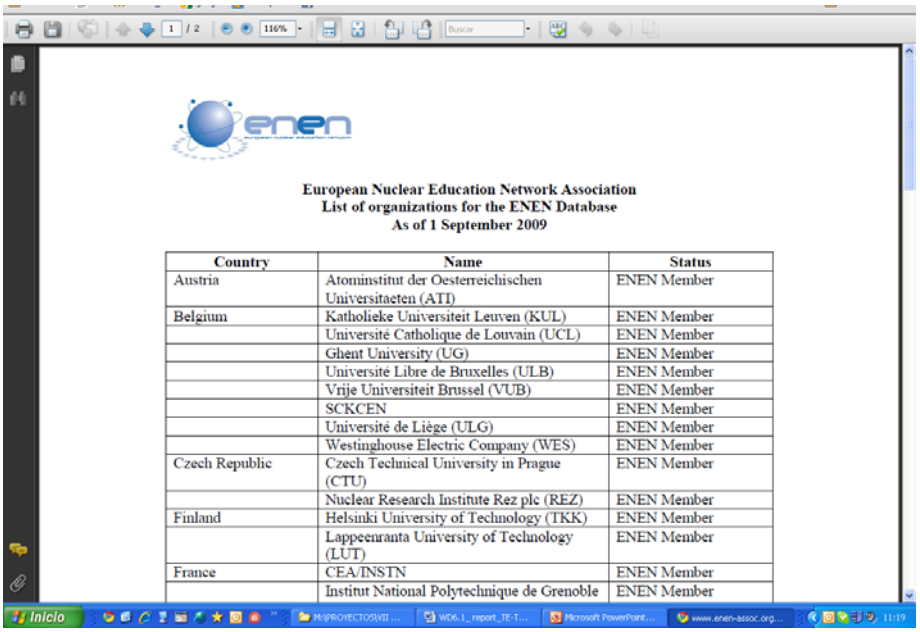
VI.3.1 ENETRAP database structure.

The ENEN DB structure is explained in detail in the point 3.2.1 of this document.

In this case, the E&T events should be organized in the four categories currently available (E&T courses, Master, PHD topics and Opportunities), and no distinction between RPO, RPE and the EW could be done at first.

It is possible to include a link with the EFOMP web, to take into account the MPE, in the area devoted to links in the main page of the ENEN DB

With respect to the providers, the list must be added in a static pdf, with the ENEN institutions, and only modifying the table of the pdf, could be possible to include the "OJT"



European Nuclear Education Network Association
List of organizations for the ENEN Database
As of 1 September 2009

Country	Name	Status
Austria	Atominstitut der Oesterreichischen Universitaeten (ATI)	ENEN Member
Belgium	Katholieke Universiteit Leuven (KUL)	ENEN Member
	Université Catholique de Louvain (UCL)	ENEN Member
	Ghent University (UG)	ENEN Member
	Université Libre de Bruxelles (ULB)	ENEN Member
	Vrije Universiteit Brussel (VUB)	ENEN Member
	SCKCEN	ENEN Member
	Université de Liège (ULG)	ENEN Member
	Westinghouse Electric Company (WES)	ENEN Member
Czech Republic	Czech Technical University in Prague (CTU)	ENEN Member
	Nuclear Research Institute Rez plc (REZ)	ENEN Member
Finland	Helsinki University of Technology (TKK)	ENEN Member
	Lappeenranta University of Technology (LUT)	ENEN Member
France	CEA/INSTN	ENEN Member
	Institut National Polytechnique de Grenoble	ENEN Member

Fig. 6. List of the organizations for the ENEN DB.

VI.3.2 Process to implement the information on E&T events

In this case, only one level of permission is given.

There are two possibilities:

1. Only ENETRAP II members have access, as is currently. In this case, each event will belong to the same organization FP7 ENETRAP II – organization. The ENETRAP II members should do all the tasks mentioned in the point *VI.2.2 Process to implement the information on E&T events*.
2. Each E&T provider need each own access (username and password), in order to the organizations could be visible in the searches of the events. For this second possibility, the ENETRAP II members could give an access to those organizations that have passed the quality assurance protocol defined in the WD 5.3, but when the providers include their E&T events for the RPO and PRE initial training and re-training, nobody could incorporate the degree of conformity with the agreed standards.

VI.3.3 Appearance and use of the ideal ENETRAP II database

The appearance would be the same as now in all the possibilities. The searches of the different events should be done though the four categories currently available (E&T courses, Master, PHD topics and Opportunities)

In order to have the same criteria for all the events and to promote effective searches through the "search-box" could be a good idea to include in the title area (the only common area in all the categories) the type of even (RPO, RPE or EW).

In this case is not possible to look for an event from a selected E&T provider.

ANNEX V: SEARCH OF DIFFERENT (NATIONAL AND INTERNATIONAL) KIND OF RP COURSES AND OTHER RESOURCES

web site	Institution	Country	Area	Name of Activity	Type of activity	Methodology	Receiver	Fees
http://www.cursossanitarios.org/tecradiologia/tecradiologia.asp	Asociación Cultural para la Formación, Educación e Investigación científica y sanitaria	Spain	radiological technician	Continuing education for the study of radiographics positions	course 325h	traditional distance learning	Health and sanitarian professionals	133 €
http://www.cursossanitarios.org/tecradiologia/tecradiologia.asp	Asociación Cultural para la Formación, Educación e Investigación científica y sanitaria	Spain	radiological technician	Radological images: Updating of Physical Principles and Instrumentation. Continuing education	course 300h	traditional distance learning	Health and sanitarian professionals	115 €
http://www.cursossanitarios.org/tecradiologia/tecradiologia.asp	Asociación Cultural para la Formación, Educación e Investigación científica y sanitaria	Spain	radiological technics	Nuclear medicine: Exploration Technics. Continuing specializing education	course 425h	traditional distance learning	Health and sanitarian professionals	116 €
http://www.cursossanitarios.org/tecradiologia/tecradiologia.asp	Asociación Cultural para la Formación, Educación e Investigación científica y sanitaria	Spain	radiological technics	Thorax radiology	course 300h	traditional distance learning	Health and sanitarian professionals	145 €
http://www.cursossanitarios.org/tecradiologia/tecradiologia.asp	Asociación Cultural para la Formación, Educación e Investigación científica y sanitaria	Spain	radiological technics	Pediatric Radiology	course 425h	traditional distance learning	Health and sanitarian professionals	154 €
http://www.ieev.uma.es/interad/	UNIVERSIDAD DE MÁLAGA.Departamento de Radiología y Medicina Física	Spain	radiology and medical physics	Interactive doctorate course of Radiology and Internet	doctorate course	e-learning	students of PhD course	
www.acpro.es	Asesoría y Control en Protección Radiológica, S.L.	Spain	Radiation Protection	Radiation Protection and radiological diagnostic course	course	e-learning	professionals using radiological diagnostic technics	130 €
www.acpro.es	Asesoría y Control en Protección Radiológica, S.L.	Spain	Radiation Protection	Radiation Protection course and quality control in computarized tomography	course	e-learning	professionals using computarized tomography que utilizan técnicas de tomografía computerizada	130 €
www.acpro.es	Asesoría y Control en Protección Radiológica, S.L.	Spain	Radiation Protection	Radiation Protection and interventionist radiology course	course	e-learning	professionals usingi interventionist radiology technics	130 €
www.acpro.es	Asesoría y Control en Protección Radiológica, S.L.	Spain	Radiation Protection	Radiation Protection and quality control in mamography course	course	e-learning	Health and sanitarian professionals	
www.acpro.es	Asesoría y Control en Protección Radiológica, S.L.	Spain	Radiation Protection	Radiation Protection and quality control in digital radiology course	course	e-learning	Health and sanitarian professionals	
http://www.solocursosgratis.com/curso_gratis_medicina_nuclear-slccurso1019674.htm	Formación Gratis	Spain	nuclear medicine	Nuclear medicine	pdf	Available training material	Health and sanitarian professionals	0 €
www.emagister.com/cursos	Formación Gratis	Spain	radiology	conventional radiology	pdf	Available training material	Health and sanitarian professionals	0 €
www.emagister.com/cursos	Formación Gratis	Spain	radiology	digital radilogy conferences	pdf	Available training material	Health and sanitarian professionals	0 €
www.emagister.com/cursos	Formación Gratis	Spain	radiology	radiology	pdf	Available training material	Health and sanitarian professionals	0 €
www.emagister.com/cursos	Formate +	Spain	radiology	radiology	pdf	Available training material	Health and sanitarian professionals	0 €
www.emagister.com/cursos	Formación Gratis	Spain	radiology	digital radiology	pdf	Available training material	Health and sanitarian professionals	0 €
www.emagister.com/cursos	Formación Gratis	Spain	radiology	conference about multimedia in radiology	pdf	Available training material	Health and sanitarian professionals	0 €
www.emagister.com/cursos	Formación Gratis	Spain	radiology	radiology	pdf	Available training material	Health and sanitarian professionals	0 €
www.emagister.com/cursos	Aula Tutorial	Spain	radiology	quality management in radiology services course	course	traditional distance learning	Health and sanitarian professionals	128 €
www.emagister.com/cursos	Formación Gratis	Spain	radiology	radiology	pdf	Available training material	Health and sanitarian professionals	0 €

www.emagister.com/cursos	Formación Gratis	Spain	radiology	digital radiology	pdf	Available training material	Health and sanitarian professionals	0 €
www.emagister.com/cursos	Formación Gratis	Spain	radiology	Radiology regulatory rule of 18th/6/2002	pdf	Available training material	Health and sanitarian professionals	0 €
http://www.biodiversidad.upv.es/formacion/cursos2.htm	Fundación Biodiversidad-Universidad Politécnica de Valencia	Spain	ionising radiations	ionizing and no inonizing radiation contamination	course	e-learning	Health and sanitarian professionals	0 €
www.emagister.com/cursos	Centro de Estudios y Formación de Albacete	Spain	radiology	oposición technician expert in radiological diagnostic	specializing course	traditional distance learning	Health and sanitarian professionals	930 €
http://radiologia.um.es	Area de Radiología y Medicina Física. Universidad de Medicina. Murcia	Spain	Radiation Protection	Radiological Protection and Radiological Diagnostic quality guarantee	course 115h	e-learning	Anyone interested in the topic	95 €
http://radiologia.um.es	Area de Radiología y Medicina Física. Universidad de Medicina. Murcia	Spain	radiology	Technics and conventional radiology equipments	course 52h	e-learning	Anyone interested in the topic	95 €
http://radiologia.um.es	Area de Radiología y Medicina Física. Universidad de Medicina. Murcia	Spain	radiology	Mamography and its technics	course 52h	e-learning	Anyone interested in the topic	95 €
http://www.aulatutorial.com/fcontinua/Curso_gestion_de_la_calidad_en_servicios_de_radiologia_a_distancia.html	Aulatutorial	Spain	radiology	Radiology services quality management	course 40h	traditional distance learning		240 €
http://www.tcampusvirtual.com/	tecnatom,s.a.	Spain	Radiation Protection	Basic Radiation Protection for nuclear power station external workers	course	e-learning	nuclear power station external workers	110 €
www.emagister.com/cursos	Formación Gratis	Spain	radiological diagnostic	Radiological Diagnostic Legislation	pdf	Available training material	Health and sanitarian professionals	0 €
http://www.seram.es/formacion_continuada	Sociedad Española de Radiología Médica	Spain	radiology	Quality in Radiology. Scientific Committee October 2003	conferences/ Macromedia Flash Player, Windows media, Internet	Available training material	Anyone interested in the topic	
http://www.radiologiavirtual.org/index.html	Sociedad Española de Radiología Médica, Sociedad Argentina de Radiología y Colegio Interamericano de Radiología	Spain	radiology	Educational thematic portal adressed to radiologists training based on the internet	portal temático con enlaces	thematic portal	radiologist	
http://www.sar.org.ar/	Sociedad Argentina de Radiología	Spain	radiology	Virtual Classroom	Congress/Conferences	Available training material		
www.servei.org	Sociedad Española de Radiología Vascular e Intervencionista	Spain	radiology	Radiology training related activities	thematic portal/ links	thematic portal	Anyone interested in the topic	
http://www.ciemat.es/bandrri/	BANDRRI	Spain (CIEMAT)	Nuclear	Nuclear	Nuclear data base	Available training material		
http://www.tsid.net/index.html	TSID, portal de radiologia	Spain	radiology	Radiology Thematic Portal, focussed in medicine	thematic portal/ links	thematic portal	Anyone interested in the topic	
http://www.hpa.org.uk/radiation/training/rpts/	Health Protection Agency	United Kingdom				Available training material		
http://www.icr.ac.uk/physics/courses/Rpcourse.htm	The Institute of Cancer Research	United Kingdom	Radiation Protection	Radiation Protection		Available training material		£550
http://www.icr.ac.uk/ieu/	The Institute of Cancer Research. Interactive Education Unit	United Kingdom			IEU promotes and disseminate the educational, research and clinical activities ot The Institute	Available training material		
http://www.cll.strath.ac.uk/cpd/scosh/pdrp.htm	University of Strathclyde	United Kingdom	Radiation Protection	Certificate of Professional Development in Radiation Protection	course	blended learning		£1150.00
http://www.jolie2.it/cirm/default.asp?sezId=cat4	C.I.R.M. (Consorzio Italiano per la Ricerca in Medicina)	Italy	Radiation Protection	"Principles of Radiation Protection: the law 187/2000"	course	e-learning		
	MARTIR (Multimedia and Audiovisual Radiation Protection Training in Interventional Radiology)	EU	Radiation Protection	Computarized tomography test. Doses and image quality comparative analysis. Dosimetry and mamography quality control.	CD ROM	Available training material		
http://www.emerald2.net/emerald/index.htm	EMERALD (European Medical Radiation Learning Development)	EU	Radiation Protection	Diagnostic X-ray Radiology Nuclear Medicine Radiotherapy	3 training modules(CD Rom)	Available training material		
http://www.emerald2.net/emit	EMIT (European Medical Imaging Technology Training)	EU			Training course guide	Available training material		
http://www.nuclides.net/	WEB BASED COMPUTATIONS ON RADIONUCLIDES AND THEIR RADIATION	EU	Radiation protection, Nuclear Industry, Health Physics	course in Radiation Protection and cases of sudy through the software Nuclides.ne	Nuclides software	Available training material		

http://www.ntec.ac.uk/intro.htm	NTEC (Nuclear Technology Education Consortium)	United Kingdom	Nuclear Sciences and Technology	Postgraduate education in Nuclear Science & Technology	modules will be delivered by direct teaching but will be converted subsequently to a distance learning format to provide greater choice for students. This is scheduled for 2007.	Available training material		
http://www.syberad.com/	SYBERAD LIMITED (Radiation Protection-Software Solutions for Safety Professionals)	United Kingdom	Radiation Protection	software tool for obtaining information about radionuclides, radiation and dosimetric quantities, radiation physics	Calculation Software	Available training material		
http://site.riti.org.uk/Public/default.aspx?PageID=1	Radiology- Integrated Training Initiative (Royal College of Radiologists, Department of Health and the National Health Service)	United Kingdom	Radiology		courses	Blended Learning		
http://www.sckcen.be/isrp/	Belgian Nuclear Research Centre/ International School for Radiological Protection	Belgium	Radiological Protection, Nuclear Science and Technology	Background and Basic Knowledge Nuclear Expertise Information and Comunication	textbooks and multimedia material,interactive software	Available training material/ on line/ courses		
	RADIOR	Prodidact-France, CEPN, European Commission	Radiation Protection	An Introductory Computer Aided Training Package on Radiation Protection Optimisation	software	Available training material/ on line/ courses		
	CALLIOPE	France (IPSN, INSTN)	Radiation Protection	Teaching tool: An Interactive database on CD Rom. For evaluating internal dosimetry and interpreting the results of the monitoring, both in routine and accidental situations	CD ROM	Available training material/ on line/ courses		
http://www.amtsn.org/spip/IMG/pdf/OMIRIS_v1_r-2.pdf	OMIRIS	France (EDF, COGEMA, Framatome)	Radiation Protection	Ionising Radiations and Health Multimedia tool	Software/ CD ROM	Available training material/ on line/ courses		

web site	Institution	Country	Area		Type of activity	Methodology	Receiver	Fees
://www.irpa.net/edu/index.h	IRPA(International Radiation Protection Association)	International Association	Radiation Protection		educational tools	Available training material		
http://www.iaea.or.at/	IAEA (Intenational Atomic Energy Agency)	Internacional	Radiation Protection		multimedia material	Available training material		
http://www.icrp.org/educational_area.asp	ICRP (International Commission in Radiological Protection)	Internacional	Radiation Protection		documents	Available training material		
http://www.world-nuclear-university.org/)	World Nuclear University (Atoms for sustainable development)	International Network	Nuclear	active colaboration network. National Institutions of nuclear education	pdf	Available training material		
http://www2.rsna.org/search/RSNA_RC_CustomSearchAction.cfm?class=RC	RNSA (Radiological Society of North America)	USA	Radiology and Medical physics	Radilogy and related Sciences	courses	e-learning		
http://www.aapm.org/education/ce/info.asp	AAPM (American Association of Phisicists in Medicine)	USA	Radiology and Medical Physics		multimedia material	Available training material		
www.anent-iaea.org	Asian Network for Education in Nuclear Technology	Asia	Nuclear	Cooperation network of technology and nuclear aplications education, training and research in Asia	pdf	Available training material		
Methodology (used terms)	**e-learning**: the use of new multimedia technologies to improve the quality of learning and teaching. It includes: **On-line learning**: Teaching and learning based on the net	**Available training material**: delivery of content via Internet. Different kind of files (*.PDF; *.DOC; *.EXE; multimedia, software, etc.) can be offered, mainly to be downloaded.		**Blended Learning**: combination of both presence and distance learning	**Traditional distance learning**: distance learning without the use of new multimedia technologies through the net. Only course information is available via Internet. Cotents and material is delivered via postal mail		**Thematic Portal**: Web site or service that offers a broad array of resources and services of an specific subject. (A Website that acts as a doorway to the Internet or a portion of the Internet, targeted towards one particular	