EUROPEAN TRAINING AND EDUCATION IN RADIATION PROTECTION FOUNDATION

BOOK OF ABSTRACTS

6th EUTERP Workshop
Legislative change in Europe: the implications for training in radiation protection – Rising to the challenge

September 30 – October 2, 2015
Athens, Greece

Westerduinweg 3
1755 LE Petten
The Netherlands
www.euterp.eu

SCK•CEN-BA-71

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Organising committee

Programme

Penelope Allisy-Roberts, EFOMP, UK
Michèle Coeck, Belgian Nuclear Research Centre (SCK•CEN), Belgium
Folkert Draaisma, NRG, The Netherlands
Richard Paynter, EUTERP, The Netherlands
Marcel Schouwenburg, University Delft, The Netherlands
Joanne Stewart, PHE, UK

Organisation

Michèle Coeck, Belgian Nuclear Research Centre (SCK•CEN), Belgium
Anna Dalles, Greek Atomic Energy Commission, Greece
Konstantinos Karfopoulos, Greek Atomic Energy Commission, Greece
Griet Vanderperren, Belgian Nuclear Research Centre (SCK•CEN), Belgium

Introduction

The new Basic Safety Standards Directive 2013/59/EURATOM (BSS) was published in January 2014 and Member States of the European Union are currently considering how to implement its requirements into their national legislation. It is very timely, therefore, to now hold a workshop to review these requirements, to see how they differ from those of the earlier BSS, and consider the implications in the field of education and training in radiation protection. One innovation in the new BSS is the bringing together the education and training requirements into one chapter. This chapter requires Member States to have suitable arrangements in place for education, training and retraining. It also specifies the responsibilities of the Member States in the development and maintenance of an education and training infrastructure. Elsewhere in the BSS there are important education and training requirements associated with changes in radon arrangements, the approach to cosmic radiation exposure of air crew, outside worker requirements, and non-medical imaging exposures.

The major changes in training terms are associated with the introduction of the roles of Radiation Protection Expert (RPE) and Radiation Protection Officer (RPO), and the training requirements for these roles. Previous EUTERP workshops made a major contribution to the development of the definitions of these new posts and we now have the opportunity to discuss and comment on the education and training requirements for these posts, developed by the ENETRAP III project of the EC. This will be the subject of Session 4 of the Workshop.

An objective of the EUTERP Foundation is the harmonisation of education and training approaches across Europe to radiation professionals, workers and others that need information on radiation protection. Your participation of the Workshop will encourage a common understanding to the education and training challenges of the new BBS requirements and will contribute to the implementation process of these requirements in Member State legislation.

I wish you a useful and inspiring Workshop.

Richard Paynter
EUTERP President

Programme

Tuesday September 29, 2015	
18.30 – 19.00	Registration
19.00	Welcome reception

Wednesday September 30, 2015		
09.00 – 09.30	Registration	
09.30 – 09.45	Welcome	Richard Paynter, EUTERP Konstantinos Karfopoulos, Greek Atomic Energy Commission, Greece
Session 1: Euratom Basic Safety Standard Chairperson: Vasiliki Kamenopoulou		
09.45 –10.15	Overview of the new requirements in Euratom BSS Council Directive 2013/59/EURATOM	Richard Paynter, EUTERP
10.15 – 10.45	The views of HERCA	Ton Vermeulen, HERCA
10.45 – 11.00	Overview of the poster contributions	Michèle Coeck, EUTERP and SCK•CEN
11.00 – 11.30	*Break*	
Session 2: Communicating radiation risks		
11.30 – 11.45	Introduction by the facilitator	Richard Paynter
11.45 – 12.00	Indoor Rn concentration and Greek building energy regulations. Educating Greek engineers	Dimitris Karangelos, University of Athens, Greece
12.00 – 12.15	How do you explain radiation risk in a risky world?	Elisabeth Grindrod, Public Health England, UK
12.15 – 12.30	Communicating the risks from radon – dealing with a wide and varied audience	Joanne Stewart, Public Health England, UK
12.30 – 12.45	Radiological risks: how they are communicated by and to educators and trainers	Metka Kralj, ARAO, Slovenia
12.45 – 13.00	Q&A	
13.00 – 14.00	*Lunch*	

Session 3: Occupational exposure		
14.00 – 14.15	Introduction by the facilitator	Joanne Stewart
14.30 – 14.45	Implementing the EU BSS: implications for the system of Education and Training in Germany	Jan-Willem Vahlbruch, Leibniz University of Hannover, Germany
14.45 – 15.00	Qualification in radioprotection in Belgium in view of the new BSS-Directive (2013/59/ Euratom)	Annie Vanderlinck, Federal Agency for Nuclear Control, Belgium
15.00 – 15.15	Redefining the position of the Dutch supervising expert in light of the implementation of the basic safety standards in the Netherlands	Barbara Godthelp, Authority for Nuclear Safety and Radiation Protection, The Netherlands
15.15 – 15.30	Q&A	
15.30 – 15.45	*Break*	
15.45 – 16.00	Initiatives of a regulatory authority for the training of veterinarians on radiation protection	Sotiris Economides, Greek Atomic Energy Commission, Greece
16.00 – 16.15	Writing training programmes in a nuclear organisation	Heleen van Elsäcker-Degenaar, NRG, The Netherlands
16.15 – 16.30	Q&A	
16.30 – 17.00	Introduction to the working groups	Richard Paynter, EUTERP
17. 00	Closure of day 1	
18.00	Visit to the museum and dinner at the Acropolis	

Thursday October 1, 2015		
Session 4: Results of the ENETRAP III project		
9.00 – 9.15	Introduction to the ENETRAP III project	Michèle Coeck, SCK•CEN, Belgium
9.15 – 9.30	Development of specialised training modules for the RPE	Csilla Pesznyak, BME, Hungary
9.30 – 9.45	From competences to contents by innovative teaching methods and tools	Paul Livolsi, CEA-INSTN, France
9.45 – 10.00	Capacity building and transfer of know-how in radiation protection. Dissemination of ENETRAP results.	Cristina Llorente Herranz, CIEMAT, Spain
10.00 – 10.15	Guidelines for the implementation of E&T programmes for RPE and RPO	Annemarie Schmitt-Hannig, BfS, Germany
10.15 – 11.00	Q&A + discussion on the progress made and future work of ENETRAP III with the Consultancy Group	
11.00 – 11.30	*Break*	

11.30 – 12.30	Working groups: - How to promote and improve stakeholder contributions to training in RP? How to increase awareness and visibility of existing training activities? - Communication and risk perception - What is the value of a Train-the-Trainers approach? In what areas could this be usefully implemented?	Virginia Tsapaki & Marcel Schouwenburg Michèle Coeck & Folkert Draaisma Joanne Stewart & Paul Livolsi
12.30 – 13.00	Intermediate reporting of the three groups	
13.00 – 14.00	*Lunch*	
Session 5: Occupational exposure in the medical sector		
14.00 – 14.15	Introduction by the facilitator	Virginia Tsapaki
14.15 – 14.30	The Radiation Protection Expert in the medical sector	Stephen Evans, EFOMP, UK
14.30 – 14.45	Guidelines on radiation protection education and training of medical professionals in the European Union	Stelios Christofides, Biomedical Research Foundation, Cyprus
14.45 – 15.00	The Medical Physics Expert	Hilde Bosmans, KU Leuven, Belgium
15.00 – 15.15	Q&A	
15.15 – 15.45	*Break*	
Session 6: Emergency response		
15.45 – 16.00	Introduction by the facilitator	Marcel Schouwenburg
16.00 – 16.15	Training of RPEs for emergency response	Folkert Draaisma, NRG, The Netherlands
16.15 – 16.30	Training of first line officers on emergency preparedness and response	Antonios Maltezos, Greek Atomic Energy Commission, Greece
16.30 – 16.45	Training of first responders in the view of the legislative change in Europe	Johannes Neuwirth, Seibersdorf Laboratories, Austria
16.45 – 17.00	Q&A	
17.00 – 18.00	Working groups continued	
18.00 – 19.00	EUTERP Associates meeting	

Friday October 2, 2015		
9.00 – 9.30	Reporting of the working groups	
Closing session: Implementation of the BSS - Implications for education and training Chairperson: Michèle Coeck		
9.30 – 10.30	Panel and plenary discussion	
10.30 – 11.00	*Break*	
11.00 – 11.30	EUTERP work plan 2015 – 2016: expectations from the Associates	Joanne Stewart
11.30 – 12.30	Summary and conclusions of the workshop & outlook to future events	Richard Paynter
12.30	*Farewell lunch*	
Optional: Guided tour in Athens (registration required)		

Poster presentations

Elevated indoor radon concentrations: risks and safety measures as presented by mass media in Slovenia	Metka Kralj, ARAO, Slovenia
EAGLE: for an improved coordination of citizen-centered communication on ionising radiation	Tanja Perko, SCK•CEN, Belgium
Spanish course for the Radiation Protection Experts (RPE). A new approach in the methodology	Cristina Llorente Herranz, CIEMAT, Spain
E&T in the new BSS Directive (2013/59/EURATOM) and the Portuguese legal framework	Antonio Falcao, Lisbon University, Portugal
Cooperation in education and training in nuclear chemistry (CINCH-II)	Claudia Morariu, Institute for Radioecology and Radiation Protection, Leibniz University, Germany
Impact of the new BSS Directive on radiation protection education and training in Slovenia	Matjaž Koželj, Jožef Stefan Institute, Slovenia
Training in radiation Protection at NRG	Heleen van Elsäcker-Degenaar, NRG, The Netherlands
Collaboration between institutions in Lithuania for emergency preparedness training	Ieva Gatelyte, Radiation Protection Centre, Lithuania
Radiation protection training by the SCK•CEN Academy for Nuclear Science and Technology	Michèle Coeck, SCK•CEN, Belgium

Oral presentations

Overview of the new requirements in Euratom BSS Council Directive 2013/59/EURATOM

R. Paynter
EUTERP Foundation, Petten, The Netherlands

richard.paynter@outlook.com

Abstract

The European Commission formally adopted the new Basic Safety Standards (BSS) Directive (2013/59/Euratom), on the 5th December 2013. The Directive, which lays down the basic safety standards for protection against the dangers arising from exposure to ionising radiation, repealed the previous BSS and also incorporated the requirements of previous Directives on outside workers, medical exposures, high activity sealed sources, and public information in the event of a radiological emergency. The new BSS has also incorporated the Commission recommendations of 21 February 1990 on the protection of the public against indoor exposure to radon (90/143/Euratom).This revision was prompted primarily by the new recommendations of ICRP (ref), which are based on the latest scientific findings in radiological protection. However, it also created the opportunity to revise those topics in the old BSS where further clarity was needed.
This presentation will describe the areas of significant change in the Directive and consider the implications for education and training. These include the new functions of Radiation Protection Expert and Radiation Protection Officer, national action plans for radon, emergency response arrangements, the use of non-medical imaging, protection against natural radiation sources and requirements for outside workers.

The views of HERCA: Outcome HERCA workshop on the implementation of the radiation protection expert and the radiation protection/Towards a common understanding of the relevant requirements on RPE/RPO

T. Vemeulen[1], B. Godthelp[1], O. Guzman[2], J-L. Godet[2]

[1]Authority for Nuclear Safety and Radiation Protection (ANVS), The Hague, The Netherlands
[2]French Nuclear Safety Authority (ASN), Montrouge, Paris, France

ton.vermeulen@anvs.nl

Abstract

Radiation protection education and training (E&T) has been of outmost interest for the Heads of the European Radiation protection Competent Authorities (HERCA) from the beginning of the Association in 2007. Nevertheless, it was recognised that the topic at that time was already covered by the ongoing European Commission (EC) sponsored programmes. HERCA therefore agreed not to duplicate the work. Since 2007 several steps have been made by HERCA in this area. The TF E&T-RP was set up in November 2012. The ultimate mandate of this TF was to present a general picture of the situation on E&T in radiation protection (RP) to the board of HERCA and to identify the current need for harmonisation among HERCA member countries. The findings, conclusions and recommendations by the TF E&T were approved in November 2013.

Among the recommendations from HERCA:
- HERCA recommended that the EC should develop further guidance on the duties and required practical competencies of the RPE
- HERCA recommended that the EC should develop further guidance on the role of the RPO and the required training and competencies.

The Council directive 13/59/Euratom laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation (Euratom-BSS) introduces the radiation protection expert (RPE) which evolves from the former "Qualified Expert" (Directive 96/29). The traditional role of the RPE is advisory but Article 82 (4) allows for the RPE to be assigned specific tasks such as radiation protection of workers and members of the public 'if provided for in national legislation.' The role of the radiation protection officer (RPO) is new and is not mandatory since the task of the RPO may be carried out by a radiation protection unit or RPE.

On the occasion of the 14th meeting of HERCA in Stockholm in 2014 the HERCA TF E&T was assigned with the development of criteria/guidelines for the implementation of RPE and RPO (making use of ENETRAP I, II, III results where appropriate) and respecting diversity in the implementation of the BSS in the framework of the HERCA Action Plan on the role of HERCA in the transposition of the Euratom-BSS. HERCA decided that a workshop on this topic should be organized.

The workshop on the implementation of Radiation Protection Expert (RPE) and Radiation Protection Officer (RPO) was organised by the HERCA Task Force on Education & Training in Radiation Protection on behalf of HERCA in collaboration with the Dutch Authority for Nuclear Safety and Radiation Protection (ANVS), the Greek Atomic Energy Commission (EEAE) and the French Nuclear Safety Authority (ASN) from 6-8 July 2015 in Paris.

The objectives of this workshop were:

- to explore a common understanding of the new requirements on RPE/RPO;
- to exchange national approaches relating to the implementation of the BSS on RPE/RPO. Whenever possible, to identify good practices with national implementation of RPE/RPO;
- to develop recommendations, to be approved by HERCA, to facilitate implementation of BSS on RPE and RPO. To be sent to national authorities;
- to comment on the draft guidance from ENETRAP III;
- to develop a joint vision on future ambitions of HERCA on RPE/RPO: duties, harmonisation (registration, other).

Experts from 17 European regulatory countries participating in HERCA as well as experts from international organisations such as EC, IAEA, and IRPA participated in this workshop. The presentations on the different national approaches have shown that if existing regulations need to be updated, there are no serious issues in the participating countries with regard to the transposition activities of the BSS in this field. The workshop has also been the occasion to exchange with members of the ENETRAP Network (European Network on Education and Training in RAdiological Protection) with a view to coordinate efforts.

This workshop has allowed to identify that radiation protection authorities share in general terms a common understanding of the relevant requirements on RPE/RPO in the new Euratom BSS as well as a graded approach where possible. Furthermore, during the workshop it was concluded that the ENETRAP III guide could be a reference for E&T in Radiation Protection in Europe, which could facilitate HERCA members to go towards a common approach.

Indoor Rn concentration and Greek building energy regulations. Educating Greek engineers

D. Karangelos, A. Nikoglou and E. Hinis

National Technical University of Athens, Greece

dkarang@nuclear.ntua.gr

Abstract

Radon (222Rn) as it is well known is a noble gas occurring as a decay product of Radium (226Rn) and it is responsible for a large portion (about 50%) of the radioactive dose received by humans from natural sources. Because of its gaseous nature, Radon enters the living area through diffusion and transfer mechanisms from the soil, water and building materials and it has been observed that Radon concentration is increased in lower compartments of the premises such as basements and also inside dwellings with poor ventilation.
In accordance with the Kyoto Protocol, the European Community is continuously taking steps toward the reduction of CO2 emissions. The residential and tertiary sectors are responsible for more than 40% of final energy consumption in Europe and hence account for a significant amount of CO2 emissions. Moreover, space heating and cooling represent approximately the 40% of the building energy consumption. Based on that the Community issued directive 2002/91/EC on the energy performance of buildings to promote the improvement of energy efficiency taking into account outdoor climatic and local conditions with respect to indoor temperature requirements.

Applying measures for enhancing energy efficiency not only for new buildings but for existing buildings as well will have an impact on long-term energy consumption and demand management. The Greek legislation has already complied with the European directive and the building energy efficiency regulation (KENAK) has been applied.
Stemming from the awareness of the detrimental impact of Radon on humans, this study aims to investigate to what extent, if any, the measures of building energy efficiency could inadvertently lead to changes in indoor Radon concentration.
It is understood that in case of radon entry due to high concentration outdoors, sealing major air entry routs may decrease indoor radon concentration. The opposite is expected in case of high radon exhalation rate due to building materials. Ventilation rate of indoor spaces and Radon concentration in indoor air are inversely correlated. The study focuses on the new natural ventilation levels through the windows, meaning both frames and glasses, which are proposed in respect with the existing situation. Possible increases in Radon concentrations must be investigated both for residential and non-residential buildings, due to their different usage patterns as well as different energy efficiency regulation requirements.
Furthermore, this work aims to increase the awareness of engineers which are involved in building construction and renovation about the Radon issue and introduce the necessity of developing a base level of expertise about it. Engineers must be well trained in order to be able to decide when further investigation and measurements regarding Radon concentration are required and what measures should be taken if necessary.

How do you explain radiation risk in a risky world?

E. Grindrod

Centre for Radiation, Chemical and Environmental Hazards, Public Health England, Leeds, United Kingdom

liz.grindrod@phe.gov.uk

Abstract

We live in a world where everything we do appears to carry a risk.

However not all risk is the same - some activities are more risky for one group of people than for another and people will feel that activities imposed on them are much riskier than those they take on voluntarily. As audiences on radiation protection courses quickly realise, "risk of death" is not always what it seems: the risk of developing fatal cancer following a radiation exposure of 5 mSv is 20 in 100,000; the same risk factor applies to power line workers in the US, although the latter risk carries a worse outcome since 'death' is likely to be immediate.

In addition, to be properly understood, the increase in the risk of fatal cancer associated with radiation exposure needs to be discussed in the context of the 'background' of cancer deaths (25% in the UK).

In the UK, Regulation 14 of the Ionising Radiations Regulations 1999 requires employers to ensure that radiation workers know the risks to health created by exposure to ionising radiation.

As part of the commercial radiation safety training courses run by Public Health England, a method for explaining risk has been developed, that constrains the discussion to fatal cancer alone, in order to avoid compounding factors of the latency period and perception. This paper provides an overview of the thinking behind the method, outlines the method itself and how it explains ALARP and dose limits.

Communicating the risks from radon – dealing with a wide and varied audience

J. Stewart

Public Health England, Leeds, United Kingdom

joanne.stewart@phe.gov.uk

Abstract

The Euratom- BSS addresses a range of sources of exposure to ionising radiation including exposure to radon in homes, workplaces and other premises. A specific requirement of the BSS is for Member States to establish a comprehensive national "Radon Action Plan" to address the long-term risks from radon exposures. The parameters and topics that must be considered in the preparation of the action plan are specified in Annex XVIII of the BSS, one of which is the requirement for a

> "Strategy for communication to increase public awareness and inform local decision makers, employers and employees of the risk of radon, including in relation to smoking "

Radon exposure is the single largest source of radiation exposure in the UK and there are already well-established arrangements for understanding, assessing and managing radon exposure as well as a growing portfolio of communication strategies. During this presentation the key points of both commonality and differences in these strategies, as well as their perceived effectiveness, will be reviewed.

Radiological risks: How they are communicated by and to educators and trainers

T. Perko[1], C. Mays[2], D. Diaconu[3], N. Zeleznik[4], M. Kralj[5], C. Turcanu[1], R. Istenic[6], M.H. El Jammal[7]

[1]SCK•CEN, Mol, Belgium
[2]SYMLOG, Paris, France
[3]ICN, Romania
[4]REC, Slovak Republic
[5]ARAO, Slovenia
[6]IJS, Slovenia
[7]IRSN, France

Tanja.perko@sckcen.be

Abstract

The ideal of communication about radiological risks is to support the stakeholders to make informed decisions and to establish two-way communication and joint problem solving. To be able to take an informed decision, people need a certain level of issue understanding. Previous research shows that communication related to radiological field will not trigger enough attention to be heard or recalled among people with low levels of knowledge; consequently they will not be able to engage in the decision-making process. From this point of view, teachers in schools and other people involved in education programs hold an important role in risk communication and public understanding. How do they manage this task? This question is, among others, addressed in the EC FP7 project EAGLE.

Within the EAGLE project a review of national and international data, tools and methods as well as institutional work from the field of communication is conducted in order to identify education, information and communication needs and coordination possibilities at the European level.

In this presentation we report results from workshops, dialogue groups, public opinion surveys and pilot actions aiming at generating a better understanding of different standpoints, perceptions and information needs on ionising radiation (IR) from the perspective of teachers, general public, journalists and informed civil society.

An EAGLE questionnaire collected data on IR information provided in EU member state schools. Independently of the country's nuclear power status, in some cases basic elements on IR are provided from the age of 10-14y and pursued with students14-18y; the subject is not mandatory and the teacher may choose to teach it or not. (The Fukushima accident increased the attention to the topics). In other countries this topic is approached to a very limited extent in the pre-university levels.

The EAGLE public opinion surveys investigated the level of basic radiological knowledge in the general public in Belgium, France and Slovenia. Across these nations, knowledge about ionizing radiation is in general population rather limited. The results show that people lack knowledge in basic issues such as, for instance, that exposure to radiation does not necessarily lead to contamination, (64% of representative population answered incorrectly to this question in Belgium, 88% in France and 81% in Slovenia). With the rather low knowledge and increasing complexity of technological innovations (e.g. nuclear medicine), people must rely upon their judgments about whom to trust. Typically, academics are seen as most trustworthy and competent to inform on risks and benefits of nuclear technologies.

EAGLE dialogues highlighted under economic pressure, journalists' ability to specialize is disappearing and they have little time to attend informative seminars. Journalists like other citizens do not get basic education about ionizing radiation at school. All partners in communication are handicapped during nuclear or radiological emergencies when sources must rely partly on mass media to communicate with a low educated and under-informed public.

The EAGLE will conduct a pilot action with teachers in Romania to test educational material developed for high schools in France. Another action will ask journalists to assess information on new NPP development in Poland. The third will test EU project NUSHARE material with a non-nuclear public in Slovenia. The results of these pilot actions together with other education related results are briefly presented and some solutions for improved information and communication about ionising radiation at European level are suggested.

Implementing the EU BSS: implications for the system of Education and Training in Germany

J.W. Vahlbruch

Leibniz University of Hanover, Institute for Radioecology and Radiation Protection, Hannover, Germany

vahlbruch@irs.uni-hannover.de

Abstract

Implementing the EU BSS will change the German legislation considerably. Concerning E&T two major facts will be important: First the implementation of the RPO and RPE has to be discussed presupposing that the proven German system should be preserved. Additionally, as a consequence of the implementation of the EU BSS, two important ordinances (Radiation Protection Ordinance and X-Ray Protection Ordinance) will be combined to one. This will have a major impact on E&T in Germany because the existing complex system of many different knowledge-groups will be harmonized and made clearer as well. In this presentation necessary adjustments will be discussed and future developments concerning E&T in Germany will be presented.

Qualification in radioprotection in Belgium in view of the new BSS-Directive (2013/59/ Euratom)

A. Vanderlinck

Federal Agency for Nuclear Control, Brussels, Belgium

annie.vanderlinck@fanc.fgov.be

Abstract

In 2007 already, in preparation for the 1st EUTERP Workshop, Belgium made some suggestions on basic education and ongoing training that it deemed necessary for Radiation Protection Experts and Officers (both RPEs and RPOs), whose missions and tasks were being discussed by the European Council in the prospect of laying down basic safety standards for radiation protection (Directive 2013/59/Euratom).The recommendations that resulted from this workshop were integrated into the ENETRAP project.

The purpose of this abstract is to update Belgium's point of view as a result of two milestones: firstly, the publication of Directive 2013/59/Euratom and the compulsory transposition of this Directive into national law before February 2018 and, secondly, the IRRS mission held in December 2014, which led the FANC to reflect on how health physics is organised in Belgium, and the implementation of a resulting action plan for 2017.

With a view to prepare this transposition at European level, the Member States have participated in international working groups to ensure uniform interpretation of the requirements set forth in Directive 2013/59/Euratom (BSS). HERCA has stressed the need to define minimum education and competence requirements for Radiation Protection Experts and Officers on European level. Its action plan in relation to the transposition and implementation of the BSS explicitly includes both the RPEs/RPOs issue and the ENETRAP results for the specific case of health physics experts.
EUTERP could/should consider coming up with recommendations to adapt the education and training program for radiation protection experts (and officers) and, in particular, to add minimum skill requirements in risk management and quality systems.

Redefining the position of the Dutch supervising expert in light of the implementation of the basic safety standards in the Netherlands

B. Godthelp[1], T. Vemeulen[1], T. Molenaar[2], H. van Elsäcker-Degenaar[2]

[1]Authority for Nuclear Safety and Radiation Protection, The Hague, The Netherlands
[2]Nuclear Research & Consultancy Group, Petten, The Netherlands

barbara.godthelp@anvs.nl

Abstract

The introduction of the "Radiation Protection Officer" and the "Radiation Protection Expert" in the new European Basic Safety Standards (BSS, 2013/59/Euratom) required a thorough examination of the Dutch system for radiation protection in order to determine whether we could fulfil the new requirements for the radiation protection officer and the radiation protection expert. Under the authority of the Authority for Nuclear Safety and Radiation Protection (ANVS), the Nuclear Research & consultancy Group (NRG) has studied the implementation of the radiation protection officer in the Dutch system.

In the Netherlands practises with ionizing radiation can only be carried out by, or under the supervision of individuals that are adequately trained in radiation protection. This applies for all practises, including medical practises. In the Dutch legislation three types of experts are recognized: the "general coordinating expert", the "coordinating expert" and the "supervising expert". The general coordinating expert and the coordinating expert are comparable with the radiation protection expert (RPE) as described in the BSS, although the knowledge and skills level of the general coordinating expert is higher than that of the coordinating expert. The supervising expert is comparable with the radiation protection officer (RPO) in the BSS.

The Dutch coordinating expert ensures that practises with ionizing radiation are performed within the legal framework and monitors this, also for medical practises. In addition, the general coordinating expert grants internal permission for practises. The coordinating expert must receive a radiation protection training from an accredited institution that fulfils the learning outcomes as laid down in legislation. Besides the training he/she must be registered in a special register. In order to be registered, the coordinating expert must comply with requirements relating to (radiation) knowledge, work experience and continuing education as laid down in legislation. The implementation of the RPE in the Dutch radiation protection system is therefore well advanced as shown by the learning outcomes and registration requirements for the coordinating expert laid down in legislation.
The Dutch supervising expert carries out a practise, or alternatively a practise is carried out under the supervision of the supervising expert. Beside the requirement to obtain a diploma, certificate or other document attesting completion of training from an accredited institution, the supervising expert needs to receive adequate continuing training but registration is not required for supervising experts.
Although the Dutch supervising expert is comparable to the RPO in terms of role and responsibilities, practise-specific requirements are currently lacking in the Dutch legislation. A more practise-specific approach for the supervising expert is necessary to fully implement the RPO in the Dutch system for radiation protection.

Therefore, the role, duties, responsibilities and training requirements for the different radiation protection officers were thoroughly analysed. For the Netherlands eleven possible specialisations for the radiation protection officer were proposed. 1) nuclear medicine, 2) diagnostic radiology, 3) radiotherapy, 4) nuclear fuel cycles, 5) open sources, 6) NORM, 7) accelerators, 8) industrial radiography (including non-destructive testing, NDT and exploration research), 9) gauging techniques, 10) education, training and demonstration and 11) waste and first aid (i.e. experts that visit sites where radioactive sources are discovered unexpectedly). Based on this analysis, a model for an adapted Dutch educational system for the radiation protection officer was proposed. The training of a radiation protection officer in this new model would consist of a core training module followed by a practice-specific training module. Both core training module and practice-specific training module would consist of technical and supervision elements. With the participation of the Dutch stakeholders in the respective branches and teachers/trainers we recently started with the process of implementing the radiation protection officer in the Dutch system of radiation protection.

Initiatives of a regulatory authority for the training of veterinarians on radiation protection

S. Economides, K. Karfopoulos, C. Hourdakis, V. Kamenopoulou

Greek Atomic Energy Commission, Athens, Greece

sotiris.economides@eeae.gr

Abstract

Veterinary radiology is a specialty mainly based on the diagnostic uses of X-rays to small (canines, cats, etc) and large animals (horses, food animals, etc). The performance of radiographic examinations to animals inside or outside the premises of the vet clinics introduces special requirements regarding the protection of the operators and the public. Therefore, veterinarians should have appropriate education and training on the related techniques as well as on radiation protection. The later is also introduced as a requirement by the new EC Basic Safety Standards (BSS) Directive.

So far, radiation protection is not included in the curricula of the veterinarian schools in the Greek Universities. In this respect, and within the framework of the existing national programme for education and training on radiation protection, Greek Atomic Energy Commission (EEAE), in cooperation with the veterinary school of the Aristotle University of Thessaloniki, has initiated the organization of radiation protection seminars for veterinarians. The participants will be veterinarians already operating or in the phase of installing at their premises conventional veterinary radiography systems for diagnostic purposes. Up to now, 250 veterinary radiology facilities are registered in the National Radiation Protection Database.

The 8 hours seminars will be carried out twice a year in Athens and Thessaloniki. The syllabus include theoretical and practical training having as main learning objectives the increase of awareness of the harmful effects of radiation, the adoption of radiation protection 'good practices' and the development of a 'safety culture' in radiation protection.

The organization and performance of the seminars will be based on the procedures of the Division of Research, Education and Training (DRET) of the EEAE, which is implementing a Quality Management System (QMS) according to ISO 29990:2010 standard for the design, development and provision of non-formal education.

Writing training programmes in a nuclear organisation

H. van Elsäcker-Degenaar, A. Metz, H.A. Buurveld

Nuclear Research and Consultancy Group, Petten, The Netherlands

vanelsacker@nrg.eu

Abstract

The Nuclear Research & consultancy Group (NRG) offers a wide range of services to energy utilities, government organizations and various branches of industry - including the nuclear, NORM-industry and medical sectors. NRG has a research reactor and is a major producer of medical isotopes in Europe.

Different functions can be envisaged within the nuclear organisation of NRG, all with different tasks and responsibilities. In recent years education and training programmes have been developed for a number of key functions within the organisation. The different steps in the procedure to come to an education and training plan are described in the presentation.

Introduction to the ENETRAP III project

M. Coeck

Belgian Nuclear Research Centre SCK•CEN, Mol, Belgium

mcoeck@sckcen.be

Abstract

For a vast amount of applications in the medical, industrial, research and other sectors, a good understanding of radiation protection (RP) is fundamental in order to protect workers, the public and the environment from the potential risks of ionising radiation. Within this perspective, building and maintaining an advanced level of competence in RP, assuring sufficient well-trained personnel and organising an adequate knowledge management, is crucial. Effective education and training (E&T) is a critical element in these matters, helping to prevent the decline in expertise and to meet future demands.

ENETRAP III adds new and innovative topics to existing E&T approaches in RP. It will further develop the European reference training scheme with additional specialized modules for Radiation Protection Experts working in medical, geological disposal and NPP. It will implement the ECVET principles and will establish targeted assistance from regulators that will play a crucial role in the endorsement of the proposed courses and learning objectives.

ENETRAP III will also introduce a train-the-trainer strategy. All organised pilot sessions will be open to young and more experienced students and professionals. In this way, ENETRAP III aims to contribute to increasing the attractiveness of nuclear careers and to lifelong learning activities.

A web-based platform containing all relevant information about E&T in RP will facilitate an efficient knowledge transfer and capacity building in Europe and beyond.

ENETRAP III will also propose guidance for implementing E&T for Radiation Protection Experts and Officers, hereby providing extremely important assistance to all Member States who are expected to transpose the Euratom BSS requirements into their national legislations.
Moreover, ENETRAP III will demonstrate the practical feasibility of earlier developed concepts for mutual recognition and thus provide leading examples in Europe demonstrating effective borderless mobility.

For all these activities ENETRAP III will strongly connect with all stakeholders, i.e. end-users, E&T providers, legal authorities, and to other relevant international organisations, groups and networks dealing with E&T in radiation protection.

Development of specialised training modules for the RPE

S. Trumm[1], C. Pesznyák[2], B. Bazargan-Sabet[3], S. Evans[4], I. Kulpa[5], P. Livolsi[6]

[1]KIT, Karlsruher Institute for Technology, Eggenstein-Leopoldshafel, Germany
[2]BME, Budapest, Hungary
[3]UL, Campus ARTEM, Nancy, France
[4]EFOMP, York. United Kingdom
[5]PGE, Warszawa, Poland
[6]CEA-INSTN, Grenoble, France

Abstract

A sustainable education and training (E&T) infrastructure for radiation protection (RP) is a key component to support the expertise in RP and to sustain a positive radiation protection culture in the future. Therefore, the harmonisation of a high-quality "reference standards" and good practices for E&T in RP, especially with respect to the training of Radiation Protection Experts (RPE) in Europe, is a major objective of the ENETRAP project.

In the course of the previous ENETRAP projects, a framework has been elaborated, aiming at establishing a detailed training scheme, which can be mutually recognised by the European regulatory bodies. Based on a modular approach, this European Radiation Protection Training Scheme (ERPTS) foresees a general Common Basis which is complemented by Specialised Modules related to the specific field in which the RPE will work. Pilot sessions of the Common Basis training modules have been run successfully under ENETRAP II.

One cornerstone of the current project ENETRAP III is the implementation of the established methodology to the Specialised Modules, hence validating its effectiveness. Complementing the Common Basis modules, three Specialised Modules will be organised, meeting the requirements for RPEs in nuclear power plants, in the medical field, and in geological disposals. The Optional Modules NPP and Waste Management (geological disposal) will be organized and delivered by KIT-FTU, Karlsruhe, Germany. The Optional Module for Medical Domain is foreseen to be organized with the EFOMP assistance by Budapest University of Technology and Economics, Budapest, Hungary. Special features of the course will be active involvement of the participants by laboratory exercise, workshop and technical visit. Pilot sessions will be organised and delivered in 2016.

From competences to contents by innovative teaching methods and tools

P. Livolsi[1], C. Jimonet[2], P. Massiot[2], M. Coeck[3], J. Stewart[4], M. Kuglstatter[5],M. Marco[6], P. Vaz[7]

[1]CEA-INSTN, Grenoble, France
[2]CEA Saclay, Gif-sur-Yvette cedex, France
[3]SCK•CEN, Mol, Belgium
[4]Public Health England, London, United Kingdom
[5]KIT, Eggenstein-Leopoldshafen, Germany
[6]CIEMAT, Madrid, Spain
[7]IST-ID, Lisboa, Portugal

paul.livolsi@cea.fr

Abstract

Within the framework of the ENETRAP II project, the Radiation Protection Expert's syllabus has been created driven by learning outcomes supporting the ECVET approach.
But until now, Education and Training projects focused mainly on the development of technical and scientific modules related to the required radiation protection knowledge and skills. In the ENETRAP III WP4, it has been decided to develop a Train-the-trainer course on other part of competences required for a trainer.
The didactic approach is based on the different teaching practices of European project partners. Thus, the best matching training practices devoted to radiation protection domain will be implemented.
To achieve this goal, it is planned to create a Training course for Trainers which will allow, by the use of specific andragogic methods and innovative training tools, to interact more favorably with the learners by introducing interactivity, participation and practice.
It will be particularly rewarding that each WP's member brings its experiment in terms of knowledge and use of new educational methods such as of 3D immersive room, serious games, mock-up facilities, dose calculation simulation tools, forums, interactive voting system to name some. The text book "European Radiation Protection Courses – Basics[1]" published in the framework of ENETRAP II results, will be the guideline.
Initially tailored to train trainers for the radiation protection domain, this TTT training could be implemented for other nuclear domain as nuclear safety, decommissioning and waste management…

[1] P. Massiot and C. Jimonet

Capacity building and transfer of know-how in radiation protection. Dissemination of ENETRAP projects results

C. Llorente[1], M. Marco[1], M. Schouwenburg[2], H. van Elsäcker-Degenaar[3], P. Livolsi[4], P. Massiot[4], M. Coeck[5]

[1]CIEMAT, Madrid, Spain
[2]TUDelft, Delft, The Netherlands
[3]NRG, Petten, The Netherlands
[4]CEA-INSTN, Grenoble, France
[5] SCK•CEN, Mol, Belgium

cristina.llorente@ciemat.es

Abstract

The ENETRAP projects, since the stating of the first edition in 2005 till nowadays in the currently edition, ENETRAP III, always have been the objective to maintain a high level of competence in radiation protection (RP), assuring the continued development of suitable well-trained personnel and adequate knowledge management. This objective is crucial to ensure future safe use of ionising radiation and the development of new technologies in a safe way.

A big effort and lot of work has been done in these 10 years including the new definitions in the BSS for RP Expert (RPE), RP Officer (RPO) and Medical Physics Expert (MPE) which are the basis for future national development and implementation and adequate the high-level education and training (E&T) in the countries.

To preserve the results already produced and to be produced in ENETRAP I- II-III projects, bring together the information that is currently spread over several websites and other carriers (databases, CD-ROMs, paper documents, etc), and promote the EUTERP community are objectives of ENETRAP III. The Working Package 5 (WP5) is in charge of developing these objectives improving the EUTERP website to become a *capacity building and transfer of know-how in RP tool*.

This movement will increase the efficiency of the RP initiatives, will provide access to a vast amount of knowledge and opens the door for new opportunities.

The design of this tool has been done to integrate, in a coherent way, all the own information of the EUTERP foundation as well as all the structure to include, since the point of view of the RP students, RP professionals, and the RP community:

- A database of E&T events and providers, which increases awareness of, and accessibility E&T, opportunities and resources
- A complete collection of information of E&T in RP: legal requirements, national approaches, European E&T standards and requirements, course material, course organizations, etc
- Support of the RPE and RPO job profiles, in terms of education and training qualification and credit systems such as EQF and ECVET. Raise the profiles of RPE and RPO as an attractive career option and facilitate the mobility
- Resources and events for improving the educators (train-the-trainers TTT)
- Promote the social networking and interchange of ideas throughout forums to identify where and which education and training measures are currently missing as well as stretching relations and establishment of partnerships

- Technology and research centers: can also contribute to the tutoring and can establish a better coordination between needs and the choice of appropriate training. OJT

The second task of the WP5 of ENETRAP III is the organization of an open project workshop which will be held in 2016 on Madrid. The objective of this task is to present the obtained project results and to identify the potential future initiatives.

Guidelines for the implementation of E&T programmes for RPE and RPO

A.M. Schmitt-Hannig[1], J. Stewart[2], M. Coeck[3], R. Paynter[4], A. Falcao[5]

[1]BfS, Germany
[2]Public Health England, Leeds, United Kingdom
[3]SCK•CEN, Mol, Belgium
[4]EUTERP, Petten, The Netherlands
[5]IST, Lisbon University, Portugal

Aschmitt-hannig@bfs.de

Abstract

The (revised) Euratom BSS Council Directive 2013/59/Euratom lays down specific requirements for the Radiation Protection Expert (RPE) and for the Radiation Protection Officer (RPO). Member States must translate the goals and requirements that it lays down into their national legislation within a defined period of time.
Experience has shown that, even though the specific requirement in a European Directive may be quite clear, there can be widely varying approaches to the interpretation of those requirements and implementation in practice. This was well illustrated by the different interpretations of the "Qualified Expert" in the previous BSS and the consequential varying approaches to E&T which prompted much of the work undertaken in ENETRAP and ENETRAP II and has led, in part, to the introduction of the concepts of RPE and RPO in the Council Directive 2013/59/Euratom.
The draft guidance document which has been developed in the last months within WP 7 of the ENETRAP III project

- provides guidance to regulatory authorities and professional bodies on the roles of the RPE and RPO, as defined in the BSS.
- specifies the knowledge, competencies and practical skills RPEs and RPOs will need to have for the effective implementation of their roles
- specifies the core training requirements for RPEs and RPOs
- describes a process for the national recognition of RPEs
- provides guidance on the development of mutual recognition processes between member states.

The guidance proposed will complement the guidance which has already been developed in the medical field by facilitating the implementation of the new E&T requirements for RPE and RPO in Member States and helping to ensure a consistent approach throughout the European Union. A close collaboration with HERCA, EC DG ENERGY and the Art. 31 Group of Experts has been started and an official publication of the guidance document within the RP series of the commission is envisaged.

Radiation Protection Expert in the medical sector

S. Evans[1], V. Tsapaki[2], S. Christofides[3], H. Bosmans[4], J. Damilakis[5], P. Sharp[6], M. Brambilla[7], A. Torresin[8], R. Padovani[9], M. Bardies[10], R. Bayford[11], A. Manivannan[12]

[1]retired, formally Northampton General Hospital NHS Trust, Northampton, United Kingdom
[2]Konstantopoulio Hospital, Athens, Greece
[3]Biomedical Research Foundation, Nicosia, Cyprus
[4]Catholic University, Leuven, Belgium
[5]University of Crete, Greece
[6]University of Aberdeen, United Kingdom
[7]Azienda Ospedaliero Universitaria Maggiore della Carità, Novara, Italy
[8]Azienda Ospedale Niguarda Ca' Granda, Milano, Italy
[9]ICTP, Trieste, Italy
[10]Centre de Recherches en Cancerologie de Toulouse, France
[11]The Middlesex University, London, United Kingdom
[12]NHS Grampian and University of Aberdeen, Scotland, United Kingdom

shevans58@gmail.com

Abstract

A Medical Module for Radiation Protection Experts (RPEs) working in the medical field, in compliance with Council Directive 2013/59/Euratom (BSS), is being designed as part of the European Network on Education and Training in Radiation Protection (Part III) (ENETRAP III) EC funded project (Fission-2012-5.1.1). This project also contains three generic modules as pre-registration requirements for the Medical Module (although consideration may be given to Accreditation of Prior Certified Learning (APCL) or equivalent).

The applicant will be expected to have achieved:
(i) An education to: Bachelor degree level either specifically in radiation protection, or in a physical/engineering/mathematical discipline
OR
An academic equivalent
AND
(ii) A minimum of 3 years' experience working in a radiation protection environment.

The Medical Module is designed to ensure that the knowledge skills and attitudes (KSAs) are obtained by the successful course participant to provide expert radiation protection advice to employers, staff and members of the public that will allow him or her to obtain the status of radiation protection expert (RPE) from an authorised body in the medical fields of radiotherapy, diagnostic & interventional radiology and nuclear medicine.

The Medical Module will contain a one week face-to-face session which will consist of a number of lectures and workshops designed to ensure the KSA requirements are fulfilled. The face-to-face session will be delivered during the summer of 2016.

Around 12 months before the face-to-face session, registered course participants will be tasked to provide a comprehensive 10,000 word portfolio covering: the regulatory framework; measurement of absorbed dose, absorbed dose rates and contamination measurements; calculation of potential exposures; hazard and risk assessments; control procedures (including the zoning of radiation areas); and, personal and environmental dosimetry. These portfolios will be discussed in the face-to-face session to provide opportunities for improvements and reflective thinking. The successful candidates will have fulfilled the required contents for the portfolios and passed both an oral assessment on their portfolio and a multiple choice examination at the end of the face-to-face session.

The course participant will gain the knowledge skills and attitudes to provide expert radiation protection advice to employers, staff and members of the public that will allow them to obtain the status of RPE in the medical fields of radiotherapy, diagnostic & interventional radiology and nuclear medicine from an authorised body.

The Medical Module is being developed by radiation protection experts of the European Federation of Organisations for Medical Physics (EFOMP) www.efomp.org.

For more information on the ENETRAP III project please visit: http://enetrap3.sckcen.be/en

Guidelines on radiation protection education and training of medical professionals in the European Union

S. Christofides[1], S. Evans[2], H. Bosmans[3], V. Tsapaki[4], J. Damilakis[5], P. Sharp[6], M. Brambilla[7], A. Torresin[8], R. Padovani[9], M. Bardies[10], R. Bayford[11], A. Manivannan[12]

[1]Biomedical Research Foundation, Nicosia, Cyprus
[2]Retired, formally Northampton General Hospital NHS Trust, Northampton, United Kingdom
[3]Catholic University, Leuven, Belgium
[4]Konstantinopoulio Hospital, Athens, Greece
[5]University of Crete, Greece
[6]University of Aberdeen, United Kingdom
[7]Az. Ospedaliero Universitaria Maggiore della Carità, Novara, Italy
[8]Azienda Ospedale Niguarda Ca' Granda, Milano, Italy
[9]ICTP, Trieste, Italy
[10]Centre de Recherches en Cancerologie de Toulouse, France
[11]Middlesex University, London, United Kingdom
[12]University of Aberdeen, United Kingdom

c4stelios@gmail.com

Abstract

Radiation protection education and training starts at the entry level to medical, dental and other healthcare professional schools. The new Euratom Basic Safety Standards Directive (2013/59/Euratom – EU BSS Directive), states in chapter IV, article 18, that:

1. Member States shall ensure that practitioners and the individuals involved in the practical aspects of medical radiological procedures have adequate education, information and theoretical and practical training for the purpose of medical radiological practices, as well as relevant competence in radiation protection.
2. For this purpose Member States shall ensure that appropriate curricula are established and shall recognise the corresponding diplomas, certificates or formal qualifications.
3. Individuals undergoing relevant training programmes may participate in practical aspects of medical radiological procedures as set out in Article 57(2).
4. 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, training is provided on these techniques and the relevant radiation protection requirements.
5. Member States shall encourage the introduction of a course on radiation protection in the basic curriculum of medical and dental schools.

In January 2014, the European Commission published Radiation Protection Report 175 "Guidelines on Radiation Protection Education and Training of Medical Professionals in the European Union" (RP 175).

These guidelines are an update of Radiation Protection Report 116, and takes into account the recent technological advances, the education and training requirements of the EU BSS Directive, the European qualifications framework and includes requirements for new specialists using ionising radiation. These guidelines have been divided into sections according to the roles of the healthcare professionals in question, and each section includes, in table format, learning outcomes in terms of knowledge, skills and competence. Recommendations are also made as to the European qualifications framework level in radiation protection needed on entry to the particular profession and the type of continuous professional development in radiation protection required for the particular profession.

The guidelines include a section on the basic learning outcomes that all healthcare professionals should have. This is followed by a section with additional learning outcomes for each of the following healthcare professionals:

a) Referrers
b) Physicians directly involved with the use of radiation:
    I. Diagnostic radiologists
    II. Interventional Radiologists
    III. Non-radiological specialists employing ionising radiation in interventional techniques
    IV. Nuclear Medicine specialists
    V. Radiation oncologists
c) Dentists/dental surgeons
d) Radiographers
e) Medical physicists/Medical Physics Experts
f) Nurses and other healthcare workers not directly involved in the use of ionising radiation
g) Maintenance engineers and maintenance technicians

Following the above sections, the guidelines include a section on accreditation, certification and recognition of medical education and training, and a section on education and training resources.
RP 175 was prepared by a consortium led by the European Society of Radiology (ESR) (under the name MEDRAPET) and consisted of:

- European Federation of Radiographer Societies (EFRS)
- European Federation of Organisations for Medical Physics (EFOMP)
- European Society for Therapeutic Radiology and Oncology (ESTRO)
- European Association of Nuclear Medicine (EANM)
- Cardiovascular and Interventional Radiological Society of Europe (CIRSE)

The above organisations as well as the European Training and Education in Radiation Protection (EUTERP) Foundation and the European Society of Vascular Surgeons (ESVS) have officially endorsed RP 175.
It is also acknowledged that during the MEDRAPET workshop that was held in Athens, Greece between the 21st and 23rd of April 2012, a great deal of constructive feedback was received from a wide range of participants, including regulators, representatives of professional societies, equipment manufacturers' associations and individuals

At the multi-stakeholder meeting on justification of individual exposures, organised by HERCA (Heads of the European Radiological protection Competent Authorities), in Brussels, Belgium on the 26th of September 2014, EFOMP has made a number of commitments, one of which is:
"To develop and deliver courses, based on the European Commission Radiation Protection Report 175, using modern methods of course delivery such as e-learning and learning by hands-on experience, for the education and training in radiation protection of the involved healthcare professionals".

The aim of this presentation is to explain the philosophy behind the development of RP 175, its structure, which is designed to facilitate future amendments by various professions and the inclusion of new professions. The presentation will also refer to the EFOMP efforts, to meet the requirements of the EU BSS Directive by developing curricula and other educational material for the different healthcare professionals based on the RP 175 guidelines.

The Medical Physics Expert

V. Tsapaki[1],C. Caruana[2], S. Christofides[3], S. Evans[4], P. Sharp[5], N. Vanpeteghem[6], H. Bosmans[6]

[1]Konstantopoulio General Hospital, Athens, Greece
[2]Medical Physics Department, University of Malta, Msida, Malta
[3]Biomedical Research Foundation, Nicosia, Cyprus
[4]Retired, formally Northampton General Hospital NHS Trust, Northampton, United Kingdom
[5]University of Aberdeen, United Kingdom
[6]Catholic University, Leuven, Belgium

hilde.bosmans@uzleuven.be

Abstract

The Motto for medical physics experts (MPE) is 'Drive technology to advance healthcare – proactively protecting patients from ionizing radiation and other physical agents'.It is essential that medical physicists taking the lead in this are trained to the highest level in every EC Member State (and beyond).

In the European Commission's Radiation Protection Report 174 'European Guidelines on the MPE', the necessary knowledge, skills and competences have been listed. The MPE level has been set at the European Qualifications Framework for Lifelong Learning (EQF) level 8. The authors of the document also pointed to the fact that the necessary courses for qualified Medical Physicists to move to MPE level were not available in the EC. The main objective of the FP7 EUTEMPE-RX project is therefore to provide a model training scheme that allows the medical physicist in diagnostic and interventional radiology (D&IR) to reach the MPE level. The EUTEMPE-RX project was launched in August 2013. Fourteen partners cooperate to create a well-integrated course programme. Partners include representatives of the European Federation of Organisations for Medical Physics (EFOMP) www.efomp.org, European scientists in X-ray physics and Monte Carlo simulation, medical physics and radiobiology as well as MPEs in European hospitals and screening organisations.

In the frame of the project twelve course modules are being developed at EQF level 8 (see table). Course content, teaching methods and evaluation types have been defined; this process was streamlined with a quality manual. The target public consists of medical physicists in hospitals, scientists in medical device companies, the medical physicists in radiation protection authorities and PhD students in medical physics in radiology.
Every module consists of an online part that uses an e-learning platform and a face-to-face part in groups of less than 30 participants. All modules will end with a voluntary test and lead to a certificate. The on-line part of module 1 was started on the 10th of December, 2014.

The first experience is very positive. For the first module, medical physicists from 23 countries (18 member states) enrolled. An analysis of the quality surveys that will be conducted after each module will be presented during the conference.

For more information on the EUTEMPE-RX project please visit: www.eutempe-RX.eu.

Table 1: Course scheme

Module	Module topic	Module date and location
MPE01	Development of the profession and the challenges for the MPE (Diagnostic and Interventional Radiology) in Europe	9-13 February 2015, Prague, Czech Republic
MPE02	Radiation biology for medical physicists in radiology	13-18 April 2015, Pavia, Italy
MPE03	Monte Carlo simulations of X-ray imaging and dosimetry	15-19 June 2015, Barcelona, Spain
MPE04	Innovation - Advanced X-ray physics for imaging device and user protocol innovation in D&IR	13-17 July 2015, Ferrara, Italy
MPE05	The use of physical and virtual anthropomorphic phantoms for image quality and patient dose optimization	7-13 September 2015, Varna, Bulgaria
MPE06	The development of advanced QA protocols for optimized use of radiological devices	9-14 November 2015, Leuven, Belgium
MPE07	Optimisation of X-ray imaging using standard and innovative techniques	20-23 October 2015, Guildford, United Kingdom
MPE08	Role of the medical physicist in CT imaging and patient dose optimization: CT imaging and patient dose optimized with objective means	14-18 March 2016, Lausanne, Switzerland
MPE09	Achieving quality in diagnostic and screening mammography	18-22 January 2016, Nijmegen, the Netherlands
MPE10	High dose X-ray procedures in Interventional Radiology and Cardiology: establishment of a robust quality assurance programme for patient and staff	13-18 February 2016, Udine, Italy
MPE11	Radiation dose management of pregnant patients, pregnant staff and paediatric patients in diagnostic and interventional radiology	March 2016, Iraklion (Crete), Greece
MPE12	Personnel dosimetry of the personnel - Preliminaries, Techniques and Applications	17-22 April 2016, Braunschweig, Germany

Training of RPEs for emergency response

F. Draaisma, H. van Elsäcker-Degenaar

Nuclear Research and Consultancy Group, Petten, The Netherlands

draaisma@nrg.eu

Abstract

In our nuclear installations we need an adequate and trained emergency organisation. Experience learns that a lot of attention is focussed on the risk of radioactive releases and the potential consequences. Therefore, the Radiation Protection Expert (RPE) plays an important role in the emergency organisation.
We developed a training program specifically for 24/7 available RPEs in order to give proper advice. These advices are derived from pre-defined scenarios and the potential exposure to members of the public.
Topics addressed are e.g.: national nuclear emergency response plan, pre-defined scenarios (15) of our installations with source term release values, programs to calculate release and exposure in the environment and parameters influencing the effect of the release (mainly the weather conditions).
Evaluation shows that the training is adequate and that practical refresher course are needed to improve the performance of the RPEs during exercises.

Training of first line officers on emergency preparedness and response

A. Maltezos, K. Karfopoulos, Ar. Boziari, S. Vogiatzi, V. Kamenopoulou

Greek Atomic Energy Commission (EEAE), P.O. BOX 60092, 15310 Agia Paraskevi, Greece

antonis.maltezos@eeae.gr

Abstract

The Greek Atomic Energy Commission (EEAE) is the national competent authority for the control, the regulation and the supervision in the fields of nuclear energy, nuclear technology, radiological and nuclear safety and radiation protection. As such, EEAE is responsible for the prevention, detection and response of malicious acts involving nuclear and other radioactive materials out of regulatory control. In this framework EEAE contributes to the national security program against the terrorist threat with radiological consequences and takes measures for the prompt and effective response. A key element to fulfil its tasks is the provision of training and continuous training to the first line officers (e.g. fire fighters, police officers etc).
In the light of the new EC BSS in which it is stated that arrangements for the provision of prior information and training for emergency workers and all other persons with duties or responsibilities in emergency response, regular exercises have to be included in an emergency management system, EEAE has developed a series of courses dedicated to the particular characteristics of the above mentioned target group.

The objective of the courses is to familiarise first line officers with the principles of radiation protection and the measurement of ionising radiation and to make them understand the emergency response procedures including the cooperation and communication between different groups of first responders. To this end, both lectures and on-the-scene practical exercises are performed including typical scenarios according to their responsibilities.
Lectures focus on the methods employed to detect and recognise the existence of ionising radiation, on the principles of radiation protection and on the safety of both the first responders and the casualties, while information is given regarding the transportation coding and handling of radioactive materials. Some of the aspects which are examined during the practical exercises concern the communication and response, according to the existing emergency plans, the management of the casualties in a way that ensures the safety of both rescuers and casualties, and the mitigation of consequences due to radiation.
During the last years, approximately 3 courses are implemented annually and an analytical evaluation based on the participants' feedback was performed in terms of the learning outcomes. It was concluded that the learning objectives of the courses were more effectively achieved through the practical exercises, while suggestions for interaction with other involved parties were expressed. Additionally, it was once again highlighted the collaboration attitude of the first line officers and the need for continuous training, as the fear of the ionizing radiation is not easily defeated.
The design, the implementation and the evaluation of the courses are based on the established quality management system of the EEAE for the design, development and provision of non-formal education in radiation protection and nuclear safety (ISO 29990:2010).

Training of occupational first responders in the view of the legislative change in Europe

J. Neuwirth, A. Stolar, A. Hefner

Seibersdorf Laboratories, Germany

Johannes.Neuwirth@seibersdorf-laboratories.at

Abstract

Training of first responders is an interdisciplinary field attracting several emergency organizations as well as *workers, who are potentially exposed to orphan sources or radioactive waste* in the same way. Therefor it is necessary to perform a practical training with theoretical basics to increase awareness.

Half a century ago the radiation protection training award (Strahlenschutz-Leistungsabzeichen) was established and became a nationwide success because it is training at a high international level approved everywhere. The "Orphan Source Management Course" was provided as a part of the additional training of the above mentioned radiation protection training. Due to the revision of basic safety standards the "Orphan Source Management Course" has to be revised.

Training
The "Orphan Source Management Course" provides the basic theoretical knowledge and the practical experience for workers, who can potentially be confronted with radioactive sources during their work (e.g. scrap yards, major metal scrap recycling installations as well as in significant nodal transit points).

The practical part of this two-days course amounts to 50 % and includes the visual recognition of sources and their containers, theoretical education on radioactivity and shielding, the correct behavior while handling radioactive material, contamination and decontamination. During the theoretical part participants get to know about the basics of radiation protection, the legal situation (especially in Austria), disposal of waste and radiation accidents. The course ends up with an exam.

Conclusion
The "Orphan Source Management Course" is addressed to workers, who can potentially be confronted with radioactive sources during their work and continues the successful "Orphan Source Management Course" of the past, including newest standards in radiation protection and legislative standards.

Poster presentations

Elevated indoor radon concentrations: Risks and safety measures as presented by mass media in Slovenia

M. Kralj[1], I. Daris[1], N. Železnik[2], C. Mays[3], T. Perko[4]

[1]ARAO, Llubljana, Slovenia
[2]REC, Slovak Republic
[3]SYMLOG, Paris, France
[4]SCK•CEN, Mol Belgium

Metka.Kralj@arao.si

Abstract

Communication about ionizing radiation is usually focused on nuclear technology and safety issues while natural background radiation less frequently considered as a topic of major public concern. In reality the public is more often exposed to ionizing radiation arising from natural background than from nuclear power plants or radioactive waste management facilities.
Balanced communication about sources of actual ionizing radiation levels in the human living environment is an important challenge for mass media. Distinguishing between the actual danger, the risks of radiation accident and health risks is very important for establishing a good communication platform between information sources and information recipients.

The Coordination project EAGLE[1] aims to produce guidelines for improving communication about ionizing radiation in EU member states. Working with stakeholders, the project investigates education, training and information materials and activities at the level of information sources (governmental institutions, safety authorities and technical support organizations, nuclear and radiation facilities, medical institutions); public perceptions of ionizing radiation and its risks; and the role of mass and social media as actors in information transfer. Four national dialogue groups engaging journalists or science communicators and information sources were established in France, Poland, Romania and Slovenia.

The national dialogue group in Slovenia discussed the reporting about elevated radon concentrations measured lately in some of this country's public primary schools and kindergartens. Daily newspapers and TV reports were studied in advance and two national workshops were organized in order to bring together opinions about the quality of the reports, meeting public needs and complying with interests or missions of information sources. Difficulties and good practices were identified regarding media reporting about non-crisis ionizing radiation issues. It was found that in Slovenia the reporting about elevated radon concentrations follows a general trend of sensationalistic reporting and that objective reporting is less favored. In most cases the reporting style was similar to that used in case of radiation crisis, thus presenting the situation of increased risks as a situation of actual danger. The discussion also focused on the availability and quality of information for the journalists provided by the information sources. Journalists would need more technical data and graphic material for direct reproduction. The need for information sources to better understand media requirements was also highlighted.

[1] "Enhancing education, training and communication processes for informed behaviors and decision-making related to ionizing radiation risks", grant agreement n° 604521, coordinated by Ms. Tanja Perko, SCK-CEN.

EAGLE: For an improved coordination of citizen-centered communication on ionising radiation risks

T. Perko[1], C. Turcanu[1], C. Mays[2], M. Kralj[3], D. Diaconu[4], N. Zeleznik[5]

[1]SCK•CEN, Mol, Belgium
[2]SYMLOG, Paris, France
[3]ARAO, Ljubljana, Slovenia
[4]ICN, Romania
[5]REC, Slovak Republic

tanja.perko@sckcen.be

Abstract

Education, training and information to the general public are key factors in the governance of ionising radiation risks. Communication about ionising radiation with the general public has to be further improved, as highlighted also by international responses to the 2011 accident in Japan. EAGLE, a European Commission-sponsored three year coordination action (2013-16) analyses the state of the art and the existing needs in education, training and information, and formulates recommendations to improve and coordinate information and communication about ionising radiation at European level.

EAGLE (Enhancing educAtion, traininG and communication processes for informed behaviors and decision-making reLatEd to ionising radiation risks), seeks to identify and disseminate good practices in public information and communication processes related to ionising radiation. The project attends to several domains, including nuclear and radiological emergencies, medical use of ionising radiation and radon.The consortium are reviewing national and international data, tools and methods as well as institutional work in order to identify education, information and communication needs and coordination possibilities at European level. The five project countries (Belgium, France, Poland, Romania and Slovenia) have been the theater of more intensive investigation and dialogue. Dialogue workshops are held with media representatives and institutional sources to identify how better quality information can be achieved. The uses of social media to communicate during the Fukushima events, and also institutional website contents, have been reviewed. Public perceptions and attitudes on ionising radiation risks have been measured in several countries. Intensive interviews have helped to identify the 'mental models' of these risks in order to foster a move towards the ideal of citizen-centred communication, including a participative component. Project workshops bring together representatives of nuclear actors, users of ionising radiation, authorities, mass and social media and informed civil society. Active outreach is achieved through the EAGLE website and newsletters.

Results most useful for the EUTERP mission are presented from the various EAGLE workstreams: sources of information, mass media and social media and recipients of information. Drawing on these results, recommendations are formulated for the information and communication of ionising radiation risks to radiation protection professionals and members of the public, as well as for the education and training programmes in radiation protection.
More information can be obtained from coordinator Ms. Tanja Perko, tperko@SCKCEN.BE, SCK•CEN.

Spanish course for the Radiation Protection Experts (RPE). A new approach in the methodology

C. Llorente, M. Marco, S. Falcón and J. Fernández

CIEMAT, Madrid, Spain

cristina.llorente@ciemat.es

Abstract

The revised BSS, Council Directive 2013/59/Euratom of December 5 2013, published on January 17 2014, establishes new definitions for the Radiation Protection Expert (RPE), Radiation Protection Officer (RPO) and Medical Physics Expert (MPE).

The figure of Radiation Protection Expert (RPE) in Spain currently is defined in The National Regulatory Body guidance IS-03. In this document is established the requirements to get the qualification to be recognized as a RPE.

To be recognized as RPE, the applicant must have a university degree, approved a 300-hour training course, 3 years experienced in the radiation protection field and finally overcome the aptitude exams of the National Regulatory Body.

Since the eighties, the CIEMAT is the organization that traditionally delivers this training course as part of its principal education and training activities.

CIEMAT, at this moment, is immersed in the results of the ENETRAP projects. In this context and with the recent approval of the new Basic Safety Standards, has adapted this course to the new European situation.

The main result of this adaptation is materialized on the ongoing edition of the course, programmed from 1st October 2014 to 14th March 2015.

For this new proposal, the Face-to-face and the Virtual Classroom areas of the CIEMAT Education &Training Unit has been working together in the development of a "blended learning" methodology, which means combination of both presence and distance learning.

The course has been modulated following the ENETRAPII RPE scheme, for this edition in five modules, three of them are the common part which is compulsory (Basic concepts, Foundation and Occupational), and the other two corresponds to the optional part which almost one must be coursed (Medical and research facilities and Nuclear and fuel cycle facilities). In the following edition (2016), it is envisaged including three optional modules more (Industrial Facilities, Accelerators and NORM) as well as an on-the-Job-training project.

The training packages of the two first modules have been virtualized in a multimedia format, and delivered on a Virtual Learning Environment, available through Internet.

The multimedia material has been developed by experts in the different subjects and includes the theoretical interactive content, exercises, animations, videos, crosswords, etc. The assessment process

includes an online evaluation per module as well as compulsory exercises. A coordinator registers all the logs of the students of the course and experts are in charge of the knowledge acquisition.

Experts in matter are in charge of the student track. The face-to-face classroom part lasts one month and a half and includes the practical sessions of the two firsts modules and the modules 3, 4 and 5.

This methodology, using the new information and communication tools (ICTs), contributes to the harmonization of national and international training contents; it allows workers to receive continuous training whenever and wherever and reduces cost of lodging; it also integrates multimedia elements that improve the efficiency in the learning process; the contact between teachers and students is continuous and more effective than in the traditional way.

First results of this training edition will be taken before the summer.

E&T in the new BSS Directive (2013/59/EURATOM) and the Portuguese legal framework

A.N. Falcão, M.M. Meruje

Instituto Superior Técnico, Lisbon University, Portugal

falcao@ctn.ist.utl.pt

Abstract

The Portuguese Legal Framework addressing the requirements for qualification of professionals in radiation protection and safety is quite recent. However the new BBS EURATOM Directive will imply a thorough revision of the Portuguese law. The implications of the new BBS EURATOM in what concerns education & training, as well as recognition schemes will be presented. The steps to be given towards full transposition of the relevant articles of the Directive will be outlined.

Cooperation in education and training In Nuclear Chemistry (CINCH-II)

C. Morariu

Institute for Radioecology and Radiation Protection, Leibniz University Hannover, Germany

morariu@irs.uni-hannover.de

Abstract

In order to mitigate the effects of the decline of number of staff qualified in nuclear chemistry, is the CINCH-II project aiming at the Co-ordination of education In Nuclear Chemistry, being supported within FP7 Euratom from July 2013 to May 2016. The CINCH-II project is built around the three pillars Education, Vocational Education and Training (VET) and Distance Learning. These main pillars are supported by two cross-cutting activities – Vision, Sustainability and Nuclear Awareness that includes also dissemination, and Management.

One of the goals of CINCH-II is to develop a Training Passport in Nuclear Chemistry and to support networking by dissemination of knowledge at German university and non-university institutions, by teaching radiochemistry.

This poster presents the activities of the Institute of Radioecology and Radiation Protection (IRS) of the Leibniz University Hanover, Germany. IRS contributes to this project mainly by providing remote access to controlled exercises, based on the RoboLab concept (remote controlled laboratory of practical experiences with video feedback). The teaching material will help to enable institutions to offer nuclear chemistry courses even for small numbers of learners. This will help to broaden the nuclear chemistry education and to contribute to the preservation of competence.

Impact of the new BSS Directive on radiation protection training and education in Slovenia

M. Koželj[1], H. Janžekovič[2], V. Slapar Borišek[1]

[1]Jožef Stefan Institute, Ljubljana, Slovenia
[2]Slovenian Nuclear Safety Administration, Ljubljana, Slovenia

matjaz.kozelj@ijs.si

Abstract

Implementation of the new EU BSS Directive will influence radiation protection system in Slovenia on multiple levels. First, implementation requires update of existing legislation which is quite extensive and comprehensive. This includes update of the Ionising Radiation Protection and Nuclear Safety Act, governmental decrees and rules/regulations of different ministries. Altogether, at least 20 different legal documents should be changed. But before these changes could be implemented in legislation, it is necessary to identify and resolve the most important inconsistencies between implemented solutions in legislation and practice and the new BSS Directive, and find optimal solutions that will comply with new requirements and use the best of existing solutions.
Regarding radiation protection training and education the greatest differences to existing system are related to education and training of radiation protection experts, and radiation protection officers duties and competencies, and therefore also their training.

While the definition and role of radiation protection expert in Slovenian legislation is basically not different from the definition and roles in the new BSS Directive, only the general requirements for recognition and authorisation are given. Recognition of expertise for particular field of radiation protection is therefore performed through the "case-by-case" evaluation, which is not transparent and optimal approach. According to the new BSS Directive, the recognition requirements should be specified and also communicated to the Commission, which will make them also available to other Member States. The current situation is mainly consequence of absence of formal arrangements for education, training and retraining of radiation protection experts in Slovenia, which are now required by the new BSS Directive.

In current Slovenian legislation radiation protection officers were already introduced as "the radiation protection unit staff member" and "the person responsible for radiation protection". The first group of radiation protection officers was inherited from the original organisation of radiation protection services in nuclear facilities in Slovenia, while the second group was introduced in the last legislation (in years 2002/2004) to provide persons in charge for the implementation of radiation protection in non-nuclear facilities and other organisations. Their duties were initially related mostly to licensing or registration of practices, and later to implementation of radiation protection measures, but not on the technical level. They should take care of all necessary arrangements that required radiation protection measures are implemented, but their capacity to be practically involved in radiation protection tasks or supervise them is limited. The main reasons are that their training is limited (training for exposed worker is required plus "upgrade" related to details of legislation), and being the person responsible for radiation protection is usually their supplemental duty on the job. New BSS Directive imposes more technical and practical duties to radiation protection officers, which will require revision of current approach to training of persons responsible for radiation protection. This will be probably the most important and demanding change in the existing system of radiation protection training in Slovenia.

According to new BSS Directive, one of the practical tasks that may be assigned to the radiation protection officer is also training of exposed workers. Considering that this task requires additional skills and knowledge that could not be acquired through simple training, it is highly unlikely that an average radiation protection officer (being either the person responsible for radiation protection or radiation protection staff member) will be able to deliver effective radiation protection training as is required by current Slovenian legislation. At present, the training and retraining is performed by few organisations, which are authorised as radiation protection experts for training. Since the training is extremely important element of radiation protection, it is highly improbable that this system will be changed. However, training programmes will require update to reflect changes in BSS directive and national legislation.

Training in radiation protection at NRG

H. van Elsäcker-Degenaar, P. Ruiter, H.A. Buurveld, M.S. Koster

Nuclear Research and Consultancy Group, Petten, The Netherlands

vanelsacker@nrg.eu

Abstract

The Nuclear Research & consultancy Group (NRG) offers a wide range of services to energy utilities, government organizations and various branches of industry - including the nuclear, NORM-industry and medical sectors. NRG is a major producer of medical isotopes in Europe.
One of these services is training in radiation protection. This training is offered both to workers at NRG and to others. All the courses are offered at regular bases and as 'in-company' courses.

Since the introduction of energy production through nuclear energy in the Netherlands NRG provides training to acquire and maintain the knowledge and skills of personnel of nuclear installations. The unique combination of the experienced staff and the availability of nuclear installations give the courses a surplus value.

The Dutch law requires experts to have training and instruction before they work independently with radioactive substances and/or X-ray equipment. The law defines several levels of expertise for radiation protection experts (former level 3 and level 2) and radiation protection officers, (level 5 up to level 3). In this system of qualification level 2 is the highest, and level 5 the lowest.
NRG has been accredited as a training institute by the Dutch government and is as such authorised to run courses and hold examinations at levels ranging from 5 to 3. This makes our range of courses one of the most comprehensive in the country. Anyone who passes an NRG examination at one of these levels will be awarded an officially recognised diploma.

Apart from regular training for radiation protection experts and officers, NRG also provides training to particular professions as measurement engineers in the E&P industry, officers in the fire department, medical specialists using X-ray, dentists and their assistants. Attendees who pass examination in these courses will also be awarded with an official diploma, recognised by the authority. With this diploma they can state that they have the knowledge about radiation protection to perform their profession. The training in skills and attitude, that are also required for the profession has to be received in their own company.

When one has the knowledge, skills and attitude in radiation protection one has to maintain them to keep up with the changing (inter)national regulations to keep good working practices. In the Netherlands there is a recognition system for radiation protection experts. One of the requirements is to keep up with the knowledge, skills and attitudes by participating in refresher courses. NRG organises these refresher courses with a general theme and with different subjects, like neutron radiation protection, radiation protection in the NORM-industry, radiation protection from incidents and disasters and in the field of organisational and administrative aspects of radiation protection.

Collaboration between institutions in Lithuania for emergency preparedness training

I. Gatelyte, A. Mastauskas, J. Ziliukas

Radiation Protection Centre, Vilnius, Lithuania

ieva.gatelyte@rsc.lt

Abstract

The Fukushima's Daiichi nuclear disaster in 2011 showed that every country, despite of having or not having the nuclear power plant, should be prepared and ready to react on time to the critical situations.

The quality of the emergency preparedness depends on many factors and one of the most important is a periodical practical training of the first responders and those who might be related to the emergency situation (emergency workers). The Council Directive 2013/59/EURATOM of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 7/43/Euratom and 2003/122/Euratom requires that Member States shall ensure that emergency workers who are identified in an emergency response plan or management system are given adequate and regularly updated information on the health risks their intervention might involve and on the precautionary measures to be taken in such an event. Regarding to this Directive there is also requested that the undertaking or the organization responsible for the protection of emergency workers provides appropriate training as described in the emergency management system. Where appropriate, this training shall

include practical exercises. The organization of the emergency preparedness training in Lithuania is stated on the Law on Civil Protection of the Republic of Lithuania and on the Law on Radiation Protection of the Republic of Lithuania.

According to the Law on Radiation Protection of the Republic of Lithuania everyone who is responsible for the ionizing radiation sources or is working with them, must have radiation protection training. Regarding to this statement, the Order of the Minister of Health (Order No. 1001 On the Approval of Compulsory Radiation Protection Training and Instruction Procedure) was approved. In this Order there is described the process of the compulsory radiation protection training: requirements for the technical support organizations, the order of examination, lecturers qualification etc. Also the attention is paid to the training programmes, their content and length. The programmes consist of the various topics, and one of the most important is about the emergency preparedness and response, biological effects of the radiological incidents etc.

According to the State Residents Protection Plan in Case of Nuclear Accident the staff of the state and municipality institutions, other establishments and economic entities, must participate at the civil protection training, determined by Fire and Rescue Department.

According to the State Residents Protection Plan in Case of Nuclear Accident, State level civil protection trainings must be periodically organized. In these trainings all the necessary first response institutions have to be included. This helps to review and evaluate how well the institutions are prepared to react to the emergency situations.

In 2011 the Minister of the Interior of the Republic of Lithuania approved the State Level Civil Protection Training Plan for 2012 – 2014. By this Plan the Radiation Protection Centre was bind to organize this kind of training during 2013. Regarding to this in 2013 October the Radiation Protection Centre organized the state level civil protection functional training on radiation accident caused by „dirty bomb".

Many institutions participated in this training: Vilnius International Airport, Lithuanian Police Anti-terrorist Operations Unit "Aras", Fire and Rescue Department under the Ministry of the Interior Authority, Police Department under the Ministry of the Interior, Vilnius city municipality, State Enterprise Radioactive Waste Management Agency, the Environmental Protection Agency, State Nuclear Power Safety Inspectorate and the others. The purpose of the training was to evaluate the interinstitutional collaboration and emergency preparedness effectiveness of the institutions. The institutions, which were participating in the training, agreed, that such kind of practice helps to evaluate emergency preparedness and to reveal the advantages and disadvantages of separate institutions.

Radiation Protection Centre also cooperates with other institutions as State Border Police, Fire and Rescue Department, Police Department, First Aid in order to organize the periodical training for first responders according approved schedule.

Radiation protection training by the SCK•CEN Academy for Nuclear Science and Technology

M. Coeck
Belgian Nuclear Research Centre SCK•CEN, Mol, Belgium

mcoeck@sckcen.be

Abstract

Since the early discoveries by Marie Curie, Becquerel, Einstein and many others, a deep insight into the risks and benefits of applying radioactivity in daily commercial and research practice has been build up. The scientific world of radiological protection is in constant motion, triggered by new research as well as by developments and events in the daily industrial and medical sector. In addition, national and international standards, regulations and guidelines aim at steering daily practice and procedures that guarantee the protection of workers, the public and the environment.

With the SCK•CEN Academy, we transfer the latest insights in radiation protection to professionals dealing with ionizing radiation and to students. This poster presentation describes our contribution in:

1. *Guidance to students and young scientists in the domain of radiation protection:*
The SCK•CEN Academy provides opportunities for Bachelor and Master students, PhD candidates and any professional interested in enriching his or her radiation protection competences. Teaching and research supervision are provided by members of the SCK•CEN research team. They share their knowledge 'from the frontiers of nuclear science' and oversee practical exercises that can be carried out using our centre's nuclear facilities. Final-year pupils and teachers can also discover the world of radiation protection via monthly visits to the radiation protection research laboratories.

2. *Organisation of courses related to radiation protection:*
The SCK•CEN Academy contributes to academic learning through collaboration with all Belgian universities and several universities abroad. For example, the Radiation Protection Expert (RPE) course is a one-year post-graduate course (20 ECTS) developed in line with the legal requirements for RPEs, as set in the Belgian royal Decree of 2001. It is targeted towards those who need to be formally recognised as RPE, as well as to all professionals working in nuclear, radiology or the medical sector. Next to academic learning, the SCK•CEN Academy also provides customized training courses for professionals. For example, the course "Information and training in radiation protection for radiation workers" is aimed at workers who are possibly exposed to ionizing radiation in their professional environment, according to Article 25 of the Royal Decree of 20 July 2001. In addition, we also provide for continuous professional development (CPD) sessions in radiation protection in the medical sector, where we aim at discussing the most recent status of relevant subjects in radiation protection for professionals responsible for the supervision of exposed workers, public and environment. But also more specialised courses in dosimetry, emergency preparedness, radiation biology, etc... are provided.

3. *Policy support in radiation protection education and training matters:*
The implementation of a coherent approach to education and training in nuclear science and technology becomes crucial in a world of dynamic markets and increasing workers' mobility.

Through networking and participation in international programmes, the SCK•CEN Academy contributes to a better harmonisation of education, training practice and skills recognition on a national and international level. In the domain of radiation protection we coordinate the ENETRAP series of projects (6FP and 7FP), we participate to the IAEA steering committee for education and training in radiation protection, transport and waste safety and ad-hoc working groups of the OECD. We also organize the series of ETRAP conferences and are active in the Board of EUTERP.