BOOK OF ABSTRACTS

10th EUTERP Workshop
Competence-based approaches in radiation protection

July 7-9, 2026
PSI, Villigen, Switzerland

© EUTERP Foundation
Westerduinweg 3
1755 LE Petten
The Netherlands
www.euterp.eu

SCK•CEN-BA-178

Scientific programme committee

- EUTERP President, Jan-Willem Vahlbruch, UHannover, Germany
- EUTERP Board Members:
  - Tom Clarijs, SCK CEN, Belgium
  - Hielke-Freerk Boersma, UGroningen, the Netherlands & IRPA
  - Sonja Schreurs, UHasselt, Belgium
- Andrea Luciani, IAEA, Austria
- Sotiris Economides, GAEC, Greece & HERCA
- Maxime Henri, CEA-INSTN, France
- Tamás Pazmandi, HUN-REN, Hungary & IRPA

Organizing committee

Tom Clarijs, SCK CEN, Belgium
Jan-Willem Vahlbruch, UHannover, Germany
Maya Keller, PSI, Switzerland
Griet Vanderperren, SCK CEN, Belgium

Introduction

A warm welcome to Switzerland for the 10th EUTERP workshop "Competence-based approaches in radiation protection".

Since its establishment, the EUTERP foundation has been exploring how the harmonisation of E&T in RP can be promoted in Europe and beyond. However, the results have been quite limited as the implementation of the tasks and responsibilities of RPOs, RPEs and radiation workers continue to vary significantly across the various Member States, even after the implementation of the EU BSS.

Nevertheless, progress is being made, as more and more countries are translating radiation protection tasks and duties into a framework of competencies. These competences can now be compared – provided there is a common understanding of how assessable competences should be defined in terms of knowledge, skills and attitude. And at the same time, the application of AI is transforming and expanding the range of possibilities enormously.

This is exactly where our workshop comes in. We will discuss a common understanding of competences, how they can be compared to identify differences and commonalities in different countries, and how AI can help us in this regard. First approaches to this are showing promising results, and I look forward to fruitful discussions and interesting new ways of identifying common components in E&T in RP across different countries and developing ideas on how to successfully bridge existing gaps.

I wish everyone a stimulating and successful workshop!



Jan-Willem Vahlbruch
EUTERP President

Programme

Tuesday July 7, 2026		
09.00 – 09.30	Registration	
Setting the scene I – competency framework in radiation protection		
09.30 – 10.30	- Welcome address - Framework of competences in radiation protection & aims of the workshop - European Commission (EC) activities related to radiation protection and implementation of the BSSD	Jan-Willem Vahlbruch, EUTERP President Maya Keller, PSI Ana Rita Lopes Ramos, European Commission
10.30 – 11.00	*Break*	
Setting the scene II		
11.00 – 12.00	- Education and Training: Role and reflections of the competent authorities - Education and Training: Role and initiative of IRPA - Important aspects in competency management and radiation protection: introducing the working groups	Sotiris Economides, HERCA Hielke Freerk Boersma & Tamas Pazmandi, IRPA Tom Clarijs, EUTERP
12.00 – 13.30	*Lunch*	
Session 1 | Competencies: how to design, implement and evaluate		
13.30 – 13.50	Operationalising European competence frameworks in STEM teacher education: a training kit approach for the green and digital transition	Sandra Soares, University of Beira Interior, Portugal
13.50 – 14.10	Radiation protection training for master students: from formulation of competences over design of learning activities to evaluating the learning outcomes	Sonja Schreurs, University of Hasselt, Belgium
14.10 – 14.30	IAEA Safety Reports Series No. 130 as a practical framework for competence building in radiation protection for health professionals	Tom Clarijs, SCK CEN, Belgium
14.30 – 15.00	*Break*	
15.00 – 16.45	**Working session 1 | Design, implementation and evaluation of competencies**	
16.45 – 17.00	**Wrap-up of working session 1**	

18.00	**Barbecue @ PSI**

Wednesday July 8, 2026		
Session 2 | Recent developments regarding implementing competencies in E&T for RPOs and RPEs in Europe		
09.00 – 09.20	Implementing Competence-Based Training for Radiation Protection Officers in the Netherlands following the EU Basic Safety Standards	Jacoba Beiboer, University of Groningen, The Netherlands
09.20 – 09.40	The new revised guidelines on E&T of RPOs and RPEs in Germany	Jan-Willem Vahlbruch, University of Hannover, Germany
09.40 – 10.00	Qualification pathways for Radiation Protection Experts and Radiation Protection Officers in Finland	Maaret Lehtinen, STUK, Finland
10.00 – 10.30	*Break*	
Session 3 | IAEA competence framework and current status of qualification pathways		
10.30 – 11.00	The IAEA Competence framework for QE and RPO, IAEA	Andrea Luciani, IAEA, Austria
11.00 – 12.00	**Working session 2 | the establishment of qualification pathways and competence frameworks**	
12.00 – 13.00	*Lunch*	
13.00 – 14.15	**Working session 2 (continued) | the establishment of qualification pathways and competence frameworks**	
14.15 – 14.30	**Wrap-up of working session 2**	
14.30 – 15.00	*Break*	
Session 4 | New methods in radiation protection E&T		
15.00 – 15.20	CSI: Radioactive - Case 313: Radiation Protection: Staying Safely Non-Radioactive	Aline Thumm, NUTEC GmbH, Germany
15.20 – 15.40	Integrating Technical, Durability, and AI Competencies in Blended International Training weeks for nuclear engineering students	Sonja Schreurs, University of Hasselt, Belgium
15.40 – 16.45	**Working session 3 | New methods in radiation protection E&T**	
16.45 – 17.00	**Wrap-up of working session 3**	

19.00	**Optional | Get-together in Baden**

Thursday July 9, 2026		
Session 5 | Good practices of competence-based training events		
09.00 – 09.20	Implementation of a training module on the establishment and utilization of diagnostic reference levels in medical imaging for radiation protection training courses for professionals in Georgia	Davit Nadareishvili, Radiation Safety Centre, Georgia
09.20 – 09.40	Modular competence-based training in radiation protection for unsealed sources: combining e-learning, active learning and continuing professional development	Siria Medici, Institut de Radiophysique IRA/CHUV, Switzerland
09.40 – 10.00	Training and educational activities in radiation protection and ionizing radiation: the Italian experience	Flavia Groppi Garlandini, UNIMI, Italy
10.00 – 10.30	*Break*	
Session 6 | Summary of the working group sessions, further actions and outlook		
10.30 – 11.45	Summary of the working group sessions, further actions and outlook	
11.45 – 12.00	Closure of the EUTERP workshop	
12.00 – 13.30	*Lunch (optional)*	

Oral presentations

European Commission (EC) activities related to radiation protection and implementation of the BSSD

A.R. Lopes Ramos

European Commission, Directorate General for Energy, Directorate D – Nuclear Energy, Safety and ITER, Unit D3 – Radiation Protection and Nuclear Safety, Luxembourg

Ana-Rita.Lopes-Ramos@ec.europa.eu

Abstract

The activities of the Service of the European Commission Directorate General for Energy in charge of Radiation Protection and Nuclear Safety will be presented.

Competence based approaches in radiation protection: the role and reflections of competent authorities

S. Economides[1,2]

[1]Greek Atomic Energy Commission (GAEC), Athens, Greece
[2]Head of the European Radiological Protection Competent Authorities, HERCA Working Group on E&T, Montrouge, France

sotiris.economides@eeae.gr

Abstract

The implementation of competence-based approaches in radiation protection has become a key element of the European radiation protection framework. Competent authorities play a central role in ensuring that the knowledge, skills and attitudes required for radiation protection functions are commensurate with the radiological risks associated with different practices and activities.

In line with the work of HERCA Working Group on Education & Training (WGET) and, in particular, the analysis of the implementation of Radiation Protection Expert (RPE) and Radiation Protection Officer (RPO) concepts across European countries, this presentation examines how competent authorities have translated regulatory requirements into practical competence frameworks using a graded approach. The study demonstrates that while the concepts of RPE and RPO are now widely established across Europe, significant differences remain in their recognition, qualification requirements, training schemes, assignment of responsibilities and continuing competence arrangements.

The presentation explores the various ways competent authorities contribute to competence assurance, including the establishment of qualification criteria, approval and recognition systems, certification and re-certification processes and verification of professional experience. Moreover, it reflects on how competence-based regulatory approaches can support both effective radiation protection and regulatory efficiency by ensuring that requirements remain proportionate to risk while preserving a high level of radiation protection and safety.

The HERCA perspective highlights the importance of continued cooperation among competent authorities to share experience, promote good practices and foster greater consistency in competence frameworks throughout Europe. Such collaboration contributes to strengthening regulatory confidence, facilitating professional mobility and supporting the long-term sustainability of radiation protection expertise across all sectors using ionising radiation.

Education & Training: role and initiative of IRPA

H.F. Boersma[1,3], T. Pázmándi[2,3]

[1]University of Groningen, Health, Safety and Environment/Radiation Protection Unit, Groningen, the Netherlands
[2]Hungarian Research Network (HUN-REN), Budapest, Hungary
[3]International Radiation Protection Association

h.f.boersma@rug.nl
pazmandi.tamas@ek.hun-ren.hu

Abstract

The International Radiation Protection Association (IRPA) is the international voice of radiation protection. IRPA recognizes that Education & Training is a starting point for adequate Radiation Protection and a sound Radiation Protection Culture. Given current developments in Radiation Protection (key words: nuclear renaissance including new nuclear reactor concepts, ageing of RP work force, increase in medical applications, lack of (knowledge / awareness of) RP in large parts of the world), IRPA intensifies its activities in Education & Training in Radiation Protection. In March 2025 IRPA established a Task Group on RP Education and Training. Core objectives of the new Task Group are – among others –

- (to contribute to) the development of guidance material for competences, qualification and certification of Radiation Protection Experts and Officers;
- to take initiatives to actively contribute to continuous professional development of RP professionals.

In this contribution, we will provide a concise overview of the activities of the three Working Groups that currently work under the umbrella of this new Task Group.

Important aspects in competency management and radiation protection & introduction to the working groups

T. Clarijs

SCK CEN Academy, Belgian Nuclear Research Centre, Mol, Belgium

tom.clarijs@sckcen.be

Abstract

Ensuring effective radiation protection increasingly relies on the ability to manage competence in a structured, transparent, and harmonised way across roles, organisations, and countries. This presentation explores how a competency-based approach can be operationalised by linking training methodologies, international guidance, and recent insights on key professional roles in radiation protection.

Starting from the Systematic Approach to Training (SAT), it will be illustrated how regulatory requirements and professional functions can be systematically translated into competencies and learning outcomes using the ADDIE framework, ensuring alignment between expected competence levels, training activities, and assessment. This structured approach is essential in a context where international guidance emphasises that radiation protection competence extends beyond theoretical knowledge to also include practical skills, judgement, communication, and ethical responsibility throughout the professional lifecycle.

However, when these principles are applied to key roles such as the RPE, RPO and MPE, important challenges become visible. Across Europe, variations in the interpretation of roles, the definition of competence, and the processes for recognition lead to inconsistencies in competence profiles, training pathways, and professional mobility. Recent recommendations highlight that competence is often insufficiently defined in practice, with too strong a focus on technical knowledge and insufficient attention to operational and behavioural capabilities required for effective decision-making and advice.

Addressing these issues requires a more integrated approach, where competence-based training (as structured through SAT) is directly connected to clearly defined role expectations, harmonised qualification and recognition processes. This includes clarifying responsibilities and levels of involvement of RPEs, RPOs, and MPEs, strengthening their collaboration, and ensuring that education and training pathways (such as those reflected in European guidance from ENETRAP and EFOMP) remain aligned with technological developments and practical needs.

Against this background, the themes addressed in the EUTERP workshop (harmonisation of competence frameworks, clarification of roles and responsibilities, innovation in education and training, and ensuring a sustainable and sufficiently skilled workforce) can be seen as direct responses to the identified gaps. By bringing these elements together, this presentation sets the stage for the workshop discussions, aiming to support a shared vision on how competency management can evolve to effectively strengthen radiation protection practice across Europe.

Operationalising European competence frameworks in STEM teacher education: a training kit approach for the green and digital transition

S. Soares[1,2], L. Lopes[1,2]

[1]Department of Physics, University of Beira Interior, Covilhã, Portugal
[2]Laboratory of Instrumentation and Experimental Particle Physics (LIP), Lisbon, Portugal

shsoares@ubi.pt

Abstract

The growing importance of environmental sustainability, digital transformation, and public health challenges highlights the need to strengthen competence-based approaches in teacher education, particularly in areas related to environmental and radiation-related risks. Within the European context, European competence frameworks for radiation-related fields, such as those supporting Radiation Protection Experts (RPE) and Radiation Protection Officers (RPO), provide structured references for aligning knowledge, skills, and professional practice, emphasising the integration of technical knowledge with transversal skills, including communication, critical thinking, and decision-making.

From the perspective of operationalising European competence frameworks in teacher education, this work presents the design and development of a training kit (Module 4) within the Erasmus+ T4Green project (Transforming Teacher Education for Green and Digital Transition), aimed at supporting the integration of STEM education in teacher training programmes in Armenia and Moldova. The module is structured into four units: (i) foundations of STEM education, (ii) active methodologies such as Project-Based Learning (PBL), (iii) STEM project design and assessment, and (iv) the integration of digital tools and inclusive practices. The pedagogical design is aligned with key European competence frameworks, including the Sustainable Development Goals (SDGs), GreenComp, and DigCompEdu, ensuring coherence between policy-level frameworks and pedagogical implementation.

A key feature of this model is the explicit operationalisation of European competence frameworks within pedagogical practice, bridging competence frameworks in radiation related contexts with teaching and learning processes in in higher education. This is achieved by integrating environmental radiation topics, specifically radon exposure, into STEM learning activities. The module includes a complete STEM project example that illustrates increasing levels of complexity in risk interpretation, evidence-based reasoning, and the communication of environmental information.

The module is prepared for implementation with a cohort of trainee teachers. The structured training led to increased engagement and an improved understanding of competence-based STEM approaches. The planned evaluation focuses on assessing participants' confidence in integrating sustainability, radiation risk awareness, and digital tools into their future teaching practice. This training module provides a practical and transferable framework for the implementation and adaptation of European competence frameworks in STEM teacher education, demonstrating how these frameworks can be translated into concrete learning activities and assessment strategies. By strengthening the alignment between European competence frameworks and pedagogical practices, this approach supports the implementation of green and digital transitions within STEM education.

Radiation protection training for master students: from formulation of competences over design of learning activities to evaluating the learning outcomes

S. Schreurs[1], W. Eerdekens[1], W. Schroeyers[1]

[1]Hasselt University, CMK, NuTeC, Diepenbeek, Belgium

sonja.schreurs@uhasselt.be

Abstract

In modern education, competence-based education is essential for preparing the next generation of experts. Especially for nuclear engineering, dialogue with the worked market and regulatory bodies are needed to design and optimization of the curriculum. Constructive alignment between aimed competences, offered learning activities and evaluated learning outcomes are the responsibility of the academic trainers.

Modern competences integrate technical, durability and digital competences to the specific required level for the program. Current trainees are the future trainers in work field of tomorrow. Good practices are translated when they are involved in the process of quality assurance.
Moreover, international exchange of approaches and alignment in joined programs of training activities are needed in order students can collaborate in the activities and benefit from the gained ECTS credits when they return to their home institution.

During this presentation several examples from the nuclear engineering program of UHasselt are shown. UHasselt students are involved also in the quality assurance of the program in several stages in order to provide feedback to the educational management team.

Cherne : Cooperation for Higher Education on Radiological and Nuclear Engineering (https://irisib.be/cherne/)

IAEA Safety Reports Series No. 130 as a practical framework for competence building in radiation protection for health professionals

C. Rizk[1], T. Clarijs[2], S. Foley[3], G. Paulo[4], J. Vassileva[1]

[1]International Atomic Energy Agency, Vienna, Austria
[2]SCK CEN Academy, Belgian Nuclear Research Centre, Mol, Belgium
[3]University College Dublin, Ireland
[4]ESTeSC Coimbra Health School, Polytechnic University of Coimbra, Portugal

tom.clarijs@sckcen.be

Abstract

Designing relevant radiation protection competences for health professionals involved in the medical uses of ionizing radiation remains a persistent challenge for training providers. Radiation protection competence frameworks must be role-specific, aligned with regulatory requirements, and adaptable to diverse national and institutional contexts. Although the need for such frameworks is well recognised in medical applications such as in the 2013/59/Euratom Basic Safety Standards Directive, IAEA GSR Part 3 and the Bonn Call for Action, practical, internationally endorsed tools for their implementation have been limited.

The recently published IAEA Safety Reports Series No. 130, Education and Training for Building and Maintaining Competence in Radiation Protection in Medicine, addresses this gap by providing international guidance on qualification and competence in radiation protection for professionals involved in medical uses of ionizing radiation. This includes diagnostic and dental radiology, nuclear medicine, radiation therapy, and image-guided procedures, as well as referring practitioners, regulators, equipment suppliers, and service personnel, reflecting a wide range of stakeholders responsible for radiation safety in healthcare.

At its core, the publication applies a Systematic Approach to Training (SAT), a structured five-step methodology covering training needs analysis, competence design, programme development, implementation, and evaluation. This cycle is not presented as an abstract model, but as an actionable process supported by annexes with worked examples and a compilation of freely available training resources from IAEA.

The publication defines learning outcomes across nine content areas in radiation protection, organised by professional category. These role-based matrices enable educators to identify what each professional group needs to know and be able to do, rather than relying on generic curricula that may not reflect actual responsibilities. This approach also complements existing and emerging methodologies for other key roles in radiation protection, such as the RPE, RPO and the MPE.

This presentation introduces the publication and demonstrates its value as a practical tool for competence design in the medical radiation protection. It will show how role-based learning outcome matrices, qualification pathways, and training evaluation criteria directly address the competence-based design challenges faced by educators and training providers. The flexibility of the approach enables both the development of national training programmes and the benchmarking of existing curricula against international standards.

The publication provides a concrete reference for addressing the core themes of the EUTERP workshop: designing systematic and role-appropriate radiation protection competences, establishing clear qualification pathways for health professionals, and evaluating training effectiveness in a structured and reproducible way. It also supports international harmonisation, by helping bridge gaps between national practices and the evolving European competence frameworks promoted by the EUTERP community.

Implementing competence-based training for radiation protection officers in the Netherlands following the EU Basic Safety Standards

J. Beiboer[1], H.F. Boersma[1], E.J. Bunskoeke[2]

[1]University of Groningen, Health, Safety and Environment/Radiation Protection Unit, Groningen, the Netherlands
[2]University of Groningen, Isotope Laboratory Life Sciences, Groningen, the Netherlands

j.beiboer@rug.nl

Abstract

The Council Directive 2013/59/Euratom, published in 2013, has led to revised European Basic Safety Standards (EU-BSS). The new EU-BSS, which regulates safety when working with ionizing radiation and radioactive materials, mandates that training for Radiation Protection Officers (RPOs) must be specific to the applications in which they operate. Member States were required to transpose the directive into national law by February 6, 2018, prompting significant revisions in national regulatory frameworks and educational systems. In the Netherlands, this led to a thorough revision of the training system for Radiation Protection Officers (RPOs), shifting from generalist courses toward application-specific, competence-based education.

In 2015, the Authority for Nuclear Safety and Radiation Protection (ANVS) requested stakeholders to redesign the training programs for RPOs, emphasizing the development of competencies relevant to specific work environments and tailored to specific applications of radioactive materials, such as research and nuclear medicine.

The University of Groningen (UG) chaired the workgroup responsible for the development of the training program for Radiation Protection Officers of Dispersible Radioactive Materials (abbreviated as RPO-DRM). This program targets RPOs supervising limited radioactive quantities without direct patient exposure under the guidance of a Radiation Protection Expert (RPE).

In this contribution we present the qualification descriptors / competences and learning outcomes of the courses for RPOs, specifically focusing on working with dispersible radioactive material. We conclude with a short overview of the current system of training programs for RPOs in the Netherlands.

The new revised guidelines on E&T of RPOs and RPEs in Germany

J.-W. Vahlbruch[1]

[1]Leibniz University Hannover, Institute for Radioecology and Radiation Protection, Hannover, Germany

vahlbruch@irs.uni-hannover.de

Abstract

Following the transposition of the EU BSS into German national law, the guidelines for the training of RPOs and RPEs in Germany have been updated, with a particular focus on implementing a competence-based approach. This contribution presents the revised German guidelines on E&T for RPEs and RPOs for technical applications in radiation protection and explains the fundamental principles underlying the revision. Where necessary, the revised guidelines could now be used to identify commonalities in the E&T of RPEs and RPOs with other countries on the basis of competencies.

Qualification pathways for Radiation Protection Experts and Radiation Protection Officers in Finland

M. Lehtinen[1]

[1]Radiation and Nuclear Safety Authority (STUK), Vantaa, Finland

maaret.lehtinen@stuk.fi

Abstract

In Finland, there are three competence areas for radiation protection experts (RPE). The competence areas are health care and veterinary medicine; nuclear energy; and industry, research and natural radiation. For radiation protection officers (RPO) there are up to 13 competence areas, divided between healthcare and veterinary; as well as industry, research and nuclear energy.

Prior to the current legislation, Finland had a position of person in charge of radiation safety, which was largely equivalent to the current RPO. The transition to the RPO role required some changes from the previous setup, whereas the RPE role is entirely new.

The arrangements for recognition RPO qualification are straightforward, as courses are offered in various competence areas; completing these courses, along with work experience, is required to obtain RPO qualification. The structure and duration of the courses vary depending on the organizing body (universities or private institutions). The requirement for the length of work experience and required learning outcomes varies by area of competence. A certificate is issued upon passing the associated exam. Regarding work experience, the operator ensures that there is sufficient experience before appointing a RPO to the role.

There is no procedure in Finland for recognizing the validity of an RPO qualification obtained in another country. The reason is that the person in question must, in any case, familiarize themselves with national legislation, which is part of the RPO training.
The training is relatively short and can also be completed in English.

Arrangements for the recognition the qualification of RPE vary by competence area. In the healthcare – which also includes veterinary – medical physicists serve as both medical physics experts (MPE) and RPEs. The requirements for qualification include completing a medical physicist study, which includes practical training, passing a medical physicist exam, and applying for the right to use a name-protected professional title.

In industry and research, and in nuclear energy recognition of RPE qualification is applied from Radiation and Nuclear Safety Authority (STUK). In their free-form application, applicants must describe how they have acquired the required skills (through work and studies). Requirements for each competence area are set in radiation legislation. There is no set educational path for these fields of expertise; instead, experts must acquire the necessary skills from a variety of courses and sources. For that reason, competence is assessed, and recognition of qualification is made case by case. RPE in industry and research and in nuclear energy must have master's degree in natural sciences or engineering e.g. physics, radiochemistry, nuclear technology, in-depth and broad expertise in radiation protection across various fields of radiation use, and work experience at least two years after graduation.

Once a person has obtained qualification to act as an RPE in another EU country, they may apply to STUK for mutual recognition. Otherwise, the RPE certification system is the same as for Finnish experts. Mutual recognition is based on a certificate or documents issued by a competent authority in another EU country. Usually, the recognition decision includes a requirement to pass an aptitude test or an adaptation period of up to three years. Aptitude tests and adaption periods are typically needed because national legislation is generally unfamiliar, and you need to be familiarized with.

For the most part, the procedures are effective, but there are still some issues that, if resolved, would help ensure that radiation operators have access to qualified personnel. Regarding RPOs, the large number of skill areas means that it can be difficult to find training for certain specific skill areas if the need for new RPOs is sporadic. As far as RPE specialists are concerned, the situation in the healthcare sector appears to be favourable, as the training of hospital physicists has a long tradition and well-established procedures. There is also a training pathway in place for the use of nuclear energy, and there are enough RPE personnel to meet the need. In contrast, there is still room for improvement in the fields of veterinary as well as industry and research.

In veterinary, the biggest challenges stem from the fact that not all medical physicists have a sufficient understanding of the unique characteristics of veterinary and their impact on radiation protection requirements. The field of industry and research, on the other hand, is extremely broad, and there are very few individuals who have a comprehensive understanding of all applications of radiation. In such cases, it becomes necessary to assess how deep and broad a level of expertise is required to qualify. In addition, the RPE must also consider what types of tasks they can offer their expertise for, so that the safety licence holder receives the support and appropriate advice they need regarding radiation safety matters. The holder of the safety licence must also ensure that they hire an RPE suitable for their operations.

IAEA competence framework and learning pathways for QERP and RPO

A. Luciani[1], B. Okyar[1], C. Rizk[1], S. Dhlomo[1]

[1] Division of Radiation, Transport and Waste Safety, Department of Nuclear Safety and Security, IAEA, Vienna, Austria

A.Luciani@iaea.org

Abstract

IAEA Safety Standards Series No. GSR Part 3 introduces requirements for the Radiation Protection Officer (RPO) and the Qualified Expert, two parties with specified responsibilities for protection and safety. The RPO is a person technically competent in radiation protection matters relevant to a specific practice and is designated to oversee the application of regulatory requirements. The Qualified Expert is an individual duly recognized as having expertise in a relevant field of specialization and consulted, as necessary, on the observance of regulatory requirements in an advisory capacity. The Qualified Expert in radiation protection (QERP) may be considered equivalent to the Radiation Protection Expert referred to in other international guidance and provisions (e.g. IRPA, EC directives).

The requirements in GSR Part 3 outline the roles and duties of the RPO and the QERP, and some additional information is spread across IAEA Safety Guides. However, the competences needed by the RPO and the QERP to effectively carry out their responsibilities and perform their respective duties, and the learning pathways to gain such competences have not yet been systematically described in an IAEA publication. This has led several Member States facing challenges in establishing effective and appropriate regulatory frameworks for RPOs and QERPs, that reflect the national needs, and in developing an education and training infrastructure capable of building the necessary and complementary levels of competence.

To address these challenges, the IAEA is developing a Safety Report that provides a systematic overview of the competences required by RPOs and QERPs to carry out their duties, as outlined in IAEA safety standards. These competences are described in terms of knowledge, skills and attitudes. The document also outlines the associated learning pathways for achieving and maintaining the required levels of competence through education, training and experience. In addition, it presents considerations related to possible schemes for the formal recognition of QERPs and the designation of RPOs.

Science Slam: CSI: Radioactive - Case 313: Radiation Protection: Staying Safely Non-Radioactive

A.K. Thumm[1]

[1]NUTEC GmbH, Kronberg im Taunus, Germany

a.thumm1@web.de

Abstract

Radiation is often associated with danger, glowing skin and science fiction scenarios. But how much of that is actually true? This science slam takes the audience on an engaging journey through the world of radiation protection.

A detective-style narrative is used to introduce different types of radiation (alpha, beta and gamma) as unique characters. Each type of radiation is associated with its own properties and risks. Although these phenomena may seem alarming at first, the talk reveals how well they are understood and controlled in scientific practice.

The focus then shifts to radiation protection: how can we work safely with something invisible yet powerful? Key principles such as justification, dose limitation and optimisation (ALARA – As Low As Reasonably Achievable) are presented alongside the necessary tools, ranging from Geiger counters to protective equipment.

The talk concludes with a clear message: radiation is not a villain, but a natural phenomenon that is strictly governed. Working with it does not make you "radioactive" unless you seriously overdo it.

And who would have thought that radiation protection could actually be this exciting?

Integrating technical, durability, and AI competencies in blended international training weeks for nuclear engineering students

S. Schreurs[1], W. Eerdekens[1], E. Vandersmissen[2], W. Schroeyers[1], E. Emmers[2]
[1]Hasselt University, CMK, NuTeC, Diepenbeek, Belgium
[2]Hasselt University, SES, U-RISE, Diepenbeek, Belgium

sonja.schreurs@uhasselt.be

Abstract

Over the past 5 years multiple Erasmus projects within the CHERNE (Collaboration network) and internal DIOS funded projects integrated new competences in nuclear engineering programs, bringing European master students and staff together to collaborate, co-create, exchange of ideas.

Recognizing that the modern nuclear professional requires a complex spectrum of competences—including advanced technical skills, training proficiency, durability (sustainability), and digital readiness—these projects offer blended activities of 1 week on-site training together with online mixed-group pre- and/or post training. This approach enables students to work across borders on topics in environmental, medical, and nuclear measurement fields. Responsible use of AI and sustainable development goals are new challenges in nuclear education not only for students but also for trainers to reinvent the activities. The outputs also integrate dissemination activities in order to raise the awareness among new target groups including high school pupils and (pre-service) teachers.

First tentative results of an impact study during a staff and students trainings on integrating AI in these trainings is presented.

Cherne : Cooperation for Higher Education on Radiological and Nuclear Engineering (https://irisib.be/cherne/)

Implementation of a training module on the establishment and utilization diagnostic reference levels in medical imaging for radiation protection training courses for professionals in Georgia

D. Nadareishvili[1,3,4], K. Jariashvili[1,2,4], S. Kiparoidze[1,3], M. Gvasalia[1], N. Astamadze[4]

[1]Applied Radiation Research Laboratory, Ivane Beritashvili Center of Experimental Biomedicine, Tbilisi, Georgia
[2]Agency of Nuclear and Radiation Safety, Tbilisi, Georgia
[3]School of Medicine, New Vision University, Tbilisi, Georgia
[4]Radiation Safety Center, Tbilisi Georgia

dnadareishvili@biomedicine.org.ge

Abstract

Diagnostic Reference Levels (DRLs), as one of the tools for implementing the principle of optimization in radiation protection in medical imaging, are used in many countries. In Georgia, through the efforts of the regulator and the scientific and medical communities, this process has already been launched, although it is still in its infancy. A legislative framework has been established, and scientific research in this area has begun.

However, the establishment and utilization of DRLs require specific training. Given that periodic training and retraining courses for personnel are mandatory in the country, it is reasonable to incorporate a module on the establishment and utilization of DRLs into these courses.
Based on our experience in developing and delivering periodic training and retraining courses, we designed a module consisting of three parts.

The first part provides general knowledge about DRLs and their role in radiation protection in medicine and will be common to all participants, including RPOs, radiographers, radiologists and medical physicists.

The second part consists of modules on the utilization of local DRLs for different types of procedures, including CT, Angiography procedures and others. The first part of the module will be delivered during the theoretical component of the course, while the second will be conducted during practical sessions, taking into account the specifics of each type of medical imaging.

The third part is intended for personnel directly involved in the process of installing local DRLs in medical facilities. In addition to knowledge, the third group will be provided with all necessary equipment, including data collection forms. This process should involve collaboration with the regulatory body, other education providers in this field, and all relevant stakeholders. This approach, taking into account the mandatory retraining of personnel every three years, will enable the effective preparation of professionals in Georgia for the utilization of DRLs at both the national and local levels. The third part of the module will also enable professionals to participate in the development and optimization of guidelines for the establishment of local DRLs. By adopting this integrated approach, it will be possible to implement and apply national and local DRLs in practice within a relatively short timeframe and at an acceptable level, thereby supporting good practice in medical facilities.

Modular competence-based training in radiation protection for unsealed sources: combining e-learning, active learning and continuing professional development

C. Lemesre[1], F. Bochud[1], S. Medici[1], J. Damet[1]

[1]Institute of Radiation Physics, Lausanne University Hospital and University of Lausanne, Switzerland

siria.medici@chuv.ch

Abstract

The use of unsealed radioactive sources in research, medical and industrial laboratories requires specific competences in radiation protection (RP), including risk assessment, prevention and handling of radioactive contamination, waste management and regulatory compliance. In addition to technical knowledge, RP professionals must increasingly develop transversal competences such as communication, decision-making, professional ethics, risk assessment and prioritisation, and sustainability awareness. In this context, a modular competence-based RP training programme dedicated for the handling of unsealed sources has been developed to better align learning outcomes, qualification pathways and professional competences. This modular approach has also been applied across other RP courses, promoting harmonisation of competences, coherence of training pathways and alignment with European frameworks.

The training programme at the Institute of Radiation Physics of the Lausanne University Hospital has been structured into thematic modules, each associated with clearly defined competences and learning objectives. In the basic training programmes, part of the theoretical content is delivered through in-house developed e-learning modules and completed prior to the face-to-face training sessions. This approach allows participants to acquire fundamental knowledge at their own pace and ensures a more homogeneous level of baseline knowledge, enabling in-person sessions to focus on problem-solving, practical applications and discussions.

A key element of the programme is the integration of active pedagogical methods. Each module alternates between short lectures, guided exercises, case studies, group work and practical laboratory sessions involving contamination and dose rate measurements, waste management and handling of unsealed sources. This structure fosters active participation, peer learning and the development of both technical competences and transversal skills such as communication, teamwork and risk assessment.

The modular structure is also particularly well suited for continuing professional development programmes. Continuing education courses are built using the same modules as the basic training programme, allowing participants to revisit core RP topics, update their knowledge according to technical and regulatory developments, and integrate feedback from operational experience, incidents or radiological events. In addition, this modular and interactive structure makes it possible to engage participants in training components that are traditionally perceived as more passive, such as the legal and regulatory aspects of radiation protection. Through case-based discussions, practical examples and guided exercises, participants are encouraged to explore concrete applications of the legal framework in their own professional context and to become familiar with regulatory texts.

This approach helps transform regulatory requirements into operational practice and supports the development of confidence in their practical implementation. In this regard, a continuing education course is currently planned on RP administration and regulatory implementation in Switzerland.

Competence assessment combines written examinations and practical evaluations in a controlled area. This modular competence-based approach supports both initial qualification and lifelong learning in radiation protection and can be aligned with European competence frameworks and qualification pathways.

Training and educational activities in radiation protection and ionizing radiation: the Italian experience

F. Groppi[1], G. La Verde[2], M. Pugliese[2], M. Sisti[3], M. Colucci[1]

[1]LASA, Physics Department – Università degli Studi di Milano & INFN, Segrate, Italy
[2]Physics Department – Università degli Studi di Napoli Federico II & INFN, Napoli, Italy
[3]Istituto Nazionale di Fisica Nucleare, INFN, Milano, Italy

flavia.groppi@unimi.it

Abstract

Training and educational activities in radiation protection and ionizing radiation in Italy represent a well-structured and comprehensive system, governed by both European and national regulations, with a strong focus on the safety of workers, patients, and the environment. Over the years, the increasing use of ionizing radiation (IR) in fields such as medicine, industry, and scientific research has led to growing attention toward radiological safety. In this context, the implementation in Italy of the Legislative Decree 101/2020, which transposes the European Basic Safety Standards, and the National Radon Action Plan (PNAR) have further highlighted the importance of developing a solid and informed educational framework on IR and radiation protection. Education is therefore not only a regulatory requirement but also a fundamental tool for promoting a culture of safety, responsibility, and awareness across society.

Within this framework, the Istituto Nazionale di Fisica Nucleare (INFN) with some Physics Departments of Italian Universities plays a central role in promoting educational and outreach initiatives at the national level, particularly those aimed at secondary school students. These initiatives are designed to disseminate reliable scientific knowledge and, at the same time, foster transversal skills such as critical thinking, teamwork, data analysis, and problem-solving. Directly involving students in scientific activities helps bridge the gap between theoretical learning and real-world applications, while also encouraging interest in STEM disciplines and increasing awareness of the societal implications of IR.

One of the most relevant initiatives in this field is the RadioLab project, active since 2004. This project involves a network of ten INFN sections and university departments and offers structured educational pathways focused on radioactivity. RadioLab is based on a hands-on, inquiry-based learning approach, in which students actively participate in environmental radioactivity monitoring campaigns, with particular attention to indoor radon, a naturally occurring radioactive gas that represents one of the main sources of radiation exposure for the general population.

Using detection instruments and experimental techniques, students carry out measurements, collect and analyze data and interpret their results considering scientific knowledge and existing regulations. This process allows them to better understand the connections between physics, environmental science, public health, and regulatory frameworks. The laboratory thus becomes not only a place for experimentation but also a methodological approach that integrates scientific knowledge with active citizenship and risk awareness. Students are encouraged to reflect on the implications of their findings, developing a more conscious and informed perspective on radiation-related issues.

The success of the RadioLab project has led to its expansion beyond the Italian context, reaching international settings such as Albania and Ecuador. This demonstrates its flexibility and effectiveness as a model for science education and public engagement, while also fostering collaboration and the exchange of best practices among students, teachers and researchers.

In addition to RadioLab, the ISOradioLAb project further strengthens the educational outreach by bringing monitoring and training activities to geographically and environmentally sensitive areas, such as small Italian islands. These territories often face specific challenges related to environmental monitoring and access to scientific infrastructure. By organizing local campaigns and educational activities, ISOradioLAb promotes inclusivity and ensures that students and communities in these areas can actively participate in scientific initiatives, while also contributing to the collection of valuable environmental radioactivity data.

Beyond education, these competencies find direct application in national-scale infrastructures designed for radiological protection. In this context, the ability to promptly detect accidental releases of radionuclides (RN) into the environment becomes a key element in the management of radiological and nuclear emergencies. The EyeRAD project (Environmental RADioactivity monitoring network) aims to establish a national network for real-time monitoring of atmospheric radioactivity. EyeRAD represents a strategic infrastructure to strengthen national preparedness, enhancing rapid response capabilities and improving the understanding of the environmental and health consequences of accidental radiological events, in line with current safety and public protection needs.

Alongside these initiatives, INFN coordinates at the national level the International Particle Therapy Masterclass (PTMC), within the framework of the International Particle Physics Outreach Group (IPPOG). This program introduces students to the medical applications of IR, particularly advanced cancer treatment techniques such as hadron therapy. Through interactive lectures and simulations using specialized software, students gain insight into how fundamental physics research translates into clinical applications.

The PTMC experience highlights the interdisciplinary nature of modern science, where physics, biology, and medicine converge. By working on simulated treatment plans and analyzing clinical scenarios, students develop a deeper understanding of both the potential benefits and challenges associated with radiation-based therapies, while also reflecting on their ethical and social implications.

With all these initiatives the individuals are better equipped to critically understand the role of IR in contemporary society, from environmental monitoring to medical applications and technological innovation. At the same time, they are encouraged to adopt a responsible and informed attitude toward radiation risks and benefits. In a context where IR continues to play a crucial role in many sectors, investing in education and training is essential to ensure safety and sustainable progress, as well as to contribute to the development of informed citizens and future professionals.