



HERCA Working group on  
Education and Training

-  
HERCA Workshop on the Challenges  
in Implementation of RPE & RPO in  
HERCA member states

Information Paper / Report

Workshop held the 10 to 12 May 2021

*Organised by the HERCA workgroup on Education & Training in Radiation Protection  
in the framework of the HERCA Action Plan in relation to the transposition  
and implementation of Directive 2013/59/Euratom (Euratom-BSS)*



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& RPO in HERCA member states

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## Background

Radiation protection education and training (E&T) has been of outmost interest for 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. The interest of HERCA in E&T activities, in particular in the activities of ENETRAP following previous contacts from this consortium, has been confirmed in subsequent meetings.

Several steps have been made by HERCA in this area. A Task force (TF) E&T in radiation protection (RP) was set up in November 2012 and has been led by Mr. Ton Vermeulen (ANVS). The ultimate mandate of the TF was to present a general picture of the situation on E&T in RP to the Board of HERCA and to identify the current need for harmonisation among HERCA member countries and eventually, if needed, the mandate of a future working group on E&T. 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 radiation protection expert (RPE)
- ▶ HERCA recommended that the EC should develop further guidance on the role of the radiation protection officer (RPO) and the required training and competencies.

On the occasion of the 14<sup>th</sup> meeting of HERCA (Stockholm 21-22 October 2014) the HERCA TF E&T was tasked 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 implementation of the BSS in the framework of the HERCA Action Plan on the role of HERCA in the transposition of the Euratom-BSS. It was decided that a workshop on this topic should be organised while paying attention to the deadlines of the ENETRAP III project which include among the deliverables guidance documents to support the implementation of E&T requirements for RPE and RPO.

Following the approval to establish the Working Group on Education & Training in radiation protection at the 16<sup>th</sup> board meeting with a new mandate and action plan (approved at 17<sup>th</sup> meeting), the activities of the workgroup are focused on the achievement of a common understanding of the EU-BSS Directive requirements considering education and training in radiation protection. At the 20<sup>th</sup> Board meeting a guidance document for the implementation of RPE and RPO was presented to the board, approved and published on the HERCA public website.

The Council directive 13/59/Euratom<sup>1</sup> laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation (Euratom-BSS) introduces the 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.’

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<sup>1</sup> The new BSS articles directly linked to RPE and RPO include: Art 4 (73, 74) – Definitions; Art 14 (2, 3) – General responsibilities for the education, training and provision of information; Art 34 – Consultations with a radiation protection expert; Art 79 – Recognition of services and experts; Art 82 – Radiation protection expert and Art 84 – Radiation protection officer.

Having a common understanding on the new requirements for RPE/RPO would facilitate the implementation of the BSS on RPE and RPO at the national level and might enable a better harmonisation on this issue.

Moreover, the roles of RPE and RPO are becoming more challenging considering the continuous advances in ionizing radiation application and the radiation protection techniques. To gain more insight in the implications of these developments on the RPE and RPO implementation a second workshop on the challenges in RPE and RPO implementation was organised (May 10-12, 2021) by the WG E&T in RP core group. Besides asking all the HERCA members about the perceived challenges in RPE and RPO implementation, we also wanted to look forward at the implications of new and approaching techniques on education and training and asked ourselves the question whether we are ready for these new challenges when education and training of RPE's/RPO's is concerned.

## Objectives of the workshop

Different objectives have been defined for the HERCA Workshop “on the Challenges in Implementation of RPE & RPO in HERCA member states”:

- ▶ Explore the perceived challenges in RPE and RPO implementation in the Member States
- ▶ Investigate the level of preparedness for the challenges for RPEs and RPOs introduced by the new techniques.
- ▶ Explore a common understanding of the new requirements on RPE/RPO
- ▶ Explore the current status of mutual recognition of experts and the future possibilities among the Member States.
- ▶ 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

# Future requirements in RPE and RPO implementation according to international organisations/projects: are we ready for new Techniques etc.

## Organisation EC

MSs were obliged to transpose the Council Directive 2013/59/Euratom into their national legislation until February 2018. The Directive establishes, among others, the roles and responsibilities of RPEs, RPOs and MPEs. Corresponding provisions are provided in articles 4, 14 and 79, 34, 82 and 84.

EC is monitoring the degree of transposition of the Directive to MSs legislation in terms of completeness and compliance.

EC supports the transposition and implementation of the Directive's requirements for RPEs and RPOs through EUTERP and ENETRAP III platforms. EC is supported in this task by Article 31 group of experts and collaborates with HERCA. Moreover, the EC cooperates with several European and international organisations, such as: HERCA, IAEA, IRPA, ICRP, IACRS, WHO, ERA, ENA to draft related guidance.

The core competences of RPE include a Bachelor's or Master's degree and 3 years of working experience (ENETRAP).

RPO is primarily concerned with the oversight and supervision of radiation protection and safety of workers and the public. The appointment of the RPO is not mandatory, while its recognition is not required. The RPO is a stakeholder's employee with a role different from the RPE's.

Additionally, the RPO shall be provided by the employer with the necessary means for the assigned tasks. The tasks are more detailed including, among others the supervision or performance of radiation protection arrangements.

The European BSS does not define minimal requirements for RPOs regarding their Education and Training in radiation protection and safety. However, these requirements are implemented at national level.

The mutual recognition for RPE and RPO is still a challenge among the MSs. To achieve this goal, the harmonization of E&T requirements of RPEs and RPOs among the MSs is necessary.

EC will carry out a study on the transposition and the implementation of the requirements for RPEs and RPOs at MSs. The study will start in 2022 and last for 24 months.

Results of IRPA and IAEA activities concerning E&T in radiation protection and safety are used to better understand the development of E&T programs.

## Organisation IRPA

The IRPA perspective on RPE & RPO for the future was presented.

The representation of the young generation network in actions related to E&T on radiation protection is important for the professional development of new scientists in order to deal with future challenges.

One of the IRPA objectives is to support and implement activities related to E&T on radiation protection. In this respect, IRPA:

- cooperates with international and regional organisations on E&T matters,
- organises related discussion forums, and
- organises refresher courses during regional congresses.

IRPA issued a guidance document in 2016, which establishes the principal elements of the certification process for the RPES, including, among others: training requirements, professional experience, assessment of competence, etc.

The RPE certification schemes implemented in different countries include, among others:

- an academic degree (4 out of 6 countries),
- specific RP knowledge (all countries),
- experience 3 to 7 years not always specified,
- re-certification process (most of the countries).

Future challenges in radiation protection seem to concern:

- the implementation of the new system of radiological protection. ICRP 2021 will launch a decade of review of the current system of radiological protection.
- a greater focus on ethics,
- culture and communication related issues,
- new ionizing radiation techniques, such as: novel radioisotope therapies, hybrid techniques, emerging imaging technologies, etc.

Although the fundamental principles of radiation protection remain unchanged, the areas of their implementation are continuously broadening (safety culture, ethics and radiation protection, reasonableness & tolerability, stakeholder engagement, risk communication and relationship). In this respect, new skills will be required with regard to the proper implementation of radiation protection.

Developments in radioisotope therapies (Y90 microspheres for pancreatic cancer, Lu177 PSMA for prostate cancer) introduce new challenges in patient dosimetry and staff protection. How will RP professional get the necessary experience?

Moreover, there is an increased use of hybrid imaging and Artificial Intelligence (AI) technologies. How will these advances affect the related radiation protection arrangements?

The provision of E&T on radiation protection is a 2 - stage process:

- initial provision of E&T concerns the acquisition of the necessary knowledge, skills, competences and experience. Intrinsically related to certification and standards might be more dynamic depending on demands;
- ongoing CPD aiming to keep knowledge and skills up to date (maintaining competences, gaining knowledge and experience on new techniques).

Additionally, future needs regarding radiation protection include the following:

- RPE&RPO should be secure in fundamental principles and practise in radiation protection,
- Radiation protection knowledge & skills should be transferable to novel situations,
- data on new techniques should be shared,
- experience gained during pandemic regarding online learning and exchange of information should be further elaborated.

## Organisation IAEA

The IAEA supports MSs to establish a regulatory framework for Qualified Experts (QEs) and RPOs. The related definitions and requirements regarding the corresponding roles and responsibilities are provided in GSR part 3.

The requirements for QEs include expertise in a relevant field of specialization (broader than RPE) and formal recognition. QEs provide consultation on occupational, public and medical exposure. Definitions and requirements RPO.

The IAEA supports MSs to strengthen their regulatory framework and to develop competence in E&T:

- 30 EduTA missions conducted until 2020,
- 21 expert missions have been conducted to support the development of E&T infrastructures in MSs,
- The compliance of MSs' with IAEA requirements is verified through RASIMS (radiation safety information management system),
- Conduct of Post Graduate Educational Course in Radiation Protection and the Safety of Radiation Sources - PGEC (5 month course in radiation protection, 47 courses, 866 participants),
- Train the Trainers (TTT) courses for RPOs (29 courses, 567 participants),
- Syllabus for training of RPOs at industrial and medical radiation facilities.

## Organisation EANM

The new developments in nuclear medicine have initiated a "Theranostics' revolution". Theranostics concern the use of radioisotopes to achieve a combination of diagnosis and therapy, including:

- RN therapy, or molecular radiotherapy: image guided patient specific IMRT/molecular conformal RT.
- Dosimetry based decision on further therapy with  $^{177}\text{Lu}$ -DOTA-octreotate of metastatic neuroendocrine tumours.

The European BSS require the exposures of target volume in therapy to be individually planned. However, the trials are based on fixed dose.

ICRU Report 96 sets the conceptual framework for dosimetry guided radiopharmaceutical therapy and define 3 levels of dosimetry reporting:

- Level 1: administered activity.
- Level 2: activity some idea patient dose.
- Level 3: dosimetry guided therapy patient

Theranostics have a significant impact on the implementation of radiation protection concerning:

- Exposures due to gamma ray component
- Risk of contamination (injection, body fluids)
- Risk of inhalation after cremation (Th 227)
- Release of radioactive waste in sewage systems
- Collection of radioactive waste for decay in tanks at hospitals
- Pharma filter contamination
- Long-lived contaminants in therapeutic RN like  $^{177}\text{mTc}$
- Treatment of common tumours (e.g. prostate cancer) concerning larger numbers of patients.



## Organisation

### MELODI

Radiation protection research is necessary to support the practical implementation of radiation protection.

MELODI research platform focuses to the field of low doses and its activities include, among others: annual workshops, young scientist awards, scientific opinions etc.

A holistic strategy set by MELODI is based on 3 key questions:

- Is there a dose/dose rate dependency of cancer risk?
- Are there any other exposure thresholds related to protection from health risks other than cancer?
- Are there reliable methods for identifying individual radiation sensitivity, and addressing related ethical issues?

MELODI E&T workgroup prepared strategic agenda for research. Moreover, it runs a mobility program providing 5000 euro travel awards to young scientists.

The challenges concerning radiation protection research include:

- Dissemination of research projects not targeting radiation professionals (RPE, seldom RPO),
- Radiation protection research is not always applied research, and
- Involvement of end users is not always optimal in RP research projects.

Therefore, it is necessary to lower the threshold for RP training providers to include latest scientific insights (also involve HERCA in dissemination), and to strengthen the link between researchers and training providers (proper stake holder involvement).

In conclusion:

- Research could have a huge impact on daily RP practise, technological advancements, and standards & regulations.
- RP research community is ready to support basic and advanced training courses in RP.
- RPE and RPO system is fit for purpose.

## Organisation

### European ALARA Network

The European ALARA Network (EAN) created in 1996 with the participation of experts from 18 European countries. Its activities include, among others:

- The organisation of workshops. So far, 19 workshops have been organised.
- The support to EU surveys.
- Interaction with RP networks.
- The publication of a practical guide book on ALARA.

According to feedback received from E&T workshops, there is a need to keep a balance between nuclear safety and radiation protection in the content of the training to achieve an all hazard approach. Attention is needed to continuous professional development of scientist involved in radiation protection.

Harmonization of the related training is a point of concern. Radiation protection training mainly concerns academic skills and less attention is paid to soft skills, human factors, communication and leadership. It is important to integrate human factors in the design of training on radiation protection (more practical training). In this respect, training should be based on case studies.

New challenges in RP mainly concern the medical sector, nuclear installations and existing exposures situations.

Regarding medical applications of ionizing radiation, Innovative tools (serious gaming, on line dosimetry, use of AI) can be a challenge for RPEs, RPOs and MPEs. The use of simulation and 3D representation of the workplace and radiation risk enables a better training, communication and a better preparation of the workers. However, it is questionable how the radiation protection professionals will be prepared to face all these challenges.



## Discussion – Main points

The main challenges concerning training on radiation protection include among others new medical technologies and techniques and the use of AI. In this respect the provision of appropriate training to persons involved in RP matters is considered of great importance

The lack of standardization of RP training among countries is another challenge to deal with. This issue was also underlined during the previous workshop of HERCA E&T working group. At the moment we are far away from such a goal which seems to be unrealistic as there are different approaches in the different countries based on the corresponding national legal frameworks.

Competence assessment could be a good approach to achieve standardization among MSs. The accomplishment of the necessary competences through different routes is achievable but it requires flexibility. A robust check in the recognition process of the RPEs could overcome the differences in initial training. In this respect the role of mentorship for the effective training of future RPEs under the supervision of an experienced RPE could be of great importance. However, special training on how to mentor young RPEs is necessary.

In Belgium, mentorship for 1-2 years (not in rules/regulation) is required when working in an organisation before the accreditation. Moreover, the requirement for on the job training under the supervision of an experienced RPE was effective in Italy.

Moreover, there are worries regarding the educational systems on RP applied in the different European countries as teachers at top level who are involved in RP research are becoming scarce. This might be related to the limited career possibilities which are available for RP specialists.

To overcome this problem specific actions should be taken to:

- support teachers/trainers,
- increase networking with other training providers (EUTERP),
- train the trainer,
- ensure the provision of available resources.

Additionally, online education could be used for sharing trainers for basic modules (radiobiology, physics etc.)

## Sharing experience between HERCA members: **Exchange of perceived challenges in RPE/RPO implementation in HERCA MS**

### Country

## THE NETHERLANDS

In the Dutch legislation the term RPE has been implemented literally with requirements for expertise and training laid down in legislation. The addition of the technical competence relevant to a given type of practice that was demanded in the BSS for the educational programme of RPEs is part of an ongoing modification of the related educational system in the Netherlands.

The RPO has been implemented as supervisory employee radiation protection. To comply with the EU-BSS requirements for RPOs, the national RP system had to be modified in order to become application specific i.e., relevant for a given type of practise.

There are learning outcomes for nine application-specific courses for RPOs in the national legislation: 1) medical applications, 2) dentistry, 3) veterinary applications, 4) nuclear fuel cycles, 5) dispersible radioactive materials 6) NORM, 7) accelerators, 8) industrial radiography (including non-destructive testing and exploration research) and 9) gauging techniques.

At present RPO courses for all nine applications are available at the Dutch training institutes. Besides the new application specific RPO training modules, an additional training module for nuclear power plant security personnel was developed. Learning outcomes for this course are incorporated in the Dutch nuclear safety Ordinance. At the moment there is a demand for a short specific course for RPO's working with intrinsic safe devices. Therefore, the gauging techniques course will be split in two modules: devices and sources.

Training institutes in the Netherlands provide general RPE courses and additional training modules (NPPs, scrap metal, gauging techniques, etc.). The RPEs are not application specific, and they can carry out the tasks of the RPOs.

In The Netherlands the impact of the COVID-19 epidemic on the E&T legal requirements was limited. Training in RP is ongoing for both RPEs and RPOs albeit online. However, some difficulty was perceived with the performance of practical exercises and examinations online.

Regarding the main challenge encountered in the Netherlands, it concerns the recognition of the RPEs who are coming from abroad (e.g. common understanding, registration of RPEs, etc.)

### Country

## AUSTRIA

The tasks to be performed by RPE and RPO are defined in the Austria's regulatory framework (Radiation Protection Acts of 1969 and 2020). The legislative process is ongoing for over 5 years. The "Strahlenschutzbeauftragter" (SSB) as defined in the Austrian legislation is a combination of RPE and RPO. The SSB provides advice, implements, and supervises RP measures and is tasked with the exercise of RP by the licensee.

There are five SSB categories for medical, veterinary, non-medical, research reactor and RW management facilities. Each category may include additional subcategories. The SSB shall have appropriate, officially recognised training. The national legislation states specific requirements regarding SSB training courses which are based on a graded approach (no academic training for

SSBs for the operation of security X-ray systems). Yet, a university degree in natural sciences is necessary to attend most of these courses.

The recognition of SSB's is performed by the CA during licensing. The prerequisites for the recognition include, among others:

- Professional education
- Participation in the RP courses, and
- Retraining

Additionally, for the recognition of some SSB categories sufficient professional experience is required (e.g. research reactors).

The main challenges encountered in the implementation of RPEs/RPOs in Austria include:

- The procedure for the new legislation to enter into force is long and complex,
- The E&T system is complex (multiple categories),
- The SSB recognition is specific to type and scope of practice as well as to the authorized company,
- Difficulties in conducting practical training (required by Law) due to the COVID 19 pandemic.
- Retraining of SSB covers topics already covered in the basic education and specific topics such as measurements, calculations, etc.

## Country

## IRELAND

The concepts of RPO and Radiation Protection Advisor (RPA) are in place in Ireland.

The RPO is defined in national legislation as an individual who is technically competent in RP matters relevant for a given practice to supervise or implement RP arrangements. The RPOs must report directly to the undertaking and be afforded adequate information and facilities to discharge their functions.

There is no legislative requirement or system in place for the recognition of the RPOs. The competent authority is required to set out minimum training requirements. This is a challenge due to the range of sectors where the RPOs can be involved.

There are two main RPA categories:

Category I: Medical, Dental, Vet, Chiro applications

Category II: Industrial, Educational, etc.

For the recognition of Category I RPAs 7 years of experience in radiation protection is required, plus CPDs which have to be renewed after a specified time period. No stipulation on work experience is required for Category II RPAs. No need for CPDs.

There is a proposal for establishing a two-tier RP system based on low and high risk practices according to a graded approach.

## Country

## SLOVENIA

Slovenia has a recognition scheme for RPEs in place since 2007. The recognition process was updated in 2018 to better reflect the requirements of EU-BSS. The definition, scope of work and recognition requirements for RPEs are set in Ionising Radiation Protection and Nuclear Safety Act (RPNSA) and secondary legislation.

There are 15-120 approved RPEs in Slovenia, most of them employed by TSOs. In practise, most RPEs have an MSc/PhD.

RPE are not employed by the operator and provide advice on RP matters. There is no training scheme for RPEs in Slovenia and their approval is work sector specific (11 work sectors defined in national legislation).

The recognition requirements for RPEs include:

- a university degree (EQF level 7) in disciplines which provide basic knowledge in physical and technical fundamentals of radiation protection
- adequate knowledge, experience, and training in RP
- at least five years of working experience in the area of RP.

Some additional requirements concern:

- professional references in specific RP sector, necessary knowledge in RP and the use of measuring equipment
- knowledge, competences, and experience to compose a RP evaluation
- knowledge of the legislation and international recommendations in RP
- continues professional development (CPD).

CPD is a credit points-based scheme which is in a test phase. At the moment candidates are asked to submit their CPD table but it is not mandatory to obtain sufficient credit points. Introduction of CPD scheme in the recognition process is currently the main challenge in the RPE implementation.

Approval process has two steps; the submitted application is reviewed by a special three-member committee and subsequently SRPA issues a related decision. Approval is issued for a maximum period of five years and can be withdrawn by SRPA. To extend the approval an RPE has to apply for a re-approval.

Radiation Protection Officers (RPO) are part of the Slovenia's RP system for several decades. The related legislative provisions were updated in 2018 to better reflect the requirements of EU-BSS including the definition, scope of work, minimal formal E&T requirements etc.

The qualifications of a person to act as a RPO (i.e., adequate formal E&T in RP) are evaluated by the regulatory authority during the authorisation process of a radiation practice.

The authorisation issued for a practice shall mention the RPO involved. However, there is no requirement for the recognition of RPOs. Additionally, there is no related training scheme for the RPOs is similar to that of the exposed worker based on the risks associated to the implemented practices.

## Country

## FINLAND

A new radiation legislation came into force in 2018. In the new framework the RPEs in use of radiation in industry and research and also in use of nuclear energy are accepted by the STUK.

At the moment, there are no education programs that directly provide qualifications for RPEs in the fields of industry and research or nuclear energy, but some courses and guidance are under development. Education must be at level EQF 7. Finland is a small country and the market for the provision of this kind of E&T is not large.

STUK carried out a survey in autumn 2020 on the implementation of RPEs using a questionnaire. According to the survey results the cost for the involvement of RPEs in industry is high, especially in low-risk applications of ionising radiation. Moreover, the benefits of the RPE involvement in

radiation practices are not experienced by the undertakings. In this respect, a guidance on the involvement of the RPEs in the different ionizing radiation applications is considered necessary.

National legislation does not assign tasks to RPOs. Their participation in RP training has been decreased as well as the number of trainings (16 h: theory 8 h + practice 8 h). RPO training has to correspond to 1-2 credits (1 credit is approx. 27 h). Covid-19 pandemic has affected the number of trainings provided and the participation to them. The main challenge concerns the availability of adequate training for many different fields in the future.

Regarding health care, the new law has not significantly affected the involvement of radiation safety experts. Medical physicists (EQF 8) are also acting as MPE and they are also acting as RPEs without additional training. RPEs are often carrying out also the tasks of RPOs (EQF 4).

## Country

## FRANCE

The RPE and the RPO are implemented in national legislation as "Conseiller en radioprotection" (CRP), which is a literal translation of "Radiation Protection Counsellor/Advisor". The roles and the tasks of the CRP are described in two codes: the Labour code for the occupational exposure (article R. 4451-123) and the Public Health code for the public and environment exposures (R. 1333-19).

The CRP, appointed by the employer and under his responsibilities give advice on RP, helps and assists the employer and executes or supervises the RP measurements and verifies the effectiveness of the RP means. The CRP, appointed by the responsible of a nuclear activity gives advice regarding and executes or supervises the implementation of the RP measures mentioned above.

Except in the Basic nuclear installations (BNI) the CRP may be an internal certified person called "Personne compétente en radioprotection" (PCR), or an external certified body called "Organisme compétent en radioprotection" (OCR). The PCR are certified by a certified training body and the OCR is certified by an accredited body and composed of upgraded trained PCR.

In the Basic nuclear installations (BNI) the undertaking is responsible for an internal organization named "Pôle de compétence en radioprotection" (Competence center) which is composed by RPEs. This organisation, in the BNIs is approved by the ASN within the BNI regulation procedure.

An order of 18 December 2019, entered into full effect on 1 January in 2020, renews the E&T of the PCR by abrogating the order of 2013. The new order provides two levels of PCR E&T. The first level (low radiological hazards) has two fields: NORM or artificial ionizing radiation sources. The second level (more significant radiological hazards) includes two fields: medical or industry. In each of those fields there are two options: 1) sealed sources including electric generators and accelerators and 2) non-sealed sources. An additional option (nuclear option) is requested in the industry field for the companies that intervene in the BNI's. In the PCR level 2, a reinforced E&T is mandatory for the PCRs in the external certified bodies (OCR) according to the related field (medical, industry or nuclear).

By the creation of new bodies (OCR, Competence centres) and by renewing the role and function of the CRP and the E&T requirements, the new regulation aims to provide a graded approach in the implementation of the RPEs/RPOs, to allow undertakings to find a suitable organization and to enhance the skills of the RPEs/RPOs.

The main challenges encountered in France concern:

- The consideration of a graded approach in the implementation of RPE/RPO,
- The ability of the undertakings to find a suitable organisation,
- The enhancement of the RPE/RPO skills.

**Country****GERMANY**

In Germany the functions of the RPOs are performed by the RPEs. Radiation Protection Supervisors SSB have functions as RPE and RPO within their field of competence (“RP-supervisor”). In this respect, the SSB shall have:

- education and training in RP,
- expertise in RP, which must be updated every 5 years.
- professional experience.

The SSB qualifications are examined and conferred by the competent authority. Currently, there are 60 areas of expertise depending on the type of radiation practice. Additionally, SSV “Strahlenschutzverantwortlicher” acts as RP executive.

The qualifications of persons who want to function as SSB and come from abroad are examined on a case-by-case basis considering related language and legal system requirements.

There is in place a new RP Act since 2018. Provisions concerning qualifications on RP are expected to be added. Moreover, a revision of implementing guidelines for SSBs is in progress.

The requirements regarding expertise in RP include:

- a. Appropriate professional education
- b. Successful completion of RP courses
- c. Sufficient professional experience in Relevant radiation practice

As challenges encountered regarding the implementation of RPEs and RPOs the following are considered:

- a. The regulatory framework on RP was redone and now RP is regulated in an Act of its own.
- b. Transition of traditional system of SSV, technical experts and SSB into new legislation
- c. Some changes to include new regulations by 2013/59/Euratom
- d. Additional changes to improve position of SSB within undertaking
- e. Revision of implementing guidelines for SSB in progress
- f. Covid-19 pandemic challenges: Some interim regulations were necessary during 2020/2021 to keep education system in function without dropping expertise of new trained SSB.

**Country****GREECE**

EU-BSS have been fully transposed to the national legislation in 2018. Presidential Decree 101/2018 defines in detail the roles and responsibilities of the RPEs and RPOs while a Joint Ministerial Order defines the qualifications, competence, and training requirements.

The requirements for the RPE recognition include:

- an academic degree,
- postgraduate formal education in subject relevant for RP,
- proven experience in providing RP advice in the field of recognition.



The evaluation of the recognition requests is carried out by a three-member committee. The recognition is valid for 7 years and for its renewal a minimum of 60 h of non-formal training in RP relevant to the field of recognition is required.

So far about 140 RPEs for medical facilities and 40 for non-medical facilities have been recognised. EEAE has conducted an analysis to assess the national needs. According to the results of this analysis the number of the recognised RPEs is sufficient to cover the current needs.

For radiation practices including medical exposure which are subject to registration a radiologist or dentist can be designated as a RPO. For practices including medical exposure which are subject to licensing only medical physicists can be designated as RPOs.

The required qualifications of the RPOs in non-medical practices with radiation sources include:

- an academic degree,
- 3-6 months of on-the-job training under the supervision of an experienced RPE.

RPOs are approved by EEAE during the authorization process.

The main challenges encountered include:

- the large number of requests for RPE recognition
- the delay in the evaluation of requests due to COVID-19 pandemic restrictions, and
- the planning of training activities related to the renewal of recognitions.

No challenges are encountered in the RPO approval procedures but only difficulties in the conduct of the related RP training courses due to COVID-19 restrictions.

## Country

## HUNGARY

In Hungary, the RPOs support licensees in activities related to RP matters. There are no statutory requirements for the level of education of the RPOs. HAEA requires comprehensive level of training in RP and additional training in case of involvement in practices with category II and III radioactive sources.

RPO qualifications are valid for 5 years. Updating of the qualifications through the participation in appropriate retraining is required.

The QEs/RPEs provides advice on RP matters. Their function and duties are defined in the national legislation as well as the related qualification criteria. Persons acting as QE/RPEs shall be certified as experts. This certification is valid for 5 years and for its renewal appropriate retraining is required.

Comprehensive training and retraining courses for RPEs (medical and industrial applications) have been developed. First course was conducted on 24 October 2018. The course on May 2020 was cancelled while the course in October was conducted 2020 online (practicals recorded, not interactive).

## Country

## SPAIN

EU-BSS are still partially transposed to the national legislation and the concept of the RPE is implemented as the Head of the RP service (RPS).

RPEs and RPOs implementation has not been a challenge, as a staff classification, based on RP responsibilities and tasks, has been in place for more than 30 years, and the related functions and tasks are quite consistent with those defined in the EU-BSS.

Therefore, the implementation of this figures into the Spanish regulation doesn't imply a major change in our radiation protection system's organisation, which continues working along the same line.

According to current national regulations, facilities with a significant radiological risk, require a RPS recognized by the competent authority. The facilities concerned are NPPs and nuclear fuel cycle facilities, hospitals with radiotherapy, nuclear medicine and diagnostic radiology facilities (simultaneously), medical facilities equipped with cyclotrons for medical isotope production and diagnostic use and research facilities involving more than fifty people using or handling radioactive material.

In addition to this, in Diagnostic Radiology Facilities the participation of an external RPS (authorized by the CSN) is required. For medical exposures the corresponding functions are assigned to MPE.

To perform the related duties an RPE shall obtain a license (Diploma) which is personal, one level and facility specific. The required qualifications for the recognition of RPEs include:

- A bachelor's degree,
- Specific training in RP, and
- Minimum of three-year experience.

The requests for RPE recognition are evaluated by the competent authority.

The tasks assigned in the EU-BSS to the RPO can be considered consistent to those assigned in Spanish regulation to the so-called "supervisor". A supervisor is a person with a specific license or accreditation granted by the competent authority and performs the related duties as an undertaking's employee. The employment of supervisors is mandatory. There are two types of RPOs: for facilities with radioactive sources (license) and for medical X-ray facilities (accreditation).

## Country

## SWITZERLAND

In Switzerland, the three competent authorities are responsible for the implementation of the RP legislation. This includes, among others, E&T requirements according to the Radiation Protection Act, Radiation Protection Ordinance and Radiation Protection Training Ordinance. The authorities are also in charge for the recognition of RP training courses and individual training made abroad.

The roles and the functions of the RPO and RPE, are distributed among the license holder, the Strahlenschutz-Sachverständige and the competent authorities. The roles and functions of the Strahlenschutz-Sachverständige are equivalent to those of the RPO and RPE for a given type of a radiation practice or activity. The tasks and the responsibilities defined in the EU-BSS for RPOs and RPEs are all included and ensured in the Swiss System by the Strahlenschutz-Sachverständige.

The Strahlenschutz-Sachverständige should provide high-level, specialized, advice on RP to undertakings using ionizing radiation for an authorized type of practice. As such, the Strahlenschutz-Sachverständige needs to have, besides professional education, a specialized E&T recognized by the competent authority. The required level of training, skills and competences are adapted according to the risk and complexity of the practices and activities.

The Strahlenschutz-Sachverständige must have a good understanding of RP principles and how they are applied in workplaces. He/she also needs to have a comprehensive understanding of the relevant national legislation and be able to give advice on the actions needed to ensure compliance with the related requirements.

The national legislation requires that every person dealing with or who may be exposed to ionizing radiation must, in addition to the required fundamental E&T in RP, shall receive continuous training in the related field of activity every 3 to 5 years.

A precise description of the activities where a Strahlenschutz-Sachverständige shall be involved, as well as the duration, competences, topics, and the minimum training requirements is provided in the legislation. More than 50 training courses are defined for Strahlenschutz-Sachverständige. However, this approach has led to a very strict and rigid system and the defined minimum requirements made the system complex while they do not necessarily guarantee high-quality training. The provision of training in soft skills is studied at the moment.

Moreover, the medical physicist is still not recognized as a medical profession in Switzerland. However, in radio oncology, radiology or nuclear medicine, the role of the Strahlenschutz-Sachverständige is often endorsed by medical physicists. To be able to undertake these responsibilities, medical physicists must have specialized E&T. Currently, this recognition is granted in the form of a certification by private organizations, which set the related rules and conduct the examinations. The RP aspects of the MPEs' E&T are regulated in the national RP ordinance but the recognition of the medical physicist as a medical profession must be pursued.

Country

PORTUGAL

The legal framework that recently came into force in Portugal with the publication of Decree-Law n.º 108/2018, of December 3, besides the RPE figure already foreseen, introduced the figure of Radiation Protection Officer, translated as “the person responsible for radiation protection” (RPR/RPO). National Law requires the involvement of RPRs/RPOs in all types of radiation practices to supervise or carry out RP tasks. Moreover, the national legislation requires the involvement of a Qualified Expert (QE) - RPE to perform the prior safety assessment and provide advice on RP matters among other duties.

The QEs should have level 1 of professional qualifications, while the RPR/RPO level 1 or 2.

- RPRs/RPOs are recognized by two distinct ways in line with the requirements in the Decree-Law no. 227/2008, of 25 November: a) through the completion of a specific training course on RP (including a six -month internship for level 1 RPRs/RPOs) or b) through an equivalence complying with the defined legislative requirements. The requirements for recognition through equivalence include: A specific graduation degree (RPE) and specific areas of graduation degree (RPR/RPO) - as defined in national Law.
- Five years (RPE)/three years (RPR/RPO) of experience in the effective exercise of technical functions in RP area.
- Proof that the activities carried out as RPE or RPR/RPO are in line with those defined in national Law).

So far, there are 75 professionals with level 1 qualifications considered as RPEs and 30 professionals with level 2. These numbers are still insufficient to cover the current national needs but are expected to increase as more registrants/licensees ensure the training of their RPO's in line with the legislative requirements.

The Decree-Law no. 227/2008, of 25 November defines the legal regime concerning RP qualifications. More specifically, it:

- defines the professional profiles, defines the conditions of access to specific training and the respective training plans, and
- specifies the requirements, both for access and training, as well as the content of the respective training programs.

The main challenge encountered in the implementation of RPEs/RPOs in Portugal concerns the minimum required qualifications to participate to the training courses leading to level 1 qualifications in RP. Therefore, the competent authority has requested the contribution from several stakeholders to review the legal framework, (i.e., the content of the training leading to professional qualifications for these levels) considering the related specificities.

**Country****SLOVAK REPUBLIC**

The competent authority has implemented RPOs/RPEs through act no. 87/2018 Coll. on RP to a certain extent. Recognition of RPOs/RPEs on different levels and defining the fine line to recognize both entities as individuals with their agenda and competencies was brought to light in this document.

The requirements for the RPOs' certification include training of 8-24 hrs and 1 year of continuous practice in RP.

The certification of professional competence of RPOs is valid for undetermined time but re-training of 6-16 h in RP is required. So far, there are 3000 certified RPOs in Slovak Republic.

Different types of RPEs cover areas such as nuclear installations, unsealed sources, medical exposures and NORM. The requirements for their certification include:

- A university degree, 10 years of continuous practise,
- Certificates, publications, and lectures, and
- Participation in professional courses.

The RPE certification is valid for 10 years, and so far, there is only 1 RPE in Slovak Republic.

The competent authority aims to improve the qualification and quality of the education provided to RPOs and RPEs through various means such as working materials, guidelines, and opts to create a specific approach to respective assignments based on the definition of RPO and RPE.

**Country****SERBIA**

A new Law on radiation and nuclear safety and security is in place in Serbia since 2018. Although Serbia is not an EU member, its legal framework incorporates many elements from the EU-BSS.

According to the related legislative requirements, the license holders are obliged to make use of the services of an RPO. The tasks assigned to RPOs are defined in the Law and they can also be carried out by Radiation Protection Services (RPS). Their certification is valid for five (5) years.

The competent authority specifies:

- the practices which call for the establishment of a radiation protection service
- the requirements for the establishment of a radiation protection service.

The Law defines the concept of the RPE as a body having the knowledge, training and experience needed to give RP advice, and whose competence in this respect is recognized by the competent authority.

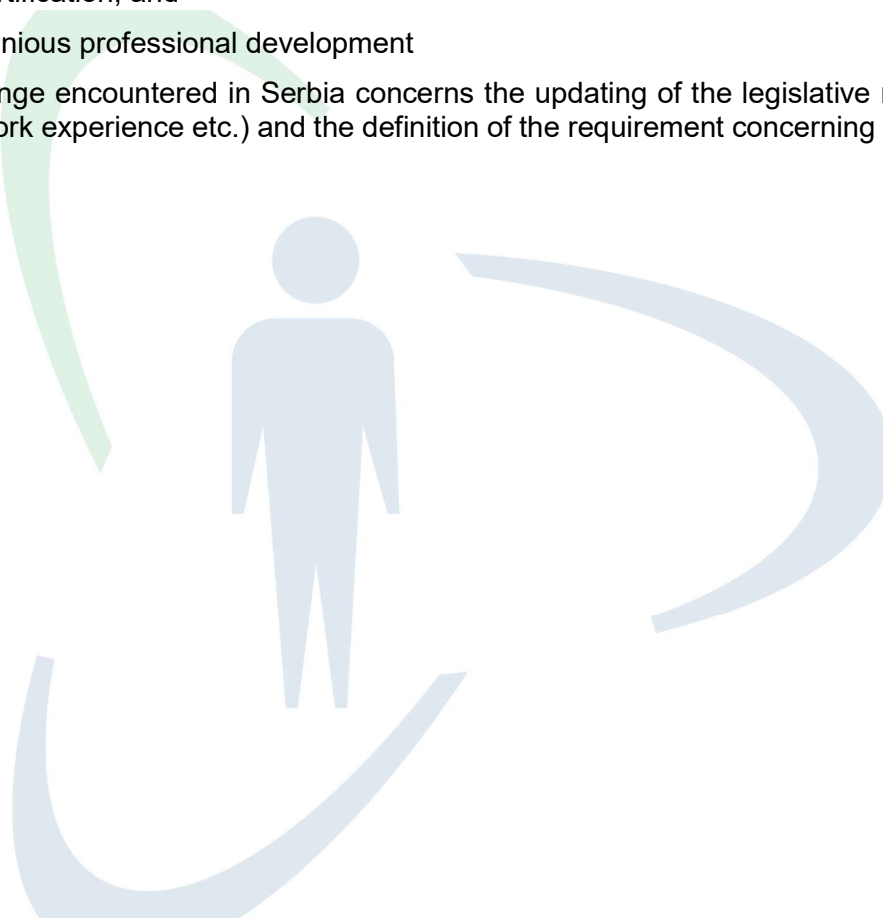
Moreover, the competent authority:

- issues a certificate for the activities of RPE based on the submitted application and supplementary documentation. The certificate is issued for one or several fields of radiation protection for a period of 5 years.
- specifies the areas of RP the certificate is issued for, detailed requirements for obtaining, extending, and revoking the certificate for a RPEs as well as the relevant certificate fees.
- specifies the authorization holders' responsibilities with regard to consultations with a RPE.

A new Rulebook is expected to be adopted which will define the requirements for the recognition of RPEs, concerning:

- the definition of areas of ionizing radiation protection the certificate is issued for
- the initial certification
- the resertification, and
- the continuous professional development

The main challenge encountered in Serbia concerns the updating of the legislative requirements for the RPOs (work experience etc.) and the definition of the requirement concerning RP Services.



The main conclusions from the points addressed in the countries' presentations are as follows:

Despite the different approaches followed, the implementation of RPE & RPO concepts in the different MSs seems to be successful. In the most HERCA MS a comparable system of RPE/RPO exists within the range of options in the HERCA guidance document for the implementation of RPEs/RPOs.

However, a broad variety in national approaches was observed which concerns:

- The recognition of the RPOs
- The number of categories of the RPEs and the RPOs
- The basic training and specific training for the RPEs, and
- The necessary work experience.

The main challenge encountered among the MSs is the large differentiation in the E&T requirements for the RPEs and the RPOs. This non-uniformity reduces the possibility for harmonized requirements in the near future and has a great impact on the efforts concerning mutual recognition of experts.

In this framework the difficulties introduced by the COVID-19 pandemic in the organisation and conduct of training should be also considered.

## Challenges from new technologies

The following points were addressed during the discussions about the challenges which are expected to be encountered from new technologies:

A decrease in the chairs in RP at Universities is observed as well as in the number / level of the trainers in RP. This decrease directly affects the available E&T options for the RPEs/RPOs.

There is a need to focus not only on academic background of RPEs/RPOs but also on the necessary soft skills. This could be accomplished through their integration in the provided training.

Moreover, attention has to be paid to new technologies and advances in the uses of ionizing radiations and RP (Nuclear Medicine, Radiotherapy, Diagnostics, mixed modalities, etc.) The link between research and E&T is weak. Strengthening this link could strengthen the connection of the RP E&T with the new developments.

There is a variety of approaches regarding the required training and competences of RPEs/RPOs among the different MSs. In some of them the specialization of RPEs/RPOs is not an option and only core competences are required while in others there are multiple categories of RPEs/RPOs with more specific training and competence requirements.

A modular approach in the training provided to RPOs could be helpful for the MSs. This could be based on a module covering all the necessary basic knowledge on RP and several different modules concerning the different areas of specialization as defined in the corresponding regulatory framework.

A survey on the different competence needs among MSs has been carried out by the EC and the related results are available at: <https://ec.europa.eu/jrc/en/ehro-n>.

## Workshop outcome

All the MSs participated in the workshop have implemented the concepts of RPEs and RPOs as defined in the Council Directive 2013/59/Euratom within their own legislative framework. It was evident that although there is a wide variety of approaches, similarities can be found when comparing MSs.

It is necessary to figure out whether further action should be taken for the harmonization of the different approaches (specialization of RPEs/RPOs, combined functions, required work experience, OJT, etc.) to achieve a common framework for the mutual recognition of RPEs and RPOs among the MSs.

One of the main challenges concerns the differences in the required educational background of the RPEs. However, it was pointed out that MSs despite their differences (already addressed in the previous workshop) have implemented common or similar practices. In this respect a common understanding of practices could be a good start for the harmonisation.

The HERCA guidance document provides the whole range of options for the implementation of RPEs and RPOs. However, not all of them fully comply with the ENETRAP guidance.

A discussion with the participating countries in the WG E&T showed that it is not always clear if the implementation of Directive 2005/36/EC of the European Parliament and of the Council of 7 September 2005 on the recognition of professional qualifications influences the recognition of RPE's /RPO's coming from abroad.

Mutual recognition of RPEs and RPOs among MSs and harmonization of the corresponding recognition or approval requirements does not seem to be feasible at the moment. Assessing competences instead of educational background of RPEs and RPOs could be an effective solution to the harmonisation issue. The common criteria for the evaluation of the competences could be based on the commonalities among the learning objectives set by the different MSs. In this respect, it is also of great importance to define and describe the concept of on-the-job training as it is strongly related to the required competences.

Moreover, the new developments in ionizing radiation applications create additional training requirements on specialized topics. An international cooperation for the development and conduct of related training courses and the sharing of experience might facilitate the effort for harmonisation.

Additionally, research is connected to new developments in ionizing radiation applications and RP. However, researchers are not always aware of the impact of their research in practise. Additionally, the funding for E&T and dissemination is limited. Therefore, close collaboration is needed among the researchers and institutes. In this respect, the connection with research platforms such as MELODI is considered of great importance.



## Annexe 1: programme

# HERCA Workshop on the Challenges in Implementation of RPE & RPO in HERCA member states

## 10-12 May 2021

Online via Webex

**Monday May 10, 2021**

### Session I

**Introduction and Future requirements RPE and RPO implementation according to international organisations/projects: are we ready for new Techniques etc.**

It.	Topic	Speaker
		<b>Chairman session I : Ton Vermeulen</b>
	12.30-13.00 Welcome, Test Webex	
<b>1</b>	13.00 Introduction Official welcome	<b>Ton Vermeulen, Chair WGE&amp;T</b>
<b>2</b>	13.05-13.15 Introduction to the Workshop.- Objectives of the workshop	
<b>3</b>	13.15-13.45 EC Education and Training – views on the RPE and RPO concepts implementation	<b>Mihaela Michaila</b>
<b>4</b>	13.45-14.15 IAEA IAEA's support to Member States establishing a regulatory framework for QE and RPO	<b>Andrea Luciani</b>
<b>5</b>	14.15-14.45 IRPA	<b>Claire-Louise Chapple</b>

It.	Topic	Speaker
	IRPA Perspective on RPE & RPO for the future	
6	14.45-15.15 15.15-15.30 EANM Coffee break	Mark Konijnenberg
7	15.30-16.00 MELODI Radiation protection research to support radiation protection in practice'	Tom Clarijs
8	16.00-16.30 ALARA-network EAN feedback on RPE and RPO	Fernand Vermeersch
9	16.30-17.00 Discussion Future requirements	IAEA/IRPA /SAMIRA/Melodi/ALARA
	17.00 End of the day 1	

**Tuesday May 11, 2021**

## Session II Analysis CFS: first general impression RPE/RPO implementation

It.	Topic	Speaker
		Chairman session II/III : Sotiris Economides
1.	13.00-13.20 Emerging picture on RPE and RPO implementation: Analysis of country fact sheets and questionnaires	Barbara Godthelp
2.	13.20-13.30 Discussion results CFS/Q	All

## Session III Exchange perceived challenges in RPE/RPO implementation in HERCA MS

It.	Topic	Speaker
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<b>It.</b>		<b>Topic</b>	<b>Speaker</b>
3.	13.30	<b>The Netherlands</b> Challenges in the implementation of the basic safety standards in the Netherlands	<b>Barbara Godthelp</b>
4.	13.45	<b>Austria</b> Challenges in Implementation of RPE/RPO in Austria	<b>Beatrix Schönhacker-Alte</b>
5.	14.00	<b>Ireland</b> Perceived Challenges in RPE/RPO implementation in HERCA MS: Ireland	<b>Heather Ryan</b>
6.	14.15	<b>Germany</b> Implementation in Germany	<b>Jens Uwe Büttner</b>
7.	14.30	<b>Slovenia</b> Challenges in RPE/RPO implementation in Slovenia	<b>Nina Jug</b>
8.	14.45	<b>Switzerland</b> Challenges in RPE/RPO implementation in Switzerland	<b>Annemarie Harwig</b>
<b>15.00-15.15 Coffee break</b>			
9.	15.15	<b>Hungary</b>	
10.	15.30	<b>Greece</b> Current status of the implementation of the legislative framework for the RPEs/ RPOs in Greece	<b>Sotiris Economides</b>
11.	15.45	<b>Spain</b> RPE and RPO implementation in the Spanish Regulation	<b>Dolores Rueda</b>
12.	16.00	<b>France</b> Implementation of Radiation Protection Expert and Radiation Protection Officer in France	<b>Pierrick Jaunet</b>
13.	16.15	<b>Bulgaria</b>	<b>N. Chobanova</b>
14.	16.30	<b>Portugal</b> State point of the implementation of RPE & RPO in Portugal	<b>Helena Moreira</b>
15.	16.45	<b>Slowak Republic</b>	<b>Marek Brinza</b>
16.	17.00	<b>Finland</b>	
17.	17.15	<b>Serbia</b> Status and Challenges in implementation of RPE/RPO in Serbia	<b>Milan Vujović</b>
18.	17.30-17.40	<b>General discussion perceived challenges</b>	
	17.40	<b>End of the day 2</b>	

Wednesday May 12, 2021

## Session IV

### Discussion Challenges new technologies: is our RPE/RPO system future proof?

It.	Topic	Speaker
		Chairman session III: Barbara Godthelp.
1.	13.00-14.00 Future proof system	Group 1+ 2o/moderatr
2.	14.00-14.30 Exchange results discussion	Rapporteurs

## Session V

### Conclusions, Shared Picture RPE/RPO implementation and Recommendations to facilitate implementation of BSS on RPE and RPO

It.	Topic	Speaker
		Chairman Session V : Ton Vermeulen
3.	14.30-14.55 Conclusions previous sessions I-IV	Rapporteurs
	<b>14.55</b> Coffee break	
4.	15.10-16.10 Discussion II: Outcome workshop <ul style="list-style-type: none"> <li>Country experiences incl future proof</li> </ul>	Group 1+2/ moderator
5.	16.10-16.40 Exchange results II	Rapporteurs
6.	16.40-17.00 Wrapping Up: <ul style="list-style-type: none"> <li>Shared picture/ Recommendations BoH</li> </ul>	Ton Vermeulen/Barbara Godthelp
7.	17.00 End of the day 3	



