



IRPA

INTERNATIONAL RADIATION PROTECTION ASSOCIATION

IRPA GUIDANCE ON CERTIFICATION OF A RADIATION PROTECTION EXPERT



The cover features a repeating pattern of stylized human figures in a light teal color. A large, semi-transparent teal shape, resembling a stylized 'C' or a partial circle, is positioned on the left side. A solid teal rectangular box is overlaid on the bottom left of this shape, containing the title and edition information in white text.

**IRPA GUIDANCE
ON CERTIFICATION
OF A RADIATION
PROTECTION EXPERT**

EDITION 2016

Working Group on Radiation Protection Certification and Qualification

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Contents

1. Introduction
2. Underpinning Basis of a Certification Scheme
3. The Regulatory Background
4. Key Attributes of a Certification Scheme
5. Conclusions
6. Annexes
 - Annex 1 IAEA and EU Basic Safety Standards
 - Annex 2 IRPA Definition of Radiation Protection Expert (RPE)
 - Annex 3 Model RPE Knowledge and Skills Syllabus
 - Annex 4 The RPE Training Scheme (ENETRAP projects)
 - Annex 5 Model Code of Practice
 - Annex 6 Accreditation Standards for Certification Boards
 - A. CESB
 - B. NCCA
 - Annex 7 Certification Schemes
 - A. United States
 - B. United Kingdom
 - C. Canada
 - D. Slovenia
 - E. Netherlands
 - F. Spain
 - G. Australasia
 - H. Italy
 - I. Germany

1. Introduction

There is a broad expectation from society that persons influencing safety-related decisions and actions have an appropriate level of expertise and competence such that society has confidence in the judgements, advice and decisions. This will ensure the necessary protection of all persons impacted. It would be usual for such decisions and advice to be made within a comprehensive legal framework, usually by organisations which are subject to regulatory oversight and scrutiny. It is increasingly recognised that formal schemes for the recognition of the expertise and competence of individual practitioners involved in critical advice, guidance and decisions in a safety-sensitive situation is an important contribution to ensuring the safe conduct of such activities.

Radiation safety is an integral part of this picture, and it is essential that radiation protection practitioners at all levels are appropriately equipped in terms of knowledge, skills, competences, and experience to discharge their responsibilities and ensure safety.

The International Radiation Protection Association (IRPA) has declared the following Mission Statement:

IRPA is the international professional association for radiation protection. It promotes excellence in the practice of radiation protection through national and regional Associate Societies and radiation protection professionals by providing benchmarks of good practice and enhancing professional competence and networking. It promotes the application of the highest standards of professional conduct,

knowledge, skills and competences for the benefit of individuals and society.

Hence it is one of IRPA's major goals 'to promote excellence in radiation protection professionals'. In line with this goal, many of IRPA's Associate Societies (AS) around the world are actively involved in schemes which assess and certify the competence of individual radiation protection practitioners to undertake safety-related work. Noting that there is a growing pressure, largely from a regulatory perspective, to enhance this approach, many other AS are considering introducing such schemes in the future. Alternatively, regulatory bodies might consider this guidance for introducing appropriate schemes in their country.

Experience has shown that there is no common, unique 'best practice' approach to the certification of expertise. Existing schemes differ in many dimensions, for example in scope of application, knowledge and experience requirements and assessment methods, in part due to the need for alignment with national regulatory requirements and also due to established regional/national practices. The objective of this IRPA Guidance Document is not to offer a single template of how to establish a certification scheme, but rather to explore and describe the different options and approaches, to identify their respective strengths and weaknesses, and to outline the key considerations which must be taken into account when introducing and establishing such schemes.

2. Underpinning Basis of a

Certification Scheme

Historically, many certification schemes have been established on the responsibility of the profession itself, through an AS acting as a professional body recognising the need to ensure and protect professional standards in radiation protection. This has also served to provide a service to employers to help give them the confidence that key employees have been judged by their peers as having appropriate knowledge, skills, competences and experience to undertake safety-related tasks.

In some cases, such schemes have directly supported a regulatory requirement for employers to have competent employees nominated for specific key roles. This has often involved employers having to provide the regulator with the name of specific employees covering identified roles, following which the regulator has the option of refusing to accept such a nomination if it sees fit. Schemes for the certification of competence operated by AS (and other parties) on a voluntary basis have made a great contribution to giving both employers and regulators confidence in the qualities of individual practitioners.

However, increasingly there is a trend (as outlined in the next section) for a more formal approach to certification, whereby the regulatory body is required to ensure that persons undertaking specific key radiation safety roles have been assessed and certified as competent by an approved scheme. Such an approved scheme could either be directly under the control of the regulatory body, or operated by a non-governmental organization, such as an AS, under an approval from the regulatory body.

The advent of this trend and direction is leading to many AS considering the need to develop such a certification scheme, and hence

the timeliness of this IRPA Guidance.

3. The Regulatory Background

The move towards a more formalised approach to the certification of radiation protection expertise is evidenced through the most recent editions of both the International Atomic Energy Agency (IAEA) Basic Safety Standards (IAEA BSS 2014) and the European Basic Safety Standards (EU BSS 2013). The relevant details from these Standards are given in Annex 1.

Both the IAEA and EU BSS place great emphasis on the appointment of a professional-level person having the knowledge, skills and competences through training and experience needed to give radiation protection advice in order to ensure the effective protection of individuals, and whose competence in this respect is recognised by the competent authority. Under the IAEA BSS this role is termed a **Qualified Expert** (QE), and the EU BSS uses the term **Radiation Protection Expert** (RPE). The role of this person is to give authoritative advice to employers on matters relating to compliance with applicable legal requirements, in respect of occupational and public exposure. The term Radiation Protection Expert should not to be confused with the Radiation Protection Officer as defined in the EU BSS and described later in this section. In the US there is no single term to describe this role, for example QE is commonly used for an individual in this role as it applies to radiation generating equipment (x-ray machines), but is rarely used when referring to radiation protection professionals involved with radioactive materials.

This role has been recognised for many years within the profession as a key role for ensuring radiation safety. In 2008 IRPA proposed to the

International Labour Organisation (ILO) that the role of RPE be formally registered under the ILO system for the International Standard Classification of Occupations (ISCO). This was agreed, with the RPE being registered within the group of environmental and occupational health and hygiene professionals (see Annex 2).

Under both the IAEA and the EU BSS there is a requirement for regulatory bodies to have a system for the formal recognition of the competence of the QE/RPE. This is a new requirement for the IAEA BSS, although the previous EU BSS (1996) had a similar provision which was newly introduced at that time. In practice, the rigour of application of this requirement by regulatory bodies has increased over time, moving from 'passive acceptance' of nominations (e.g. refusing appointments by exception) towards the requirement for formal certification schemes.

Both the IAEA BSS and the EU BSS also require the appointment of a **Radiation Protection Officer** (RPO), who is technically competent in radiation protection matters to oversee, supervise or perform the implementation of the radiation protection arrangements. This role is essentially focused on more day-to-day supervision and control of work with radiation, and is not necessarily a full professional-level appointment, as, in general, this role may require less expertise and more hands-on level experience. The BSS do not require any formal scheme for the recognition of competence for this role, although of course this is an option for national authorities or indeed for professional bodies such as the AS to pursue if they so choose.

Given the above international background, the prime focus for the formal recognition of competence within radiation protection is the professional role outlined above as QE/RPE. This

role will be the principal focus of this guidance document, **for which we will use 'Radiation Protection Expert' (RPE) as the generic term.** As noted above, it is possible, but much less common to apply certification schemes to the different role of Radiation Protection Officer (RPO), but this will not be covered in any detail in this guidance.

4. Key Attributes of an RPE Certification Scheme

4.1 Scheme Management and Governance

An RPE Certification Scheme should be established as a specific legal entity. This could be as part of an Associate Society, thereby using the AS as the established parent organisation, or as a separate body such as a Trust, corporate entity, or national authority. The mechanism of appointing to the controlling Board of the scheme must be clear, as should be the scope of authority of that Board. The scheme must have formally defined procedures for applications, assessment and all related issues, including the appointment of assessors.

In most schemes, assessors are volunteers who are themselves certified RPEs whose competence and experience is widely regarded by their peers. When initially establishing a scheme it will not be possible to appoint persons who are already certified, but the first appointed assessors must be persons who are regarded as leaders in their field and who are widely respected by their peers. Assessment process should ensure that judgements on the competency of a candidate are not over-reliant on the views of any single assessor.

The requirement for fees covering application, renewal and (if appropriate) annual registration must be clearly defined.

Schemes should have arrangements which

take account of the considerations which follow in this section of the guidance.

4.2 Scope of the role to be certified

The first step in developing a scheme is to have a clear understanding and definition of the scope of the role being considered. There is much variation in current certification schemes, and the nature of the scope of the role is one of the key reasons for differences.

4.2.1 Radiation Protection Expert (RPE)

It is essential that the scope of the role to be covered aligns with any regulatory requirements, where they exist. If the scheme requires regulatory approval, it is quite likely that the regulator will have published requirements or guidance which the scheme must take into account. Where the scheme is voluntary, whether or not it indirectly supports a regulatory requirement for competent employees, it is good practice to discuss the development of the scheme with relevant regulatory bodies.

There are many approaches to the certification of RPEs, but in the main they can be considered in two categories as follows.

(a) Generic RPE Certification

In this approach the basic capacity of the RPE to give appropriate advice on radiation protection and compliance with regulations is considered, irrespective of the field of application. This recognises that the underpinning knowledge, skills, competences and experience are largely common across all fields of practice.

Minor variations on this approach are possible. For example, in the UK, for legal reasons there are two closely related schemes covering respectively, occupational exposure and public

exposure aspects. These schemes are operated by the same certification body, but require separate approval because the regulators and regulations for each aspect are different. However, each scheme has a generic coverage, irrespective of field of application.

(b) RPE Certification differentiated by Field of Application

Several existing certification schemes are based around giving certification limited to specific fields of application, for example: sealed sources, medical applications, nuclear power plants, other nuclear facilities, etc. Most such schemes recognise that there is a common core of knowledge, skills, competences and experience across all fields, but in this approach the assessment can focus on practical application in the specific field. Some schemes acknowledge that some fields are less complex and require less knowledge, skills, competences and experience than others – an example of a proportionate, graded approach to certification. The fields of application can even be grouped together and graded, for example as Level 1 to Level 4 as the complexity of the role increases.

The output from such schemes would take the form of a certificate clearly stating the field of application or the level of competence endorsed.

Discussion

Each of the above categories has its strengths and weaknesses. Most practitioners would agree that there is an extensive range of underpinning knowledge, skills, competences and experience of radiation protection and related regulations necessary for all fields, and that there are many common aspects of practical application techniques. However, it can be helpful to the assessment process to limit the scope involved so that evidence of practical application can be more clearly focused.

If the generic approach is adopted, there is a need to be able to ensure that a certified RPE is appropriate for a given practical situation. There are at least two components to how this should be addressed:

- The ultimate responsibility lies with the employer for ensuring that the certified RPE it appoints is suitable for the scope required within the organisation. It would be expected that the RPE can demonstrate this via a 'resume' or curriculum vitae showing relevant experience.
- The first responsibility of any professional practitioner is to be aware of his/her limitations, and it is therefore a professional responsibility not to accept any appointment that does not align with this. It would be good practice for schemes to remind all successful candidates of this very important responsibility through a formal code of ethics. Where an RPE wishes to change fields of application it would be reasonably expected that experience in the new field is obtained through a supporting role prior to taking formal responsibility as the certified RPE.
- For small countries the RPE may be trained to have adequate knowledge, skills and competences in multiple fields and will be trained on the job to get the experience in one or more fields.

Any differentiated scheme has the potential complexity of requiring detailed specification of expectations in several fields. Such fields can only be drawn quite broadly, and each field may still have to cover many different technologies. For example, if 'medical applications' is a field then this would cover X ray equipment, CT scanning systems, interventional radiology, nuclear medicine applications, etc., and also allow for future technological developments. If the specified field is 'nuclear

power plants', are the commonalities across PWRs, BWRs, gas-cooled and research reactors covered? Ultimately, the employer and the RPE are still left with an element of judgement about whether the RPE is 'suitable'.

At a first level it seems that the generic scheme is simpler and may be more appropriate for those societies beginning their consideration of certification, especially for smaller societies and for countries with a limited range of applications. However, the importance of ensuring the 'suitability' of RPEs for their specific role must be addressed within the overall national framework.

4.2.2 Certification for other roles

Certification processes can be applied to roles in radiation protection other than that of the RPE. This would depend on the relevant legal requirements and on the perceived demand from professionals within the country. Options could include specialist roles at a professional level which support the work of the RPE, such as shielding assessor, criticality assessor, internal dosimetry specialist, instrumentation specialist, environmental modelling and assessment specialist. These roles could be regarded as 'narrow but deep', in the sense that there is a need for very specific technical knowledge, skills, competences and experience within a well-defined but relatively narrow field.

As noted above, certification could also be applied to the role of Radiation Protection Officer (RPO), especially if the regulatory body supports this approach.

The field of non-ionising radiation usually has a completely separate regulatory basis to ionising radiation, and the detailed nature of the hazards and controls is also different. However, the same issues regarding competence in advisers are relevant here, and there is also a growing

regulatory interest in this approach. As is the case for ionising radiation, schemes can be established on either a voluntary basis or, where there is clear regulatory role, a scheme could operate under regulatory approval. An example of a voluntary scheme is the UK Laser Protection Adviser, operated by the same certification body as for ionising radiation roles and in the US, Certified Laser Safety Officer operated by the Board of Laser Safety.

For any such scheme as discussed in this section, it would be necessary to apply the same approach and principles outlined in this guidance. However, this guidance does not give any further specific consideration to these options.

4.3 Requirements for certification as an RPE

The objective here is to ensure that there is a clear specification of the requirements so that a candidate knows what must be demonstrated to achieve certification, and that assessors have clear guidance on what is the acceptable standard. The requirements must take account of regulatory provisions and guidance, where these exist. Where the scheme is differentiated by field of application, then the requirements must be focused around each specified field, although it is likely that many basic requirements will be common across all fields.

There are four principal components to the requirements for certification – Knowledge, Skills, Competences and Experience. The European Qualifications Framework (EQF), a bridge between national qualification systems, defines **eight reference levels** in terms of **knowledge, skills and competences**. For the purposes of establishing these reference levels, the EQF describes knowledge, skills and competences as follows:

- Knowledge levels are described in terms of

knowing theory and/or facts;

- Skills is described in terms of cognitive ability (involving logical, intuitive and critical thinking) and practical ability (involving manual dexterity and the use of methods, materials, tools and instruments);
- Competences is described in terms of responsibility and autonomy.

At a minimum, the RPE should be EQF reference level six (6) with knowledge, skill and competences indicated in the following table.

Knowledge	Skills	Competences
Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles	Advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study	Manage complex technical or professional activities or projects, taking responsibility for decision- making in unpredictable work or study contexts; take responsibility for managing professional development of individuals and groups

Current existing schemes take different approaches, especially regarding competences.

4.3.1 Knowledge and skills

The first aspect to be considered is educational attainment. The RPE role is regarded as a college graduate-level appointment and profession, and as such a normal requirement would be a college degree, usually in science or engineering, including specialized fields such as radiation protection, medical physics or industrial hygiene. According to national approaches, this would normally be a three or four year degree

course. Some current schemes may require a Master's or other postgraduate degree, and some may require specific radiation protection content. However, the intent of these additional requirements may alternatively be met by requirements for demonstrated knowledge and/or experience.

Whilst a college degree would be a normal requirement, it is important to consider whether to provide a route for non-graduates to achieve certification. If non-graduates are allowed to achieve certification, there needs to be compensatory measures identified, usually including enhanced experience requirements and demonstrated learning via other routes.

All schemes should have detailed requirements for radiation protection knowledge and skills. These would cover underpinning science, radiation protection philosophy and principles, management, organisation and practical application techniques and knowledge and skills of applicable legislation and guidance. It can be helpful to specify the level of knowledge required, for example in terms of general awareness, basic understanding and detailed understanding. This allows the assessment process to be prioritised and graded.

A model knowledge and skills syllabus is attached as Annex 3.

One option is to specify specific examinable courses which must be attended and assessed. However, such courses do not always exist, and the approach may be unnecessarily restrictive given the alternative approach of a specified syllabus.

4.3.2 Competence

All certification schemes are ultimately aimed at ensuring that a successful candidate is able to act independently in all relevant practical situations and give authoritative and effective

advice. Whilst this clearly requires a necessary level of knowledge and skills, as discussed previously, there is also a need to be able to have confidence that the candidate is capable of applying this knowledge, skills and experience in real practical situations, making appropriate judgements, and that he/she can communicate effectively with, and influence, the organisation.

As such, providing evidence of examined courses covering the knowledge and skills requirement, plus evidence of working for a period of time in a relevant facility, is not in itself evidence of the capability to act in an independent and effective manner. This aspect of performance is often termed 'competence to act', or simply 'competence', and implies a step further than just knowledge, skills and experience. Assessment of competence is not straightforward, and is discussed in the next section, but this dimension is increasingly recognised by both regulators and professions as being a fundamental requirement. As an example, it is noted that both sets of BSS refer to 'competence' repeatedly, and the term is becoming increasingly common in national regulations.

4.3.3 Experience

It is self-evident that candidates for certification as an RPE must have relevant practical experience in at least the type of activities relevant to the role. A review of experience requirements within existing schemes shows a range from two to six years, and it is considered here that relevant experience over at least a three to five (3-5) year period would usually be acceptable. There is an interaction between length of experience and the type (or level) of experience. Where a significant part of the experience is of a limited or lower level nature, then longer time periods may be

necessary. Because many years of the same experience does not necessarily add significantly to learning and competence, the candidate for certification should show progressively higher levels complexity over the experience period.

It would be possible to specify minimum timescales for experience which would be an absolute requirement for successful certification. Alternatively, the statement of experience requirement could be a guide as to how long it would take a good candidate to assemble the necessary evidence in order to satisfy the assessment regime of the necessary competence across all required areas.

4.4 Assessment methods

The certification scheme must define the processes for the assessments of candidates. Firstly, this would require a clear identification of what the candidate must submit, including whether there is a need for the candidate to attend for a written examination or interview. The process would also usually involve the engagement of at least two assessors from its Assessment Panel (or equivalent), chosen to have experience relevant to the candidate's field, who would be responsible for reviewing the candidate's overall submission.

Assessment processes can be considered against each of the four components identified in section 4.3 above.

4.4.1 Assessment of knowledge and skills

Educational attainment can be assessed by the provision of certificated evidence, for example degree certificates.

There are several options for assessing radiation protection knowledge and skills:

- The most direct assessment route is a requirement to attend for a specific written

examination. This approach results in a clear assessment of the candidate's knowledge and skills, although care must be taken in assembling the question set to ensure that the required range of knowledge and skills are tested, and that the 'pass' level is appropriately set. The approach is potentially quite resource-intensive in terms of examination development and marking.

- Candidates are asked to provide evidence of satisfactory completion of courses, which cumulatively cover the required scope of knowledge and skills. Ideally these courses would be examined, and where this is not the case some additional method of gaining confidence that the candidate has assimilated the knowledge and skills should be considered (see below).
 - Course content should be assessed and the course approved by the certifying organization or other cognizant authority preferably prior to submission as evidence of knowledge and skills.
 - The required scope of knowledge and skills should be defined.
- Candidates are asked to submit transcripts of their college education.
- These approaches can be replaced or supplemented by the assessment of competence discussed in the next section.

4.4.2 Assessment of Competence

This is perhaps the most challenging aspect of assessment, and there is a wide variation of approaches in existing certification schemes.

- Written examinations can be designed to make the applicant demonstrate their approach to specific practical situations. This extends the assessment of knowledge and skills towards the notion of competence.
- Testimonials from line managers / supervisors,

and/or, certified RPEs familiar with the candidate's work performance can provide a third party view on competence to perform the role in real life situations.

- A requirement to submit a portfolio of evidence, taken from the practical work experience of the candidate, to demonstrate competence against each of the fundamental requirements of the scheme.
- A requirement to undertake an interview with a panel of assessors, who would directly explore the ability of the candidate to apply knowledge, skills and experience to practical situations

There are clear advantages and disadvantages of each method.

A written examination can be very objective, but it requires significant effort to develop and grade the questions.

Testimonials can be very subjective and should not be used alone to determine competence.

There is a considerable time commitment for the panelists to conduct thorough reviews of the candidates' background and to conduct in-depth interviews of the candidates. There is the very real possibility to introduce bias (social, political, personal) into the approval process. Traveling to the interview site may be difficult for geographically large countries or where the transportation infrastructure is not well developed.

A combination of these assessment methods may also be used.

4.4.3 Assessment of Experience

Every candidate must submit a comprehensive work history detailing relevant experience. This should aim to provide a good

picture of the length, depth and scope of each period of experience. A more detailed approach would be to require the candidate to provide a link from each section of experience to the detailed scope of requirements.

If the individual's responsibilities (and thus their experience) are specified by regulation based on their title/position (e.g., the RPE in an EU country), then evidence of holding this position could be used to demonstrate relevant experience.

The experience statement should be verified by an independent person, for example the employer, line manager or referee.

4.5 Renewals

Most Certification Schemes have a renewal system, with a time-limited Certificate. Most re-certification processes are less onerous on the applicant than the original process.

Options include:

- Requirement to demonstrate Continuing Professional Development for a period of years, on the order of 5. In the UK this requirement is to show that the certificate holder has kept up-to-date their competence in appropriate legislation and technological advances in Radiation Protection. In the US, the certificate holder must be engaged substantially and currently in professional radiation protection practices and must demonstrate a specified level of continuing education activity.
- Requirement to state to the Assessing Body that appropriate Continuing Professional Development is being undertaken. A random sample of renewals is then audited.
- Re-assessment of competence – usually applied if the Certificate expires or the

certificate holder fails an alternative renewal process.

4.6 Code of Conduct

Certificated RPEs must follow a Code of Conduct linked to the IRPA Code of Conduct (see Annex 4 Model Code). Particular emphasis should be given to the requirement that RPEs should not undertake professional obligations for which they are not qualified, or for which they do not believe themselves to be competent to carry out (see section 4.2.1 above).

4.7 Appeals, Disciplinary Aspects, Withdrawal of Certification, Insurance Cover

Processes within the certification scheme should define mechanisms for candidates to appeal against decisions made by the scheme. The possibility of disciplinary proceedings against certificated RPEs, including the withdrawal of a certificate, should be considered in the procedures, for example where there is a *prima facie* case that an RPE has not acted in accordance with the Code of Conduct or has repeatedly given inappropriate advice. Consideration should also be given to the possibility of arranging insurance coverage to protect the scheme from the costs of potential litigation.

4.8 Accreditation

Consideration should be given to review of the scheme by a third party accrediting organization. Annex 6 provides example accreditation standards. These standards also provide additional considerations albeit not specific to RPE certification.

4.9 Reciprocity

The scheme should take into consideration the RPE certification attained in another scheme, for example, attained in another nation or AS.

5. Conclusions

There is an increasing need for certification schemes to meet both regulatory and professional expectations for the demonstration of expertise in radiation safety. Experience has shown that there is no singular 'best practice' approach to such certification. Existing schemes differ in many dimensions, for example in scope of application, knowledge, skills, competences and experience requirements and assessment methods. The objective of this IRPA Guidance Document is not to offer a single template of how to establish a certification scheme, but rather to explore and describe the different options and approaches, to identify their respective strengths and weaknesses, and to outline the key considerations which must be taken into account when introducing and establishing such schemes.

In order to inform these considerations, brief descriptions of several existing schemes are given in Annex 7.

**Endorsed by the IRPA Executive Council
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Annex 1

IAEA and EU Basic Safety Standards

- **IAEA Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards**
- **General Safety Requirements Part 3 No. GSR Part 3, 2014**

Definitions

Qualified Expert: An individual who, by virtue of certification by appropriate boards or societies, professional license or academic qualifications and experience, is duly recognized as having expertise in a relevant field of specialization, e.g. medical physics, radiation protection, occupational health, fire safety, quality management or any relevant engineering or safety specialty.

Radiation Protection Officer: A person technically competent in radiation protection matters relevant for a given type of practice who is designated by the registrant, licensee or employer to oversee the application of regulatory requirements.

Selected Requirements

2.21. The government shall ensure that requirements are established for:

(a) Education, training, qualification and competence in protection and safety of all persons engaged in activities relevant to protection and safety;

(b) The formal recognition of qualified experts: ['Formal recognition' means documented acknowledgement by the relevant authority that a person has the qualifications and expertise required for the responsibilities that he or she will bear in the conduct of the authorized activity].

2.22. The government shall ensure that

arrangements are in place for the provision of the education and training services required for building and maintaining the competence of persons and organizations that have responsibilities relating to protection and safety.

2.41. Other parties shall have specified responsibilities in relation to protection and safety. These other parties include:

..... (b) Radiation protection officers;

..... (f) Qualified experts or any other party to whom a principal party has assigned specific responsibilities;

2.44. The relevant principal parties and other parties having specified responsibilities in relation to protection and safety shall ensure that all personnel engaged in activities relevant to protection and safety have appropriate education, training and qualification so that they understand their responsibilities and can perform their duties competently, with appropriate judgement and in accordance with procedures.

2.46. The relevant principal parties shall ensure that qualified experts are identified and are consulted as necessary on the proper observance of these Standards.

European Commission: Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation

Definitions

(73) "radiation protection expert" means an individual or, if provided for in the national legislation, a group of individuals having the knowledge, training and experience needed to give radiation protection advice in order to ensure the effective protection of individuals, and whose competence in this respect is

recognised by the competent authority;

(74) "radiation protection officer" means an individual who is technically competent in radiation protection matters relevant for a given type of practice to supervise or perform the implementation of the radiation protection arrangements;

Selected Requirements

Article 34

Consultations with a radiation protection expert

Member States shall require undertakings to seek advice from a radiation protection expert within their areas of competence as outlined in Article 82, on the issues below that are relevant to the practice:

(a) the examination and testing of protective devices and measuring instruments;

(b) prior critical review of plans for installations from the point of view of radiation protection;

(c) the acceptance into service of new or modified radiation sources from the point of view of radiation protection;

(d) regular checking of the effectiveness of protective devices and techniques;

(e) regular calibration of measuring instruments and regular checking that they are serviceable and correctly used.

Article 79

Recognition of services and experts

1. Member States shall ensure that arrangements are in place for the recognition of:

(a) occupational health services;

(b) dosimetry services;

(c) radiation protection experts;

(d) medical physics experts.

Member States shall ensure that the necessary arrangements are in place to ensure

the continuity of expertise of these services and experts.

If appropriate, Member States may establish the arrangements for the recognition of radiation protection officers.

2. Member States shall specify the recognition requirements and communicate them to the Commission.

Article 82

Radiation protection expert

1. Member State shall ensure that the radiation protection expert gives competent advice to the undertaking on matters relating to compliance with applicable legal requirements, in respect of occupational and public exposure.

2. The advice of the radiation protection expert shall cover, where relevant, but not be limited to, the following:

(a) optimisation and establishment of appropriate dose constraints;

(b) plans for new installations and the acceptance into service of new or modified radiation sources in relation to any engineering controls, design features, safety features and warning devices relevant to radiation protection;

(c) categorisation of controlled and supervised areas;

(d) classification of workers;

(e) workplace and individual monitoring programmes and related personal dosimetry;

(f) appropriate radiation monitoring instrumentation;

(g) quality assurance;

(h) environmental monitoring programme;

(i) arrangements for radioactive waste management;

(j) arrangements for prevention of accidents and incidents;

(k) preparedness and response in emergency exposure situations;

(l) training and retraining programmes for exposed workers;

(m) investigation and analysis of accidents and incidents and appropriate remedial actions;

(n) employment conditions for pregnant and breastfeeding workers;

(o) preparation of appropriate documentation such as prior risk assessments and written procedures;

3. The radiation protection expert shall, where appropriate, liaise with the medical physics expert.

4. The radiation protection expert may be assigned, if provided for in national legislation, the tasks of radiation protection of workers and members of the public.

Article 84

Radiation protection officer

1. Member States shall decide in which practices the designation of a radiation protection officer is necessary to supervise or to perform radiation protection tasks within an undertaking. Member States shall require undertakings to provide the radiation protection officers with the means necessary for them to carry out their tasks. The radiation protection officer shall report directly to the undertaking. Member States may require employers of outside workers to designate a radiation protection officer as necessary to supervise or perform relevant radiation protection tasks as they relate to the protection of their workers.

2. Depending on the nature of the practice, the tasks of the radiation protection officer in

assisting the undertaking, may include the following:

(a) ensuring that work with radiation is carried out in accordance with the requirements of any specified procedures or local rules;

(b) supervise implementation of the programme for workplace monitoring;

(c) maintaining adequate records of all radiation sources;

(d) carrying out periodic assessments of the condition of the relevant safety and warning systems;

(e) supervise implementation of the personal monitoring programme;

(f) supervise implementation of the health surveillance programme;

(g) providing new workers with an appropriate introduction to local rules and procedures;

(h) giving advice and comments on work plans;

(i) establishing work plans;

(j) providing reports to the local management;

(k) participating in the arrangements for prevention, preparedness and response for emergency exposure situations;

(l) information and training of exposed workers;

(m) liaising with the radiation protection expert.

3. The task of the radiation protection officer may be carried out by a radiation protection unit established within an undertaking or by a radiation protection expert.

Annex 2

IRPA Definition of Radiation Protection Expert (RPE)

The International Labour Organization (ILO) established in 1957 the first International Standard Classification of Occupations (ISCO-58). This classification was later on superseded by ISCO-68, ISCO-88 and then by ISCO-08, the actual version. ISCO is a tool for organizing jobs into a clearly defined set of groups according to the tasks and duties undertaken in the job. Until ISCO-08, no occupation in the field of radiation protection was registered by ISCO.

The IRPA Executive Council (2004-08) proposed the registration of the Radiation Protection Expert (RPE), which ILO has included in the actual ISCO-08 within a new Unit Group in which the RPE is given as an example of registered occupations:

ISCO-08; Unit Group 2263: Environmental and occupational health and hygiene professionals

Environmental and occupational health and hygiene professionals assess, plan and implement programs to recognize, monitor and control environmental factors that can potentially affect human health, to ensure safe and healthy working conditions, and to prevent disease or injury caused by chemical, physical, **radiological** and biological agents or ergonomic factors.

Examples of the occupations classified here:

- Environmental Health Officer
- Occupational Health and Safety Adviser
- Occupational Hygienist
- **Radiation Protection Expert**

Radiation Protection Expert (RPE)

In context with the ISCO-08 classification of the RPE the IRPA Executive Council (2004-08) elaborated the following definition:

(A) "*Radiation Protection*" is that science and art devoted to the anticipation, recognition, evaluation, and control of radiation hazards that may cause impaired health and well-being, or injury among workers, patients, the public, or harm to the environment.

(B) "*Radiation Protection Expert (RPE)*" is a person:

- having education and/or experience equivalent to a graduate or master's degree from an accredited college or university in radiation protection, radiation safety, biology, chemistry, engineering, physics or a closely related physical or biological science; and

- who has acquired competence in radiation protection, by virtue of special studies, training and practical experience. Such special studies and training must have been sufficient in the above sciences to provide the understanding, ability and competency to:

- anticipate and recognize the interactions of radiation with matter and to understand the effects of radiation on people, animals and the environment;

- evaluate, on the basis of training and experience and with the aid of quantitative measurement techniques, the magnitude of radiological factors in terms of their ability to impair human health and well-being and damage to

the environment;

- develop and implement, on the basis of training and experience, methods to prevent, eliminate, control, or reduce radiation exposure to workers, patients, the public and the environment.

(C) In most countries the competence of radiation protection experts needs to be recognized by the competent authority in order for these professionals to be eligible to undertake certain defined radiation protection responsibilities. The process of recognition may involve formal certification, accreditation, registration, etc.

Annex 3

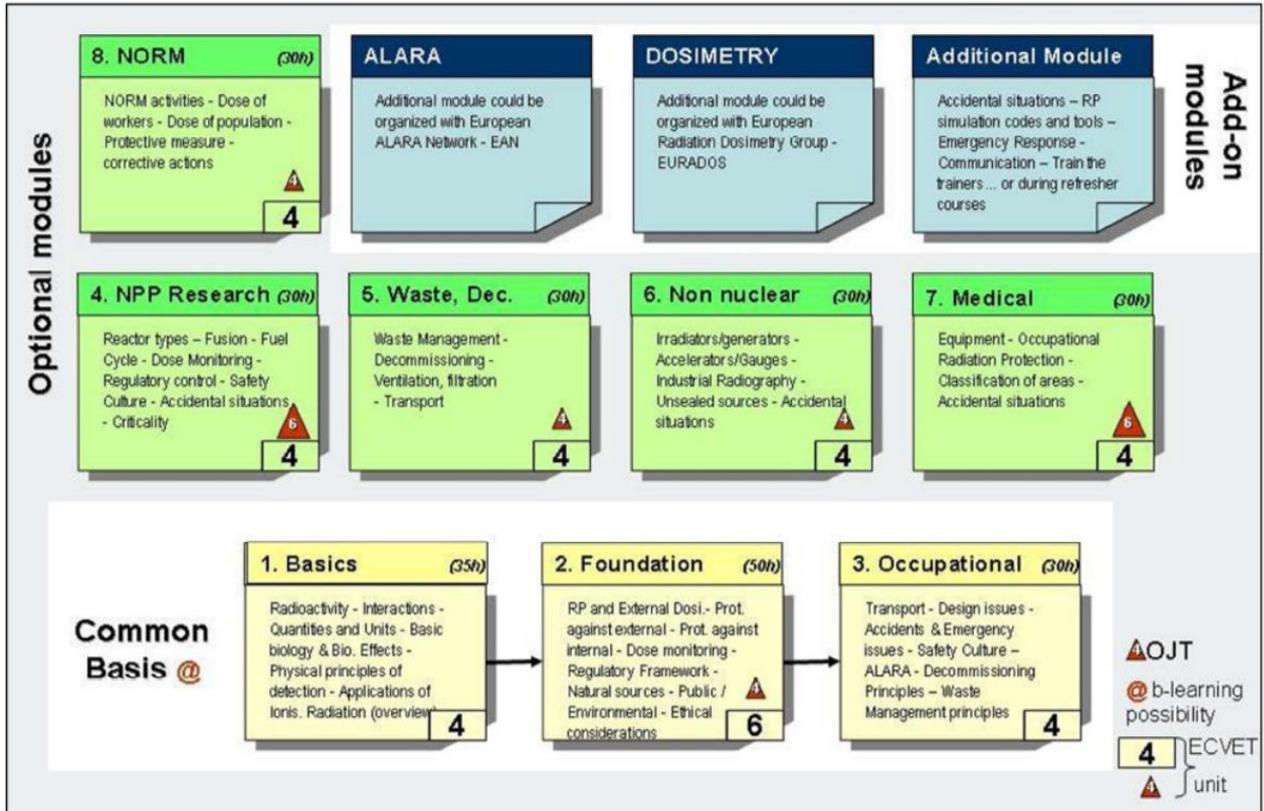
Model RPE Knowledge and Skill Syllabus*

Topic	Sub-topics
Basic atomic and nuclear physics	Atomic structure and composition of the nucleus Stable and unstable isotopes, activity Types of radioactive decay Nuclear fission Half life and decay constants Radioactive equilibria The effects of time, distance and shielding
Basic biology	Basic radiation chemistry Effects of radiation on cells and tissue
Interaction of radiation with matter	Charged particles, photons and neutrons Types of nuclear reactions Induced radioactivity
Biological effects of radiation	Deterministic biological effects of ionising radiation Stochastic biological effects of ionising radiation The dose–response relationship Effects of whole body irradiation Effects of partial body irradiation
Detection and measurement methods	Principles and theory of detection and measurement (e.g. efficiency, background, geometry, statistics) Types of detection instruments (e.g. gas filled, ionisation chambers, scintillators, thermoluminescence, neutron detectors) Choice of detection instruments Interpretation of instrument measurements
Quantities and units (including dosimetry underlying regulatory quantities)	Units Dose terms (absorbed dose, equivalent dose, effective dose, committed dose) Dose limits and constraints Dosimetric calculations
Basis of radiation protection standards	Linear hypothesis for stochastic effects Threshold for deterministic effects Epidemiological studies
ICRP principles	Justification of practices Optimisation of protection from radioactive substances Dose Limits
Legal and regulatory basis	international standards and recommendations for radiation protection national standards and recommendations for radiation protection, regulations and legislation
Operational radiation protection	types of sources (sealed, unsealed, x-ray units, accelerators); hazard and risk assessment (including environmental impact); minimisation of risk; control of releases; monitoring: area, personal dosimetry (external, real time and internal), biological; critical dose concept/dose calculation for critical group; ergonomics (e.g. user-friendly design and layout of instrumentation); operating rules and contingency planning; emergency procedures; remedial action/decontamination;

Topic	Sub-topics
Organisation of radiation protection	analysis of past incidents including experience feedback role of qualified experts; safety culture (importance of human behaviour); communication skills (skills and ability to instil safety culture into others); record keeping (sources, doses, unusual occurrences, etc.); permits to work and other authorisations; designation of areas and classification of workers; quality control/auditing; dealing with contractors
Waste management	principles of management; principles of disposal
Transport	Transport of radioactive materials Packaging of radioactive materials and waste for transport Security of radioactive materials during transport Transport documentation – dispatch and receipt

*. Adapted from the U.K. Scheme

Annex 4 The RPE Training Scheme (ENETRAP projects)



Annex 5

Model Code of Practice

IRPA has a Code of Ethics and ASs can then develop one of their own, relevant to a Certification Scheme. Below is the IRPA Code of Ethics, followed by the UKs Code of Technical Conduct for the Certification Scheme.

IRPA Code of Ethics

These principles are intended to aid members of IRPA Associate Societies in maintaining a professional level of ethical conduct related to radiation protection. They are to be regarded as guidelines. Members of Societies may use them to determine the propriety of their conduct in all relationships in which they are exercising their professional expertise. Associate Societies are encouraged to adopt or incorporate them as appropriate. If there is reason to believe that a member has breached this Code of Ethics, the Society to which the member belongs is expected to investigate and take appropriate measures.

1. Members shall exercise their professional skill and judgement to the best of their ability and carry out their responsibilities with integrity.

2. Members shall not allow conflict of interest, management pressures or possible self-interest to compromise their professional judgement and advice. In particular members shall not compromise public welfare and safety in favour of an employer's interest.

3. Members shall not undertake any employment or consultation that is contrary to the public welfare or to the law.

4. Members shall protect the confidentiality of information obtained during the course of their professional duties, provided that such

protection is not in itself unethical or illegal.

5. Members shall ensure that relations with interested parties, other professionals and the general public are based on, and reflect, the highest standards of integrity, professionalism and fairness.

6. Members should satisfy themselves as to the extent and content of the professional functions required in any particular circumstances, especially those involving the public safety. Members should not undertake professional obligations that they are not qualified, or do not believe themselves to be competent, to carry out.

7. Members should take all reasonable steps to ensure that persons carrying out work done under their supervision or direction are competent, and not under undue pressure from workload or other causes.

8. Members should strive to improve their own professional knowledge, skill and competence.

9. Professional reports, statements, publications or advice produced by members should be based on sound radiation protection principles and science, be accurate to the best of their knowledge and be appropriately attributed.

10. Members should, whenever practicable and appropriate, correct misleading, sensational and unwarranted statements by others concerning radiation and radiation protection.

11. Members should take advantage of opportunities to increase public understanding of radiation protection and of the aims and objectives of IRPA and their own Society.

IRPA. May 2004

Annex 6

Accreditation Standards for Certification Boards

A. The Council of Engineering & Scientific Specialty Boards (CESB) – Accreditation Guidelines (edited)

1. Purpose of the Certification Program

The primary purpose of the certification program shall be the evaluation of individuals who practice in specialized areas within the fields of engineering and science and other areas related to engineering and the issuance of credentials to those individuals who demonstrate a specified level of knowledge and competence.

2. Structure of the Certifying Body

The Certifying Body is that organization duly authorized to specify the certification scope, grant certification, and approve, supervise and/or administer all procedures and policies necessary to operate the certification program. It shall:

- a. Be a legal, not-for-profit non-governmental entity or part of a legal, not-for-profit non-governmental entity or a governmental entity;
- b. Be independent and impartial in all matters pertaining to granting certification. However, appointment of members to the Certifying Body may be by the sponsoring organization;
- c. Consist of a majority of certified individuals; and
- d. Have formal procedures for the selection of the Certifying Body members specified in its bylaws. Such procedures shall prohibit the Certifying

Body from selecting more than one-third of its members.

3. Resources of the Certifying Body

The Certifying Body shall:

- a. Have adequate financial resources to properly conduct the certification activities; and
- b. Have personnel — volunteers, employees, and contractors — who possess the knowledge and skill necessary to conduct the certification program and the management system(s) to assure their effective and ethical use.

4. Certification Program Operation

The certification program shall:

- a. Be national or international in scope;
- b. Provide the public, consumers, and sponsoring organizations with an opportunity to contribute to the formulation of policies and decisions of the Certifying Body;
- c. Use procedures that assure relevance of the knowledge, skills, and abilities that define the body of knowledge of the certification scope;
- d. Use a method to evaluate individual competence that is objective, fair, and based on the knowledge, skills, and abilities needed to function in the

specialty area;

- e. Assure that any evaluations used are both reliable and valid measures of each individual's capabilities;
- f. Assure that any examinations used are designed to test the body of knowledge of the certification;
- g. Set pass/fail scores for any examinations used with procedures that are consistent with generally accepted psychometric principles;
- h. Utilize appropriate measures to protect the security of any examinations used by the program to evaluate individuals for certification;
- i. Periodically review, at least every five years, or more often if required, the body of knowledge and methods used to measure individual capability to assure that they are keeping pace with changes in the technology and professional practices covered by the certification program;
- j. Prohibit those involved in the certification of individuals to provide training for the purpose of obtaining such certification; and
- k. Define and maintain policies which describe the ethical behavior (a code of ethics) expected of Certifying Body leaders, volunteers and staff, its contractors and those it certifies.

The Certifying Body may grant certification to individuals on the basis of eminence or extensive education and/or experience without examination (i.e., by

grandfathering) for a period not to

exceed twelve months after the date of CESB accreditation of newly accredited certification programs. After that time, no individual shall be certified other than by the program's regular certification method.

5. Public Disclosure of Certification

The Certifying Body shall:

- a. Publish a document which clearly defines the certification responsibilities of the certifying body and describes any other activities of the certifying body which are not related to certification;
- b. Make available general descriptions of the procedures used to evaluate candidates. If examinations are used, the procedures used in their construction and validation, examination administration, and reporting of test results shall also be made available;
- c. Publish a comprehensive statement of the body of knowledge for the certification; and
- d. Publish at least annually, a summary of certification activities, including the number of applicants, number certified and number recertified.

6. Responsibilities to Applicants

The Certifying Body shall:

- a. Not discriminate among applicants as to age, sex, race, religion, national origin, disability, or marital status;

- b. Provide all applicants with complete information on the procedures governing application for and attainment of certification;
- c. Have a formal policy for the periodic review of the application and evaluation procedures to assure that they are fair and equitable;
- d. Provide competently proctored sites for any required testing that are readily accessible in all areas of the geographic area served by the certification program at least once annually. Such testing sites and examinations shall appropriately accommodate all disabled applicants who possess one or more of the disabilities defined by United States of America laws and regulations;
- e. Promptly report evaluation results to applicants;
- f. Provide applicants who fail an evaluation information on the general areas of deficiency;
- g. Maintain the confidentiality of each person's application documents, evaluation results, recertification information, and any other information on file unless authorized to release the information by the individual or if required by law;
- h. Prescribe, maintain, and publish procedures that certification candidates can use to appeal actions and decisions of the Certifying Body pertaining to the candidate's application and certification; and

- i. Not require any training offered by the Certifying Body as a prerequisite for certification.

7. Responsibilities to the Public and Consumers

The Certifying Body shall:

- a. Assure that any title or credential awarded by the credentialing body accurately reflects the certification body of knowledge.
- b. Assure that the certification method employed properly measures the knowledge, skill, and abilities required for practice in the certification body of knowledge;
- c. Award certification only after the knowledge, skills, and abilities of the individual have been evaluated and determined to be acceptable;
- d. Maintain a publicly accessible roster of those persons certified by the Certifying Body;
- e. Have formal due process policies and procedures for discipline of certificants, including revocation of the certificate.

8. Recertification

The Certifying Body shall:

- a. Have a process that limits the certification granted to no more than five years;
- b. Provide for recertification either by the examination method used by the Certifying Body to initially grant certification or by presenting

satisfactory evidence of some combination of continuing professional experience, continuing professional development, and professional and/or technical society activity related to the body of knowledge certified. While continuing professional experience should receive primary weighting in granting recertification, the requirements must include an average of at least twenty hours per year of continuing professional development in the body of knowledge certified. Continuing professional development activities may include formal courses, technical meeting attendance, and similar activities. Professional and/or technical society volunteer activity, related professional community volunteer service, authoring of technical papers, and similar activities may be considered by the Certifying Body in lieu of a portion of the continuing professional development or professional experience requirements. All activities for which recertification credit is granted must have been conducted during the immediately preceding period of certification. No credit may be granted for activities occurring at any prior time.

9. Titles

The Certifying Body shall:

- a. Limit the use of the title “engineer,” or any variation, to Professional Engineer Specialty Certification Boards and Graduate Engineer Certification Boards. The Certifying Body shall make clear that any title it grants using the

word “engineer” does not convey any legal right to practice engineering;

- b. Limit the use of the title “Diplomate” in any title including the word “engineer” to those individuals certified by Professional Engineer Specialty Certification Boards;
- c. Not inappropriately use the word “engineer” or similar wording in any title granted. The use of the phrase, “in engineering,” in any title granted by a Certifying Body shall be considered equivalent to use of the title, “engineer.” Using “engineering” as a modifier, e.g., “engineering technology,” “engineering technologist,” “engineering technician,” and “engineering aspects” is acceptable use by Engineering Related Specialty Certification Boards and Engineering Technician Certification Boards; and
- d. Use effective procedures to assure that any titles or trademarks granted to certified persons are properly used.

The Certifying Body may grant the title “emeritus” or “retired” or similar title to persons who are retired from practice in the specialty certified and who possessed valid, current certification at the time of retirement if they no longer engage in professional practice in the specialty certified. Retirees who subsequently re-enter practice in the specialty certified as consultants or through re-employment must renew their certification using methods described in these Guidelines for recertification.

Supplemental Guidelines for Engineering-

Related Specialty Certification Programs

Engineering-Related Certification Programs are those programs which certify scientific specialties and/or other specialties allied to the practice of engineering.

To achieve CESB accreditation, Engineering-Related Specialty Certification programs will be measured against the following guidelines:

- (1) Candidates for certification must hold a baccalaureate degree (accredited by an accrediting body recognized by the Council on Higher Education Accreditation) in a field related to engineering (or equivalent) and possess a minimum of four years of practical, responsible experience in the specialty area acceptable to the Certifying Body. At the discretion of the Certifying Body, a supplementary examination or four years of related education and/or experience beyond the four-year minimum requirement may be accepted in lieu of an accredited degree.

B. National Commission for Certifying Agencies Certification Accreditation Summary

This summary is adapted from the *National Commission for Certifying Agencies (NCCA) Self-Assessment Checklist*. The checklist from which this was adapted is intended to provide guidance on a program's readiness to submit an application for accreditation to the NCCA. The NCCA Standards apply to certification programs, not certificate of attendance or participation, or certificate programs.

This document provides a short summary of the actual accreditation standard. The complete accreditation standard is available for purchase at:

<http://www.credentialingexcellence.org/p/pr/vi/prodid=169>

This summary is intended to emphasize the elements of a well-developed certification scheme.

Purpose, Governance, and Stakeholders

- 1) Well-defined purpose, well-defined population being certified, and well-defined justification for appropriateness of activities.
- 2) Autonomy in essential certification decisions reflected in governance structure, bylaws, policies
- 3) Development, administration, scoring of assessment(s) promote purpose as defined above
- 4) Distinct firewall between education and certification activities; no conflict of interest
- 5) Does not accredit of education or training, review, etc. leading to

certification

- 6) Certification governance board
 - a. is elected fairly, without undue influence
 - b. is of adequate size
 - c. has a public member meeting NCCA criteria
 - d. has appropriate representation/balance of stakeholders and certificants though continuous election or rotation
- 7) Certification program is financially viable

Responsibilities to Stakeholders

- 1) There is sufficient staff resources/expertise and use of consultants to conduct an effective program
- 2) Policies and procedures are established for key certification activities and responsibilities and are published, applied, reviewed, and updated:
 - a. Eligibility criteria and application policies
 - b. Examination processes and procedures
 - c. Listing/outline of performance domains w/content area weights, tasks, associated knowledge and skills
 - d. Summary of certification activities/statistics
 - e. Equitable disciplinary policies to address complaints or ethics issues
 - f. Discipline, non-discrimination and accommodation following

applicable laws and regulations

- g. Confidentiality/disclosure and conflict of interest of all key personnel involved with the certification program is adequately addressed
 - h. Appeals policies and procedures to question eligibility, exam results, certification status
- 3) There are published descriptions of exam development and validation, eligibility requirements, administration
 - 4) Certification is awarded after appropriate evaluation of knowledge and skills only, and grandfathering is not permitted once accredited
 - 5) Rationale for grandfathering of limited, qualified certificants prior to accreditation is provided
 - 6) A list of certified individuals is kept and can be verified upon request, without violating confidential information

Assessment Instruments

- 1) There is a rationale and a timeframe for conducting a job analysis, with periodic review and update to verify that it is relevant to current practice
- 2) The job analysis was conducted of adequate sample size, given practicing individuals within the profession or industry, with a representative group across practice areas, work settings, geography, work experience, gender, etc.
- 3) There is a detailed published report linking the results of job analysis to specifications for the assessment instruments, with weightings for each

domain, the decision rules for any actions that may deviate from the survey data, and the experts involved

- 4) The cut or passing score has been set using accepted criteria, and a technical report is published, outlining the methods, procedures, subject matter expert and consultant involvement, and results
- 5) The program has documented the psychometric procedures used to score, interpret, and report assessment results
- 6) Candidates are given score reports with meaningful information on their performance beyond the pass/fail result
- 7) For responses scored by judgment, judge qualifications and selection, standards, and training materials are documented
- 8) Aggregate assessment data is available to stakeholders
- 9) Reported scores and sub-scores are sufficiently reliable for the intended purposes of the assessment instrument(s), including estimates of errors of measurement
- 10) Reliability or consistency of pass/fail decisions are reported
- 11) If multiple forms are used, content and empirical evidence and rationale for how equivalence and fairness is ensured is provided
- 12) If assessment instruments are translated or adapted across cultures, the methodology is described and the evidence shows translation/adaptation practices and empirical comparability in test scores and inferences.
- 13) Security Practices: There are published secure procedures adhered to for

development and administration of the assessment instruments

- 14) Security Practices: Document retention policies describe procedures for secure retention of all assessment forms, items, reports, and analyses related to development and implementation of the program, including scores, results, and procedures for personnel authorized to access them

Recertification

- 1) Periodic recertification is required, with published rationale for the purpose, requirements and time interval
- 2) Consequences to certificants who do not recertify are published
- 3) If recertification is intended to measure competency (re-testing), the assessment instrument used is either the same as for initial certification, or the separate assessment instrument meets the same criteria for validity and reliability
- 4) If recertification is intended to enhance competency (continuing education, practice modules, etc.), there is rationale for the requirement and how it contributes to professional development

Maintaining Accreditation

- 1) An annual report must be submitted each year, and it will indicate substantive changes to any aspects of my program(s) as well as aggregate statistical data and reports of appeals or complaints

Annex 7 Certification Schemes

A. American Board of Health Physics

Additional information can be found at <http://www.hps1.org/aahp/boardweb/prospectus.html>

Specific Legal Entity: American Academy of Health Physics (AAHP); a non-governmental, not-for-profit organization. Within the AAHP, the American Board of Health Physics (ABMP, Board) is the certifying body. Note, The AAHP and the ABHP are not directly affiliated with the Health Physics Society and are not an Associate Society of IRPA.

Formally defined procedures for:

- (a) Applications:
- (b) Assessments:
- (c) Appointment of assessors:

Assessment process should ensure that judgements on the competency of a candidate are not over-reliant on the views of any single assessor

Scope of Certification:

Generic Radiation Protection Expert Certification (The term 'comprehensive' rather than 'generic' is used.)

Notes on Scope of Certification:

- (1) The American Board of Health Physics certified radiation protection experts that specialized in nuclear power reactors, but discontinued the practice as nuclear power plant radiation protection experts became more broadly educated and capable of satisfactorily meeting the requirements of comprehensive certification.

- (2) There is a separate certifying body, the American Board of Medical Physicists (ABMP), which has developed a certifying scheme for radiation protection experts in medicine. The ABMP is not affiliated with IRPA through an AS.
- (3) Another organization certifies experts in laser safety. It, too, is not associated with IRPA through an AS.
- (4) The Code of Ethics which every certified individual must accept includes restrictions on practicing outside of one's area of expertise.

Certification for Other Roles

The National Registry of Radiation Protection Technologists (a separate legal entity) certifies radiation safety technicians, primarily nuclear power workers.

Requirements for Certification:

Knowledge/Education:

A four year college degree (bachelor's degree) in physical sciences, engineering, or biological sciences with 20 college credits in physical sciences.

Assessment of Knowledge:

A member of the Board reviews each application to determine if the applicant is eligible to sit for the examination. All rejected applications are also reviewed by the ABHP chairperson. The application includes educational background and college transcripts.

A two part examination is used to

assess knowledge and competence. The first exam part tests knowledge. It is a 150 question, multiple-choice examination that is machine scored. Statistical evaluation of each question is performed to assess how well it discriminates between the higher scoring and lower scoring candidates.

Experience:

6 years professional level experience

5 years professional level experience with a Master's level degree in radiation protection.

4 years professional level experience with a doctorate level degree in radiation protection.

Assessment of Experience:

A member of the Board reviews each application to determine if the applicant is eligible to sit for the examination. All rejected applications are also reviewed by the ABHP chairperson. The application includes a detailed work history, a reference from the applicant's immediate supervisor, two additional professional references preferably by a certified individual, and the submission of a professional level report or project.

Assessment of Competence:

The second part of the examination is designed to test practical application of knowledge. A team of three graders are assigned to each question and assess the candidates' answers based on a predetermined stock answer. A grading leader reviews the points given from all three graders and resolves any significant differences. The candidates are identified only by number, so the graders are blind to

whose answer they are scoring. No grading team sees an individual candidate's entire examination. The candidate's scores are summed

No interview (oral examination) is given. Originally, oral examinations were offered to examinees that were close to the pass/fail mark. The practice was abandoned as the grading process became more robust and due to the inherent subjectivity associated with the process.

Recertification

Recertification period – 4 years

Recertification method

Continuing education credits are given for continuing education activity. A total of 80 credits must be accrued in the four year recertification cycle. No single course, meeting, or activity shall be awarded more than one half of the credits needed for recertification. Four major categories of continuing education activities have been approved for CHPs who wish to obtain CEC. These are:

- Formal Educational Activities
- Publications, Reports, and Presentations
- Professional Society Participation
- Other Professional Activities
- Non-technical, related Activities, e.g., advanced technical writing and presentation skills. (Does not include basic computer skills course.

Activities are reviewed by a standing committee, which assigns credits.

An applicant for recertification must submit an application showing the

continuing education activities in which he or she has participated. These are reviewed by the Board Administrator.

Code of Conduct

The "Standards for Professional Responsibility" are embedded in the bylaws of the American Board of Health Physics.

These principles are the standards of professional responsibility for CHPs. By applying for and achieving certification, the Certified Health Physicist recognizes and assumes the following responsibilities.

The Certified Health Physicist (CHP) shall:

- **A. Support and Improve the Profession of Health Physics**
 1. The CHP shall support the purposes of the American Academy of Health Physics (the Academy).
 2. The CHP shall endeavor to advance the Health Physics profession by sharing information and experience with others and by contributing to the work of professional associations, schools, and the professional, scientific, and technical press.
 3. The CHP shall not act in a manner that may bring the profession or the Academy into disrepute.
- **B. Provide Technical Competence**
 1. The CHP shall remain active in the field, strive to improve his/her professional knowledge, and endeavour to be aware of contemporary scientific, technical, and regulatory developments.
 2. The CHP shall practice only in areas of his/her expertise.
 3. The CHP shall practice his/her profession following recognized scientific principles.
- 4. The CHP shall counsel affected parties factually regarding potential health risks and precautions necessary to avoid adverse health effects.
- 5. The CHP should accept opportunities to increase public understanding of radiation protection and the purposes of the Academy.
- **C. Act in the Public Interest**
 1. The CHP shall have due regard for the safety and health of the public and of individuals who may be affected by his/her work.
 2. The CHP shall not undertake any employment or consultation that is contrary to law.
 3. The CHP shall not compromise public welfare and safety in favor of a private interest.
- **D. Maintain High Standards in Dealing with Others**
 1. The CHP shall maintain the highest standards of integrity and fairness in his/her professional interactions with employers, colleagues, workers, clients, government agencies, and the general public.
 2. The CHP shall not attempt to falsely injure the reputation of any person.
 3. The CHP shall protect the sources and content of confidential communications or other confidential personal or business information obtained in the course of his/her practice, provided that such protection is not itself unethical or illegal.
 4. Without the knowledge and consent of his/her client, the CHP shall not

accept or offer commissions, allowances, or finder's fees, directly or indirectly, from contractors or other parties dealing with the client.

5. The CHP shall avoid circumstances where a compromise of professional judgement or conflict of interest may arise.
6. The CHP shall not knowingly take credit for the work of others and shall give credit where it is due.

Annex 7

Certification Schemes

(continued)

B. The UK Certification Scheme

Full documentation can be found at <http://www.rpa2000.org.uk>

1. Introduction

- 1.1 The Euratom Basic Safety Standards Directive (EU BSS 2013) requires 'Radiation Protection Experts' to be involved in specified tasks and additionally requires Member States to recognise the 'capacity to act' of such experts. This new Directive from Europe is required to be implemented in Member States by February 2018. The previous Directive specified "Qualified Experts", to which the current UK legislation complies.
- 1.2 In the UK, the qualified expert in relation to occupational radiation protection is the Radiation Protection Adviser (RPA) in the Ionising Radiations Regulations 1999 (IRR99). In addition the qualified Expert for Public Exposures is the Radioactive Waste Adviser (RWA) under the Radioactive Substances Regulations, and the Environmental Permitting Regulations.
- 1.3 RPA 2000, a company limited by guarantee, was established by four Professional Societies, namely: the Society for Radiological Protection; the Institute of Physics and Engineering in Medicine; the Institute of Radiation Protection and the Association of University Radiation Protection Officers (The Societies). Since then the Institute of Radiation Protection has been incorporated into the Society for Radiological Protection. RPA 2000 is

recognised by the Health and Safety Executive (HSE) as an Assessing Body for Radiation Protection Advisers, and by the Environment Agencies for Radioactive Waste Advisers.

- 1.4 RPA 2000 assesses the competence of persons who wish to work as Radiation Protection Advisers and Radioactive Waste Advisers. In addition RPA 2000 assesses the competence of persons wishing to work as Laser Protection Advisers and as Ionising Radiations Instrument Specialists.

2. Competence and Suitability

- 2.1 UK legislation defines the occasions where Employers, and Users of Radioactivity are required to seek the advice of Suitable Radiation Protection Advisers and Radioactive Waste Advisers. The legislation then defines what is meant by Suitable, and requires the Employers and Users of radioactivity to satisfy themselves that the Advisers they are appointing have the right experience for their particular application. This means that whilst there are two different kinds of Certificated experts in the UK, in fact there are many different experts, but all with the same "Core Competence" to advise on radiation protection.
- 2.2 Thus a Certificated RPA working in a Hospital would need to obtain additional relevant experience before being able to be appointed by an employer as an RPA in a different Sector like Nuclear Power. Even within the same sector there can be different requirements for RPAs in, for example Nuclear Reprocessing and

Nuclear Power.

2.3 This provides for considerable flexibility and minimum administration.

2.4 For Radiation Protection Advisers, there is a general and useful statement of what an RPA should be competent at, and note the

inclusion of a requirement to give "adequate advice". i.e being able to communicate.

Item	HSE Statement requirement
1.	<ul style="list-style-type: none"> Knowledge and understanding that meets the level stated for each topic referred to in Annex 3 of the HSE Statement (known as the 'Basic Syllabus').
2.	<ul style="list-style-type: none"> A detailed understanding of IRR99 and its ACOP, together with knowledge of non-statutory HSE guidance in 'Work with Ionising Radiation' (HSE Books L121).
3.	<ul style="list-style-type: none"> Knowledge of operational radiation protection methods, especially: <ul style="list-style-type: none"> interpretation and application of radiation protection data; work supervision; radiological measurements; control procedures for work involving the potential for significant radiation exposure.
4.	<ul style="list-style-type: none"> The ability to give adequate advice to duty holders and employers on compliance with IRR99.

In the UK there are about 550 Certificated RPAs and 120 RWAs (certificated or in process), and there are 41 Assessors.

those requiring a General Understanding, those requiring a Basic Understanding and those requiring a Detailed Understanding. These terms are defined in the procedures.

The key elements of the IRPA Guidance are addressed as follows

Specific Legal Entity: RPA 2000 is a not for profit company limited by guarantee, and approved by the Regulatory Body.

ii. Detailed Understanding Syllabus elements also require proven competence by demonstrated experience.

Formally defined procedures for:

- a. Application Process, including timing, appeals etc
- b. Detailed requirements to meet the defined Syllabus, as defined in UK Legislation
 - i. Syllabus elements are separated into

c. Detailed requirements for re-Certification.

Scope of Certification: Certification as a Radiation Protection Adviser, or a Radioactive Waste Adviser under UK legislation. Certificates are also awarded for Laser Protection and Ionising Radiations Instrument Specialist, but these are not defined in UK Legislation.

Certification for Other Roles

Not applicable.

Requirements for Registration:

Not applicable

Knowledge/Education:

Applicants for an RPA 2000 Certificate have to demonstrate underpinning knowledge of main and sub-topics specified in the Basic Syllabus – which is slightly different for the Radiation Protection and Radioactive Waste Advisers.

The basic syllabus specifies the topics of the underpinning knowledge and also the depth of knowledge required for each topic of the syllabus, namely: GA (general awareness), BU (basic understanding) or DU (detailed understanding).

Sufficient evidence must be provided to demonstrate that each topic of the basic syllabus has been covered, to the required depth of knowledge, either:

- in the applicant's degree, postgraduate study, professional training courses, certificated study or other local training events; and/or
- as part of the applicant's work experience. This evidence should be in the form of a resume of the applicant's work history and should detail the positions held and relevant work experience, clearly highlighting those aspects that demonstrate the necessary knowledge for each relevant topic.

Course outlines, syllabus information, meeting programmes attended or similar items would usually suffice for the evidence in those areas where general awareness or basic understanding is required, provided the evidence is sufficient to demonstrate the

necessary knowledge.

Assessment of Knowledge, Experience and Competence:

RPA 2000 maintains a team of some 41 trained volunteer Assessors who can demonstrate to the RPA 2000 Board of Management

- a minimum of 10 years experience in a senior position closely associated with radiation protection such as senior professional Health Physicist in the nuclear industry, senior Medical Physicist or Consultant RPA;
- a position which entails (or has in the past entailed) appraisal and management of the performance of individuals engaged in radiation protection; and
- the holding of a current RPA 2000 certificate in the subject/work area in which they are to become an Assessor.

For each Initial Applicant three Assessors are chosen, a Lead Assessor and a two Support Assessors. The Lead Assessor and one Support Assessor are chosen from the same work Sector but not the same employer. For each Re-Certification. A Lead Assessor and one Support Assessor are selected, with both Assessors ideally being from the same work sector.

Applicants for Initial Assessment provide a detailed Portfolio containing the evidence of Education Experience and Competence. Typically this can be two cm thick.

Experience:

Initial Applicants are expected to provide evidence accumulated over the previous five years, but there is no specified minimum period. Typically applicants would have been in a

position of obtaining relevant professional experience over two to three years.

Recertification

Applicants for re-certification provide a record of the evidence that shows that they have kept up to date their knowledge of radiation protection legislation and of developments in radiation protection practice.

Recertification period – Certificates are valid for 5 years.

RPA 2000 Code of Technical Conduct

The IRPA Code of Ethics has been adapted for the RPA 2000 Code of Technical Conduct.

The holder of a Certificate of Competence for any RPA 2000 certification scheme will:

1. Maintain an appropriate level of knowledge and workplace competence, as applicable to the discipline of that certificate.
2. Provide sound and unambiguous technical advice that meets the current legislative standards associated with that certificate and is fully in accordance with established principles of good radiation protection practice.
3. Maintain up-to-date personal knowledge and awareness of advances in the established principles of good radiation protection practice.
4. Maintain up-to-date, detailed knowledge of all legislation that is

relevant to the discipline of that certificate including, as far as is practicable, awareness of impending changes to that legislation.

5. Never provide advice in any area of expertise or competence that can reasonably be regarded as being beyond the holder's working experience or ability.
6. Never provide or attempt to provide advice related to that Certificate of Competence unless the Certificate has current validity.
7. Co-operate, so far as is practicable, with the RPA 2000 Board should the need arise for the Board to investigate a complaint questioning the holder's technical competence to hold the certificate.

It should be noted that this CoTC relates only to technical competence. It makes no mention of the certificate holder's standards of professional conduct, which are beyond the remit of RPA 2000. It is suggested that queries concerned with such matters should be referred to the certificate holder's Professional Body.

Colin Partington MBE

Qualifications and Professional Standards Committee for the SRP, and Director of RPA 2000 - March 2016

Annex 7 Certification Schemes (continued)

C. Canada Registration of Radiation Safety Professionals Scheme

Specific Legal Entity: Canadian Radiation Protection Association (CRPA); a non-governmental, federally incorporated not-for profit organization. The CRPA is an Associate Society of IRPA.

Formally defined procedures for:

- (b) Applications:
 - a. Recognition Phase
 - b. Core Level Registration
- (c) Assessments:
 - a. Competency Profile and Curriculum Guide used to assess Recognition Applications
 - b. Examination Question Bank based on Competency Profile
 - c. Examination results reviewed.

Scope of Certification: Registration as a Registered Radiation Safety Professional, denoted as CRPA (R)

Notes on Scope of Registration:

- (1) The Code of Ethics which every Registered individual must accept includes restrictions on practicing outside of one's area of expertise
- (2) Candidates for Recognition and Registration must be CRPA members and maintain CRPA membership to maintain their credential.

Certification for Other Roles

Not applicable.

Requirements for Registration:

Knowledge/Education:

CRPA full members shall:

- Have graduated from an accredited university or have recognized equivalent scientific, technological, or professional qualifications or in exceptional cases have equivalent training.
- Have been engaged in some form of radiation protection activities for at least one year;
- Be regularly engaged in one or more appropriate aspects of radiation protection at the time of their application for membership in the Association.

Assessment of Knowledge & Experience (Recognition Phase):

A member of the Registration Sub-Committee (typically the Chairperson) reviews each Recognition application to determine if the applicant is eligible to sit for the examination. In ambiguous situations the members of the Registration Sub-Committee are consulted. The application may include educational background and college transcripts depending on whether accredited training programs have been completed or not (if accredited training programs have been completed we just need to see proof of completion, if non-accredited training is cited then we need course

descriptions, etc).

A written examination is used to assess knowledge and competence. It is a 100 question, multiple-choice examination. Exam questions in which more than 50% of the candidates answered incorrectly are reviewed.

Experience:

1 year.

Recertification

Recertification period – Registration must be renewed every 3 years

Registration Maintenance methods

Two methods, Re-write Registration Examination or submit Maintenance of Registration package which encompasses professional practice, publications, professional development, continuing education courses and participation in business of the CRPA (i.e. Board/Committee/Conference planning committee membership)

Activities referred to in Maintenance of Registration submission are reviewed by a standing sub-committee, which verifies credits and has the ability to audit submissions.

Code of Conduct

The IRPA Code of Ethics has been adopted as the Code of Conduct for Registered Radiation Safety Professionals.

Annex 7

Certification Schemes

(continued)

D. Slovenia Radiation Protection Expert Scheme

1. Introduction

In Slovenia the Law on Protection against Ionizing Radiation and Nuclear Safety from 2002 recognises radiation protection expert. The Law defines radiation protection expert as the expert who has the required knowledge and is qualified to perform physical, technical and radiological test needed to estimate doses and to give advice on radiation protection measures. The radiation protection expert is authorised by the Ministry of Health. The Slovenian Radiation Protection Society is not involved in the process of authorisation.

2. The role of Radiation Protection Expert (RPE)

The Law defines the role of the RPE.

- The employer has to consult RPE on
 - working conditions of exposed workers
 - extend of the radiation protection measures in supervised and controlled areas
 - checking the efficiency of the radiation protection measures
 - calibration of the measuring equipment
 - checking of the personal protection equipment
- The RPE together with the

employee makes the Radiation Safety Assessment what is the most important document in the licensing process and involves description of the ionizing sources, work with these sources, doses to the workers and to the public, radiation protection measures, etc.

- Every source of ionizing radiation has to be checked in regular intervals by the RPE. The intervals are 6 month, 1 year or 3 years depending on the source.

3. Authorisation Process

The authorisation process is prescribed in the Regulation on Authorisation in the field of Radiation Protection (2004).

3.1. Fields of Authorisation

The one can gets authorisation on following fields:

- Practices in medicine and veterinary where X-ray devices are used
- Practices in medicine and veterinary where unsealed and sealed radioactive sources are used
- Practices out of medicine and veterinary described in the authorisation

3.2. Extend of Authorisation

The one can gets authorisation for:

- Giving the expert opinion based on measurements or calculations on practices where ionizing radiation is used
- Giving lectures on radiation

protection courses for workers working with ionizing radiation sources

The authorisation is given for the period of 5 years. After that a new application is needed. In the new application the evidences on continuous education, training and practical work should be given to the Ministry of Health. There are no prescribed credits, the Ministry of Health decides on the evidences given whether the applicant still fulfils the requirements for the authorisation.

3.3. Requirements for Authorisation

The Ministry of Health issues authorisation on the basis of:

- Expert references in the fields mentioned above
- Required knowledge on the radiation protection in the fields mentioned above
- Required knowledge about ionizing radiation measuring equipment
- Technical or natural sciences university degree
- At least 7 years of practical experience on the radiation protection filed

3. Reporting

The RPE has to report to the employer on

- Results of ionizing radiation measurements in supervised and controlled areas
- Checking of the ionizing radiation sources
- Radiation protection measures that need to be implemented by the users of ionizing radiation sources
- Control of conditions specified in the licence issued for particular radiation practices and ionizing radiation sources

The RPE has to send till 25th in the month to the Ministry of Health the report on the measurements, checks and controls done in the previous month. If deficiencies which could cause the exposure of workers or members of the public above prescribed limits are observed the reporting should be done immediately.

The RPE has to prepare the report on his activities in the past year until March 31st and send it to the Ministry of Health.

Annex 7

Certification Schemes

(continued)

E. Dutch regulation on implementing Radiation Protection 2013 (extract)

The Dutch system for registration of RPEs distinguishes between the coordinating expert and the general coordinating expert. The first one usually acts as a RPE for one or a few applications of ionizing radiation with significant risk. The second one is usually employed as a RPE for complex licenses and/or high risk applications.

Below the main aspects of the Dutch system for registration of RPEs are summarized. The registration is performed by the Dutch Authority for Nuclear Safety and Radiation Protection. Please note that no rights can be derived from this text.

Article 3.3

1. Any person who is registered as a general coordinating expert holds a degree of the course for general coordinating experts.
2. Any person who is registered as a coordinating expert holds a degree of the course for coordinating experts .
3. Registration can only be applied for once and has a maximum duration of five years.

Article 3.4

1. Any person that is re-registered as a general coordinating expert :

- a. holds a degree of the course for general coordinating experts
 - b. has an employer's certificate showing that the person in the five years prior the date of the application has worked at least 500 hours per year within the field of ionizing radiation, and
 - c. has in the five years preceding the application in accordance with section A of Annex 3.1 , 200 earned points with continuous professional development within the field of ionizing radiation.
2. A re-registration in the register has a maximum duration of five years.

Article 3.5

1. Any person that is re-registered as a coordinating expert :
 - a. holds a degree of the course for coordinating experts
 - b. has an employer's certificate showing that the person in the five years prior the date of the application has worked at least 250 hours per year within the field of ionizing radiation, and
 - c. has in the five years preceding the application in accordance with section A of Annex 3.1 , 200 earned points with continuous professional development within the field of ionizing radiation.
2. Article 3.4 , second paragraph shall apply mutatis mutandis.

Dutch system for continuous professional development

Activity	Notes	Rating	Minimum requirement in points per registration period (5 years)
Refresher courses	Proof of participation	10 points per day	Coordinating experts: 60 points Gen. coord. experts: 70 points
Refresher courses with examination	Evidence of positive result of examination	15 points per day	
Attending conferences and symposia	Proof of participation	5 points per day	Coordinating experts: 20 points Gen. coord. experts: 60 points
(poster)presentation or guest lecture at symposium/conference	Proof through program of symposium/conference	10 points per presentation / lecture	
Publication in professional journal	Submitted journal	5 points per publication	
Publication in peer reviewed journal	Submitted journal	10 points per publication	
Teaching at recognized institute	Course program	2 points per hour	
Participation in (inter)national organizations	List of participants	10 points per year per commission	
Membership of professional organizations	Proof of membership	2 points per year	

Annex 7

Certification Schemes

(continued)

F. Spain Radiation Protection Experts Certification Scheme

According to Spanish regulation, the undertaking is the prime responsible for the implementation of the legal requirements in Radiation Protection.

In facilities with a significant radiological risk, a **Radiation Protection Service (RPS)** may be required by the Spanish Regulatory Body, Nuclear Safety Council, (CSN) in order to **give advice** and technical support to the undertaking to ensure appropriate implementation of Radiation Protection (RP) rules.

The **competence in this respect to act is recognized by the competent authority (CSN)**

Facilities in which the undertaking must be supported by an RPS:

- Nuclear power plants and nuclear fuel cycle facilities.
- Hospitals with Radiotherapy, Nuclear Medicine and X Ray facilities (simultaneously).
- Medical facilities with cyclotrons for medical isotope production and diagnostic use.
- Research facilities involving more than fifty people using or handling radioactive material.

In addition to this, in Diagnostic Radiology Facilities, Spanish regulation establishes that the participation of an external RPS (authorized by the CSN) is required for:

- The certification of the project at the registration stage.
- Carrying out an annual quality control review at the operation stage.
- The definition and development of Radiation Protection Program
- The periodical certification of conformity required by Spanish regulations

The RPS are essential elements to ensure the application of the radiation protection system in the facilities in which they are required and, for this reason:

The RPS must be organized **independently** from the rest of the departments of the facility, and the **Head of the RPS (RPE) must be in direct functional subordination** to the manager of the facility.

The RPE is a figure that belongs to a superior organization that is the RPS.

The RPS must be authorized by the CSN and the Head of the RPS (RPE) must also obtain an official license from the CSN which is the highest qualification category in Spain in terms of RP.

The Head of RPS, (RPE) has functions regarding not only to exposed workers but also to the protection of the public and management of radioactive waste.

Requirements for basic competence for the Head of an RPS (RPE):

1. Education:

- **An official Bachelor's degree in science**, or a degree in Engineering or Architecture, or an officially recognized equivalent, in the case of non-national degrees.
2. **Specific training.** The following shall be required:
- Training in the theoretical background and practical aspects of radiation protection **(300 h**, equivalent to approx. 30 ECTS)
 - Specific knowledge in matters related to radiation safety, with respect to the type of facilities (medical, nuclear, industrial) where services are going to be rendered.
3. **Experience and practice.**
- A minimum **three-year experience working in radiation protection.**
 - In the case of X-ray facility for purposes of medical diagnosis, exclusively, a minimum six month experience must be proven

within the field of control and/or monitoring of radiation safety of facilities for medical radiodiagnosis.

In addition to these general requirements, Spanish Regulations also establish that the Head of a RPS (RPE) **in medical facilities** must have an official recognition as **Medical Physics Expert (MPE)**, which is regulated as a medical specialization by the Ministry of Health.

In Spain, the Competent Authority on radiation protection (CSN) undertakes the assessment of RPE competence, and subsequent awarding of RPE recognition. The Spanish Society of Radiological Protection (SEPR) has no official role in certification neither of the RPE nor the MPE, although there is a close collaboration with the corresponding authorities, and SEPR is considered for consultation regarding improvement of the current system and its adaption to the European directive 13/59/Euratom.

Annex 7

Certification Schemes

(continued)

G. Australasian Radiation Protection Accreditation Board (ARPAB)

Specific Legal Entity: ARPAB is sponsored by three professional societies. These being The Australasian Institute of Occupational Hygienists (AIOH), the Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM) and the Australasian Radiation Protection Society (ARPS). The Board is made up of 4 representatives from each of the three participating Societies. ARPS is an Associate Society of IRPA.

Formally defined procedures for:

- (d) Applications:
- a. Recognition Phase
 - b. Core Level Registration
- (e) Assessments:
- a. Competency Profile and Curriculum Guide used to assess Recognition Applications
 - b. Examination Question Bank based on Competency Profile
 - c. Examination results reviewed
 - d. Practical examination
 - e. Defense of application

Scope of Certification: Registered as a Certified Radiation Protection Advisor.

Notes on Scope of Registration:

- (3) The Code of Ethics requires Certified individuals to restrict practicing outside of one's area of expertise

Certification for Other Roles

Not applicable.

Requirements for Registration:

There are two paths to Certification. Candidates with verifiable experience exceeding 5 years in radiation safety are assessed by the Board as being 'Fast -Track' candidates. Those with who don't meet the 5 year experience threshold are considered 'Normal-Track' candidates. For those meeting the Fast Track criteria, the requirements are as follows:

- Acceptance of application for Certification;
- 2-hour written examination consisting of 3 sections (25 multiple choice, 12 short answer and 1 long answer question). A passing grade requires 70% correct answers in each section;
- Practical examination proctored by certified ARPAB person or persons selected by the Board; and
- Oral examination/defense proctored by certified ARPAB person or persons selected by the Board.

Normal-track candidates require the same steps as Fast-track above, but also includes completion of a written assignment (approximately 5000 words) which is agreed upon with the Board prior to submission.

Knowledge/Education:

Typically, a candidate can be accepted into the ARPAB process by completing a recognized

university degree in science, engineering or other program which includes skills in physics, chemistry, mathematics, computation, anatomy and physiology. There is a path for non-graduates who have several years of experience and industry based training that is apropos to radiation safety.

Assessment of Knowledge & Experience (Recognition Phase):

A member of the Board assigned by the Chairperson reviews each application to determine if the applicant is eligible to sit for the examination. The member's recommendation is then provided to the Board for approval. The application may include educational background and transcripts and other documentation.

A written examination is used to assess knowledge and competence. It is a 100 question, multiple-choice examination. Exam questions in which more than 50% of the candidates answered incorrectly are reviewed.

Experience:

1 year professional experience in Radiation Safety.

Recertification

Recertification period – Registration must be renewed every 5 years

Registration Maintenance methods

Two methods, Re-sit Registration Examination or submit Maintenance of Registration package encompassing professional practice, publications, professional development, continuing education courses or other due methods that the Board agrees to.

Activities referred to in Maintenance of Registration submission are reviewed by a standing sub-committee, which verifies credits and has the ability to audit submissions.

Code of Conduct

The IRPA Code of Ethics has been adopted as the Code of Conduct for Registered Radiation Safety Professionals.

Annex 7

Certification Schemes

(continued)

H. Italian Radiation Protection Experts (Qualified Experts) Certification Scheme

Introduction

The “Qualified Expert” (QE) existed in the Italian legislation since the Sixties, and its role has evolved with the subsequent versions of the RP legislative framework. No RPO was present in the legislation; hence the QE assumed some of the roles that today may pertain to the RPO.

The process for QE certification that will be described here is the form cast into the 1995 RP Legislation. Currently, RP legislation is being revised for the implementation of the EU Directive 59-2013, and the two Professional roles for the RPO and the RPE are likely to be introduced.

In Italy, the QE is a professional; an official list is maintained at the Ministry of Labor, in Rome.

A Professional QEs’ Association (ANPEQ) meets, on a voluntary basis, the vast majority of QEs attend, and represents their Professional Category and interests.

ANPEQ is affiliated to IRPA via AIRP’s [the Italian (Scientific) Radiation Protection Association] International Committee.

Legal requirements

A QE is required by law in all activities which fall into the scope of the RP Legislation. The QE must be appointed by the employer/licensee/operator, and has legal (civil

and penal) responsibilities.

The employer must appoint a QE who possesses a QE qualification (degree) corresponding to the field of activity, or higher (see table below)

Requirements for Registration and Certification Process

The process for the certification of the QE is based on the fulfilment of four conditions:

1. Comply with basic generic individual requirements (being European or citizen of specific countries, possessing civil rights, not having being previously revoked from the QE category)
2. Comply with minimum education requirements
3. Comply with minimum training requirements
4. Pass an oral examination performed in Rome by a specifically appointed Commission

Education requirements

Minimum education levels are fixed for the three QE qualification degrees, and include University education (of BSc or MSc level) in scientific fields (chemistry, engineering, physics). See table below.

Training requirements

A period of apprenticeship (training on the job) under the supervision of another QE of the same degree as the one for which the Candidate will sit for the exam is required, and must be declared before its start by the Licensee.

120 working days (around six months) are required for each accreditation degree. More than one year and a half of compulsory apprenticeship is therefore required of the QE Candidate to qualify for the third-degree examination and subsequent certification.

Assessing Panel

The panel assessing QE Candidates is a Commission composed of eight Members (and

eight alternate Members) belonging to: the Ministry of Labor (2), the Ministry of Health (1), the Superior Health Institute (1), the Safety at Work Superior Institute (1), the Ministry of University and Research (1), the Nuclear Regulatory Body (2).

The exams take place once per week in Rome, at the Ministry of Labor: Candidates must be assessed by the panel, normally only via an oral exam, which on rare occasions may be complemented by a written test.

Degrees of QE certification

QE level	First degree	Second degree	Third degree
Area of work (simplified)	X-ray machines	Radioactive sources, X and gamma irradiator, low-fluence neutron generators	Nuclear reactors, high energy accelerators
Requested minimum education level	BSc	BSc	MSc
Requested minimum training level	120 working days	120 working days (for the first degree) + 120 working days (for the second degree)	120 working days (for the first degree) + 120 working days (for the second degree) + 120 working days (for the third degree)

It is also worth to be noted that, in the current legislative framework, QE certification is valid independently from the specific work field, for a given radiation source. For example, a third-degree QE (the highest level) can legally provide RP support both to a medical accelerator in a hospital and to a high energy research accelerator. This is likely to be addressed with the new Legislation adopting the EU 59-2013.

Validity of the QE certification and Recertification

The qualification as QE is currently not subject to renewal. However, the certification can be suspended or deactivated, as the result of an

investigation or a fraud. A QE can be revoked by a judge from the official Ministry of Labor Records and List. A revoked QE cannot sit for the examination again.

Certification for Other Roles

Certification schemes exist for the "Medical Physicist" and for the "Approved Medical Practitioner".

Code of Conduct

No specific Code of Ethics has formally been adopted by the Ministry of Labor as the Code of Conduct for the Professional Category of Qualified Experts.

Annex 7

Certification Schemes

(continued)

I. German regulations on implementing Radiation Protection

Legal basis of RP in Germany

On the basis of the Atomic Energy Act two ordinances have been come into force to protect man and the environment from the harmful effects of ionizing radiation: The Radiation Protection Ordinance and the X-Ray Ordinance. In both ordinances the organisation of RP including the implementation of persons responsible for RP is defined identically.

Radiation Protection Supervisor

According to the Radiation Protection Ordinance and the X-Ray Ordinance anyone who requires a licence of the Atomic Energy Act or pursuant to these Ordinances shall be radiation protection supervisor (German: Strahlenschutzverantwortlicher).

Radiation Protection Commissioners

Insofar as this is necessary to ensure radiation protection for the practice, the appropriate number of radiation protection commissioners (German: Strahlenschutzbeauftragter) for the control and surveillance of the practice in question shall be appointed in writing through the radiation protection supervisor. When a radiation protection commissioner is appointed, his functions, his in-plant authority and his authorization required for him to assume his functions shall be defined in writing.

Persons may only be appointed as radiation protection commissioners if no facts are

known which cast doubt on their reliability and if they possess the requisite qualification in radiation protection.

The competent authority shall be notified immediately about the appointment of the radiation protection commissioner, his functions and authorization, any alterations of his functions and authorization and his resignation from this position. The notification of appointment shall be accompanied by the certificate about the requisite qualification in radiation protection. The radiation protection commissioner and the workers' or staff council shall receive a copy of this notification.

In most cases the Radiation Protection Commissioner is employed at the facility or installation needing a license according to the Radiation Protection Ordinance and the X-Ray Ordinance. Radiation Protection Commissioners do not only give advice to the Radiation Protection Supervisor but also take responsibility for the area of RP defined in their appointment. This structure enables a clear and straightforward assignment of the responsibility regarding RP and has been proven to ensure RP in Germany successfully.

The requisite qualification in radiation protection

The requisite qualification in radiation shall, as a rule, be acquired through an education suited for the respective area of application, practical experience and successful participation in courses recognized by the competent agency. The education shall be

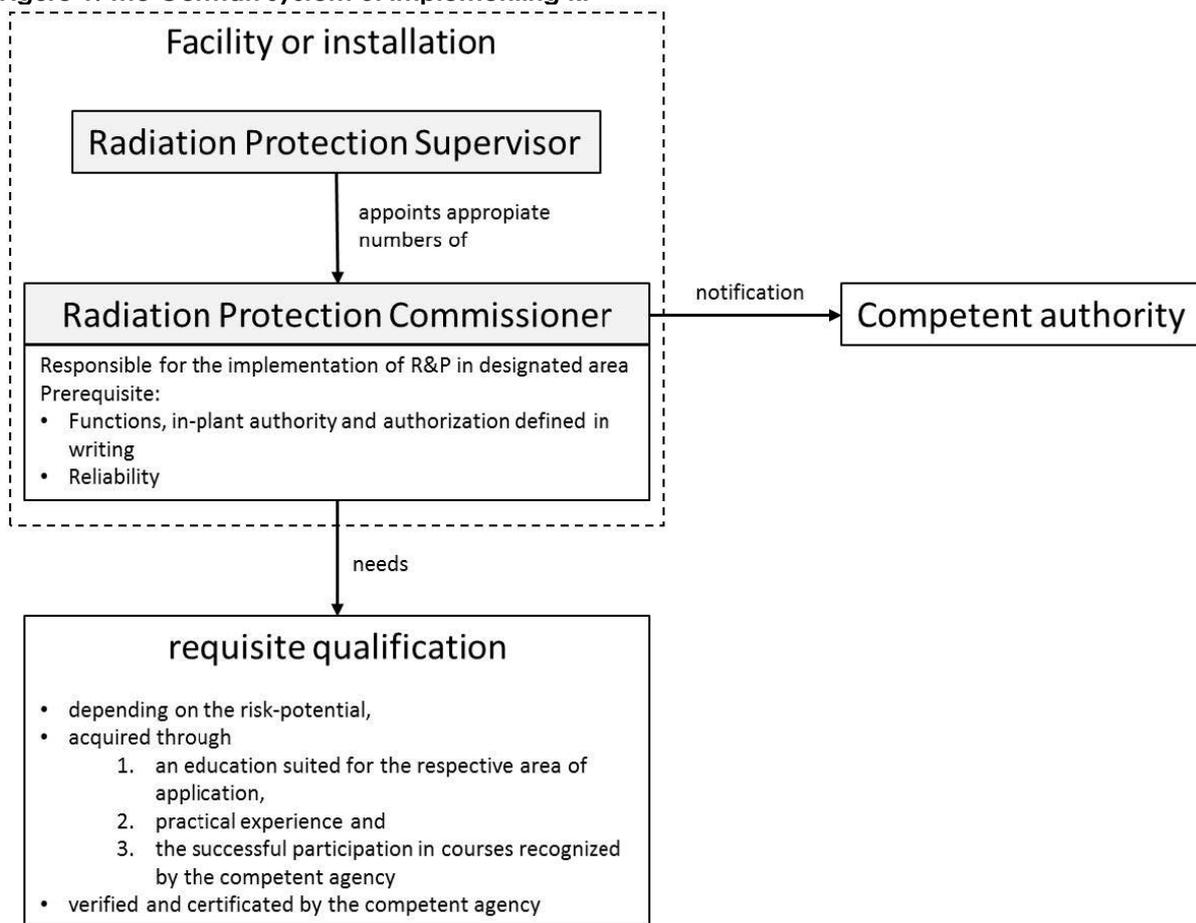
documented by reports, practical experience by supporting documents and successful participation in a course by a certificate. The acquisition of qualification shall be verified and certified by the competent agency.

As many radiation protections commissioners do not necessarily have to prove an academic education a diversified system of many different radiation protection courses (more than 60 different courses) for a large amount of different radiation protections commissioners has been established. By implementing this system different levels of educations and practical experiences can be taken into consideration. As each single radiation protections commissioner has to be

recognised by the competent authority (together with the proof of the requisite qualification) a radiation protection commissioner can be seen in general as a Radiation Protection Expert although many of these radiation protections commissioners do not necessarily have an academic education.

The requisite qualification in radiation protection must be updated at least every five years by a successful participation in a course recognized by the competent agency or other measures of further education recognized as suitable by the competent agency.

Figure 1: The German system of implementing RP



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