Education and Training of RPOs in the Netherlands – beyond EU 2013/59

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Abstract In recent years, the Education and Training system for Radiation Protection Officers (RPOs) in the Netherlands has changed significantly because of the implementation of the European Directive 2013/59/Euratom. The training programs are much more application specific than before. In this contribution, we will comment from a training provider's perspective on this change. It seems to be clear that the new system has both advantages and disadvantages above the system in place until 2018. An unsolved problem in the new system is the mixing of all measurement and control applications into one set of learning outcomes. We report on the outcomes of a project on behalf of the Dutch Authority for Nuclear Security and Radiation Safety to develop more adequate learning outcomes for RPOs responsible for measurement and control applications.

KEYWORDS: RPOs, Education & Training, Measurement and Control Applications, Graded Approach.

1 INTRODUCTION

Until 2018, the system of Education and Training (E&T) for Radiation Protection Officers (RPOs) in the Netherlands basically followed a graded approach. The implementation of the European Directive 2013/59/Euratom [1] forced the Dutch regulatory authorities to adapt this system considerably. Main reason for this is the definition of the RPO, being an "individual who is technically competent in radiation protection matters for a given type of practice….". The old system provided broad scope training programs for RPOs, whereas application specific components were missing. In addition, the former programs did not spend too much attention to soft skills.

In the period 2016-2018, learning outcomes for the new E&T programs were developed and implemented in Dutch legislation. Essential starting point for the Dutch authorities was the graded approach, which is also required by the Directive 2013/59.

In this paper we will briefly discuss the old (chapter 2) and new (chapter 3) system of E&T for RPOs. We will discuss some strong and weak points of the new system (chapter 4) and present the contribution of the University of Groningen to overcome at least partially a major flaw in the new system: the learning outcomes for the training program for RPOs responsible for measurement and control applications (chapter 5). We will conclude with some conclusions and recommendations (chapter 6).

2 OLD SYSTEM FOR E&T OF RPOS IN THE NETHERLANDS

From 1960 onwards, there have been radiation protection courses for Radiation Protection Experts and Officers in the Netherlands. These courses gradually developed into a system that did not significantly change over a period of more than thirty years [2]. This system is summarized in Table 1. On the lower levels (4 and 5) some distinction is made between applications: the A-levels for X-ray devices and the B-levels for open radioactive sources. Both levels however, covered sealed sources.

Table 1. System of E&T of RPOs and RPEs in the Netherlands from 1984 – 2014/2018

Level of Expertise	Characteristics	Purpose
5 (A or B)	Low risk and few sources	X-ray (5A), sealed sources (5A&5B)
4 (A or B)	Moderate risk or low risk and more than ten sources	X-ray (4A), sealed sources (4A&4B)
3	Significant risk	small accelerators, X-ray, sealed and open sources
2	High risk / complex licenses	All licenses

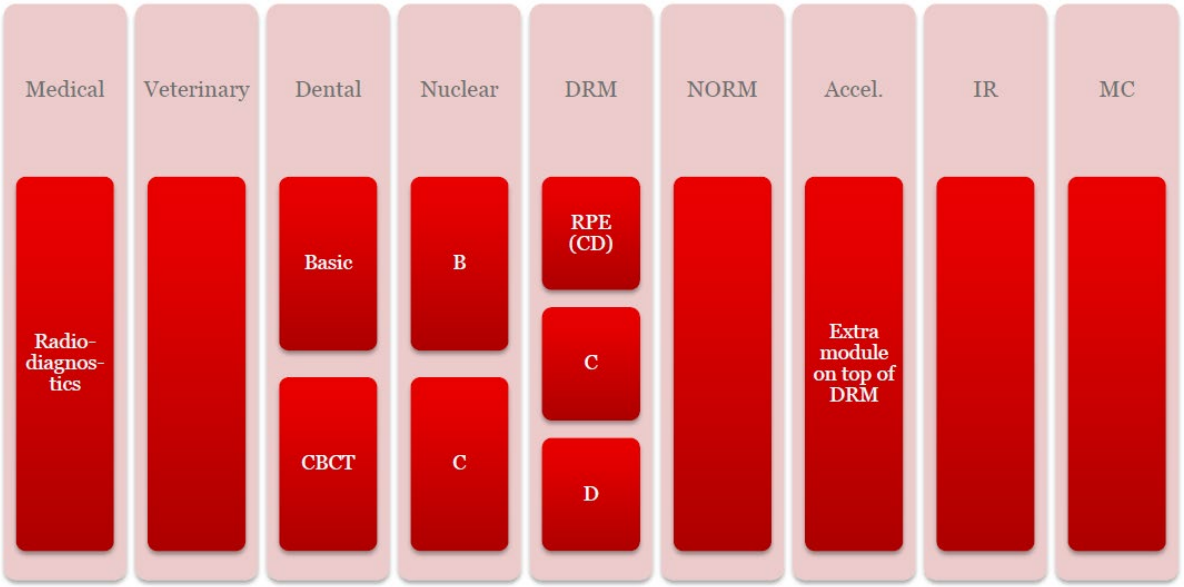
3 THE 2018 SYSTEM FOR E&T OF RPOS IN THE NETHERLANDS

On 6 February 2018 the new Dutch Basic Safety Standards Decree became effective. This Decree and the underlying Regulation introduced the new E&T system [3,4]. In the new system, nine different categories of applications are recognized (see Table 2). In some, but not all of these categories, a further division is made, based on the risk of the application. The system as it in place since 2018 is summarized in Figure 1. Note that in addition the Dutch E&T system recognizes two levels of education of RPEs, roughly coinciding with the levels 2 and 3 in the old system.

Table 2. Categories of applications of ionizing radiation

Category of application	Abbreviation
Medical applications	Medical
Dental radiology	Dental
Veterinarian applications	Veterinary
Nuclear applications	Nuclear
Dispersible Radioactive Material	DRM
Naturally Occurring Radioactive Material	NORM
Accelerators	Accel
Industrial Radiography	IR
Measurement and Control applications	MC

Figure 1. The 2018 System of E&T of RPOs. The categories 'Dental', 'Nuclear' and 'DRM' (and implicitly 'Accel') are divided in two or three levels.



4 STRONG AND WEAK POINTS OF BOTH E&T SYSTEMS

The former system for Education and Training of RPOs was simple and easy to explain and proved its applicability for over thirty years. Most important, it perfectly fitted a graded approach. Unfortunately, it was everything but application specific, except for some distinction between the lower levels, as indicated in chapter 2.

It is clear that the new system is an improvement for some practices. A striking example is the RPO, responsible for practices involving NORM. Until 2018, he/she had to take the level 5B-course, which focused on working with open sources in laboratories. Virtually no attention was paid to the specific aspects of NORM. Also veterinarians and dentists saw tailor made learning outcomes provided by the new Decree. We notice that these the latter two groups already had adequate E&T programs in place from 2013 onwards.

The current Decree also enables the possibility for RPOs with VRS-D or VRS-C to actually act as an RPO for restricted amounts of dispersible radioactive material. Under the old decree, supervision over an isotope laboratory was limited to those who successfully completed a course for RPEs. Thus, for open sources, the new system is more in line with the graded approach than the old system.

Unfortunately, this situation is different for some other categories, especially for the categories 'medical applications' and 'measurement and control applications'. For medical applications, the learning outcomes only describe the low-level risk devices used in diagnostic radiology. No statement is made with respect to the higher risk applications in the medical sector. Consequently, hospitals are forced to look for alternatives. In practice, this implies that RPEs (usually Medical Physics Experts) are acting as RPOs for the more hazardous applications.

For Measurement and Control applications, the situation is even more complicated. In fact, this category comprises all applications not categorized otherwise. To this category belong e.g. all X-ray devices for security purposes, electron microscopes, ^{63}Ni-sources for electron capture detectors, high activity sealed sources used for in-vitro studies, but also the common use of sealed sources for density, thickness or moisture measurements. From this wide range of applications, it will be clear that the learning outcomes for this category are by no means application specific or in line with the graded approach. Moreover, the Regulation does not describe in detail for which applications an RPO trained at the level of RPO MC suffices, leaving licensees in uncertainty.

Of course, one has to realize that it is impossible and even undesirable to enlarge the number of application categories significantly: it would lead to a system of Education and Training that is not feasible economically due to the low numbers of students for some specific applications.

5 LEARNING OUTCOMES FOR RPOS FOR MEASUREMENT AND CONTROL APPLICATIONS

The most striking discrimination between the applications now gathered in the category Measurement and Control applications, is the use of X-rays versus the use of sealed sources. At the same time, representatives of customs and companies only using X-ray equipment, insisted on the development of specific courses for RPOs only responsible for this equipment. The straightforward conclusion emerging from these facts was that a splitting of the category was desirable. Consequently, the Dutch Authority for Nuclear Security and Radiation Protection (ANVS) invited the Groningen Academy for Radiation Protection (GARP) to advice on the splitting of the learning outcomes of the training for RPOs responsible for Measurement and Control applications.

We formulated two preconditions for our advice:

1. Providers of E&T of RPOs for Measurement and Control applications are allowed, but should not be required to adapt their training programs because of the advice. Maintaining the current training program should remain sufficient for RPOs for all Measurement and Control applications. We considered this fair, as a new significant adaption of the E&T system within 2 years from the implementation of the EU directive, leads to an undesired administrative burden without obvious advantages.
2. The advice should not only contain the learning outcomes (or 'qualification descriptors') for the 'new' categories, but should also include recommendations concerning the specific applications for which they are meant.

In order to draw up the advice, GARP set up a working group consisting of representatives of the national Board of Educators, and of Customs. As a template for the advice, we used documents produced in preparation of the current learning outcomes for RPEs [5] and for RPOs for dispersible radioactive material [6]. Thus, we hope to take a step towards future unification of the learning outcomes for all RPOs. A further advantage of this template is the presence of a list of suggested keywords of the subjects to be covered in the training program. This list significantly facilitates E&T providers in setting up their training programs for the respective RPOs.

The working group completed its advice in November 2019 [7]. The advice consists of an introductory justification and two documents with qualification descriptors for the E&T programs for RPOs responsible for X-ray devices and sealed radioactive sources respectively. We expect the advice to be implemented in Dutch legislation in the course of 2021.

The main characteristics of each of the documents can be summarized as follows:

- The learning outcomes in principle apply to X-ray equipment or sealed sources, which are either exempt, or subject to registration. The E&T program also suffices for practices subject to licensing provided that workers do not have to be categorized as 'exposed worker', i.e. their annual dose should not exceed 1 mSv (including potential exposures).
- The learning outcomes for RPOs for X-ray devices are also suitable for RPOs responsible for operating accelerators satisfying the requirements given above.
- Following the graded approach, for higher risk measurement and control applications, the E&T program for RPEs is recommended.

6 DISCUSSION AND CONCLUSIONS

With the recommended splitting of the learning outcomes for RPO MC programs implemented, the new system of E&T of RPOs in The Netherlands will work reasonably well. There certainly is a need for implementing the graded approach for medical applications in a better way than in the current system.

There is however further room for improvement. The working group noted that the qualification descriptors as formulated in the Regulation on Basic Safety Standards Radiation Protection [4] in the form of sub-competencies or learning objectives for the various RPO training courses are hardly coherent. Moreover, the way in which the qualification descriptors are presented, is not uniform. The working group therefore recommends standardizing the current qualification descriptors and reformulating them in such a way that they can be used unambiguously as learning objectives of the training courses. Moreover, they should clearly connect with the duties and responsibilities of an RPO as required by the Decree on Basic Safety Standards Radiation Protection [3].

Apart from these recommendations, the last few years of experience with the new system of education and training of RPOs have proven that a combination of application specific training programs on one hand and implementation of the graded approach on the other cannot always be established at the same time. The transition from the old to the new system has resulted, at least for some applications, in a loss of the graded approach in The Netherlands. Partially, this has to do with economic aspects: only large countries can establish various levels of training for each relevant application category. The smaller the country, the more difficult it becomes to fulfil both requirements (following a graded approach and offering application specific programs). As an example, we mention the E&T program for RPOs responsible for accelerators. To our knowledge this training has only been given to one(!) person in the past two years. Bearing in mind that in The Netherlands a RPE is considered suitable to act as a RPO for all applications (provided he will address application specific aspects in his refresher program), it will be clear that there is virtually no market for this specific training program.

The previous considerations lead to the conclusion that – especially in small countries – a restricted amount of E&T programs for RPOs would be preferable above a detailed distinction between many applications or practices. Discrimination between e.g. X-ray equipment and radioactive sources on two different risk levels might suffice. Specific knowledge is gained subsequently as part of on-the-job training. Furthermore, a wider applicability of the training program for RPOs, increases the possibility to act as RPO for other practices than the one the originally course was taken for. In the new system of E&T in The Netherlands, this advantage of the old system was lost largely – welcomed by some, but regretted by others. In practice this disadvantage of the new system is solved pragmatically, by incidentally offering combined programs, e.g. of RPO VRS-D en RPO MC.

In conclusion, we suggest that the European Commission considers slightly weakening the requirement for competency for a specific practice for RPOs in its next Basic Safety Standards.

7 ACKNOWLEDGEMENTS

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8 REFERENCES

[1] European Commission, Council Directive 2013/59/Euratom, 5 December 2013, https://eur-lex.europa.eu/eli/dir/2013/59/oj.

[2] Bunskoeke, E.J., Boersma H.F., 2013. Education and Training in Radiation Protection at the University of Groningen – past, present and future, in Transactions of the ETRAP2013 Conference, Vienna, 2013, p.318 (accessible via http://ens.cs-flow.be/scientific-resources/conference-proceedings/#1549229280280-90fc6770-c712).

[3] Decree on Basic Safety Standards Radiation Protection ('Besluit Basisveiligheidsnormen Stralingsbescherming'), 2018, https://wetten.overheid.nl/BWBR0040179/2018-07-01 [in Dutch], retrieved March 2020.

[4] Regulation on Basic Safety Standards Radiation Protection ('Regeling Basisveiligheidsnormen Stralingsbescherming'), 2019, https://wetten.overheid.nl/BWBR0040509/2019-02-15 [in Dutch], retrieved March 2020.

[5] Dullemen S. van (ed.), 2012. Eindtermen voor de opleiding Stralingsbeschermingsdeskundige Basis [in Dutch], unpublished (on request available).

[6] Boersma H.F. (ed.), 2016. Qualification Descriptors for the Training of Radiation Protection Officer for Dispersible Radioactive Material Level C / D, accessible via https://www.rug.nl/education/courses/other-education/radiation-protection/eindtermen/qualification-descriptors-rpo-open-sources.

[7] Boersma H.F. (ed.), 2019. Splitting of the Qualification Descriptors for the Training of Radiation Protection Officer for Measurement and Control Applications of ionizing radiation, to be made accessible via https://www.rug.nl/education/courses/other-education/radiation-protection/groningen-academy-for-radiation-protection.