Learning Outcomes for Education & Training Programs for Radiation Protection Officers responsible for open radioactive sources – a German – Dutch comparison

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ABSTRACT

Commissioned by the Dutch Authority for Nuclear Security and Radiation Protection (ANVS) the University of Groningen has coordinated a project for determining qualification descriptors and therefore learning outcomes for RPO Education & Training for open radioactive sources. The project was conducted as part of the implementation of the EU Directive 2013/59 and its immediate predecessor.

The Universities of Groningen and Hannover are collaborating in comparing the new Dutch learning outcomes with the current and possible future German requirements for RPOs for open radioactive sources. This bilateral project aims at providing advice to the ANVS and the German Bundesamt für Strahlenschutz (BfS) to formulate the final learning outcomes for E&T programs for these RPOs. Furthermore – as the lowest level of these programs will also be suitable for radiation workers (RWs) – the project aims at facilitating employers in both countries in mutually recognizing the instruction programs for RWs.

Essential elements of the new Dutch learning outcomes will be presented along with the preliminary results of the bilateral comparison.

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1. Introduction

The Dutch Authority for Nuclear Safety and Radiation Protection (ANVS) requested the field to revise the training system for Radiation Protection Officers. The core of these revisions which derive from the European Basic Safety Standards (EU-BSS) [1] is that the training for Radiation Protection Officers should be application specific. During the past years, a start has been made on these revisions [2]. As an outcome, the University of Groningen has decided to form a workgroup whose task is to formulate the qualification descriptors for the training of Radiation Protection Officers responsible for Dispersible Radioactive Materials, abbreviated as RPO-DRM. The workgroup consisted of 20 members from 15 organizations and met twice in 2016. In the first part of this contribution we present the result of this workgroup.

In the second part of this contribution the objectives and preliminary results of the bilateral comparison between the learning outcomes of the RPO-DRM training with the German equivalent are presented.

2. Scope of the Qualification Descriptors

The qualification descriptors are meant for the tasks of the Radiation Protection Officers responsible for Radioactive Materials in dispersible form in unlimited quantities. Unlimited here refers to “all permits that relate to radioactive materials in dispersible form, regardless of the licensed activity”. The definition and tasks of the Radiation Protection Officer are given in the Radiation Protection Decree [3]. The qualification descriptors are primarily meant for

- Research, analysis and material research
- Production of radioactive materials in dispersible form
- Human radio diagnostics, radiotherapy and nuclear medicine
- Performance of leakage tests

on the understanding that a RPO-DRM can supervise in the medical sector as long as radioactive materials are not applied to the patient (no direct patient contact). Should this be the case, then the supervisor should have successfully completed a training for Radiation Protection Officer for Medical Applications. The qualification descriptors for RPO-DRM should also be sufficient to function as a Radiation Protection Officer for small calibration sources.

The RPO-DRM can be the responsible party for releasing material, waste, equipment and the performance of control measurements on any residual contamination in the laboratory. The *RPE* is actually responsible for the release of the entire laboratory, including technical facilities outside of the lab such as sewer pipes and ventilation systems. The release or dismantling of rooms and technical facilities (during decommissioning) where there is a risk of activated material also falls under the responsibility of a RPE.

The ANVS is currently working on an adjusted system of permits, registrations and notifications as part of the new national Decree on Basic Safety Standards for Radiation Protection (Bbs) and the implementation of the new EU-BSS. The implementation of this project strives for a gradual approach, which is to say that the requirements increase as the risk of the application becomes greater.

In light of this, the workgroup is of the opinion that a two- to three-fold division in the level of RPO-DRM is desirable, and for pragmatic reasons it is proposed to hold to the limits of the Directive Radionuclide Laboratories, which in any case adheres to the gradual approach for regular applications:

- RPO-DRM B for radionuclide laboratories at B-level (A_{max} = 2000 Re_{inh}*)
- RPO-DRM C for radionuclide laboratories at C-level under the direct repsonsibility of a RPE (A_{max} = 20 Re_{inh}*)
- RPO-DRM D for radionuclide laboratories at D-level under the direct repsonsibility of a RPE (A_{max} = 0,2 Re_{inh}*)

(*: In the Netherlands the quantity Re_{inh} is used for the amount of activity A that leads to an effective committed dose of 1 Sv upon inhalation)

A RPO-DRM will, in many situations regarding radiation protection, work under the direct "responsibility" of a RPE. A RPE generally possesses a broad expertise in the area of radiation protection and functions as the first contact point for the RPO-DRM for incidents, etc. Some RPO-DRMs work alone and occasionally must quickly make a decision based on the relevant radiation risks. In such a situation, the RPE is mostly hired in and has limited tasks as minimally defined by law in the Radiation Protection Decree. More is expected from the RPO-DRM, such as quickly making decisions during incidents. The workgroup believes that the difference between these two situations is mainly a distinction in the basic knowledge of a RPO-DRM B with respect to a RPO-DRM C and D. A solitarily-operating RPO-DRM should thus be trained to the RPO-DRM B level.

The EU-BSS states that a Radiation Protection Expert can perform the tasks of a Radiation Protection Officer. Beginning with the assumption that this implies that in the Bbs the tasks from a RPO may be performed by a RPE, there is no reason to formulate separate qualification descriptors for an RPO-DRM Level B – this person should successfully complete the training for a RPE. The workgroup recommends to state explicitly in regulations that the application-specific portion of the training for a RPO-DRM C counts as appropriate (refresher) training in radiation protection for a RPO-DRM B. Summarizing, we assume for the qualification descriptors given here that the RPO-DRM works under the substantive responsibility of the RPE within the organization.

3. Qualification Descriptors / Core Competencies

Two separate documents were produced presenting the qualification descriptors for RPO-DRM C and RPO-DRM D respectively. Both documents summarize the main assignments of RPOs along with the required skills.

The training for a RPO-DRM C is on EQF-level 6. The prerequisites for a course participant will in many cases be a BSc (or just below) with a profile in the exact sciences (physics and health, or physics and technical) from secondary school. The training for a RPO-DRM D is on EQF-level 4 to 5.

The draft qualification descriptors for the basic competencies of an RPO-DRM are grouped in four clusters:

- Core competency 1: The RPO-DRM supervises and enforces (for the applications for which he is responsible) the relevant laws and regulations in the area of ionizing radiation and gives content appropriate advice to the workers and the organization in consultation with the RPE.

- Core competency 2: De RPO-DRM contributes to the appropriate management of an unintentional event or (imminent) incident for the applications for which he is responsible.

- Core competency 3: The RPO-DRM actively works on furthering his own expertise and those of others for whom he is responsible.

- Core competency 4: The RPO-DRM possesses knowledge, skills, attitudes and competencies that specifically apply to radioactive materials in dispersible form.

The core competencies have each been worked out in detailed learning outcomes including a table of keywords for the E&T programs. Learning outcomes for the practical have also been formulated along with recommendations for the assignment procedure.

The nominal training period can vary per educational institute according to the didactic interpretation (schedule, contact hours versus self-study, contact hours versus e-learning/blended-learning, the use of web lectures, etc.), the combination with other courses for RPOs, the entry level of the participants (prerequisites), and the extra packets offered in addition to the minimally required packet. Indicative figures for the training period are given below:

	Indicative length (incl practicals)	Practicals	Professional attitude
RPO-DRM C	10-12 days	2-3 days	1-1,5 days
RPO-DRM D	3-5 days	1-2 days	Not specified

In September 2016, the documents containing the draft learning outcomes for RPO-DRM C and D have been approved by the Advisory Committee on Radiation Protection for inclusion in the new Dutch regulations. The English and Dutch version of the draft learning outcomes are or will be available through our website http://tinyurl.com/RPO-DRM [5].

4. Relation with the old Dutch system of Education & Training

When drafting the qualification descriptors, the workgroup realized that the former Level 4B [6] training is from origin the training for workers who in large part may work independently in radionuclide laboratories. The former Level 5B training had been used by many employers the past decade to train workers who may in large part work independently in radionuclide laboratories. Both Level 4B and 5B experts may even be deployed occasionally as an RPO (currently for sealed sources of limited risk). Consequently there is a large overlap with the old qualification descriptors of the training Radiation Expert Level 4B and 5B [7].

In order to provide employers the possibility to use an acknowledged E&T program for radiation workers (RWs) in the future, the workgroup explicitly recommends the application of the qualification descriptors for the RPO-DRM D to those exposed workers working with radioactive material in dispersible form.

5. Towards a German-Dutch comparison

Building on earlier work the Universities of Groningen and Hannover are collaborating in comparing the new Dutch learning outcomes with the current of possible future German requirements for RPOs for open radioactive sources [8]. This bilateral project aims at providing advice to the ANVS and the German Bundesamt für Strahlenschutz (BfS) to formulate the final learning outcomes for E&T programs for these RPOs. Furthermore – as the lowest level of these programs will also be suitable for radiation workers as indicated above – the projects aims at facilitating employers in both countries in mutually recognizing the instruction programs for RWs.

With the implementation of the EU-BSS ahead and the changes in the Dutch Education and Training system in mind, there is a clear necessity to update the bilateral report, while at the same time an extension to other countries in NW Europe would be of great value. As a first step in this process we intend to compare learning outcomes for E&T programs meant for the RPO-DRM (D) in The Netherlands and the S4.1 Module in Germany [9,10].

The project aimed to reach the following objectives

1. A translation into English of the draft learning outcomes for RPO-DRM C and D in the Netherlands.
2. A description of the expected changes in the current learning outcomes for these RPOs in Germany.
3. Identify gaps between both learning outcomes and formulate advice how to bridge these gaps. This advice will be offered to the competent authorities in relation to mutual recognition of these courses.
4. To make the results available to the whole EUTERP-community as well as to employers interested in mutual recognition of E&T for RWs working with open radioactive sources.

6. Preliminary results of the bilateral comparison

To identify the gaps between both learning outcomes of the RPO-DRM D in the Netherlands and the S4.1 Module in Germany as well as the conformities, a table was generated. As a first step, the learning objectives were compared by focusing on the keywords. As a result, the table illustrates which subjects harmonize most. If the content differs partially, the differences are marked and integrated as supplements. In general, the German learning outcomes are more detailed, which causes an assignment of several German subjects to one Dutch learning objective. Learning outcomes, which are content-wise identical, are contrasted in the following way:

Firstly, the table opposes the importance of the various subjects, as indicated in the Dutch and German learning outcomes respectively, to give advice concerning the arrangement of radiation protection courses. The importance is rated with the help of numbers or rather an amount of crosses. Secondly, the table presents to which extent the learning outcomes are communicated to the course participants. The extent of the training program is a direct consequence of the importance. The Dutch learning objectives are classified by three different categories:

knowledge, skills and competences. The German learning outcomes are categorized with the help of their dyadic operators. The table opposes directly the Dutch category graduation to the German operators. Apart from that, the German learning objectives, which base on the radiation protection ordinance or on other national guidelines are specially marked. Most of those subjects implicitly exhibit a Dutch equivalent. This is because the content is similar and only the legal basis is different.

The table enables to identify legislation related learning outcomes, which indicates conversely the identification of the most significant gap: the knowledge and application of national legislation and national organization structures.

Furthermore, the table illustrates which subjects are supported by experiments. The course providers are responsible for the application and the arrangement of experiments. As a result, this comparison is limited and bases on the information of the Dep. of Health, Safety and Environment / Radiation Protection Unit of the University in Groningen and the Institute for Radioecology and Radiation Protection of the Leibniz University in Hannover. At a first glance, the University of Groningen includes more experiments than the Institute for Radioecology and Radiation Protection in Hannover. In Germany seven hours must be spent on experiments, which is defined in the “Guideline for the requisite qualification concerning Radiation Protection for technical applications”. In the Netherlands there is no specific definition on the extent of the experiments, although roughly 12 hours are spent on experiments at the University of Groningen. As a consequence of the implementation of the EU-BSS the Dutch course arrangement is likely to be extended with a few hours of lecturing or experiments focusing on supervising skills.

Generally, Germany has not proceeded that much in formulating new learning outcomes. Thereby, the requirements concerning the radiation protection education will probably not change, which means that the German subjects will only slightly be modified. Therefore, the comparison bases on the current learning objectives catalogue and on the draft learning outcomes for RPO-DRM D.

The detailed report with all relevant information will presumably be published in August 2017 and will, among others, be available on our website [5].

7. Conclusions

The formulation of qualification descriptors for RPOs responsible for radioactive material in dispersible form contributes to the implementation of the European BSS. Simultaneously, the fact that the qualification descriptors for the RPO-DRM D can also be used as adequate instruction for RWs, facilitates bi- or multilateral comparison of training programs not only for RPOs, but also for RWs.

The bilateral comparison of learning outcomes for E&T programs for the RPO-DRM (D) in The Netherlands and the S4.1 Module in Germany is well under way. Preliminary results indicate a large overlap between the learning outcomes except for the knowledge and application of national legislation and national organization structures.

References

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