

THE CHALLENGES IN RADIATION PROTECTION EDUCATION AND TRAINING IN LITHUANIA

J. ŽILIUKAS,

Department of Expertise and Exposure Monitoring

Radiation Protection Centre

Kalvarijų str. 153, LT-08221, Vilnius, Lithuania

I. GATELYTĖ,

Division of Radiation Emergency Management and Training

Radiation Protection Centre

Kalvarijų str. 153, LT-08221, Vilnius, Lithuania

ABSTRACT

Training of radiation protection is one of the basic instruments to form responsible public position of safe behaviour with sources of ionizing radiation. Skills and knowledge gained in radiation protection training courses guarantee proper and effective use of radiation protection principles to protect public, patients and workers, dealing with sources of ionizing radiation from harmful ionizing radiation effects for health and environment.

Lithuania has a comprehensive and structured programme of radiation protection training, supported and maintained by detailed legislative requirements. All persons who work in activities with sources of ionising radiation, or may be required to do so during emergency response activities, are required to be trained before commencing the work and must attend retraining at regular intervals. The Technical Support Organizations, the teaching staff and the course content are also assessed, approved, and reassessed at periodic intervals. A register of trained persons is held and maintained by the Radiation Protection Centre (RPC). The quality management system of RPC conforming to ISO 9001 standard was implemented in 2009 and covers all activities of RPC, including radiation protection education and training.

On the request of RPC, an EduTA mission was agreed and conducted on 9-13 November 2015 under the Technical Cooperation national project RER9109 "Strengthening Education and Training Infrastructures and Building Competence in Radiation Safety". At the end of the mission, the EduTA team identified certain issues warranting attention or in need of improvement and believes that consideration of these would enhance the overall national capabilities and performances for education and training in radiation protection. According to EduTA recommendations and suggestions it was prepared the actions plan for 2016-2018 which was approved by RPC director.

As a the Member State of European Union Lithuania has to transpose and implement provisions of 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. One of the main challenges of this process is the recognition of Radiation Protection Experts (RPE) in compliance with Directive. Although the national legislation defines the role of the RPE, no recognition system is in place and no persons are designated as RPEs so far. The Radiation Protection Officers (RPO) in Lithuania actually carries out the duties expected of the RPE, and the high level of training required for RPOs is equivalent to that required for the RPE.

Introduction

Radiation Protection Centre (RPC) is a regulatory body and according the Law on Radiation Protection has the function to coordinate and supervise compulsory radiation protection training and play sufficient role in the development, implementation and improvement of radiation protection education and training infrastructure in Lithuania. RPC together with Ministry of Health draft the legislations related to radiation

protection education and training. In scope of transposition of new 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 RPC will have big challenge to review and improve the radiation protection education and training system.

Radiation Protection Education and Training System

The radiation protection training in Lithuania starts in the end of 90ties when Law on Radiation Protection was approved and include article on compulsory radiation protection training which oblige all workers using ionizing radiation, radiation protection officers, first responders and individuals involved in emergency preparedness and response, as well as individuals who most likely could meet the orphan sources to be trained in radiation protection. Responsibility for organization of such training lies on undertakings and employers. For implementation of requirements of Law on Radiation Protection Minister of Health approved Order on Issue of compulsory training in radiation protection prepared taking to account best practice of other countries as well as recommendations and guidance issued by IAEA. This document describe syllabus for compulsory radiation protection training taking to account field of use sources of ionizing radiation and radiation risk and also covers requirements for lecturers and technical support organizations (TSO) providing radiation protection training. The infrastructure of the compulsory radiation protection training was build step by step. The training programmes were prepared by TSO and were approved by Radiation Protection Centre as regulatory body. In few years, almost all individuals who are obliged by Law on Radiation Protection to be trained have been trained.

The technical support of IAEA via regional technical cooperation projects was very valuable for further development of Lithuanian radiation protection training infrastructure. Participation in the workshops and training courses, trainings for trainees and guidance provided by IAEA helps to improve the compulsory radiation protection training. Taking to account IAEA guidance in 2012 was drafted and approved by Minister of Health a new order on Compulsory Radiation Protection Training and Instruction Procedure. This documents change view to the existing syllabus described in previous document and now programs for different users of sources of ionizing radiation, taking to account the radiation risk developed using IAEA suggested model system. Also new document more precisely describe the groups of individuals who need to pass radiation protection training as well as topics of lectures.

Since the 2012 there are the main following groups, who have to be trained in radiation protection in Lithuania:

- Workers, dealing with ionizing radiation sources and radiation protection officers;
- Government officials (Customs officers, State Border Guard Service officers, Police officers and fire fighters) and other employees and persons (as workers of metal scrap yards) whose work (activities) is associated with orphan sources of ionizing radiation and detection of materials contaminated with radionuclides;
- Staff responding to emergencies (firemen's, police officers, workers of medical emergency service).

The 14 modules of radiation protection training are drawn, which are a guide for developing radiation protection training programmes for various groups of specialists (RPOs, workers dealing with ionizing radiation sources, government officials, etc.). Each group of such specialists works with ionizing radiation sources of different risk categories (I to V), and programmes are also developed taking into account the risk category of ionizing radiation sources. For more effective training, there are determined the minimum requirements of education levels for persons, dealing with ionizing radiation sources on their work:

- for RPOs in medical area (Tab 1),
- for RPOs in industrial area (Tab 2),
- for workers in medical area (Tab 3),
- for workers in industrial area (Tab 4).

RS risk category	Minimum education	Initial training duration	Refresher training (every 5 years)
I	University degree in biomedicine, physics sciences or technological sciences	270 hours	20 hours
II, III	University degree in biomedicine, physics sciences or technological sciences	270 hours	20 hours
IV, V	University degree in biomedicine, physics sciences or technological sciences	60 hours	20 hours
Dental X-ray machines	University degree in biomedicine, physics sciences or technological sciences	20 hours	8 hours

Tab 1: The minimum requirements for level of education and training duration for RPOs in medical area

RS risk category	Minimum education	Initial training duration	Refresher training (every 5 years)
I	University degree in biomedicine, physics sciences or technological sciences	270 hours	20 hours
II, III	General education in biomedicine, technological or physics sciences, or specialized secondary school education for graduates up to 1995	270 hours	20 hours
IV, V	High school education, or specialized secondary school education for graduates up to 1995, and acquired professional qualifications equivalent to the type of work	60 hours	20 hours

Tab 2: The minimum requirements for level of education and training duration for RPOs in industrial area

RS risk category	Minimum education	Initial training duration	Refresher training (every 5 years)
I - V	General education in biomedicine, physics sciences or technological sciences, or specialized secondary school education for graduates up to 1995, and acquired professional qualifications equivalent to the type of work with ionizing radiation sources	30 hours	20 hours

Dental X-ray machines	General education in biomedicine, physical sciences or technological sciences, or specialized secondary school education for graduates up to 1995, and acquired professional qualifications equivalent to the type of work with ionizing radiation sources	14 hours	8 hours
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Tab 3: The minimum requirements for level of education and training duration for workers dealing with ionizing radiation sources in medical area

RS risk category	Minimum education	Initial training duration	Refresher training (every 5 years)
I - V	Secondary school education and acquired professional qualifications equivalent to the type of work with ionizing radiation sources	30 hours	20 hours

Tab 4: The minimum requirements for level of education and training duration for workers dealing with ionizing radiation sources in industrial area

To ensure the effective compulsory training process, there are the requirements for TSOs. The TSOs:

- Have to have programmes approved by the regulatory authority - RPC. It is also possible to use the foreign training programmes, only they must be registered in Lithuania;
- Have to have classrooms including necessary equipment for RPT courses;
- Have to enable course participants to use legislation necessary for the courses;
- Have to enable course participants to use all equipment (dosimeter, etc.) for practical course exercises;
- Have to ensure that lecturers of the RPT courses are qualified and have valid attestation certificates listing topics the lecturer is entitled to deliver;
- Etc.

Knowledge of course participants is evaluated after every RPT course. There are some requirements for their effective knowledge assessment:

- An Evaluation Commission should be established to assess knowledge of course participants;
- The Chairman of Evaluation Commission should be a representative of RPC;
- At least one member of the Evaluation Commission has to be a qualified lecturer;
- Evaluation is divided into two parts - theory and practice: a test (30 questions for theoretical knowledge assessment) or 3 open questions, which requires oral answers and demonstration for practical knowledge assessment;
- Evaluation results must be recorded in an examination protocol;
- If participants pass the examination, they get certificates.

Also for the effective training, it is necessary to have high-qualified lecturers, who would be able to share their knowledge with the participants of the courses. Persons wishing to be radiation protection lecturers have to pass an examination of the Attestation Commission and get a certificate. The certificate is issued for specified topics. The Attestation Commission is consisted under an order of the Director of RPC. Examination is divided into two parts - theory and practice. A certified person must have a university degree in technology or physics, or

biomedical sciences. A person wishing to be certificated and be a lecturer can select a number of topics to be certificated for and the main topics are:

- Fundamentals of radiation physics;
- Fundamentals of radiobiology;
- Types of ionizing radiation doses, units of measurements and values, dosimetric equipment and methods;
- Radiation protection fundamentals. Radiation protection system and legal regulation in Lithuania. State radiation protection supervision system in Lithuania;
- Requirements for licensing of practices with sources of ionizing radiation. The state register of sources of ionizing radiation and occupational exposure;
- Radiation protection in industry and science: types of exposure, justification, restrictions, optimization, quality assurance and control system;
- Radiation protection in medicine: types of exposure, justification, restrictions, optimization, quality assurance and control system;
- Public exposure: types of exposure, monitoring and requirements for limited exposure;
- Radioactive waste classification, management and storage;
- Transportation of radioactive materials;
- Preparedness and response to radiological emergencies;
- Radiometric and dosimetry.

RPC is interested in effective implementation of radiation protection training, so once per year (or if it is necessary – more than once) is organizing the verification of institutions (TSO), providing radiation protection training.

Created compulsory radiation protection training system ensure that every year more than 1000 individuals are trained or retrained in radiation protection. In 2008, the Programme (Strategy) on Radiation Protection Training was drafted and approved by director RPC. In 2014, the Strategy was reviewed.

Education and training appraisal mission

Lithuania during the 20 years has already developed the radiation protection education, training and retraining infrastructure. It was sufficient to evaluate how created infrastructure comply with the international standards on radiation protection education and training. One of the tools for evaluation of such compliance is IAEA provided Education and Training Appraisal Mission (EduTA). On the request of the RPC, sent to the IAEA Secretariat on February 2015, an EduTA mission was agreed to be conducted on 9-13 November 2015 under the Technical Cooperation national project RER9109 “Strengthening Education and Training Infrastructures and Building Competence in Radiation Safety”.

The general objectives of the EduTA mission were following:

- To carry out a detailed appraisal of the status of the provisions for education and training in radiation protection and the safety of radiation sources in Lithuania;
- To identify areas in education and training, where the provisions should be improved to meet the IAEA safety standards, the national education and training needs and best practices;
- To provide the Lithuania with recommendations and suggestions for improvement;
- To provide key staff in the Lithuania with an opportunity to discuss the legislative framework and the national policy and strategy in the field, with the EduTA team members who have experience in the issues at stake;
- To promote the IAEA Standards and Guidelines relevant to the scope of the appraisal.

The EduTA team evaluate Lithuanian legislations on radiation protection training, has interviews with the staff of RPC as well as visited TSOs providing the compulsory radiation protection training and retraining and discussed with the TSOs staff.

EduTA team summarise that Lithuania has a very comprehensive and structured programme of radiation protection training, supported and maintained by detailed legislative requirements. All persons who work in activities with sources of ionising radiation, or may be required to do so during emergency response activities, are required to be trained before commencing the work and must attend retraining at regular intervals. The TSOs, the teaching staff and the course content are also assessed, approved, and reassessed at periodic intervals. A register of trained persons is held and maintained by the RPC. The quality management system of RPC conforming to ISO 9001 standard was implemented in 2009 and covers all activities of RPC, including radiation protection education and training.

EduTA mission identified certain issues warranting attention or in need of improvement and believes that consideration of these would enhance the overall national capabilities and performances for education and training in radiation protection. The EduTA team recommended that:

- A recognition system should be developed for the Qualified Experts (QE) and sufficient QEs must be recognised to provide expert advice to the licensees in Lithuania.
- In parallel to the establishment and implementation of QE recognition system, a separation of the functions and duties between QE and RPO should be arranged.
- The training program should be enhanced towards establishing and promoting a National Strategy on education and training in radiation, transport and waste safety.

Conclusions and recommendations of EduTA mission are sufficient for further development and improvement of Lithuanian radiation protection education and training infrastructure.

Challenges in radiation protection education and training

The existing radiation protection education and training infrastructure taking to account EduTA mission recommendations need to be improved. Lithuania is a member of European Union and is required to transpose the requirements of the 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, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom (Council Directive) into the legislation of Lithuania by 6 February 2018. It requires Lithuania to incorporate the role of the Radiation Protection Expert (RPE) into the national legislation. The provisions of Council Directive state that Member States shall ensure that arrangements are made for the establishment of education, training and retraining to allow the recognition of radiation protection experts as well as may make arrangements for the establishment of education, training and retraining to allow the recognition of radiation protection officers, if such recognition is provided for in national legislation. The Council Directive also give provisions for the undertakings to consult with RPE and on an advice shall be covered by the RPE as well as duties of RPO.

The Radiation Protection Officers (RPO) in Lithuania actually carries out the duties expected of the RPE, and the high level of training required for RPOs is equivalent to that required for the RPE. Although the national legislation defines the role of the RPE, no recognition system is in place and no persons are designated as RPEs so far. In any case Lithuania shall review the existing legislation and taking to account the EduTA mission recommendations and requirements of Council Directive to arrange it.

One of the challenges of this process will be the recognition of (RPE) in compliance with Council Directive.

Conclusion

Lithuania has created system of radiation protection training based on Lithuanian legislation and EU and IAEA recommendations. Legal requirements for radiation protection training are developed and met in practice. The created system ensures that persons, who work and deal with ionizing radiation sources or are responsible for radiation protection at working objects, get the main information and skills, required for their effective work and safety.

As a the Member State of European Union Lithuania has to transpose and implement provisions of 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. One of the main challenges of this process is the recognition of Radiation Protection Experts (RPE) in compliance with Council Directive.

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