
TRAINING OF RPOs IN SLOVENIA: LESSONS LEARNED AND SUGGESTIONS FOR IMPROVEMENT

Matjaž Koželj, Igor Jenčič
Jožef Stefan Institute, Ljubljana, Slovenia
matjaz.kozelj@ijs.si



Introduction

- In the process of accession to EU entire new legislation in the field of Radiation Protection and Nuclear Safety has been developed:
 - ➔ Act On Ionising Radiation Protection And Nuclear Safety (2002)
 - ➔ Supplementary Regulations and Rules (2003+)
- New legislation introduced **authorised Radiation Protection Experts** (before: authorised institutions) and defined profiles and duties of **Radiation Protection Officers**.

Definition of Qualified Expert in Slovenian Legislation



- **“Authorised Radiation Protection Expert** shall mean a natural or legal person authorized by the competent ministry, who **has the required knowledge and is qualified**
 - ➔ to **carry out the physical, technical or radio-chemical tests** enabling the assessment of doses, and
 - ➔ to **give advice** on radiation protection measures.”
- In EU BSS additionally:
 - ➔ “A Qualified Expert may be assigned the **technical responsibility for the tasks of radiation protection** of workers and members of the public.”

Radiation Protection Officer



- **Radiation Protection Officer (IAEA BSS):** An individual technically competent in radiation protection matters relevant for a given type of practice who is designated by the registrant or licensee **to oversee the application of the requirements of the Standards**
- In our legislation:
 - ➔ **Radiation protection unit** (in nuclear and radiation facilities) and **the person responsible for radiation protection** (elsewhere)
 - ➔ Established/appointed by undertaking/employer

Responsibilities



- Radiation protection unit:
 - ➔ **responsible for implementing** the radiation protection measures in (nuclear or radiation) facility

- The person responsible for radiation protection:
 - ➔ **shall ensure the implementation and planning** of radiation protection measures **and cooperate** with the competent ministries in matters of radiation protection

Radiation protection unit



- **Responsible for:**

- *Preliminary evaluation of radiological risk*
- *Planning, optimisation and implementation of RP measures*
- *Classification of workplaces into different areas*
- *Classification of workers into different categories*
- *Monitoring the workplaces*
- *Preparing of programmes and reports*
- *Selection and maintenance of protective equipment and instrumentation*
- *Organisation and implementation of intervention in case of emergency*

The person responsible for radiation protection



- **Looks after** safety culture and status of radiation protection, particularly for:
 - *Planning and implementation of radiation protection measures*
 - *Making of written procedures and instructions*
 - *Sending radiation workers to medical examination and training*
 - *Informing the workers and employer about all relevant subjects regarding radiation protection*
- **Takes care** of cooperation with regulatory body (“liaison officer”)



Two “types” of RPOs

- “Type I”: A member of Radiation protection unit staff
 - *Implements operational radiation protection*
 - *Carries out measurements and assessment of radiation conditions*
 - *Works in controlled area*
 - *It is full-time job*
- The responsibility of RP units are also some tasks requiring expertise of Authorised Expert
 - ➔ At least one member must have proper authorization



Two “types” of RPOs

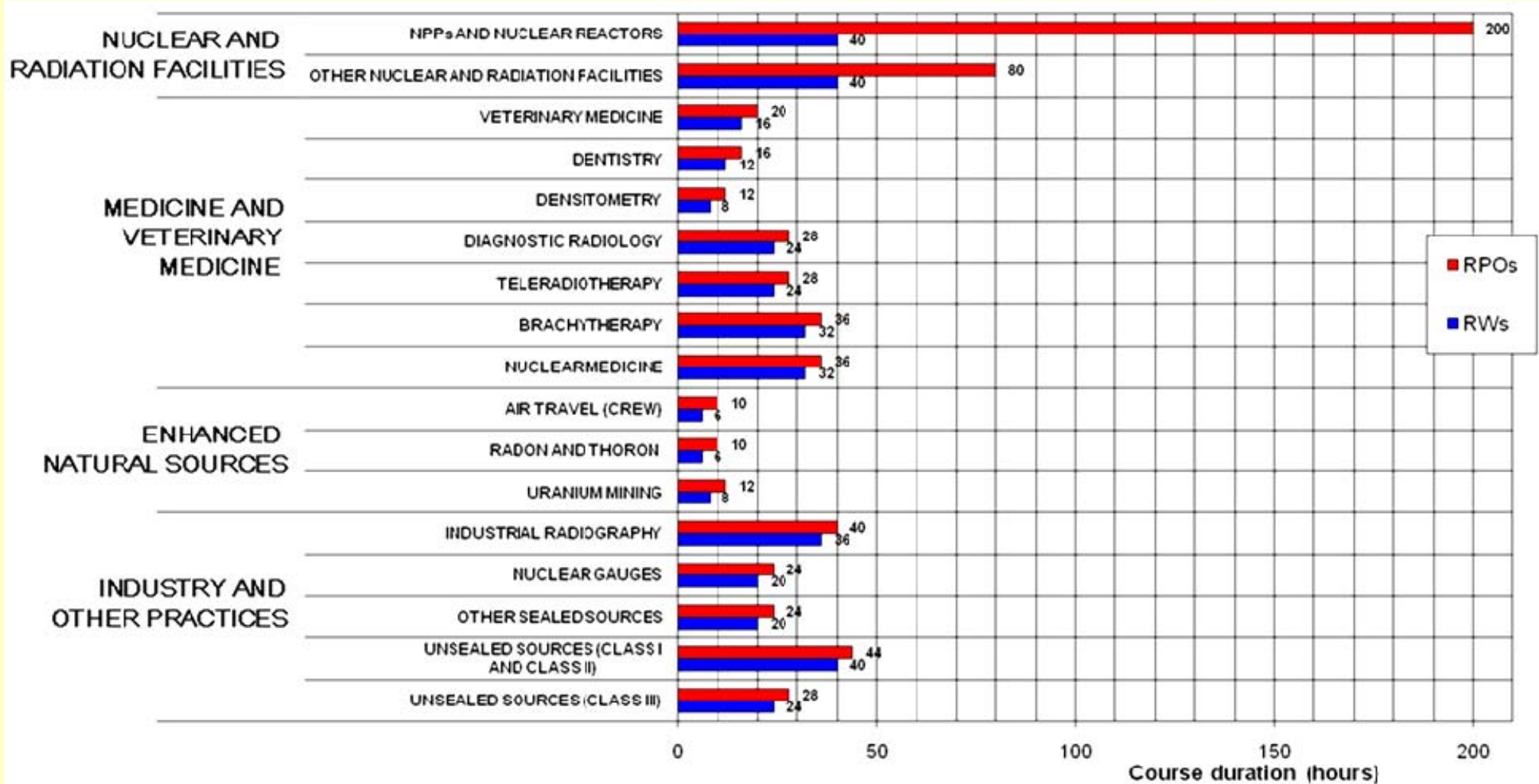
- “Type II”: A person responsible for radiation protection:
 - *More formal duties,*
 - Organizes radiation protection,
 - *Carries out paperwork,*
 - *Usually additional (part-time) job*
 - *Sometimes not “real” radiation worker*
 - *Often with limited practical experience in practical radiation protection*

Training and education of RPOs



- A member of RP unit:
 - ⇒ Required training is demanding and extensive (200 hours for NPP and 80 hours for other nuclear and radiation facilities) + proficiency examination
- A person responsible for radiation protection:
 - ⇒ Required basic training is equivalent to the training of radiation workers + additional contents related to legislation (4 hours) + proficiency examination
- Re-testing on regular basis for all (two- or five-year period)

Duration of courses for RPOs and RWs



Experience from the training of RPOs: Members of the RP Units staff



- Initial training not implemented on regular basis
- Recently implemented as supplemental training for NPP workers that have completed (initial) five-week general RP Course in USA
 - ➔ Lists of Learning objectives and training methods were developed according to legal requirements and NPP needs (**186 LOs** for classroom training and **108 LOs** for practical exercises and on-the-job training for the required 200 hours training).
 - ➔ Supplemental training: **85 LOs** (60 hours) for classroom training and **24 LOs** (20 hours) for on-the-job training.

Programme of Supplemental Course



1. Theory of reactor operation (10 h)
2. NPP systems (22 h)
3. NPP procedures and Technical Specification (10 h)
4. RP Unit related procedures (24 h)
5. Legislation (3h)
6. QA/QC (2 h)
7. Radioactive waste (7 h)



What we observed...

- Supplemental training was successfully concluded with the proficiency examination, but...
- There were problems observed:
 - ⇒ The level of general RP Course abroad was much too high for some,
 - ⇒ Foreign language was serious problem,
 - ⇒ The “two-phase” approach was stressful
 - ⇒ They had problems with (Slovenian) terminology



What we observed... (Cont.)

- Also (serious) deficiencies:
 - ➔ Knowledge of basics was limited and superficial,
 - ➔ “General view” was missing,
 - ➔ There was no preparatory mechanism to introduce them in the RP field (they were “freshmen”) – therefore previous education heavily influenced success of training,
 - ➔ Practical knowledge of RP was limited.
- Supplemental training:
 - ➔ It was efficient, goals were achieved



What should be done

- Training of RP unit staff is extensive and demanding
 - ⇒ Training abroad is definitely not optimal approach
 - ⇒ If the number of candidates is too small for classical course, it would be much more efficient to implement training at home through self-study, on-the-job training, mentoring and practice
 - ⇒ If the training abroad is considered as only option, it is obligatory to introduce some “preparatory” and “levelling” training before the real training, also regarding language skills
 - ⇒ Previous practical experience in RP should be mandatory.



Members of the RP Units staff (Cont.)

- Legislation requires proficiency exam in two-year intervals
- Refresher training is prepared prior to exam (although not required by Rules!):
 - *Review of RP basics*
 - *Practical calculation*
 - *Update of procedures*
 - *Good practice and lessons learned*



What we observed...

- Participants:

- *They are always motivated*
- *They are active*
- *They are “Mixture” of generations*
 - The influence of older and more experienced participants is positive
 - The atmosphere is relaxed and productive
 - Nobody wants to take “shortcuts”
- *They are prepared to share experience*

- Working with them is always stimulating experience!

Experience from the training of RPOs: Persons responsible for RP



- Five-year experience now
- Close to 150 participants attended the Courses
- The groups were very **inhomogeneous** regarding
 - *Education, and*
 - *Previous experience in radiation protection*
- Considerable number **has not and will not** work with sources of radiation
- Often they **lack proper knowledge and understanding** of processes where sources are involved



What we observed/concluded...

- Those with previous experience and knowledge of practical technical detail were able to follow and understand legal requirements with fewer problems
- Considering that
 - The initial training of a person responsible for RP exceeds the training of Radiation worker only in legal matters, and
 - Just “paperwork” involvement of some persons

he/she can not be of much help regarding practical problems, or emergency.



What should be done

- Persons responsible for RP **should have more technical knowledge** on sources and radiation protection than “ordinary” Radiation workers.
 - ⇒ Current form of training is too short and limited to provide it
- They should also have **more experience**
 - ⇒ Practical experience in radiation protection should be required
- Some **professional development** should be required



Conclusions

- Current form of training for RPOs is not optimal:
 - ➔ It is one-step process,
 - ➔ It is extensive and demanding for RP unit staff, and too short and superficial for persons responsible for RP
 - ➔ In both cases it is too “theoretical” and not enough supported with practical experience
 - ➔ There is nothing to stimulate and award professional development of these two groups



Conclusions (Cont.)

- Recommendations:

- ➔ Training should be multi-step process, with practice between individual steps
- ➔ Some previous experience regarding sources and RP should be obligatory condition for entering training
- ➔ Training of persons responsible for RP should be extended to cover more technical and practical knowledge
- ➔ There should be some mechanism to recognise and confirm professional development of workers