

# **HOW TO MOTIVATE YOUNG WORKERS TO BE TRAINED AS RADIATION PROTECTION PROFESSIONALS?**

**S.G. Jahn**

Swiss Federal Nuclear Safety Inspectorate (called HSK until 2008, ENSI after 2009)  
CH-5232 Villingen/HSK  
Switzerland  
Swen-Gunnar.Jahn@hsk.ch

## **Abstract and Introduction**

In the last years several NPP in Switzerland and Germany had some difficulties to hire permanently or temporary Radiation Protection professionals and to maintain the qualification (including the experience) of the actual pool of RP-professionals. In the year 2007 the unexpected outages in several German NPPs caused a reduction of 25% of temporary RP- professionals in a Swiss NPP. Fortunately this situation had no negative results on the outage duration but the authority body found some indication of lower RP performance. The recruitment of RP-professionals may turn to a challenge for the NPP in the next years.

In this report the requirements on the education and training of RP-Professionals in Switzerland as well as the situation of the recruitment of young RP-professionals will be shown and discussed. There is a hope that a harmonised recognition of education and training of RP-professionals will arouse a small improvement of the attractiveness towards the RP-profession career path. This report describes an initiative of a bilateral agreement between Swiss and German stakeholders.

## **Requirements on the RP-organisation of a Nuclear Facility in Switzerland**

The license holder of a nuclear facility in Switzerland has to appoint one person (and several representative assistants), who have the competence in radiation protection to ensure the confirmation with the requirements of the RP-legislation. These persons have to show a RP-qualification on a high level. This qualification level is named RP-specialists and it is comparable to that proposed as RP-experts and RP-officers in the EUTERP-platform for the EU-Basic Safety Standards. The RP-specialists have to be employees present or available on the facility site at all times. The appointed RP-specialist has to give advice to the NPP director. The organisational structure has to ensure a direct communication path between the director and the appointed RP-specialist.

The licence holder has furthermore to employ enough RP-professionals (named RP-technician and RP-controller) to support the appointed RP-specialists, to perform a state of the art RP and to supervise the radiological situation in and outside of the facility.

All three levels of RP-professionals have to be organised in a team independent to the operational crews of the nuclear facility. They are working fulltime as radiation protection professionals. Of course the head of the RP-team (function: RP-manager) has the qualification level of a RP-specialist.

## **General Requirements on the Qualification of RP-Professionals in Switzerland**

In Switzerland the ordinance on education and training in radiation protection (ETRP-Ordinance: [http://www.admin.ch/ch/d/sr/c814\\_501\\_261.html](http://www.admin.ch/ch/d/sr/c814_501_261.html)) regulates the requirements for training and education in RP for a total of 32 different professional categories, depending on the responsibility, the type of facility/practice and the radiological risk. 13 of these professional categories are related to the medical, 3 to the nuclear and 16 to the industrial sector. The industrial sector includes also transportation and maintenance of sources in the medical field.

The ETRP-Ordinance regulates the conditions for official recognition of the training courses. These are

- the necessary pre-qualification of the course participants,
- the detailed syllabus,
- the recommended amount of lessons,
- the recommended amount of practical exercises,
- the competence of the instructors,
- the equipment of the training facility and
- the conditions of the examination including the necessary data on the certificate.

Furthermore the ETRP-Ordinance regulates the approved/allowed RP-activities of RP-persons and also defines the criteria to recognize an RP-qualification, which has been obtained in a foreign country. The necessary qualifications of RP-professions as well as are regulated in an ordinance about education and training in RP:

Three different regulatory bodies are responsible for the recognition of training courses and individual qualifications: The Swiss Federal Office of Public Health in medicine and research, the Swiss Accident Insurance Fund for the industrial sector and the Swiss Federal Nuclear Safety Inspectorate for nuclear facilities.

## **Requirements on the recognition of RP-professionals in NPP and their typical functions**

The recognition of the qualification of RP-specialist for NPP demands

- prequalification on a high school level either in a technical or scientific field,
- theoretical education and training (at least 150 lessons a 45 min = around 5 weeks),
- practical and on the job-training (4 weeks in two different nuclear facilities) and
- one year job experience in the facility, in which he should be appointed, including emergency preparedness exercises

Typical tasks and functions of RP-specialists are:

- To give advice on a wide range of radiation protection matters including emergency cases
- To implement legal regulations into company rules
- To run the RP-organization in the company as well as the planning education and training
- To choose appropriate methods of personal dosimetry
- To oversee the total RP-program for the complete facility
- To write expertises (e.g. Safety Analyses Report) for applying for license or approval
- To report to the regulatory body
- To authorise RP-work plans

The recognition of the qualification of RP-technician for NPP demands

- prequalification as a RP-controller,
- deepening theoretical and practical education and training (at least 350 lessons a 45 min = around 12 weeks) with oral and written tests as well as a diploma work and
- three years on-the-job-experience as a RP-controller, including emergency preparedness exercises.

Typical tasks and functions of RP-technicians are:

- To oversee the RP-program for a part of a nuclear facility or a certain practice
- To classify of controlled and supervised areas or workers
- To select adequate monitoring methods
- To interpret and apply RP data
- To plan the RP issues of new installations and sources or of modifications
- To write RP-work plans
- To master a group of RP-controller (permanent and temporary)

The recognition of the qualification of RP- controller for NPP demands

- prequalification: a skilled trade (2-3 years of training) as for example electrician or mechanic
- theoretical and practical education and training (at least 550 lessons a 45 min = around 18 weeks) with written, oral and practical tests,
- practical and on the job-training (12 weeks in two different nuclear facilities),
- before starting the training it is recommended to work as an RP-assistant in a NPP for at least four weeks, thus the candidate as well as the employer know about the expectations of the job strived for

Typical tasks and functions of RP-controller are:

- To be involved in the routine radiation protection arrangements e.g. supervision, radiation monitoring
- To monitor single handed the radiological status and to take protection measures

There are no requirements on the training of RP-assistants. Within a two weeks training the assistants get the basic knowledge to ensure self protection and to perform trivial RP tasks as routine dose rate measurements and contamination monitoring under the supervision of a RP controller or RP technician. This training needs no recognition.

### **Situation on the Job Market of RP-Professionals and Estimation of Future Development**

Typically a Swiss NPP employs as permanent staff around 3 to 4 RP-specialists, 3 to 6 RP-technicians and 5 to 10 RP-controllers. There is no chance to hire those professionals from the Swiss labour market. Therefore the NPP have to engage somebody to line up the education and training while he is in salaried employment. Because the necessary time period between starting and finishing the graduation as a RP technician takes around 5 years, this situation obliges the RP-managers to plan the human resources and training program on a long term perspective to ensure the legal requirements.

During outages additional around 10 to 60 temporary RP-professionals are necessary to be contracted per NPP. Each Swiss NPP looks forward to hire those temporary RP-professionals, who are already experienced with the local conditions and tasks in the NPP.

In consequence of the aging of the NPP in Switzerland, the maintenance of the contaminated equipment attracts further on the attention of the RP-professionals. The amount of permanent and temporary RP-professionals, who are badly needed, will not shrink but increase. On the other hand the increasing number of NPP in Germany, which have to be decommissioned, binds more and more RP-professionals, who were temporary in the past. Additional there are a lot of RP-professionals, who started their career with the development of NPP industry in the 70-ies and 80-ies, going to retirement in the next years. If Switzerland, as well as other countries, is deciding to plan, construct and operate new NPP several RP-professionals with experience will change to the new opportunities. On the other hand nobody likes to start in professional career on one's own. The RP-professions are relatively unknown in schools and career counselling.

Thus demand on the job market will increase while the supply of labour remains on a very low level. Therefore several companies have started to hire and train persons.

## **Motivation of persons to be trained as RP-professional - Improvements of the Situation on the RP Job Market**

The Swiss-German RP Association (Fachverband für Strahlenschutz) supports a contest of school laboratories performing projects in the radiation protection field. Several groups of pupils have taken part in the contest in 2007. The winners were invited to take part in a RP-conference.

Several high schools in Germany have started off with new RP training courses as a supplement of bachelor in physics or in environment protection techniques.

Beside the career at a high school level, which ends up with a qualification level (for example master) recognised as a RP-specialist, the possibility to enter a training program with several qualification steps from RP-assistant -> RP-controller -> RP-technician -> RP-Specialist may support the motivation of young worker (with lower school education) to be trained as RP-professionals.

Another improvement may result if the labour market will be extended to several states. But it demands a harmonised definition of criteria for the mutual recognition of RP-professionals. Therefore Switzerland looks actually forward to agreements on bilateral recognitions. For example: The Swiss Federal Nuclear Safety Inspectorate (HSK) is in discussion with the Association of NPP Operators (Verein der Grosskraftwerkbetreiber, VGB) to harmonize the education and training requirements for different levels of RP-qualifications, starting with a comparison of

- typical tasks and functions to better know the job profiles,
- required prequalification,
- amount and learning targets of theoretical lessons including exercises,
- requirements on practical exercises and on-the-job-training,
- demands on the tests and examinations and
- demands on the requalification.

As a start up of this joint venture two German NPPs sent RP-controller to the RP-school of Paul Scherrer Institute in Switzerland to take part in the education and training for RP-technicians. A meeting to discuss the details of the agreement is planned in June 2008. The results of this meeting will be shown at the workshop.