

# Education and training of the radiation expert in Belgium

*Herwig Janssens<sup>(1)</sup>, François Tondeur<sup>(2)</sup>, Michèle Coeck<sup>(3)</sup>, Antoine Debauche<sup>(4)</sup>*

*<sup>(1)</sup>XIOS Hogeschool Limburg, Diepenbeek, Belgium*

*<sup>(2)</sup>ISIB, Haute Ecole P.-H. Spaak, Brussels, Belgium*

*<sup>(3)</sup>SCK•CEN, Belgian Nuclear Research Centre, Mol, Belgium*

*<sup>(4)</sup>IRE, Institut des Radioéléments, Fleurus, Belgium*

## Abstract

The Belgian education and training course for radiation experts is presented. Some opportunities and threats are discussed.

## 1. Introduction

Conform to the recommendations formulated in the European Directive 96/29/Euratom [1], a Royal Decree appeared in Belgium in 2001 regulating the qualification and training of the expert in radiation protection [2]. As a result, an education program and training course for the radiation expert was set up since 2003 where four partners are involved: two educational institutions (XIOS Hogeschool Limburg, dptm. Nuclear Technology, Diepenbeek, and ISIB, Haute Ecole P.-H. Spaak, Brussels) and two research institutions (Belgian Nuclear Research Centre SCK•CEN, Mol and Institut des Radioéléments IRE, Fleurus).

The rationale and background of this course were already presented at previous International Conferences on Education and Training in Radiation Protection [3,4], in particular concerning the difference between the radiation expert and the nuclear expert, and the necessary minimal education and training for the radiation experts.

This course meets the requirements imposed by the Belgian law, which is based on the definition of the qualified expert as stated in the European Directive [1]:

- persons having the knowledge and training needed to carry out physical, technical or radio-chemical tests
- enabling doses to be assessed, and
- to give advice in order to ensure effective protection of individuals and the correct operation of protective equipment,
- whose capacity to act as a qualified expert is recognised by the competent authorities.
- who may be assigned the technical responsibility for the tasks of radiation protection of workers and members of the public.

## 2. Specifications of the course

This one year education and training course on radiation protection provides a 20 day, 120 h broad based curriculum, and is separately presented in French and in Dutch. The course offers the necessary scientific foundation but also includes practically oriented sessions. The curriculum is based on the European Communication Com(1998)87def. [5]:

	dutch	french
Nuclear physics	11 h	15 h
Radiation physics	6 h	9 h
Radiochemistry	15 h	15 h
Nuclear measurement techniques	21 h	21 h
Radiobiology and fundamentals of radiation protection	6 h	6 h
Dosimetry	15 h	15 h
Legislation and regulation	9 h	9 h
Optimisation and intervention	6 h	6 h
Practical radiation protection	21 h	18 h
Ethical aspects of radiation risks	4 h	
Examination	2x6h	4x3 h

The detailed program of the course can be found elsewhere [6].

### 3. Participants

The course is intended for specialists from the nuclear sector (nuclear fuel cycle, nuclear power plants, radioactive waste management, production of radionuclides), from the radiological sector (medical nuclear techniques, industrial radiography, scientific research), as well as from the non-nuclear industry (NORM-industry, waste and recycling industry).

On admission of the course, candidates must have acquired a masters degree in natural sciences, medicine or engineering, or a bachelors degree if the candidate can approve an equivalent relevant experience. The course is also open to persons associated with some radiological practice, not aiming at obtaining a legal recognition as radiation expert, but willing to get a certain acquaintance with radiation techniques and radiation protection.

To ensure a high quality level, a maximum of 15 participants per group are accepted. Over the past three years, we registered 53 participants with a diverse initial formation and working environment.

### 4. Opportunities

A quality assessment program is implemented.

Attending one common course for workers from the nuclear sector, from the radiological sector as well as from the non-nuclear industry, and exchanging experiences among each other is highly valued by the participants. This way of working also provides a challenging audience for the lecturers, who have to pay special attention to the individual fields of expertise. Apart from the course, and on demand of the participants, visits to nuclear and radiological installations and extra practical tasks are organized that meet the need of a group of participants.

From the quality assessment program, it is also learned that the participants highly appreciate the global and coherent view offered on the broad field of radiation protection. As a matter of fact, the participants have acquired during their work specific skills in their field of expertise, but this knowledge is often fragmentary. The course offers the opportunity to cross-link this knowledge in evidence-based learning as a broadening of their already existing fragmentary knowledge in the field. The introductory scientific topics in nuclear physics, radiochemistry and radiation physics are not experienced as redundant. On the contrary, it is often considered as a necessary refreshing introduction to the course. From 2005 on, four hours of education are dedicated to ethical aspects of radiation risks with which workers in the field can be confronted in their daily routine.

Although the course is especially designed for the formation of the radiation expert, attendance is dominated by employees of whom the employers consider this training as a well-structured, broad and fundamental introduction to nuclear and radiological technologies. Also the attention for practical work, exercises and visits to nuclear installations is highly appreciated.

## 5. Threats

Future implementation and continuation of this course will be strongly dependent on the official requirements as imposed by the competent radiation protection authorities, related to legally bound matters such as the compulsory presence of radiation experts, especially in the radiological sector and in the non-nuclear industry.

As many Belgian radiation experts also work in neighbouring countries, the lack of a European mutual recognition of radiation experts is felt as a drawback.

## References

- [1] Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation, Official Journal of the European Communities, L159,39(1996)
- [2] Belgian Royal Decree of 20 July 2001 concerning the general regulation on the protection of the population, the workers and the environment against the danger of ionising radiation (2001)
- [3] H. Janssens, H. Vanmarcke, Training of the qualified expert in radiation protection, Proceedings of the International Conference (Saclay): 'Radiation Protection: what are the future training needs?', Radiation Protection, Revue de la Société Française de Radioprotection 35,C-1(2000)215-218
- [4] Herwig Janssens, Michèle Coeck, Gaston Meskens, Training of the radiation expert in a European context, Proceedings of the II International Conference on Radiation Protection Training, Future strategies, Madrid (2003)
- [5] Communication of the Commission concerning the application of the Council Directive 96/29/Euratom of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation, Com(1998)87def.
- [6] <http://projhl.xios.be/SD>, [www.sckcen.be/isRP](http://www.sckcen.be/isRP), [http://www.isib.be/sommaires/fra\\_ens.htm](http://www.isib.be/sommaires/fra_ens.htm)

### *Corresponding Author:*

Herwig Janssens  
XIOS Hogeschool Limburg  
Department Nuclear Technology  
Universitaire Campus, Gebouw H  
B - 3590 Diepenbeek  
Belgium  
T : + 32 11 26 00 30  
F : + 32 11 26 00 54  
e-mail : [herwig.janssens@xios.be](mailto:herwig.janssens@xios.be)