

## **The place of radiological protection in the global management of the risks on the workplaces**

Pascal Deboodt (*pdeboodt@sckcen.be*)

Belgian Nuclear Research Centre (SCK•CEN), Health Physics and Safety Department, 2400 Mol, Belgium

For almost all operations performed in the controlled or supervised area of nuclear installations, the workers are faced with both kind of risks, the radiological one and the non-radiological one.

Quite obviously, the nuclear sector has spent a lot of efforts in order to manage in a safe way the radiological risks. There are still unceasing efforts to improve the knowledge in this field and, in particular, as far as the effects of low doses are concerned.

In many circumstances, the qualified expert in charge of the management of nuclear workplaces will apply the general principles of protection as they appear in the ICRP-60 recommendations [IC91] or in the Basic Safety Standards [BS96]. These principles are the justification, the optimization and the limitation principles. The second one, also known as the ALARA principle has led to many studies, publications and to the implementation of networks (like the European ALARA Network [EA96]).

This approach may be considered as really efficient and, if there is still work to be done, the general framework of radiological protection may be considered as providing satisfactory results.

What has been written up to now is certainly true as long as the radiological risk remains the most relevant for a given workplace. However, there are situations where one has to be very careful and where we need to implement an approach taking into account the other risks.

This question is not really recent but during the last decade, same facts have, directly or indirectly, stressed out the need for a "global management" of the risks on the workplaces.

Let us provide three reasons for developing such a more "extended policy" concerning the health and the safety for the workers.

1. The first relates to the evolution of the regulations. Most of them have since about 10 years recognized the need for a "multi-disciplinary and dynamic" risk management. This is for instance the case of Belgium [RD96]. One of the consequences of this Royal Decree is that in the Class I-nuclear installations, the head of the Radiological Protection Service (the so-called "Physical Control

Service”) has to be the same person as the head of the Internal Service for Prevention and Protection on the Workplace. This last one is in charge of all the topics which are relevant as far as the welfare on the workplaces is concerned (Industrial Safety, Ergonomic, Hygiene, Medical Control, Sociological and Psychological factors).

**2.** Then, a practice of almost ten years as Head of the Health Physics and Safety Department (= ISPWP + PCS) has given the opportunity to be faced with situations where:

- 2.1 transfers between risks occur, consciously or not;
- 2.2 the radiological risk becomes a “secondary” risk;
- 2.3 the risk perception is strongly related to the nature of the yard;
- 2.4 the communication about risk management fails.

Let us, for instance consider the case of this operator who had to perform some work in the controlled area of a nuclear installation. For doing that, he needed to use a ladder. Looking at his ladder, the worker was thinking and found that the contamination of the lower extremities of his ladder (= rubber pieces to avoid the ladder to glide) should give rise for problems afterwards. He then decided to put some plastic sheets around these extremities. What had to happen... did happen. The worker had to stay at home for weeks with a broken leg!

The second situation was encountered during the decommissioning of the Belgian Reactor Three (BR3) at the SCK•CEN. This reactor has been built in the years sixty and was the first Pressurized Water Reactor in Europe. The definitive shut down happened in 1987 and this reactor was considered as a pilot-project on decommissioning and optimization by the European Union.

As expected, such construction of the sixties made use of insulation material containing asbestos. As a consequence of the yearly asbestos inventory (legally required), the presence of asbestos fibres has been detected in the controlled area of the BR3 installation. In accordance with the Belgian regulations, the decision to remove the asbestos has been immediately taken. An external company having a license for such removal operations has been chosen.

In order to manage such yard with both kinds of risks, the following strategy has been adopted:

*Concerning communication issues*

- kick-off meeting with representatives of the Ministry for Health and Work Inspection, of the external company, the project leader of BR3 and the HP&S Department;
- first day of the works: training on RP-topics + visit in the controlled area.

#### *Concerning technical issues*

- discussion with the manager of the external company about his technical procedure (with as consequence, a modification of the chronology of the operation);
- replacement of the company maskers by the SCK•CEN maskers.

#### *Concerning radiological protection issues*

- check-up each day at the Whole Body Counter of two workers (chosen at random);
- daily feedback on the received dose;
- briefing at the end of the yard to provide feedback;
- use of film camera's during the operations.

Due to this specific approach, the following results have been obtained:

- the received dose has been reduced by a factor 4 (19,5 man.mSv instead of 80 man.mSv);
- the amount of removed asbestos and waste was three times higher than expected;
- the duration of the yard initially planned as long as 50 days, has been reduced by 10 days;
- same low radioactive contamination has been detected (W.B.C.); this resulted into the replacement of the maskers of the company by those of the SCK•CEN;
- indirectly related to this first yard, the regulatory authorities gave their authorization for two other yards for asbestos removal, but without requiring for an external company!

**3.** The third reason for developing a global approach of the risk management may be found in the results of twelve years "ALARA practice" at the SCK•CEN.

Indeed, in the early nineties, the management of the SCK•CEN decided for the implementation of the optimization principle. Specific training for ten SCK•CEN agents, a committee "ALARA and Safety", a Task Group "Multi criteria analysis" and an ALARA procedure have been established. Let us summarize the main results of these twelve years:

- the doses, individual and collective, have been reduced; this is of course the main goal of the ALARA approach but taking into account the activities of the SCK•CEN, we have to stress on this fact;
- simultaneously, the number of "non-radiological" accidents has also decreased. This result has to be clearly put in perspective with the nature of the decommissioning of an installation;
- the severity of the "non-radiological" accidents didn't decrease;
- the ALARA procedure has been integrated in the core of the procedures of each installation;
- beyond the "normal" ALARA procedure, some group of workers have spontaneously made successfully attempts in order to modify the technical procedures (with a significant decrease of the dose).

So, and without any doubts, the implementation of the ALARA principle has been successfully, as well as for the radiological risk as for the non-radiological area. In this sense, this "way of approaching" the safety on the workplaces may certainly serve as a baseline for a more global management.

As a conclusion, the management of risks has clearly to take into account the variety and the diversity of risks. If some circumstances require that priority will be given to the radiological risk, some other should be treated with care for other sources of risks. The priority for a given yard should then be examined before the first operation. Kick-off meeting, including all the partners, are of crucial importance. This conclusion was also drawn by the 4<sup>th</sup> workshop of the European ALARA Network [MAOO].

Indeed, during three days, lawyers, radioprotectionists, regulatory bodies, managers and stakeholders of as well the nuclear as the non-nuclear industries have exchanged their views of the "Management of the occupational radiological and non-radiological risks; lessons to be learned".

The recommendations of this 4<sup>th</sup> Workshop are presented now and should be considered as provisional conclusions of this presentation.

1. To effectively manage occupational risk(s), requires the development of a common risk culture among all stakeholders. It is therefore recommended that encouragement be given to including lessons and discussions concerning risk management in the day to day life during studies as early as at school level.

It is also recommended that strategies be set up at national and corporate levels to present and discuss occupational risks

management with the workers, managers, media and public, as well as those in charge of regulations. It is also recommended that consideration be given to making regulations concerning risk management more clear and transparent, both in respect of the requirements and the culture needed to implement them.

2. Risk transfer is a major topic we have, and will have more and more to deal with, not only between occupational risks but also between public and occupational risks and even between human and ecological risks. Therefore it is mandatory to learn how to manage them, through a better knowledge of details of the actual transfers of risks, the factors involved and the interactions of the stakeholders in the decision making process. This could be achieved by developing studies to improve that knowledge, as well as research to define procedures and criteria relevant to making reasonable decisions.

3. The participation of all concerned stakeholders appears to be a key element in arriving at decisions that are reasonable and receive broad acceptance.

## References

- IC91 ICRP, Publication 60, 1991, Pergammon Press  
BS96 "International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources" – IAEA, Safety Series No 115, Vienna, 1996  
EA96 European ALARA Network, see <http://www.cepn.asso.fr>  
RD96 "Law on the Welfare at the Workplaces", Royal Decree on 04.08.1996  
MA00 "Management of occupational radiological and non-radiological risks: lessons to be learned" – 4<sup>th</sup> Workshop of the European ALARA Network, November 19-22, 2000, Antwerp, Belgium

