

# **IMPORTANCE OF THE RADIATION SAFETY OFFICER IN THE OPTIMISATION OF OCCUPATIONAL DOSES**

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## **1. INTRODUCTION**

The decree 86-1103 of October 2 1986, relating to the protection of the health of workers and the general public against the dangers arising from ionizing radiation, describes the function and the tasks of radiation safety officer.

In article 17, we can read:«In any institution concerned by this present decree, handling and use of radioactive sources or electrical generator of ionizing radiation, shall always be carried out under the surveillance of a RADIATION SAFETY OFFICER; This officer is designated by the employer and has attended a radiation protection course successfully»

This radiation protection course consists in a few days course given by a registered institution.

Health institutions are concerned by this decree just like any company, except nuclear power plant.

## **2. FUNCTION AND RESPONSABILITIES OF THE RADIATION SAFETY OFFICER IN THE MEDICAL FIELD**

### **A. Radiation protection training for potentially exposed workers**

Ignorance of the risks can involve many accidents. That is why the radiation protection training is a major issue.

What makes it difficult in the medical field, is that potentially exposed workers have many different educational backgrounds:

- Physicians (radiologists, surgeons, anesthetists,..)
- Nurses and nursing auxiliary (surgical unit, nuclear medicine department, radiotherapy department, radiology department, medicine department...)
- Stretcher-bearer
- Cleaning people
- People who carry wastes (that may be contaminated...)
- Technologists
- Physicists
- Etc....

For each of them, the radiation protection officer must adapt the training so that everybody can understand it and remind of it whenever he needs.

And this training should be repeated periodically.

In that field, the radiation protection officer is a key person because he must ensure that everybody attend the right training.

He also must be able to answer any question or give any advice regarding radiation protection.

### **Encountered Problems:**

- It is not easy to get in touch with all the concerned people. It is very hard to set up this training efficiently.
- It is very tricky to make this course understandable for everybody. Each word is important. The biggest difficulty stands in making people aware of the hazards arising from ionizing radiation without frightening them too much. Generally speaking, two behaviors can be observed relatively to ionizing radiations: some people do not care at all and refuse to protect themselves (mostly physicians) and others are so afraid that they would panic just hearing about ionizing radiations. It is very difficult to adapt the training contents so that all workers adopt the right behavior if necessary.
- This task takes a lot of time

### **B. Evaluation of potentially exposed workplaces**

The radiation safety officer must list all exposed or potentially exposed workplaces.

For each of them, he must establish a « surveillance file » in which the following points would be summed up:

- Detailed listing of all potential exposure sources
- Recommendations relative to practices or work activities in order to maintain professional exposure at the lower level as possible under the dose limitations.
- Classification of the worker and justification of it.
- Description of the kind of medical surveillance corresponding of the workplace
- Measures of protection implemented at the workplace
- Listing of the situations which could involve accidental exposure and what should be done in such cases

### **Encountered Problems:**

- The wide variety of different workplaces in any health institution
- Unlike to the industrial field, very few workplaces are automated. That means that in many cases work practices (and risk of exposure) are dependant of the operator.
- The radiation protection officer needs to find cooperating workers in order to be efficient
- Each workplace should be re-evaluated periodically to take into account any change.
- This takes a lot of time

### **C. Observance of safety measures**

The radiation safety officer has to make sure that safety measures are known and observed. His tasks are:

- To display appropriate signs indicating type of area, nature of the sources and their inherent risks
- To display working instructions appropriate to the radiological risk associated with the sources
- To check the right observance of these signs and instructions
- To check the right use of protections and shielding
- To perform measurements of dose rate behind shielding
- To calculate wall (or shielding) thicknesses
- To write a procedure describing any measures to take in case of incident. The radiation safety officer must make sure that all the workers potentially involved know this procedure and would be able to apply it
- To list all events or work activities that could lead to accidental exposure (higher than dose limitations)
- To investigate when unusual exposure has been noted so that it never happens again

## **D. Radiation sources management**

The radiation safety officer is supposed to list all radiation sources currently used in the institution and to check that they all comply with the technical, medical and administrative requirements.

### **Encountered Problems:**

- There are many different kind of radiation sources used in the medical field: sealed sources, unsealed sources, electrical apparatus
- There are many different types of radiation (beta, gamma, X, electrons...), a wide range of energies (keV->MeV) and a wide range of activities or doses involved (kBq and  $\mu$ Gy for diagnostic ->GBq and Gy for therapy)
- The risks involved are of different sorts: exposure, external contamination, internal contamination

## **E. Waste management**

The management of radioactive waste has always been part of the radiation safety officer job but a new directive (from July 2001) describes it very precisely: all the actions to be undertaken are listed. All the procedures concerning radioactive waste or effluents are to be written down.

## **F. Complying with legal requirements**

Recently many things have changed in the field of radiation protection: operational dosimetry, Transport regulations, waste management, patient dosimetry etc...

The radiation safety officer is in charge of the implementation of all these new requirements relative to radiation protection of members of the general public or workers.

## **3. DAILY TROUBLES FOR THE RADIATION SAFETY OFFICER**

First of all, the educational program needed to get the agreement, as Radiation Safety Officer is much too short and does not fit today's needs in radiation protection. What's more, the radiation safety officer should be able to keep up to date with what's happening in radiation protection but this is not easy to get in most medical institutions.

Another difficulty stands in the lack of time. Indeed, in most institutions, the radiation safety officer is also a technician, a physicist or a physician. That is why only a very small percentage of his time can be dedicated to radiation protection. The radiation safety tasks should be, at least, a full-time job.

In France, we have to deal with other specific problems: the national institutions of radiation protection have been totally reorganized and European directives 96-29 and 97-43 have not been fully transposed yet. As a result, the future of French « Radiation Safety Officer » is vague since we do not know yet the French definition of « Qualified Expert », « Radiation Protection Officer »....

## **4. CONCLUSION**

The radiation safety officer is an operational link between the many different users of ionizing radiation in medical institutions. He is supposed to adapt very restrictive requirements in order to implement them in very complex and specific situations. The Radiation Safety officer has to deal with very varied sources of radiation, with many different departments and workers. He must have skills as a technical expert and as a law expert. He must be a good teacher and he must be able to help the management to make decisions. The Radiation Safety Officer is also a link between the medical institution and the national institutions of radiation protection. On the other hand, the radiation safety officer is not really supposed to deal with radiation protection of patients but in fact he has to take in count this aspect since in the medical field, the major radiation sources for workers are the patients.