

## A way to confront stakeholder's point of view on radiological protection topics

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### Abstract

Since it began operations on 1 January 2001, the Federal Commission for Radiological Protection and Monitoring of Radioactivity in the Environment (CPR) has also sought to promote the ALARA principle as part of its mandate, specifically by trying to involve the various parties that deal with radiological protection aspects. With this in mind, the Commission has initiated a dialogue between the relevant groups in the form of annual meetings with the aim to disseminate information about current radiation protection practices and highlight any weak points from the standpoint of the various stakeholders represented. As a result of these meetings, the Commission has issued a series of recommendations for regulatory bodies aimed at improving the radiation protection of workers, patients and the public in industry, medicine and research. These recommendations are designed to ensure that the legislation is enforced, to promote the standardization of practices, to provide the appropriate protection for workers, patients and the public and also to ensure that quality control is implemented both by the authorities and by supervised operators. The lessons learned from this experience are presented in this paper.

### Introduction

The Federal Commission for Radiological Protection and Monitoring of Radioactivity in the Environment [1] is a body set up to provide advice on matters of radiological protection to the Swiss government (Federal Council), the Federal Department of Home Affairs (EDI/DFI), the Federal Department of Environment, Transport, Energy and Communication (DETEC), the Department of Defence, Civil Protection and Sports (DDPS), any public office that may be involved and also the Swiss National Accident Insurance Association (Suva). According to the Swiss legislation on radiological protection [2] the Commission shall give its opinions on:

- the interpretation and assessment of international recommendations in the field of radiological protection in terms of their application in Switzerland;
- the setting up and further development of uniform principles for the application of radiation protection measures;
- the radioactivity in the environment, the results of monitoring, their interpretation and the resulting radiation doses to the population.

The Commission shall regularly inform the public about the radiological situation in Switzerland. Within this framework the commission intends to remain vigilant concerning the protection of people and environment by informing the population competently and independently when such a need arises. This article presents the strategy put into place by the Commission to support the Alara principle, in particular by strengthening the dialogue between the various participants through regular workshops.

### Commission workshops

The commission organizes a workshop each year with the aim of informing people on current topics in radiation protection and to offer a platform for exchanging viewpoints between the various partners (representatives of the regulatory authorities, industry, medicine, research and other people concerned). This platform must allow the sharing and deepening of knowledge and also the improvement in harmonization and application of the guidance principles for radiation protection. The topics of these workshops and the lessons learned are briefly described below.

#### Individual dosimetry and protection of aircraft crew for cosmic radiation (workshop 2001 [3])

##### *Individual dosimetry*

The goal of the first part of the workshop was to compare the situation of individual dosimetry in Switzerland (Mr. Wernli, PSI) with that in the European Union (Mr. Bartlett, NRPB). This comparison showed that the Swiss regulation on individual dosimetry which came into effect on January 1, 2000, puts

Switzerland in a very comfortable position with regard to the external monitoring of radiation as well as that of internal dosimetry. Figures 1 and 2 give the main results of individual dosimetry in 2003 for Switzerland. More details are available on the web site of the Swiss federal office of public health; <http://www.bag.admin.ch/strahlen/ionisant/dosimetrie/documentation/d/report.php>

#### *Protection of aircraft crew for cosmic radiation*

In addition to the regulatory and dosimetric methods recommended in Europe, Mr. Bartlett also presented in the second part of the workshop the measurements that have been foreseen by the European Union for the radiation protection of crew personnel of flying companies, namely by evaluating the personnel exposed, taking into account these doses while organizing their work, and informing the personnel. The possibility of exempting pregnant women from flying was considered as well. Only the two latter requirements appear in art. 41 on airline crews in the Swiss radiological protection ordinance. With regard to keep doses as low as reasonably achievable, the CPR initiated a study to check the degree of achievement of these requirements. Consequently, it appears necessary to assist operators by specifying the suggested means of compliance with the general obligations mentioned in art. 41. This is the purpose of an updated guidance material drawn upon the expertise of the CPR. Special attention is given to the control of occupational exposures of pregnant women (e.g. to ground the crew members from the moment they declare their pregnancy). The obligation of individual dosimetry for air crew members was not taken over in Switzerland.

In a more general context, the Commission published an update of the recommendations concerning the protection against radiation of the pregnant woman as well as within the professional medical framework. The ideas shared at the time of the workshop are within the framework of analysis undertaken by the CPR on the relevance and the implications of adoption in Switzerland of the European directives.

#### Situation of protection against ionizing radiation in the medical field (workshop 2002 [4])

The CPR and its German counterpart SSK organized a two day workshop relating to the situation of protection against ionizing radiation in the medical field. This information exchange made it possible to compare the status quo in both countries with regard to the frequency of diagnostic radiology examinations as well as administered doses. Concerning the average dose received by members of the population, the results of the recent investigations carried out in Germany and Switzerland highlight large differences between the two countries which require clarification. The average effective dose is estimated as 1 mSv in Switzerland (1998); a survey done in Germany in 1997 resulted in a value of 2 mSv.

The commissions have also discussed the problems of protection against radiation related to the modern radiological techniques, in particular the use of digital systems and the generalization of the multiple slice scanners, which allow examination of broad segments of the body in a very short time. These developments may lead to increased doses administered during examination related to high quality images and multiple series. Various approaches are being used with an aim to control this development or even to inflect this tendency. They consist, for example, in the introduction of diagnostic reference levels (DRLs) which represent a good practise; if the doses in a radiology department are higher, an analyse of the causes is to be started and remedial actions are to be taken. The modalities of introducing these methods were discussed.

Screening mammography, which currently has become an object of controversy at international level, was also tackled. Screening is already applied in Switzerland, in particular in the francophone part of the country whilst the discussion to use this approach is still open in Germany. It appears, however, that the point of controversy lies more within the effectiveness of such program than in the radiological risk associated with screening mammography.

The evaluation of the radiological impact investigated requires a balancing of the advantages of the patient examination with the risk related to the radiation, which he or she will be exposed to. While in the major part of the clinical situations an examination carried out according to the good practise is beneficial for the patient, the communication of this information, in particular with regard to the radiological risk, remains a significant issue. The comparison of risks associated with natural radiation or with other risks, like those resulting from not having an examination, is certainly a useful approach. A better quantification of these risks would be of great help. In its aim to implement an optimal and responsible use of radiation in benefit of human health, the Commission is considering the possibility of setting up a mediation

organization, which could be consulted by medical professionals and technical staff mainly to answer the questions and problems encountered in their use of diagnostic radiology, this in addition to its support of the Swiss Federal Office of Public Health (SFOPH) program in the area of high doses examinations. The Commission is at the moment deliberating the relevance for a collaboration of medical physicists in the University Departments of Radiology.

#### Naturally occurring radioactive materials (NORM) and inspection methods (workshop 2003 [5])

##### *NORM*

This workshop offered in its first part the platform for an information exchange on the problems related to NORM (Naturally Occurring Radioactive Materials). After the presentation of Mr. Van der Steen (NRG) regarding the problems originating in natural radioactive materials in industry, the exposure potential of the NORM in Switzerland was examined by Mr. Piller (SFOPH). It became clear that radon exposure (e.g. inhalation risks for the workers at the time of tunnelling, radon in the dwellings) and the exposure to the cosmic radiation (air crew personnel) are the major concerns of NORM from the Swiss point of view. The Commission approved the radon strategy of SFOPH and will discuss the continuation of the radon program at the end of 2004.

##### *Inspection methods*

The second part of the workshop was dedicated to the critical review of the inspection methods used in radiation protection in Switzerland from the viewpoint of regulatory authorities and inspected operators in the field of industry, medicine and research. The advice on the methods applied in the different fields can be summarized as follows:

##### - Nuclear industry

There is only a limited number of Nuclear Power Plants to be supervised, but each has a high risk potential. The monitoring procedure is heavy, but systematic and considered justified by the regulatory body concerned (HSK). The operators recognized the legitimacy of the inspection authority but they complained, with very relevant examples, about radiation protection having too theoretical concepts. For the credibility of radiation protection a space must be left to an operator to endorse its responsibility. An excess of regulations can have a negative effect - taking away the responsibility of the operator. A careful balance has to be found in dividing up the responsibilities between nuclear facilities and supervision authority. The discussion is open for the search of concerted solutions.

##### - Medical field

There are a very great number of medical practices. The policy of the regulatory body (SFOPH) is directed towards control of the high-risk aspects. The inspection is based on a dialogue with the medical staff and on carefully chosen negotiated solutions. From its point of view, the hospital representative appreciate the policy of collaboration of the inspection authority and have a positive image of it. At the time of the discussion, the problem of the participation of medical physicists in the field of the diagnostic radiology and nuclear medicine was raised. This participation recommended in particular by the European Directive (97/43), is very weak, even non-existent, in the majority of the departments of the large Swiss hospitals.

##### - Other industry and research

There is a great range of enterprises. The regulatory body (Suva) executes its mandate through three parallel channels: inspections, monitoring of the workers respectively of the controlled zones and training. The representative of the enterprises evokes sarcastically the small protected world of radiation protection authorities. It opposes it to the necessary opening of industrial enterprises and the dilemma of the costs of protection. The drift towards the bureaucratization and the paper-war was also stigmatized. Here, dialogue must form the basis of the relationship with industry and research to find a balance between an effective protection of the workers and the demand for profitability.

#### Treatment of radiation victims and transport of radioactive materials (workshop 2004 [6])

##### *Treatment of radiation victims*

The first topic chosen for the workshop 2004 was the preparation of the treatment of irradiated people with some examples of administered treatments.

Professor Theodor Fliedner, Director of the group of research in radiation medicine of Ulm University, presented the treatment of irradiated people, in particular the work of the European group "METREPOL" ("Medical Treatment Protocols for Radiation Victims Accident as a Basis for a Computerised Guidance

System"). Whereas the medical treatment supported till now has been based on a forecast assumption of the dose received, currently it has been recognized that the clinical development of an irradiated individual cannot be predicted according only to this parameter. Often this information is not yet available when decisions have to be made on which treatment shall be administered. A concept is being considered that is based on the response of several body organs according to time, namely of the haematopoietic, neurovascular, cutaneous and gastro-intestinal systems. Based on these inputs, the answer can be categorized in a dynamic way and used as a basis for treatment. It appears that a radiation specialist is more a coordinator of the medical treatment specifically informed by various specialists from the emergency service.

Professor Patrick Gourmelon, Director of the department of human radiation protection of the Nuclear Safety and Radioprotection Institute (France), made a connection to a practical example by presenting the treatment administered to people irradiated at the time of the accidents of Lilo and Lia, Georgia. In both cases, the persons had come into close contact with a high radioactivity source. The treatments consisted of application of the latest techniques of tissue or even organ transplantation. The pictures presented were impressive and highlighted the very long course of treatment with all the unforeseeable ups and downs that depend on body's reaction or tolerance to the transplants. These examples confirmed that the dosimetric data cannot be used as a prognostic factor but rather for describing and documenting the treatment.

The delegate of the Swiss national Accident Insurance Association Mr. Meier presented the Swiss regulations in the case of the dose limit being exceeded. A contract was signed with the University Hospital of Zurich to guarantee the treatment of irradiated people. It seems, however, that an upgrading of this structure would be welcome; it would be beneficial to have several doctors with a specialized training in the treatment of irradiated victims.

#### *Transport of radioactive materials*

The second topic of the workshop reserved for the presentation by the authorities for transport of radioactive materials in Switzerland also included the advice of a representative of a supervising company, as well as representatives of the Swiss federal road authority and of the police in charge of applying the regulation into practice on the road.

The regulatory bodies in the field of industry (Suva) and (HSK) expressed their viewpoint that the complex and very strict regulations, which are derived from the international treaties, were applied in a consequent way by the companies involved in the transport of radioactive materials. They consider in particular that the training of those in charge of the transport within the companies as well as of the drivers is a very important issue. Till now the situation meets the requirements.

The nuclear company representative pointed out that the transport authorizations are vital, so the firms comply without discussing the requirements of the regulatory bodies. However according to him, the companies felt that the strict administrative steps of preparation and realization were exaggerated and went beyond what was necessary to ensure the safety.

The representative of the Swiss Federal Roads Authority explained that the administrative strictness was fixed by the International Conventions. A revision of the edict on the companies in charge of the transport should be launched soon and a broad consultation procedure was considered.

The delegate of the Police responsible for the inspection of transport of dangerous materials presented the surveillance methods on the road and the lessons learned. In general, the packaging was adequate, but the stowing was more critical. The vehicles and documentation generally complied with the requirements. The behaviour of the drivers (speed, maintaining of safety-distance) was currently a point of dispute.

The general impression of the issue regarding transport of radioactive materials in Switzerland was that the regulation in this field was adequate and that the application met the requirements. If one considers a part of the administrative steps as too strict, one must keep in mind that transport is a crucial point within the framework of the management of radioactive materials and that this justifies the strict application of the regulation.

#### **Conclusion**

The reached quality standard of radiation protection in Switzerland is achieved by constant motivation and supervision by the authorities in charge. To maintain the safety of occupationally exposed workers and of the public, constant adaptations of applicable regulations concerning monitoring of radiation protection

and adherence to them of all occupationally exposed are necessary. It is important to keep this in mind in times of savings and budget cuts.

After the first four years of gathering experience, the CPR has concluded that the annual workshops play an important role as a tool in guaranteeing the radiation protection of occupationally exposed workers, patients and the public. They give their participants an opportunity to take a deeper look into topical subjects. In the aim to improve the practice of radiation protection, the basic strategy is to bring various people concerned together to enable them an honest exchange of knowledge, experiences and ideas. Such discussions stimulate recommendations and positions of the Commission, some of them are listed below. Considering the importance of the issue, the CPR intends to engage itself in maintaining this effort in order to ensure a greater transparency in the radiation protection, to keep up with progress in developments and knowledge so as to guarantee an effective protection of the various groups of the population with respect to the risks resulting from ionizing radiation.

One of the important missions of the commission is to inform the public, which actually is difficult to fulfil. Indeed, the regular communications on the situation of radiation protection in Switzerland transmitted by the CPR to information agencies are almost never taken into account. These communications often do not have the expected sensational content. Nevertheless, to get more recognition, in order to keep the contact with the stakeholders, the CPR should continue the annual exchanges in form of workshops. In this context, the commission could aim for better contacts with the non governmental organisation representatives, who defend the general public's concerns. In the future years, the CPR will tend to take up this challenge.

#### **Some recommendations and positions of the CPR**

*Recommendations for protection of pregnant women*

*Recommendations concerning radiological legacies*

*Recommendations for environmental radioactivity monitoring*

*Recommendations for high activity sealed radioactive sources*

*Recommendation for sealed sources used in industrial gammagraphy*

*Recommendation concerning the medical management of radiation accident victims*

*Position on the problem of arms containing depleted uranium used in Kosovo*

*Analysis of the comparison between European and Swiss law on radiation protection*

*Position on creating a National Institute of Cancer Epidemiology and Registration*

#### **Links to legislation and workshops**

[1] <http://www.bk.admin.ch/ch/f/rs/8/814.501.1.fr.pdf>

[2] [www.bag.admin.ch/strahlen/lois/pdf/SR\\_814\\_501\\_en.pdf](http://www.bag.admin.ch/strahlen/lois/pdf/SR_814_501_en.pdf)

[3] [http://www.ksr-cpr.admin.ch/pdf/rapport/seminaire\\_2001.pdf](http://www.ksr-cpr.admin.ch/pdf/rapport/seminaire_2001.pdf)

[4] [www.ssk.de](http://www.ssk.de)

[5] [http://www.ksr-cpr.admin.ch/pdf/f/rapport\\_seminaire\\_2003.pdf](http://www.ksr-cpr.admin.ch/pdf/f/rapport_seminaire_2003.pdf)

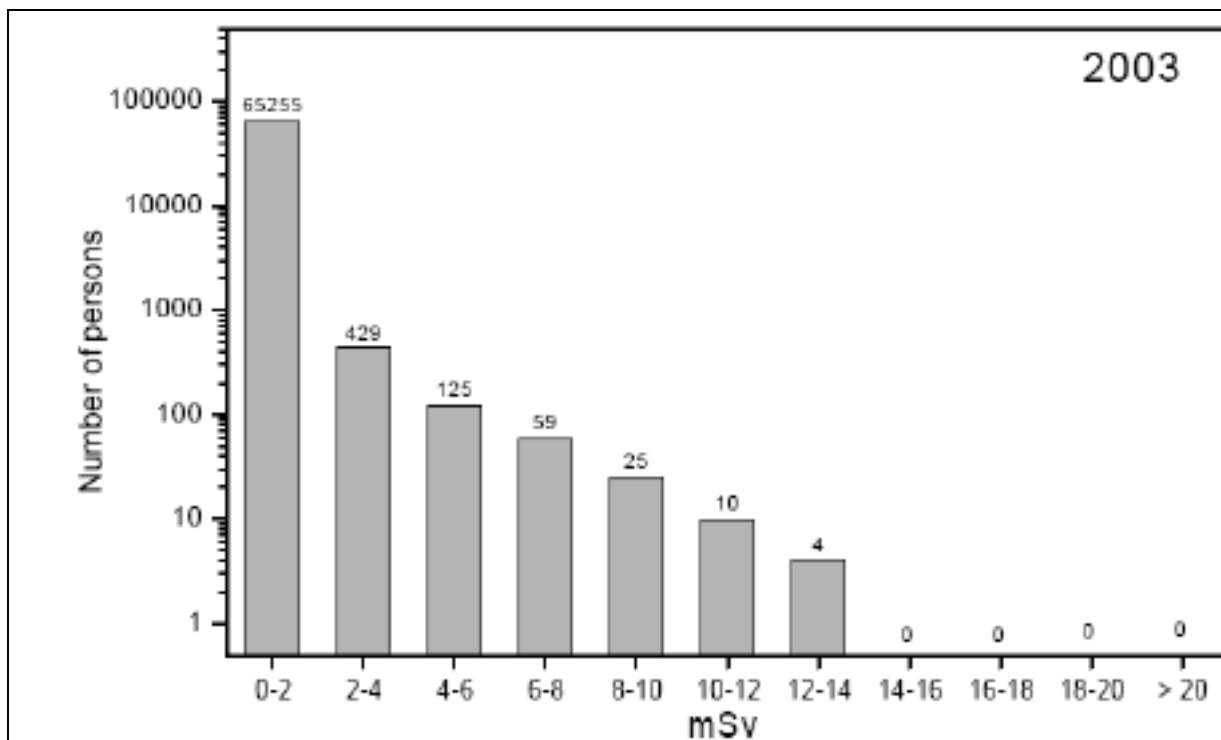
[6] [http://www.ksr-cpr.admin.ch/pdf/rapport/seminaire\\_2004.pdf](http://www.ksr-cpr.admin.ch/pdf/rapport/seminaire_2004.pdf)

#### **Links to regulatory bodies**

- <http://www.bag.admin.ch/e/index.htm>

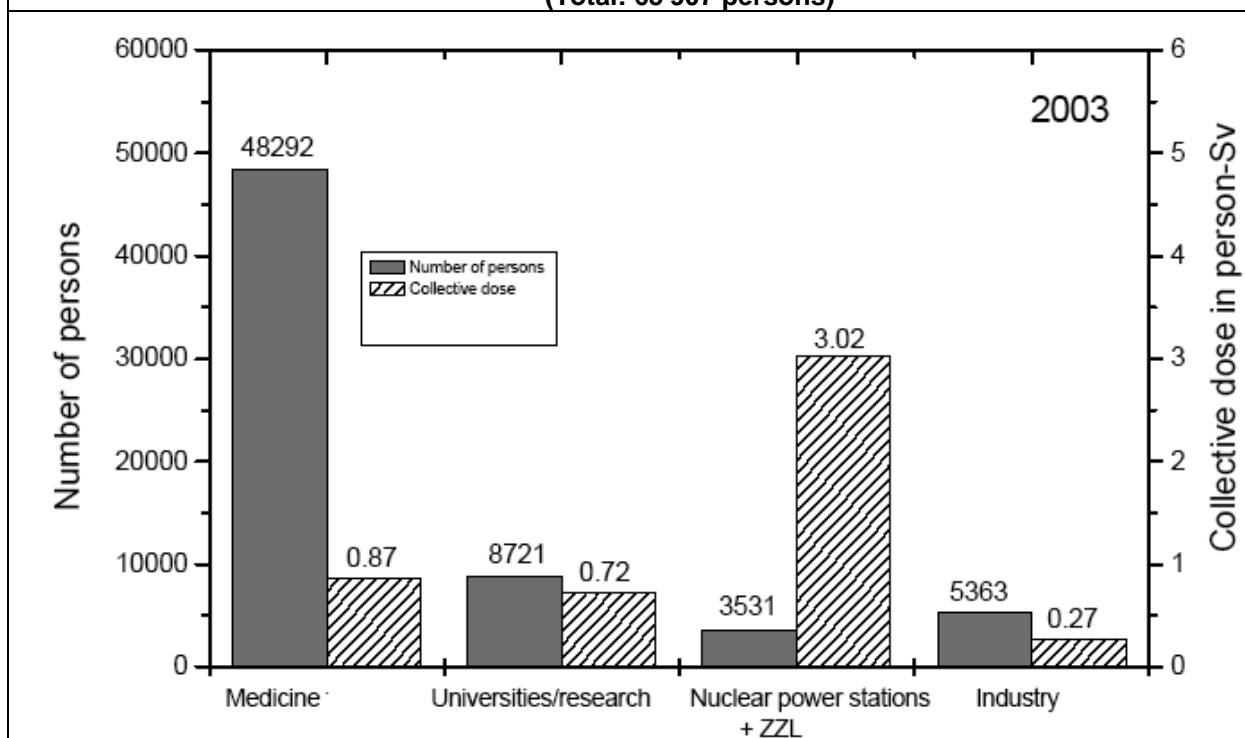
- <http://www.hsk.psi.ch/english/start.php>

- <http://www.suva.ch/en/home.htm>



Figure

1. Effective doses due to external and internal radiation for all occupational sectors  
(Total: 65'907 persons)



Figure

2. Number of persons and collective doses, external and internal radiation