
SISERI - a new system for the survey of occupational exposures in France

G. Barbier, D. Crescini*, A. Rannou* and T. Lahaye***

* Institut de radioprotection et de sûreté nucléaire BP 17 – 92262 FONTENAY-AUX-ROSES

** Direction des relations du travail, Ministère de l'emploi, du travail et de la cohésion sociale, 39-43, Quai André-Citroën – 75902 PARIS CEDEX 15.

Abstract:

A new system for the survey of occupational exposures in France has been designed and is currently tested to enter in operation at the early beginning of 2005. The three objectives of this system developed by IRSN (Institut de radioprotection et de sûreté nucléaire) : centralization of dosimetric data, their treatment and their restitution to authorized persons according to the French regulation transposed from the directive 96-29/Euratom of May 1996. This new system should be a powerful tool for those responsible for the radiation protection of the workers in companies as well as for the expertise of IRSN and for epidemiological studies.

1. INTRODUCTION

SISERI (*Système d'Information de la Surveillance de l'Exposition aux Rayonnements Ionisants* - Ionizing Radiation Exposure Monitoring Information System) is the fundamental management tool for monitoring of workers exposed to ionizing radiation in France. The Radiation Protection and Nuclear Safety Institute that operates and manages SISERI on behalf of the Ministry of Labour, has decided to completely rework the system during recent years. The purpose is to provide a tool adapted to the new requirements of the regulations for use by the various players concerned with radiation protection. For companies, the system must offer fast, reliable and confidential access to workers' dosimetry information to qualified experts in radiation protection (PCR) and occupational doctors, in order to optimise radiation protection and for medical monitoring. Nationally, the IRSN needs similar information for observing and analyzing exposure levels and proposing actions to improve working conditions in the different activity sectors in which workers are exposed to ionizing radiations. These data are also intended for use in epidemiological studies carried out by the IRSN and the different research organizations.

2. THE REGULATORY PRINCIPLES OF THE NEW SYSTEM SISERI

The development of SISERI and its current state of operation are related to the history of the regulation of the dosimetry of the workers. Since 1967, the data of the passive dosimetry has been preserved under various formats.

The publication of the decrees of 1998 relating to the implementation of operational dosimetry gave the OPRI (*Office de protection contre les rayonnements ionisants*), which has been integrated in the IRSN in February 2002, a regulatory mission in the survey of occupational exposures.

The transposition into the French regulation of the directive 96-29/Euratom of May 1996 gave a new dimension of the system and specified the responsibility of IRSN. Indeed, the decree n°2003-296 of 31 mars 2003 enacts a responsibility for filing of the data, validation and control of the whole of the individual dosimetric data of the workers, but also for their confrontation, their interpretation and their confidential restitution under specific conditions to authorized people (only qualified experts and occupational doctors). The principle dispositions of the decree are reported in different ministry orders published or in instance of publication. In particular, the ministry order which specified the rules of transmission and consultation of the dosimetric data should be published at the end of the year 2004. However, the main principles – often issued from the decree of 1998 –are known. They consist in the definition by IRSN of a “protocol for access to the system”, the delivery to authorized people of a personal and inalienable numerical key, etc.

Moreover and in agreement with law No.78-17 of 6 January 1978 relating to computers, files and liberties, the institute obtained in June 2004 the authorization from the *Commission Nationale de l'informatique et des libertés* (CNIL), which is an independent administrative authority protecting privacy and personal data, to use the *Répertoire national d'identification des personnes physiques* which consists assigning a single number of identification for every person working in France. The publication of this authorization and the ministry order will permit the official startup of the system SISERI at the beginning of the year 2005.

3. CENTRALIZATION, TREATMENT AND RESTITUTION OF DOSIMETRIC DATA

3.1 Transmission of dosimetric information to the IRSN

About 250 000 workers in France benefit from passive dosimetry. The dosimeters (film badges), issued monthly (sometimes quarterly) to the controlled workers and returned to laboratories, are employed to measure “passive doses”. The dosimetric quantities employed are the Personal Dose Equivalent $H_p(d)$, deep measurements at depth $d=10$ mm, and shallow measurements at $d=0.07$ mm for gamma and beta radiation. For neutrons it is possible to make dose estimations in terms of $H_p(10)$. Those passive doses are considered as officially doses and must be returned by the laboratory (by an authorized person of the laboratory), with some other information allowing for example the identification of both worker and company, once a month to the IRSN (figure 1). For the time being, about seven laboratories in France are approved and authorised by the Government.

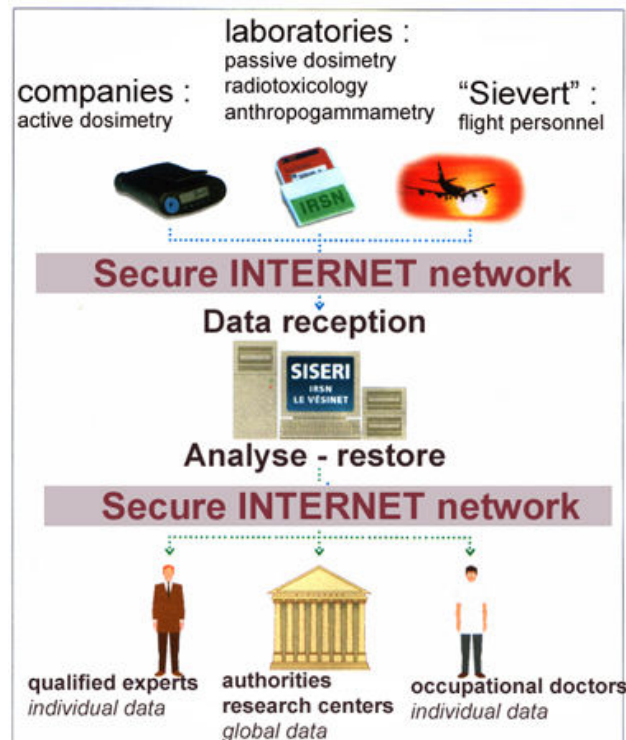


Figure 1 - Transmission of and access to dosimetric informations to the SISERI system.

Since 1998, the legislation obliges workers operating in a controlled area to wear an electronic (operational) dosimeter in addition to the dosimetric film. As for passive dosimetry, the dosimetric quantities employed are the Personal Dose Equivalent $H_p(10)$ and $H_p(0.07)$ for gamma and beta radiation. The dosimetric and associated data must be returned once a month to IRSN. For the time being, about 200 companies are equipped with operational dosimeters and are transmitting information to IRSN. There should be several thousand in the next few years.

Concerning internal dosimetry, the principles are slightly different. Radiotoxicological data and whole-body counts should be transmitted to the Occupational Health Services and by approved and authorised laboratories. The internal dose is thus calculated by the occupational doctor who is responsible for transmitting all this information to IRSN.

Furthermore, airline companies will transmit aircrew dosimetry output from the Computerized System for Flight Assessment of Exposure to Cosmic Radiation in Air Transport – acronym: "S.I.E.V.E.R.T." developed and hosted by IRSN.

3.2 Viewing dosimetric information

Occupational doctors, qualified experts in radiation protection will have access to dosimetric data of workers that they monitor.

The following table indicates values that will be directly accessible on the SISERI Internet site.

Dosimetry – last 12 months	operational	passive	internal	effective
Qualified experts in radiation protection	yes	no	no	yes
Occupational doctors	yes	yes	yes	yes

Table 1 – Dosimetry accessible to the qualified experts and occupational doctors

Occupational doctors may be able to access a life long accumulation (accumulated dose throughout their working life) for medical monitoring purposes.

3.3 The access protocol to the SISERI information system

As mentioned in the previous section, all access to the SISERI information system will be made using a protocol defined by the IRSN. The plant manager (the plant being considered as a distinct geographic entity of the company) or the dosimetry laboratory manager, will be responsible for appointing personnel skilled in radiation protection who will be authorized to transmit dosimetry information to the SISERI system, or to view this information. The plant manager will similarly inform occupational doctors who will then perform medical monitoring for workers in his plant. These persons will be "authorized" by the IRSN; they will receive a numeric certificate enabling them to authenticate, encrypt and sign all their digital exchanges with the SISERI system. This certificate will automatically be revoked every year, such that the plant manager or the laboratory manager will have to keep an up-to-date list of persons authorized to access the SISERI system. Dosimetric information will be transmitted to the IRSN either by electronic mail or through the Web interface (SISERI internet site). Dosimetric information shall be viewed exclusively using the Web interface.

4. FOR THE NEW SYSTEM AND CONCLUSION

Dosimetric information from the former system has been migrated to this new information system. This information applies to almost 500 000 workers who have benefited from dosimetric monitoring at one time or another. Among them about 250 000 persons are still followed up and their data (about 30 000 records per day) need to be collected and archived every year. It concerns 80 000 workers in the nuclear sector and 170 000 persons outside the nuclear sector, in other words conventional industry, medicine, research and various activities using radioactive sources or equipment emitting ionising radiation.

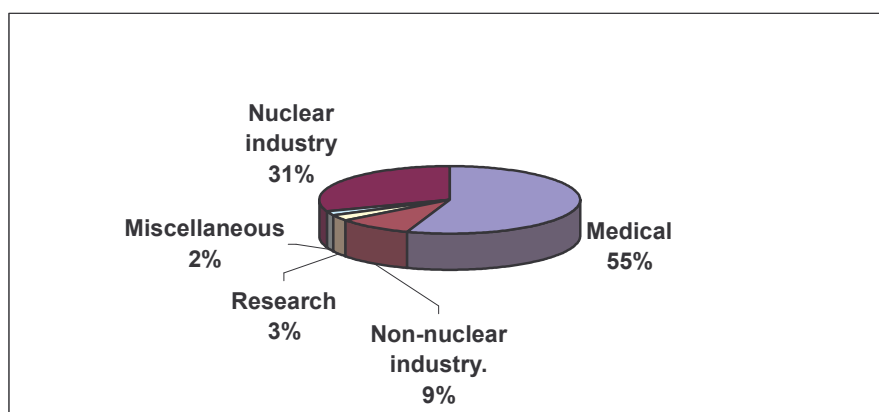


Figure 2 : Numbers of workers monitored in the different activity sectors in France

The SISERI system has been in a "pilot" phase since June 2004. Several nuclear companies and medical hospitals are today transmitting their informations according to the protocol defined by IRSN.

The technical and functional architecture of the system is such that a fundamental tool should soon be available for radiation protection of workers exposed to ionizing radiation. This tool will offer different functions to users:

- archiving and secure restoration of all information about dosimetric monitoring of workers;
- control and optimization of occupational exposure;
- access to individual dosimetry monitoring of each worker, by the person skilled in radiation protection and the authorized occupational doctor;
- reproduction of dosimetric histories on request by the persons concerned;
- a database to support statistical or epidemiological studies.

It will be important that the various persons involved in radiation protection in France should acquire the SISERI information system over the next few years. SISERI will "simply" be a depository for information sent by the different issuing sites. Therefore, a common motivation to have a powerful expertise tool is essential. This tool will then make it possible to analyse specific indicators such as a detailed distribution of individual doses for category A and B workers for specific job or activity sectors, and to compare these data with data from other countries, to compare the results of passive and active dosimetries, to make time history analyses to monitor the variations of relevant indicators (average and maximum individual doses, number of workers for whom doses exceed a given level, etc...).