# DIFFERENT PRACTICES REGARDING ACCESS TO NUCLEAR POWER FACILITIES INSIDE AND OUTSIDE THE UNION EUROPEAN AS PART OF EXPORT ASSIGNMENTS

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The high levels of expertise involved in working on nuclear power facilities requires that operators sometimes call in contractors from other countries to carry out specific maintenance operations. Such subcontracting procedures may also be necessary for economic and financial reasons. Therefore, a large number of workers in the nuclear industry work outside their home country on a more or less regular basis.

The basic principle which governs these so-called export assignments is the territoriality of the law, i.e. the domiciliation of the facility. The regulations of the country where the work is carried out govern the work, even if guarantees are generally given to workers that the regulations in their home country will also be met during their assignment. At the European level, certain regulations, particularly the labour laws (and especially in the fields of health and safety), have been harmonized and a Directive now covers intra-community workers. This facilitates cross-border exchanges.
This is Directive 96/71/CE of the European Parliament and the Council dated 16th December 1996. It concerns the seconding of workers under service contracts. This Directive was to be incorporated in the legislative, statutory and administrative framework of member states at the latest by 16th December 1999. It will be re-examined by the Commission at the latest on 16th December 2001. It makes particular reference to article 3 of the Rome Treaty dated 19th June 1980 that came into force on 1st April 1991 and which established the general rule that the parties may choose the applicable law without constraint. This allows the member states of the European union a certain degree of latitude by slightly derogating from the principle of the territoriality of the law. The purpose of these dispositions was to abolish obstacles to the free movement of persons and services within the European community.

Secondly, nuclear power plant operators are able to impose additional constraints in the form of contractual stipulations. These stipulations are either a response to pressure from the media or constitute ethnic considerations, and like the statutory obligations, should be taken into account at the invitation to tender stage and during the first negotiations.

Apart from the so-called civil status formalities, three points condition the access of workers to nuclear power facilities:

- safety and radiation protection certification and training
- dosimetry
- medical aptitude (or the absence of any medical contraindication) of the person to occupy the workstation, and especially to be assigned to work in ionizing radiation.

There is general agreement in all countries concerning recognition of the recommendations of the International Commission on Radiological Protection, currently the ICRP Publication 60 dated November 1990. In Europe, Directive 96/29/Euratom of the Council dated 13th May 1996 establishes basic standards concerning the health of the population and workers due to risks from ionizing radiation. This Directive reiterated these recommendations and will have to be applied in each state by 13th May 2000 at the latest. However, the national regulations and internal rules specific to each nuclear power station may be even stricter than the ICRP recommendations, or the directives which result therefrom, and this is not without its problems:

**1. Certification and training on safety and radiation protection**

Mechanical, electrical, testing certification, or certification for non-destructive testing issued by the original country are relatively well regulated and recognition is generally implicit in the documents presented. Training in safety and radiation protection in the home country is generally accepted, but often has to be completed on arrival on site and tested. Sometimes they are not taken into account and new training has to be undertaken. This may make it necessary to extend the duration of the assignment in order to satisfy local conditions.

**2. Dosimetry of workers**

Information on the dosimetric history of each worker is systematically requested by the radiation protection services of nuclear power plants and often by the medical services as well.

The information requested usually covers the doses accumulated over the last 3 to 12 months, the 60 most recent months and less frequently in terms of the life total.

The ICRP Publication 60 recommends 20 mSv per year as the effective dose limit, averaged out over 5 years (i.e. 100 mSv in five years) with an additional stipulation according to which the effective dose must not exceed 50 mSv for any of the years. The five-year period is based on the calendar years. It considers implicit in its recommendations that the dose constraint for optimisation should not exceed the 20 mSv per year. The European Directive of 13th May 1996 limits the effective dose to 100 mSv, also over a period of five consecutive years, with a limit of 50 mSv during any one year, while stipulating that the member-states may set an annual dose, and even stricter dose limits, but subject to informing the Commission and the other member states.

In practice, as far as we are aware, certain countries such as the United States, the United Kingdom or South Africa establish dose limits per calendar year. In most other countries, the effective dose limits

apply over 12 and (although less infrequently at present) 60 consecutive months. Outside European territory, the effective dose limits are still usually 50 mSv/12 consecutive months or 50 mSv/year (this is the case in the United States). But this situation will probably not last. Several countries have already established a supplementary limit of 100 mSv/5 years. At the European level, after hesitation, France is moving towards an effective dose limit of 20 mSv/12 consecutive months to run from 13th May, 2000. This is neither more nor less than the objective fixed by the European Directive, but without adopting the notion of the calendar year, nor retaining the less restrictive possibility of setting the level at 50 mSv/year without exceeding the limit of 100 mSv over five consecutive years as chosen by Spain, Sweden and Finland. Germany, the United Kingdom and Belgium have also decided to set the level at 20 mSv/year. More restrictive stipulations may be adopted and Germany has already set the effective life dose at 400 mSv. EDF, one of the French nuclear power station operators, already stipulates an effective dose limit of 20 mSv/12 consecutive months operational dosimetry in its contracts. Setting the effective dose limit at 20 mSv is equivalent to examining the situation of workers as early as 14 or 16 mSv/12 consecutive months. A certain number of nuclear power station operators in other countries have established lower annual limits: 10 mSv/year for instant at Sizewell B in the United Kingdom, or even more restrictive limits, which would increase the dose constraint.

The accuracy or the inaccuracy of the dosimetry measurements is also a factor which has to be considered. In the United States and many other countries, the recognised legal dosimetry is the radiothermoluminescent dosimetry. The results of this method may be considered relevant. In France, film dosimetry remains the recommended method in terms of legal dosimetry. The operational dosimetry, completes the legal dosimetry. It is the real-time controlled method used everywhere for dosimetry optimisation. Without going into the details, especially the energy responses, we have to recognise its inaccuracy which is estimated at more or less 20%. This is no better in terms of accumulated doses than a good quality dosimetry film, although this point is open to discussion.

The most widespread practice encountered in terms of dosimetry is that workers involved in carrying out cross-border assignments carry the dosimeter(s) imposed by the operator of the site, and if necessary the dosimeter assigned by his/her original employer. In France for instance, this last dosimetry record is incorporated into the medical file and counted in the person's official (or legal) dosimetry.

A further point is also worth mentioning. Although in France and in other countries the same legal dosimeter is issued to a worker for the month and covers all his/her working locations, this is not true everywhere and the legal dosimetry may be taken as the site dosimetry, or the operational dosimetry. This is particularly true in the United States.

3. The medical aptitude (or the absence of any medical contraindication) of a worker to occupy a post, and especially to be assigned to work in radiation environments.

Since the aim of radiation protection in working environments is to protect the health of workers exposed to ionizing radiation, it is understandable that all nuclear operators require a medical record

establishing a person's working capacity as part of the access formalities. This requirement essentially concerns the aptitude of a person, or the absence of any medical contraindications, to work in ionizing radiation environments. Since work in nuclear power plants exposes workers to a certain number of non-radiological risks, perhaps higher than the radiation risk, it is also necessary to stipulated that a person is not incapacitated for the execution of other tasks, whether this be working at height, the wearing of protective breathing equipment or ventilated clothing, working in hot environments, assignment to the safety function, and so on. For work in hot environments for instance, apart from the medical aptitude for this work, it is necessary to check on the safety of the workers by measuring or assessing the climatic parameters, clothing insulation, the working metabolism and by establishing limit durations on the work in accordance with the sudatory method established by standard ISO 7933. Paradoxically, the specific medical aptitude of a person is rarely requested by operators.

A certain number of countries, including the United Kingdom, Germany, Sweden, Switzerland, China, and those of Eastern Europe are satisfied with the certificate of medical aptitude, with an occasional added capacity to wear a protective breathing mask (Switzerland, Germany).

Operators in other countries require that a medical record be communicated to them for their own medical service. This may take a simple form, mentioning the usual medical information (past history, height, weight, blood test, current treatment, etc.), the results of a haematological examination (requested everywhere, although other biological examinations such as those which explore kidney and hepatic functions merit just as much attention), the dosimetry history and the decision as to the physical aptitude of the person to execute the work. In the case of Japan, South Korea and Taiwan, the communication of such a medical record appears to suffice. As to Spain, and although the medical record is similar, the blood test requested is more probing. For Belgium's nuclear power plants, the medical record constitutes the back-up document to a medical examination carried out as part of Occupational Health service. This is a requirement implemented by an Order dated 5$^{th}$ December 1990 concerning the medical examinations applicable to employees of subcontractors called in to execute works in Belgium's nuclear power stations. By a decree dated 11th July 1994, France also requires that employees temporarily assigned to a contractor without an establishment in France undergo special monitoring by the occupational physician of a territorially competent joint contractors' service. This decision makes reference to the Treaty of Rome dated 19th June 1980 regarding European workers. It leads us to observing that this treaty is often subject to the most restrictive interpretation. As stipulated in the most recent legislation, in the case of itinerant employees moving from one installation to another within the same national Territory, France is orienting towards exchanges of information between the occupational physician of the subcontractors and the occupational physician of the nuclear installations. This is materially evidenced by a medical record or more probably by a computerised health card and explains the current position, which is pending since the decree of application has not yet been published. For South Africa, full and very detailed medical records have to be communicated to the nuclear site occupational medicine service (but contrary to requests from other countries, no dosimetry information is requested, dosimetry being the responsibility of the radiation protection service). In addition, the physician who drafts this document must be approved by the electricity company's physician, in this case Eskom. On the other hand, no medical examination is

required on the site. The only examinations which are carried out, like everywhere, are the anthropogammametric or the anthroporadiametric examinations on entering and leaving the site. For the United States nuclear power plants, export assignments are carried out by American subsidiaries and the medical qualification of a worker is the responsibility of the medical centre whose work is very similar to the so-called health check-ups. The psychological examination is one of the elements. No former medical record is accepted.

Since the European Directive of 13th May 1996 provides for surveillance by approved physicians (that France calls “trained physicians”; in the same way that qualified experts will be called “competent persons”), a simplification of the information exchanges between occupational physicians or occupational health services within the European Union is preferable and answers community objectives. Either the medical aptitude or non-contraindications sheet should suffice (by insisting much more on the specific qualification relating to the work carried out), which would be logical in terms of certifications; or a simplified record or a computerised international health card would remain acceptable. On the other hand, at Community level it would be inconceivable that the access conditions were in any way protectionist. For countries outside the European Union, a simplified record, based on a standard model, should in our view be adopted.

The period of validity of this aptitude is an important point to be considered particularly in that, at the European level, an annual frequency was established by the Directive of 3rd May 1996. Most frequently it is one year, otherwise six months (as is the case in France and Belgium). This is a factor that has to be taken into account, although South Africa has recently been asked to provide information on new events occurring between two assignments in the form of a complementary record, even if the period of one year has not been exceeded.

Another important aspect is the additional request from certain countries to certify the non-use of drugs for each case. In Sweden and certain states of the United States, this is mandatory. The French nuclear operator requires that contractors' occupational physicians take into consideration the risk associated with drug addiction when determining the aptitude of a person to undertake work which may have an impact on nuclear safety. In the United States, drug and alcohol testing is routine. In the United Kingdom they are random.

Lastly, rather than further formalising or complexifying medical data exchanges, it is more the inspection and monitoring of internal exposure and the dosimetric events occurring during the work which should be effectively communicated to the sub-contractor's occupational physician. At present, this is carried out routinely on certain Belgium nuclear power plants, but in France only in the event of incidents. These are improvements which should be examined.

Thus, faced with the variety of conditions of access to nuclear power facilities for workers from other countries, even within the European Union, a certain harmonization would be necessary, at least at the European level. This could cover:

- recognition of safety and radiation protection certifications,

- recognition of the legal dosimetry of the home country and the implementation of site operational dosimetry at the work place without this bringing into question the dosimetric targets adopted by each country or imposed contractually by the operators,
- recognition of medical aptitude (or no medical contra-indications), if necessary by promoting the use of a simplified medical record as a complementary measure,

- communication of operational dosimetric data to the sub-contractors' radiation protection services and its use for optimization purposes,
- communication to occupational physicians of the internal exposure surveillance records carried out during the assignment, the operational dosimetry and any health-related event which may have arisen.

Such harmonization may lead to the implementation of a system for certifying companies working in the nuclear industry, and recognized either at a European level or internationally. This should not constitute an insurmountable objective when only 32 countries in the world (34 ultimately taking into account current ongoing work sites) have one or several nuclear power stations on their territory. In the European Union this only affects 8 countries.

# MEDICAL RECORD

**NAME** : _____
**Forename** : _____
**Date and place of birth** : _____
**Nationality** : _____
**Company** : _____
**Employment** : _____

Date of first assignment to works in ionizing radiation environments _____

## HISTORY OF SIGNIFICANT MEDICAL EVENTS

## HISTORY OF EXPOSURE TO IONIZING RADIATION

**Professional exposure**

Dosimetry over 12 previous months : _____ mSv

Dosimetry over 5 previous years : _____ mSv
Life total : _____ mSv on: _____

**Significant medical exposure**

## RESULTS OF LAST MEDICAL carried out on: _____

Weight: _____ Height: _____
Blood pressure: _____ Heart beat: _____
Other medical factors to be noted: _____

## OBSERVATIONS ON ADDITIONAL EXAMINATIONS OR CHECK UPS

## MEDICAL CONCLUSIONS

Suitability : _____
Restrictions on suitability : _____
Date and signature of Occupational Physician

Prepared at _____ On: _____

***Attachments:***
Copy of the most recent biological tests and other specialized reports
Copy of the exposure sheet or dosimetric record
Other significant events from the medical history file

**INDIVIDUAL DOSIMETRY REPORT**

**NAME:** **Forename:** **Company:** **Service:**

| MONTH/YEAR | M -59 | M -11 | M -10 | M -9 | M -8 | M -7 | M -6 | M -5 | M -4 | M -3 | M -2 | M -1 | Current month | 3-MONTH TOTAL | 12-MONTH TOTAL | 60-MONTH TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dose equivalent in mSv | | | | | | | | | | | | | | | | |
| Type of dosimetry(*) | | | | | | | | | | | | | | | | |

* | *L = Legal*
| *O = Operation*

**Life total on** **=**