

EXCHANGE OF DOSE DATA WITHIN NUCLEAR ACTIVITIES IN FINLAND AND SWEDEN

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Abstract

In the Nordic countries, i.e. Denmark, Finland, Iceland, Norway and Sweden, only Sweden and Finland have introduced nuclear power into energy production. The first still operating nuclear power plant was commissioned in Sweden in 1972 and in Finland in 1977. In 1987, over 40 % of the total generation of electricity in both countries was generated by nuclear power.

It was soon noticed that there was a growing tendency that small groups of workers used to move at short notice between Finland and Sweden to work in the nuclear power plants in both countries during maintenance periods.

In 1983, the regulatory authorities for radiation protection, National Institute of Radiation Protection in Sweden and Finnish Centre for Radiation and Nuclear Safety in Finland, surveyed the radiation exposure to those workers. The authorities have brought about an arrangement by means of which the central dose data bases in the other country since 1984 have been able to record without delay the radiation doses received by her own citizens in the nuclear power plants of the neighbouring country. In addition, the authorities have confirmed the procedures of controlling dose data on workers from the neighbouring country, before those workers start working in a nuclear power plant regulated by the national authorities in question.

The paper describes the starting point of the activity, the established practice and the experience achieved. Until now, the practical experiences are positive. The total radiation exposure to the workers in the Swedish and Finnish nuclear power plants has been relatively low at each plant site. Thus, the main objective in the exchange of dose data, is to achieve a good radiation protection control.

Introduction

In Sweden there are 12 nuclear power plant units in operation; 9 BWR units of Swedish design and 3 PWR units of US design. In Finland there are four nuclear power plant units in operation; two BWR units of Swedish design and two PWR units of Soviet-Finnish design.

The methods of radiation protection applied at the nuclear facilities in the two countries are based on ICRP's recommendations and are quite similar in both countries. The activity is characterized by well-established active cooperation between both the Finnish and Swedish regulatory authorities and the persons responsible for radiation protection in the plants of the countries.

The Finnish and Swedish regulatory authorities for radiation protection have set forth a prerequisite that all persons working at the nuclear power plants shall use appropriate personal radiation dose meters. In addition, the personal dose data are required to be recorded and reported to the central dose data bases and authorities.

The dose meters and read-out units used in the Finnish and Swedish power plants are of the same type. The calibration and quality control procedures of the dose meters are approved and regulated by the authorities.

In Finland, the Finnish Centre for Radiation Protection and Nuclear Safety maintains a computer based national dose data base. The exchange of information between the central dose data base and the data bases at the two nuclear power plants takes place by reports, for the present.

In Sweden, the nuclear industry with its four nuclear power plants and the nuclear fuel factory have computerized the reading and transfer of dose data. From each site there is a direct connection to a computer based central nuclear dose data base.

Reporting personal dose data between Finland and Sweden

According to a mutual arrangement negotiated in 1983 by the authorities for radiation protection, the radiation doses received by the citizens of one's own country in the nuclear power plants in the neighbouring country, are recorded without delay in the central home data base. Certain country-specific features have an impact on the reporting procedure, which for the time being is as follows:

a) The selected sender in Sweden, the Forsmark nuclear power plant, shall report all occupational radiation exposures to Finns, entered in the central dose data base for the Swedish nuclear power plants, directly to the national dose data base at the Finnish Centre for Radiation and Nuclear Safety in Finland.

The report shall comprise dose records per month and it shall be transferred as soon as possible after the 10th day of the following month. Reporting takes place in the form of output data by mail. A copy of the report is transmitted also to the radiation protection authority in Sweden.

The output list shall, in accordance with the Swedish data base, include up-to-date personal radiation exposure, the identity number and the name of the employer, as well as data on the accumulated annual dose received in the Swedish nuclear power plants. In addition, information is given about passing medical examination including the examination date.

b) The senders in Finland, the Loviisa and Olkiluoto nuclear power plants, shall correspondingly on a monthly basis (a) transmit the dose data on all occupational radiation exposures to Swedes to the receiver in Sweden, Asea-Atom and to the Finnish authority. Asea-Atom is, thereafter, responsible for entering the data in the central nuclear data base in Sweden. The input is recorded as a personal dose received abroad.

The procedure involves certain specifications in order to, among other things, clarify the definition of citizenship and differences in the identity numbers used.

Any other way of recording in the transmission of dose data between the countries must not be used.

Procedures followed in dose inquiries

The radiation protection personnel at nuclear power plants shall prepare to maintenance outages. As part of this work, e.g. the previous radiation doses to the workers are to be considered.

The Finnish and Swedish nuclear power companies may inquire the facilities in the neighbouring country for particular questions concerning work and dose data of persons coming from that country.

Another way of finding out dose data concerning workers from the neighbouring country is that the nuclear power companies ask the contractors, before the work is started, for the latest recorded dose data. This is possible because all contractors operating in Finland and Sweden receive monthly or after their work is completed, a dose report concerning the nuclear power plant work of their employees.

If these two first methods, in some case, do not work, it is possible to ask directly the central dose data base in the neighbouring country (Finland-Sweden) for radiation doses of persons by giving the identity number and the name of the person.

Experiences learned from the procedure

The experiences show that the quick migration of workers between Finland and Sweden is primarily concentrated on certain nuclear power plants. Factors that have a permanent impact in this respect are, among other things, the location and design origin of the plant. Temporary factors include e.g. special work at some plant. The migration of workers is naturally peaked during the annual maintenance periods of the nuclear power plants.

The dose data transferred show that the collective radiation dose of citizens received in the other country has usually been under 0,1 mSv per year. The values, as regards Swedes, have been below 1 % and as regards Finns, below 5 % of the total collective radiation dose received at the same time in the nuclear power plants in the home country. About 50 - 100 workers from both Finland and Sweden have annually worked in the neighbouring country.

The highest individual doses received during one year in the neighbouring country have been as follows: 23 mSv (1982) and, after the arrangement was introduced, at its highest, 16 mSv (1986). The majority of the annual individual doses received in the neighbouring country have been, within the range of a few mSv. In general, the individual doses have been received in one or two months.

Discussion

The exchange of dose data on nuclear power plant workers between Finland and Sweden have systematically taken place since 1984. The exchange arrangement ensures that the individual dose limits are not unawares exceeded when workers quickly move between the neighbouring countries.

The workers, and also the associations representing them have taken a very positive attitude towards the arrangement. In preparing for the arrangement, it has been taken into account the legislative rules and regulations concerning the confidentiality of information on the persons in question. Contradictions with legislation have accordingly been avoided during the implementation of the procedure.

In addition to Finland and Sweden, there has not been a similar need for arranging a comparable procedure with other countries. The prerequisite for the exchange of dose data of this type is that the methods and follow-up systems of radiation dose monitoring are compatible and comparable with each other. In practice, this results in a requirement for high quality in the radiation protection procedures.