INSTITUTE OF RADIATION PROTECTION

GUIDE YVL 7.10
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In the event of any differences in interpretation of this guide, the Finnish version shall take precedence over this translation.

INDIVIDUAL MONITORING AND REPORTING OF RESULTS

1 GENERAL

According to Resolution 594/68 of the Ministry of Health and Social Welfare, the health and radiation doses of an individual engaged in activities involving exposure to radiation shall be monitored on a regular basis. Resolution 952/75 of the Council of State requires that the Institute of Radiation Protection (IRP) maintain a centralized register of radiation workers and personal doses, or a Central Register. Dose, as used in this guide, means dose equivalent.

This guide provides rules and regulations for individual monitoring carried out by the nuclear power plant as well as for reporting the results to the IRP Central Register. Health monitoring practices are dealt with in IRP Guide YVL 7.12 and health physics procedures in Guide YVL 7.9.

2 SCOPE

This guide is applicable to the permanent and temporary staff at nuclear power plants, to all individuals working in the restricted area as well as to the equipment used in individual monitoring and to all related activity.

3 GENERAL PRINCIPLES OF MONITORING

The occupational doses of all individuals working in the restricted area shall be monitored and reported to the Central Register.

The requirements concerning individuals engaged in work involving exposure to radiation are applicable to individuals working in the restricted area on a regular basis as well as to those transient workers in the restricted area who receive a dose in excess of 1 500 mrem per annum, 750 mrem in three months, or who work at the highest zone of the restricted area (Guide YVL 7.9).

In addition to dose control, the health of the individuals engaged in work involving exposure to radiation shall be monitored (YVL 7.12), they shall be instructed in working under radiation conditions and informed of the risks involved.

Postadress
P.O. BOX 268
00101 HELSINKI 10
FINLAND

Telephone
659588

Telex
122691 STL - SF

A4 75-2658 b/4

To determine the accumulated dose of a transient worker, the licensee shall check his dose data with the Central Register, permanent employer, or with the dose records of other nuclear power plants, if such a check is necessary because of his previous employments during the past three months.

3.1
Regular monitoring of Individual Doses

Regular monitoring of individual doses means continuous measurements and recording of doses received by a worker in the course of employment. Monitoring of individual exposures will help observe changes in working conditions, collect reference material for planning work procedures and prepare for investigation of accidents conditions and their consequenses.

Monitoring of individual doses shall be started when the reactor is loaded.

In addition to permanent staff, the nuclear power plant is responsible for personnel monitoring of transient workers independently of whether they are subject to exposure control in the course of their normal work.

For the period of employment, the nuclear power plant is required to maintain systematic dose records of all individuals working under radiation conditions. Furthermore, the nuclear power plant shall store all dose data and effective instructions as long as the facility remains in service.

When the employment of a transient worker is terminated, the nuclear power plant shall provide him or his employer with a dose report, if the dose he has received exceeds the recording limit specified in section 7.

For a member of the permanent staff, a dose report shall be compiled upon termination of employment, using the annual report issued by the IRP Central Register and the dose data of the current year.

The procedure for reporting individual doses and the particulars of the employees to the Institute of Radiation Protection is presented in section 7.

3.2
Operational Individual monitoring

Operational individual monitoring utilizes direct-reading or alarm dosimeters which make it easy to control doses received in the course of work. Operational individual monitoring is mandatory when the dose rate in the work area exceeds 100 mrem/h. Operational monitoring shall be organized so that the doses received can be recorded on a work-specific basis.

4
MEASUREMENT OF EXTERNAL EXPOSURE

Measurement of individual external exposure shall be performed as follows:

- When in the restricted area, the worker shall wear his personal dosimeter on his chest.

- Beside the personal dosimeter, additional dosimeters shall be used if the doses to head or limbs, weighed with respect to dose limits, are more significant than the whole body dose

In regular monitoring of external individual doses, the observation period is one month at the most.

The personal dosimeter shall be capable of distinquishing between gamma and beta radiation and have a minimum dose range extending from 50 mrem to 500 rem.

Neutron doses shall be measured when the neutron dose rate exceeds one third of simultaneous gamma dose rate.

The personal dosimeters shall be kept in full view at the entrance to the restricted area so that

- it can be seen immediately whether the user of the dosimeter is in the restricted area.

- the periodic cheek of surface contamination of the dosimeters can be easily made

Dosimeters and their racks shall be provided with an identification number. The name of the user shall be added to dosimeters in regular use.

Other than nuclear power plant dosimeters may be taken to the restricted area only if it is assured the readings will not be recorded twice in the Central Register.

Group dosimeters may be given to individuals on a short visit in the restricted area.

The equipment used in monitoring individual exposures shall be inspected before commissioning and annually in accordance with programmes approved by the IRP.

5 MEASUREMENT OF INTERNAL EXPOSURE

Dose, as used in connection with internal radiation, means always dose commitment which is the total dose caused during 50 years by radioactive materials contained in body tissues.

For internal dose control, the licensee shall regularly monitor a pre-selected group of the permanent staff running the greatest risk of internal contamination.

To control internal doses caused by annual maintenance and refuelling, the licensee shall monitor a group selected on the basis of the radiation risks involved.

In addition, measurements shall be made at other times as well when an evaluation based on surface or air contamination or some other observation indicates that a possibility for internal contamination exists.

The procedures for monitoring internal doses shall be such as to make it possible to reliably verify the recording limits set forth in section 7.

6 AUTHORITY ACTION

The Preliminary Safety Analysis Report (PSAR) shall include a plan for individual monitoring

The Final Safety Analysis Report (FSAR) shall specify the measurement instruments including number and location

The technical specifications, and the programmes for pre-operational testing, inservice inspection and calibration, of the equipment used in individual monitoring as well as the administrative procedures associated with monitoring and reporting shall be presented in the FSAR or a separate document or operating instructions.

Additionally, the licensee is required to submit a plan for internal exposure monitoring in connection with the review of the FSAR /4/.

7 DOSE REPORTING

The nuclear power plant shall report the individual external doses of the workers to the Institute of Radiation Protection quarterly. The particulars of permanent employees who have either begun or ended a piece of work involving exposure to radiation shall be provided at the same time.

Internal exposures shall be reported each calendar quarter, or if the monitoring period is longer than that, in the next quarterly report following the close of the monitoring period. The radiation dose received by the various organs and the whole body shall be given with the radio-nuclides specified.

However, individual doses shall be reported immediately upon termination of employment. This applies to transient workers as well.

Workers' exposures are reported as individual doses when they exceed the recording limits of the IRP Central Register. Recording limits for external exposures are 150 mrem when the reporting period is three months and 50 mrem when shorter.

Skin doses are recorded separately.

Neutron doses are recorded separately if they exceed one third of the dose caused by simultaneous gamma radiation. Otherwise can neutron doses be combined with gamma doses.

Doses to limbs and head shall be specified, if they are greater than the whole body dose when weighed with respect to dose limits.

Recording limits for internal doses are 1/20 of the annual dose limits and 1/10 of the quarterly limit.

The number and collective dose of permanent and temporary restricted area workers and visitors, whose doses remain below the recording limit, shall be reported quarterly.

The particulars and doses of permanent employees engaged in work involving exposure to radiation shall be furnished using form HD-3 (Appendix 1A). The individual doses of individuals temporarily working in the restricted area shall be reported using form HD-2 (App 1B). If the licensee wishes to use other forms or follow a different reporting procedure, he shall consult the IRP. The annual report of the nuclear power plant shall contain the dose data required by the IRP Guide YVL 1.5, section 4.10.

The collective dose of individuals working outside the restricted area shall be estimated on the basis of the release data and appended to the annual report.

If there are other units being constructed on the site of the facility, the collective dose of individuals working on them shall be estimated and given in the annual report. This dose is not included in the collective dose of the facility.

5 ACCIDENT CONDITIONS

The Institute of Radiation Protection (Department of Reactor Safety) shall be immediately notified of accidents in work which involves exposure to radiation or in which dose limits are exceeded or doses uncertain. The special report (YVL 1.5, Section 5) to be compiled on the event shall provide the following items:

- plant
- date, time and place of the event
- victims, their general condition and other than radiation injuries
- estimate of the potential for internal contamination
- information on initiated medical actions taken in accordance with Guide YVL 7.12 including the name of the doctor or hospital involved plus communication channels
- desired expert or monitoring assistance

HOW TO COMPLETE FORM HD-3

In case of a foreign national, enter a nationality symbol consisting of three letters (SFS 3481) in column 53. Number 6 in column 56 means permanent employment at the nuclear power plant. Mark one of the following numbers in column 57:

1 normal operation
2 annual maintenance
3 repair and maintenance operations over and above routine annual maintenance

The doses are expressed in millirems. Report neutron doses as well as doses to limbs and head using a separate appendix.

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FORM HD-3

Report of radiation doses received by permanent staff at nuclear power plant

Date | Nuclear Power Plant | Year | Quarter

Family name and first names	Social security number	53	56 57 Work	Doses Trunk	Doses Skin
			6		
			6		
			6		
			6		
			6		
			6		
			6		
			6		
			6		
			6		
			6		
			6		
			6		
			6		

HOW TO COMPLETE FORM HD-2

In case of a foregn national, enter a nationality symbol consisting of three letter (SFS 3481) in column 53. Number in column 56 means temporary employment at the nuclear power plant. Mark one of the following numbers in column 57:

1 normal operation
2 annual maintenance
3 repair and maintenance operations over and above routine annual maintenance

Cross (x) column 58 if the licensee has administered a medical examination of the worker, or if he reports that he has undergone a medical examination during the current year.

The doses are expressed in millirems. Report neutron doses and doses to limbs and head using a separate appendix.

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FORM HD-2

Report of radiation doses received by temporary staff at nuclear power plant

Date	Nuclear Power Plant

PERMANENT EMPLOYER (only one employer to one form)

Name	Street address	Mailing code
	Postal code and office	
	Intermediary	Number of reported persons

Family name and first names	Social security number	53	56 57 Work		58	begins (date)	ends (date)	Doses Trunk	Skin
			7						
			7						
			7						
			7						
			7						
			7						
			7						
			7						
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			7						