

QUESTIONNAIRE TO THE REGULATORY BODY MEETING TURKU 2008

INVITATION

In conjunction with the 2008 ISOE Symposium, 25-27 June 2008, we are preparing a 3rd Senior Regulatory Body representatives meeting, to be held 24 June 2008 in Turku (Finland). We hope to encourage your participation in this meeting which follows on from the very successful Regulatory Body representatives meetings in 2004 (Lyon) and 2006 (Essen). The purpose of the meeting is to provide a forum for open exchange and discussion within specialised regulatory audience concerned with occupational radiation protection. For this occasion, the contamination management in NPPs from the occupational point of view has been chosen as the main topic.

OBJECTIVES OF THE MEETING

The main objectives of the meeting are:

- To meet with regulators from other organisations
 - To exchange information regarding regulatory control on **contamination management in NPPs from the occupational radiation protection perspective** focusing on
 - controlled and supervised areas inside NPP
 - occupational exposure control and assessment due to both external and internal contamination.
- This meeting will not deal with aspects of contamination management other than those related to occupational radiation protection.
- To help to improve national regulatory effectiveness on occupational radiation protection by comparing national reality versus international context

AGENDA

- Introduction of the different representatives
- Brief presentation on national requirements on contamination management
- Discussion
- Conclusions

OBJECTIVES OF THE QUESTIONNAIRE

In order to introduce the Regulatory Body representatives meeting it is expected to draw an overview of regulatory control on contamination management in NPPs from an occupational perspective in the different ISOE member countries with their similarities and differences. Therefore we would like you to answer, briefly, to the following questionnaire to stimulate information exchange and discussions. Only one response per country is necessary.

Please do not go into the details, just describe a few "objective data".

Even in case you will not be able to attend the meeting the information you can provide is precious. If you agree, questionnaires filled in by national authorities will be sent to the regulatory contacts participating in ISOE.

Yes, I agree
The information can be used only in the RB-meeting

COUNTRY AND REPRESENTATIVE IDENTIFICATION

- ❑ Country: **Finland**
- ❑ Name of the Regulatory Body: **STUK**
- ❑ Name and post of the person(s) who fill in the questionnaire: **Veli Riihiluoma**

REGULATORY CONTROL ON CONTAMINATION MANAGEMENT IN NPP

- ❑ **Legal framework on contamination control**
 - Does your legal framework have requirements on radioactive contamination control? If so, give a short description of the content of references. [The detailed requirements are stated in YVL-guides issued by STUK.](#)
 - Does your legislation specify reference levels for contamination? [See above](#)
- ❑ **Reference contamination levels on official documents**
 - Does some official document of the licensee specify levels for contamination? [Yes](#)
 - If so specify the document. [Radiation protection Manual \(RPM\)](#)
 - Are the reference levels for contamination in NPP the same for all NPPs in your country? [Yes. The YVL guide 7,9 specify the levels used.](#)
- ❑ **Contamination control in controlled or supervised areas in NPPs.**
 - How many controlled area categories could exist on NPP site? [The premises of the controlled area shall be divided into zones based on external dose rate, surface contamination and concentration of airborne activity. There shall be at least three zones. See table X.](#)
 - What are the maximum contamination levels allowed in the different categories of controlled areas of NPPs for different categories of radionuclides/ types of emissions? If levels are specific for each site, please give an order of magnitude of the range covered for the different reference levels (Registration, Investigation and Intervention).
[The following conditions shall be fulfilled in the premises of the lowest zone:](#)
 - external dose rate $\leq 25 \mu\text{Sv/h}$
 - surface contamination:
 - beta emitters $\leq 4 \text{ Bq/cm}^2$
 - alpha emitters $\leq 0,4 \text{ Bq/cm}^2$
 - concentration of airborne activity $\leq 0,3 \text{ DAC}$ (Derived Air Concentration).

[The highest zone consists of premises where only short-term, beforehand carefully planned stays are allowed. At least those premises, where one of the following conditions is fulfilled, belong to this zone:](#)

 - external dose rate $\geq 1 \text{ mSv/h}$
 - surface contamination: [br /> beta emitters \$\geq 40 \text{ Bq/cm}^2\$](#)
alpha emitters $\geq 4 \text{ Bq/cm}^2$
 - concentration of airborne activity $\geq 30 \text{ DAC}$.

[External dose rate, surface contamination or concentration of airborne activity may locally exceed the classification limit if the sub-area in question is separated by access barriers and marked with signs indicating the radiation situation, potential stay limitations and protective equipment required. Exceptional radiation sources shall be always visibly marked.](#)

REGULATORY CONTROL ON CONTAMINATION MANAGEMENT IN NPP

- What are the basic technical requirements in NPP to control spread of contamination? Which of them are specified by legal or approved documents and on which the licensee may decide in his own responsibility?

The YVL-guides give only frames which state for example:

A sufficient number of portable instruments shall be provided to measure the activity concentration of air in the working areas where stationary measuring instruments do not give representative results.

A sufficient number of portable measuring and sampling instruments of surface contamination (primarily for beta but also alpha radiation) shall be provided for use in the different operational conditions of the nuclear power plant.

Also other detailed requirements are stated. In RPM (official document) the practical approach to contamination control, ventilation etc. are specified.

- Does your legislation or approved documents include requirements about the monitoring program? Which document? What kind of requirements (periodicity, certificated instruments, exclusive performed by RP-personal with special education and training, averaging surface (volume, duration), registration and reporting)?

There are general requirements for all these in YVL-guides (regulatory guides) or in the references of these guides.

□ Contamination control of personal protective equipment.

- Does your legislation or approved documents (company instructions) include requirements about contamination of protective personal equipment? **Yes.** Which document? **YVL-guides and RPM**
- Which requirements? **The exit routes of the controlled area shall be provided with measuring equipment to ensure that the tools, protective clothing and skin of a person exiting from the controlled area are not radioactive.**
- What are the reference levels for contamination of protective personal equipment? **see Table 1**
- Is it allowed to enter controlled areas with street clothes? **You have to wear protective clothes. Under those clothes you can have own clothes. This is the case for visitors.**
- Is it allowed to wear protective clothes outside controlled areas on the NPP site? **The protective clothes for control area are not allowed to use outside controlled areas. There is one exception. There are cafeterias inside NPPs where a worker can have a pause. To enter this cafeteria you have to go through exit monitor. From cafeteria you can not leave NPP with your protective clothes.**

□ Contamination control of reusable working materials at the exit of controlled areas.

- Does your legislation or approved documents (company instructions) include requirements about the levels of contamination allowed for reusable working material at the exit of controlled areas? Which document? If affirmative, provide reference levels:

Yes There is a specific guide YVL 8.2 concerning clearance see Table 2.

If recyclable metal is to be cleared for melting, the surface contamination constraints given in Table I shall be applied so that the activity contamination of any nuclide, averaged over 0,1 m² of accessible areas at most, shall not exceed the constraint. The surface contamination includes fixed and non-fixed contamination. The share of non-fixed contamination can be estimated to be 10% of the total contamination.

REGULATORY CONTROL ON CONTAMINATION MANAGEMENT IN NPP

□ Estimation of effective dose from internal contamination

- Does your legislation or approved documents include requirements about internal contamination of occupational exposed persons? **Yes** Which document? **YVL 7.10**
- Which requirements? **The plant shall have a measuring instrument for internal contamination to ensure that any radioactive materials within the body while working in the controlled area are detected and the dose caused by them can be assessed.**
- What are the methods and criteria for assessment of internal doses?
For the detection of internal radioactivity of workers, a nuclear power plant shall be provided with monitoring equipment. The sensitivity of the equipment shall be such that it is capable of detecting from the upper body area with an adequate accuracy those radioactive substances originating from nuclear power plants and emitting gamma radiation which may cause an effective dose exceeding the recording level based on the radioactivity at the measurement moment.
All those who have worked in the controlled area during an annual maintenance outage shall be checked with this equipment when their work is accomplished. The measurement requirement also applies to other outages or repairs which may involve the intake of radioactive substances. Measurement results shall be recorded. Records shall indicate the personal data of the measured person, date of the measurement and total activity of the measured radionuclides. Also measurements which do not exceed the detection level shall be recorded.
Exposure caused by internal radiation shall also be measured whenever measurements to detect contamination of the skin or protective clothing of those leaving the controlled area, or some other observation, indicate that abnormal internal contamination may have occurred.
If exceptional internal exposure of a worker is detected based on these measurements, a whole body counting equipment capable of determining different radionuclides (nuclide-specific measurement) shall also be used in measurements. Also other workers on the same assignment shall be measured for internal radiation, if necessary. In addition, a nuclide-specific measurement shall be done to workers assessed to have the risk of internal contamination by nature of work. Workers from the permanent staff of the nuclear facility and the staff of contractors have to be chosen for measurements. A sufficient number of workers shall be chosen for this measurement to obtain representative data for monitoring. If necessary, excretion or other biological samples may be used for assessing internal dose. The time of the measurements shall be chosen so that potential intake is best detected.
Dose arising from the intake of radioactive substances shall be assessed based on measurement results and the time and mode of exposure.
- What are the reference levels for internal doses (please give examples for typical nuclides, allowed averaging volume or surface or ...)?
Doses caused by internal radiation shall be reported to the Dose Register if the dose commitment arising from the intake of radioactive substances originating from nuclear facilities exceeds 0.1 mSv.
The recording level for a deep dose is 0.1 mSv per month. Individual doses below this level shall be reported to the Dose Register as zero doses.
The neutron doses measured shall be reported to the Dose Register separately. The recording level for neutron doses is 0,2 mSv per month.
Surface doses and finger doses shall be reported to the Dose Register separately. The recording level for these is 2 mSv per month.

□ Estimation of effective dose from external contamination. Skin doses

- Does your legislation or approved documents (company instructions) include requirements about contamination of skin? Which document? **YVL 7.9**
- Which requirements? **see Table 1**
- What is the triggering level of contamination to carry out an assessment of skin dose? **This is not specified. So far there has not been any serious concentration, which has caused dose calculations.**

REGULATORY CONTROL ON CONTAMINATION MANAGEMENT IN NPP

- What is the maximum level allowed for personal contamination at the exit of the controlled area?
[see Table 1](#)
 - How contamination is measured in 1 cm²? [For discussion](#) in plenary session.
- **External risk versus internal risk perception**
- External risk versus internal risk perception and practice in your country? How and why do you weight the risks different? What is the practice in your country? What are the experiences? [For discussion](#).
[There is a consensus in the country that internal contamination should be avoided. The cases where internal contamination will cause dose over recording limit should be in practice zero.](#)

Do you have some additional topics, which you would like to discuss during the RB meeting:

Controlled area

At least those premises of the facility, where the external radiation dose rate may exceed a value of 3 µSv/h or where a 40 hour weekly stay may cause an internal radiation dose exceeding 1 mSv per year, shall be defined as a controlled area. Limit values set for surface contamination in the lowest zone of the controlled area as well as limits when leaving the controlled area are presented in Table I.

Table 1. Limit values for surface contamination at a nuclear facility.

Radioactive substances	Workplaces and tools	Workers	
	Lowest zone of controlled area Bq/cm ²	Clothes Bq/cm ²	Skin Bq/cm ²
Alpha emitters (radiotoxicity class 1)	0.4	0.4	0.2
Other nuclides	4	4	2

Table 2. The nuclide group specific activity concentration and contamination constraints to be applied for clearance of waste (annually 100 tonnes at most for each nuclear facility).

Nuclide group	Activity concentration	Surface contamination
Alpha emitters	0,1 Bq/g	0,4 Bq/cm ²
Significant beta and gamma emitters *	1 Bq/g	4 Bq/cm ²
Weak beta and gamma emitters **	10 Bq/g	40 Bq/cm ²

* Eg. ⁵⁴Mn, ⁵⁸Co, ⁶⁰Co, ⁶⁵Zn, ⁹⁰Sr, ¹⁰⁶Ru, ^{110m}Ag, ¹²⁴Sb, ¹²⁵Sb, ¹³⁴Cs, ¹³⁷Cs, ¹⁴⁴Ce and nuclides having similar radiation emission energy

** Eg. ³H, ¹⁴C, ⁵¹Cr, ⁵⁵Fe, ⁶³Ni and nuclides having similar radiation emission energy