Vanh.

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

EVALUATION OF POPULATION DOSES IN THE ENVIRONMENT OF NUCLEAR POWER PLANTS

1 GENERAL

During licensing review the applicant shall be able to demonstrate that the nuclear power plant is designed so that it will not cause radiation doses in excess of the limits set forth in Guide YVL 7.1.

During operation, the operator of the nuclear power plant shall demonstrate that the exposure limits contained in license conditions are not exceeded. As the doses at the required radiation level cannot normally be observed directly, the doses to the critical groups and collective doses shall be calculated using acceptable models and parameters. Detailed instructions for performance of dose calculations are given in the appendices to this guide. Models describing dispersion of radioactive materials are dealt with in Guide YVL 7.3 and YVL 7.4.

2 APPLICABILITY

This guide provides guidelines for estimate of the radiation doses received by the population in the vicinity of ligh-water reactor nuclear power plant.

3 CALCULATION OF RADIATION DOSES IN VARIOUS PHASES OF LICENSING PROCESS

Calculations of the radiation doses received by the population in the vicinity of a nuclear power plant are performed in three phases in step with the progress of the project.

1 During the construction permit review, the radiation doses caused by operating and accident conditions are calculated separately, using acceptable models. The release data for radioactive materials supplied by the constructor and generally acceptable parameter values are used as basic values

2 During the operating license review, the same radiation doses are computed as in the construction permit phase, using locally determined parameters whenever possible.

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3 During operation, the calculations of radiation doses are performed using two methods:

- on the basis of measured amounts of released radioactive materials, measured dispersion conditions and various environmental parameters

- by replacing, where applicable, the intermediate results of calculations with actual radiation and activity readings obtained by environmental monitoring

The models and parameters used are checked during the three first years of operation on the basis of release data, radiation and activity measurements performed in the environment.

4 EXPOSURE PATHWAYS UNDER OPERATING CONDITIONS

The surveys shall cover doses to the critical group and collective doses caused by external radiation from the plant and transportations as well as from radioactive effluents released to air and water. The doses to be considered are doses to whole body, skin, thyroid, bone, gastrointestinal tract and lungs of the critical group and collective doses to whole body and thyroid.

4.1 External Radiation from Plant and Transportations

Doses to the critical group and collective doses caused by external radiation from the plant and transportations of spent fuel and radioactive wastes shall be calculated.

4.2 Doses Caused by Radioactive Materials Released into Air

Doses to critical group and collective doses caused by radioactive materials released into air shall be calculated. As a minimum the following exposure pathways shall be considered:

1 External radiation

- from airborne radioactive materials

- from deposited radioactive materials

2 Internal radiation

- from inhaled radioactive materials
- from radioactive materials in plants
- from radioactive materials in milk
- from radioactive materials in other fauna

4.3
Doses Caused by Radioactive Materials Released into Water

Doses to critical group and collective doses caused by radioactive materials released into water shall be calculated. As a minimum, the following exposure pathways shall be considered:

1 External radiation

- from radioactive materials accumlated on shore

2 Internal radiation

- from radioactive materials in fish
- from radioactive materials in drinking water

In addition to calculating radiation doses in respect of the various exposure pathways, a summarized evaluation of the external and internal whole body doses as well as doses to the various organs of the members of the critical group and collective doses shall be made.

5
EXPOSURE PATHWAYS UNDER ACCIDENT CONDITIONS

The surveys shall cover individual and collective doses caused by external radiation from airborne and deposited radioactive materials as well as by internal radiation from inhaled radioactive materials. The doses to be considered are doses to whole body and thyroid.

6
RECOMMENDATIONS, LITTERATURE

Final Environmental Statement Concerning Proposed Rule Making Action: Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion "As Low as Practicable" for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents, WASH-1258, U.S. Atomic Energy Commission, July 1973

Concluding Statement of Position of the Regulatory Staff, Public Rulemaking Hearing on: WASH-1258, U.S. Atomic Energy Commission, February 1974