

Safety Standards

of the
Nuclear Safety Standards Commission (KTA)

KTA 1506, Issue (6/86)

**Measuring Local Dose Rates in Exclusion Areas
of Nuclear Power Plants**

(Messung der Ortsdosisleistung in Sperrbereichen
von Kernkraftwerken)

If there is any doubt regarding the information contained in this translation, the German wording shall apply.

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KTA SAFETY STANDARD

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Measuring Local Dose Rates in Exclusion
Areas of Nuclear Power Plants

KTA 1506

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PLEASE NOTE: Only the original German version of this safety standard represents the joint resolution of the 50-member Nuclear Safety Standards Commission (Kerntechnischer Ausschuss, KTA). The German version was made public in Bundesanzeiger No. 162a on September 3, 1986. Copies may be ordered through the Carl Heymanns Verlag KG, Luxemburger Str. 449, 50939 Koeln (Telefax +49-221-94373-603).

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Comments by the editor:

Taking into account the meaning and usage of auxiliary verbs in the German language, in this translation the following agreements are effective:

shall	indicates a mandatory requirement,
shall basically	is used in the case of mandatory requirements to which specific exceptions (and only those!) are permitted. It is a requirement of the KTA that these exceptions - other than those in the case of shall normally - are specified in the text of the safety standard,
shall normally	indicates a requirement to which exceptions are allowed. However, the exceptions used, shall be substantiated during the licensing procedure,
should	indicates a recommendation or an example of good practice,
may	indicates an acceptable or permissible method within the scope of this safety standard.

Basic Principles

(1) The safety standards of the Nuclear Safety Standards Commission (KTA) have the task of specifying those safety-related requirements which shall be met with regard to precautions to be taken in accordance with the state of science and technology against the damage arising from the construction and operation of the facility (Sec. 7 Atomic Energy Act); this is especially to attain the protective goals specified by the Atomic Energy Act and the Radiological Protection Ordinance.

(2) Relevant acts, ordinances and rules of the federal and state authorities as well as the relevant technical codes and guides are taken into account in developing KTA safety standards.

(3) The measurement of local dose rates serves the following purposes:

- a) development of precautionary measures relevant to radiological safety for repairs and modifications in exclusion areas, e.g. specification of individual measures for personnel protection, preparation of work sequence plans and dose estimates
- b) monitoring of the job locations of persons in the exclusion area - also with respect to the determination of the change of local dose rates with time and the resulting possibilities for the immediate specification of the required radiological protection measures
- c) demarcation and identification of exclusion areas.

These measurements should contribute towards ensuring that

- d) the radiological protection principles in accordance with Sec. 28 (1) StrlSchV are met with respect to the external exposure of persons to radiation,
- e) the requirements of Sec. 61 (1) StrlSchV for exclusion areas are met,
- f) the demarcation and identification required in accordance with Sec. 57 (1) StrlSchV can be implemented.

The measurements of local dose rates in accordance with this safety standard do not serve the determination of body doses in accordance with Sec. 63 StrlSchV.

(4) The requirements for radiation measurement, equipment are based on Sec. 72 StrlSchV, which is expanded on in this safety standard. The legal pre-requisites for the calibration requirements in accordance with the Eichgesetz are considered in this safety standard by specifying the measurement tasks for which measurement equipment calibrated in accordance with the Eichgesetz are to be provided.

1 Scope

This safety standard applies to the measurement of the local dose rate in exclusion areas of stationary nuclear power plants during specified normal operation.

2 Definitions

Note:

The definitions measurement quantity, measurement range, display range, nominal range of use, error limits and influence parameters are used in this safety standard in accordance with VDI/VDE 2600 Parts 2, 3 and 4 (11/73).

(1) Dose meter

Dose meter is a dose measuring device or a dose rate measuring device.

(Source : DIN 6818 Part 1 (12/76))

(2) Local dose

The local dose is the dose equivalent for soft tissues, measured at a given location.

Note:

For gamma radiation, the gamma equivalent dose H_x is the local dose. For gamma radiation with maximum energies up to 3 MeV, the gamma equivalent dose H_x is equal to the product of the standard ion dose and the factor 0.01 Sv/R (1 rem/R). For gamma radiation with maximum energies above 3 MeV, the gamma equivalent dose H_x is equal to the product of the measurement value of a local or personnel dosimeter, which has been calibrated for cobalt 60 gamma radiation in the open air to measure the standard ion dose, and the factor 0.01 Sv/R (1 rem/R). For neutron radiation, the measurement value of a local dose meter with isotropical, energy-independent equivalent-dose discrimination, which has been calibrated with the aid of neutron fluence equivalent-dose conversion factors (see DIN 6802 Part 2) is the local dose.

(Source: DIN 6814 Part 3 (12/85)).

(3) Local dose rate

The local dose rate is the differential quotient of the local dose with respect to time.

3 Quantities to be Measured

(1) Quantities to be measured are the local dose rate of gamma radiation and, if required, the local dose rate of neutron radiation.

Note:

The measurement of the local dose rate of neutron radiation is limited to a few individual problems, e.g., measurements near the reactor pressure vessel, handling of neutron sources. The local dose rate resulting from electron and alpha radiation including bremsstrahlung does not contribute largely towards the body dose. For work on contaminated surface areas, an exposure is avoided by appropriate protective measures (protective clothing, protective glasses). To specify these protective measures, estimations of the beta local dose rate (e.g., using gamma dosimeters calibrated for beta radiation) may be required.

For contaminations of the inner atmosphere, protective measures (e.g., respirators, suction) are specified on the basis of activity measurements in the air.

(2) The local dose rate shall be measured with dosimeters which have been calibrated for the measurement quantities defined in Section 2.

4 Requirements for the Measurements

4.1 General Requirements

(1) For local dose rate measurements in exclusion areas for the planning of activities, it shall be ensured that the dose obtained during the execution of the measurement task is justified.

(2) For local dose rate measurements in exclusion areas for the surveillance of activities, it shall be ensured that the radiation exposure during the execution of the measurement task, under consideration of the surveillance objective, is as low as possible.

Note:

A measurement of local (dose and time could better fulfill the requirements of (1) and (2)).

(3) In the planning and choice of measurement methods and measurement equipment for the local dose rate measurements in exclusion areas, it shall be ensured that the radiation exposure from the maintenance of the measurement equipment is as low as possible.