

**From:** James Downs  
**To:** David Diec; Ray Gallucci  
**Date:** Mon, Mar 22, 2004 4:31 PM  
**Subject:** Re: Comparison between Fire Protection Regulations between Germany and USA

✓ I believe that reference in made to fire brigade operations... but here's KTA 1201 to be sure.

✓>>> David Diec 03/22/2004 4:26:49 PM >>>

The German code mentioned Section 6.7 of KTA 1201 code discusses substitute measures in situation where measured and equipment-related protections are not available, as well as **the behavior of personnel in case of fire.** Do we have access to this document (KTA 1201)?

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✓>>> James Downs 03/22/04 03:25PM >>>

I already sent these to Alex and Sunil, but if you want to read the actual code for yourself, its attached.

✓>>> Ray Gallucci 03/22/2004 3:21:22 PM >>>

"Few equivalencies are given in the German code to permit deviation from the mandated structural separation requirements and no references of any manual actions are cited as alternative means of fire protection."

How interesting.

✓>>> James Downs 03/22/04 01:33PM >>>

Attached is the paper, it compares the German KTA 2101 series to the NRC fire protection regulation.

-JD

✓>>> Sunil Weerakkody 03/22/2004 1:12:34 PM >>>

This is an outstanding product because it is written at the right level of detail with no editorial errors. I was able to read the document and understand the high-level differences between us and German regulations within about 10 minutes. Please share this with the rest of the section. Please send me an e-copy because I want to share this with Suzie, Mike and John.

Sunil

**CC:** Daniel Frumkin; Eva Brown; Jason Dreisbach; Mark Salley; Naeem IQBAL; Paul Lain; Phil Qualls; Richard Dipert; Robert Radlinski

22-5

# Safety Standards

of the  
Nuclear Safety Standards Commission (KTA)

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**KTA 1201 (06/98)**

**Requirements for the Operating Manual**

(Anforderungen an das Betriebshandbuch)

The previous version of this safety  
standard was issued 12/85

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

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# KTA SAFETY STANDARD

June 1998

Requirements for the Operating Manual

KTA 1201

The previous version 12/85 was made public in Bundesanzeiger No. 33a on February 18, 1986

## CONTENTS

Fundamentals .....	5
1 Scope .....	5
2 Definitions .....	5
3 General Requirements Regarding the Contents of the Operating Manual .....	6
4 General Requirements Regarding the Layout of the Operating Manual .....	6
4.1 Physical Form and Layout .....	7
4.2 Font Type and Size .....	7
4.3 Structuring and Layout of Text Passages .....	7
4.4 Marking and Accentuation .....	7
4.5 Terms and Abbreviations .....	7
4.6 Instructions .....	7
4.7 Safety Specifications .....	8
5 Requirements for Part 0 of the Operating Manual (Table of Contents and Introduction) .....	8
6 Requirements for Part 1 of the Operating Manual (Plant Regulations) .....	8
6.1 Personnel Organization .....	8
6.2 Control Room and Shift Regulation .....	8
6.3 Maintenance Regulation .....	8
6.4 Radiation Protection Regulation .....	9
6.5 Guard and Access Regulation .....	10
6.6 Alarm Regulation .....	10
6.7 Fire Protection Regulation .....	10
6.8 First-Aid Regulation .....	10
7 Requirements for Part 2 of the Operating Manual (Plant Operation) .....	11
7.1 Pre-requisites and Conditions for Operation .....	11
7.2 Safety Related Limit Values .....	11
7.3 Reporting Criteria .....	11
7.4 Normal Operation .....	11
7.5 Abnormal Operation .....	11
8 Requirements for Part 3 of the Operating Manual (Design Basis Accidents) .....	11
9 Requirements for Part 4 of the Operating Manual (Systems Operation) .....	12
10 Requirements for Part 5 of the Operating Manual (Alarms / Hazard Alarms) .....	12
11 Updating Service .....	12
Appendix A: Regulations and Literature referred to within this Safety Standard .....	13

**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. 172a on September 15, 1998. Copies may be ordered through the Carl Heymanns Verlag KG, Luxemburger Str. 449, D- 50939 Koeln (Telefax 0221-94 37 36 03).

All questions regarding this English translation should please be directed to:

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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:

- |                        |  |
|------------------------|--|
| <b>shall</b>           | indicates a mandatory requirement,   |
| <b>shall basically</b> | 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 <b>shall normally</b> - are specified in the text of the safety standard, |
| <b>shall normally</b>  | indicates a requirement to which exceptions are allowed. However, the exceptions used shall be substantiated during the licensing procedure,   |
| <b>should</b>          | indicates a recommendation or an example of good practice,   |
| <b>may</b>             | indicates an acceptable or permissible method within the scope of this safety standard.  |

## Fundamentals

(1) The safety standards of the Nuclear Safety Standards Commission (KTA) have the task of specifying 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 damages arising from the construction and operation of the facility (Sec. 7 para. 2 subpara. 3 Atomic Energy Act), in order to attain the protective goals specified in the Atomic Energy Act and the Radiological Protection Ordinance (StrlSchV) and which are further detailed in "Safety Criteria for Nuclear Power Plants" and in "Guidelines for the Assessment of the Design of PWR Nuclear Power Plants against Incidents pursuant to Sec. 28 para. 3 of the Radiological Protection Ordinance - Incident Guidelines".

(2) In accordance with Safety Criterion 2.1 "Principles of Safety Precautions", a nuclear power plant shall be operated in such a way that the protection goals are met at all times. It is essential to this end that the administrative procedures and technical actions required both for the specified normal operation and for the control of design basis accidents are specified in written instructions (cf. Sec. 9.1 KTA 1401 "General Requirements for Quality Assurance").

(3) In fulfillment of Sec. 3 of the Ordinance on the Procedure for Licensing Facilities under Sec. 7 Atomic Energy Act (Nuclear Licensing Procedure Ordinance - AtVfV) so-called safety specifications are submitted with the application for a license permit. These safety specifications present the safety related framework within which the facility must be operated in order to fulfill the protection goal in accordance to Sec. 1 no. 2 Atomic Energy Act. The safety specifications are basically all contained in the operating manual with the exception of the testing schedule for in-service inspections and the list of licensing documents (cf. KTA 1404 "Documentation During Construction and Operation of Nuclear Power Plants"). The testing schedule for in-service inspections is contained in the testing manual.

(4) The objective of this safety standard is to specify the requirements applying to the content and layout of the operating manual. Requirements for the testing manual are specified in KTA 1202 "Requirements for the Testing Manual".

(5) The content and layout of the emergency manual relating to "plant-internal accident management" are not dealt with in this safety standard. However, the transition from the operating manual to the emergency manual dealing with these procedures must be specified (cf. "RSK Recommendations on Accident Management Measures").

## 1 Scope

This safety standard applies to the contents and layout of the operating manuals for nuclear power plants.

It is recommended to use the outline and structure as specified in this safety standard; however, other outlines and structures representing the specified content are permissible. The requirements of this safety standard regarding the content of the operating manual relate to an outline and structure as specified herein.

## 2 Definitions

### (1) Specified normal operation

Specified normal operation comprises

- operating processes for which the plant, assuming the able function of all systems (fault free condition), is intended and suited (normal operation);
- operating processes which occur in the event of a malfunctioning plant component or system (fault condition) insofar as no safety related reasons stand against continued operation (abnormal operation);
- maintenance procedures (inspection, servicing, repair).

### (2) Plant organization

Plant organization has the two aspects, that of plant organizational structure describing the hierarchical structure within the plant and that of plant administrative organization describing the procedures to be followed within the plant.

### (3) Emergency Manual

The emergency manual is an independent manual which contains the regulations regarding the procedures for damage prevention and damage mitigation in the case of beyond-design-basis accidents.

### (4) Protection Goals

Protection goals integrate individual safety functions that must be ensured in order to achieve nuclear safety. The four safety goals are:

- reactivity control,
- cooling of the fuel assemblies,
- enclosure of the radioactive materials, and
- limitation of the radiation exposure.

In addition to these four protection goals a number of all-transcending auxiliary functions (e.g. energy supply and the supply of auxiliary media) are indispensably required in order to achieve the protection goals.

### (5) Safety Specification (in accordance with Sec. 3 para. 1 No. 6 AtVfV)

Safety specifications are a collation of all the data relevant to the safety of the installation and its operation, of the measures to be taken in the event of incidents or damage, and include the testing schedule of the tests provided for safety-related components of the installation.

#### Note:

The purpose of the safety specifications is to have available at all times a quick and comprehensive presentation of all actually valid data, limit values and measures important to the safety of the nuclear power plant and its operation including the required cross-references to the design documents.

Furthermore, the safety specifications in their function as basis for the license are a binding and up-to-date documentation of the framework of safe and licensed conditions and operating procedures within the plant and are also the basis for the specification of essential changes within the plant or of its operating procedures.

The safety specifications shall be included in the application for a license.

### (6) Incident (design basis accident)

An incident (design basis accident) is a chain of events which interferes with the operation of the plant or with an activity in such a way that operation or the activity must be interrupted for reasons of safety, and for which the plant must be de-

signed or for which protective measures must be provided with regard to the activities.

#### (7) Handling of a Design Basis Accident

The handling of design basis accidents comprises the measures to be taken upon occurrence of a design basis accident with the goal of bringing the plant into a controlled safe condition and to limit the effects from the accident.

Handling of a design basis accident is subdivided into

##### a) Condition or protection-goal oriented handling of design basis accidents

The measures for handling the event are specified respectively to the condition of the plant (e.g. deviations of plant parameters, condition of the connections and availabilities of systems and components, the conjunction with particular conditions of other parameters, chronological behavior).

##### b) Event oriented handling of design basis accidents

The condition of the plant is correlated to an event in accordance with the Incident Guidelines or to a specific design basis accident (event) treated in the licensing procedure. Measures for handling the design basis accident are taken in sequential order in accordance with the instructions specified for the particular event.

### 3 General Requirements Regarding the Contents of the Operating Manual

(1) The operating manual shall contain all those operating and safety related instructions for the shift personnel which are required for normal operation of the plant and for handling of design basis accidents, and shall include those the plant regulations valid for all personnel working within the power plant.

(2) Special instructions (e.g. shift instructions, commissioning instructions) may be issued for specific operating modes that may temporarily replace or supplement the operating instructions of the operating manual. Attention shall be drawn to the existence of such instructions by suitable markings in the operating manual.

(3) Neither the technical instructions regarding the plant regulations nor the maintenance documents nor documents regarding design and construction belong to the operating manual.

(4) The following subjects shall be treated in the operating manual, however, the outline presented may be considered as one possible example. Other outlines are permissible, provided the requirements regarding the specified contents are met.

#### 0. Part 0 Table of Contents and Introduction

#### 1. Part 1 Plant Regulations

- a) Personnel Organization
- b) Control Room and Shift Regulation
- c) Maintenance Regulation
- d) Radiation Protection Regulation
- e) Guard and Access Regulation
- f) Alarm Regulation
- g) Fire Protection Regulation
- h) First Aid Regulation

#### 2. Part 2 Plant Operation

- a) Pre-requisites and Conditions for Operation
- b) Safety Related Limit Values
- c) Reporting Criteria
- d) Normal Operation (start-up, power operation, shut-down)
- e) Abnormal Operation

#### 3. Part 3 Design Basis Accidents

- a) Condition or protection-goal oriented handling of design basis accidents
- b) Event oriented handling of design basis accidents

#### 4. Part 4 Systems Operation

- a) Nuclear Power Systems including Containment
- b) Nuclear Auxiliary Systems
- c) Water-Steam Circuit
- d) Steam Turbine System
- e) Coolant Water System
- f) Auxiliary and Ancillary Systems, Water Supply and Disposal
- g) Instrumentation and Control Systems
- h) Equipment for Nuclear Fuel Handling

#### 5. Part 5 Alarm Signals

(5) The following parts of the operating manual as outlined under paragraph (4) are safety specifications and shall be unambiguously marked as such (cf. Section 4.7):

- a) Part 1: in its entirety,
- b) Part 2: paras. a and b, parts of para. c as well as parts of para. e (in accordance with Section 7.5 para. 3 of this safety standard),
- c) Part 3: the documents created under Section 8 para. 2 of this safety standard.

### 4 General Requirements Regarding the Layout of the Operating Manual

(1) The creation of, and changes to, the operating manual and the management of the data display should be computer supported for all types of information by a data base (instance) of zero redundancy. The following points shall be taken into consideration:

- a) a uniform layout of the chapters (e.g. basic formatting, positioning and text modules),
- b) a structuring of chapters and individual texts using textual components,
- c) a text structure complying with data base requirements in order to allow a coupling with other information systems, e.g. a plant data base,
- d) a safe protection from unauthorized changes, and
- e) a safe and redundant filing of data.

(2) In the case of forms other than paper media for displaying the information (e.g. monitor, multimedia) these requirements shall be applied accordingly.

(3) When utilizing various media special attention shall be paid to compatibility; e.g., the color coding used for the monitor display should be replaced by an appropriate form coding in the black and white presentation on paper.

- (4) The requirements of this section apply to the special realization of a paper print version of the operating manual.

#### 4.1 Physical Form and Layout

(1) The operating manual shall be designed in the form of loose-leaf binders allowing for amendments and changes at all times.

(2) The individual pages shall be formatted such that they can easily be copied (e.g. for revisions or for the utilization as checklists). Copying shall not lead to any loss of information and shall have no essentially adverse effect on legibility.

(3) The paper format for regular texts shall be DIN A4 upright, 29.7 cm by 21 cm.

(4) The format of technical drawings and tables should be limited to a DIN A4 upright 29.7 cm and to a maximum fold-out length of 90 cm (arm's reach). If this leads to an insufficient legibility then the individual technical drawing or table shall, additionally, be kept available in larger format in the vicinity of the control room.

(5) With respect to marking and handling the following aspects shall be taken into consideration:

- a) Size and structure should be such as to enable easy handling.
- b) Each individual binder of the operating manual shall be marked on its back unambiguously identifying its contents.
- c) The contents shall be subdivided into chapters. Each chapter shall be preceded by a title page and a table of contents.
- d) Each page of the operating manual must be unambiguously identifiable (e.g. chapter, section, page number, version).
- e) The version shall be unambiguously identifiable.

#### 4.2 Font Type and Size

A well legible font type with sufficient size shall be selected, e.g. 9 points when using font type Helvetica or 10 points when using font type Times.

#### 4.3 Structuring and Layout of Text Passages

(1) In accordance with DIN 1422-1 the texts shall be structured in short sections and paragraphs corresponding to their logical and contents related inter-relationship. If necessary, these shall be numbered in accordance with DIN 1421. The individual sections shall be marked by headings in accordance with DIN 1421.

(2) Texts shall be written such that the eye is properly guided (e.g. by a suitable grouping of text lines or by using a line spacing of one-and-a-half lines). If this is not possible, such as in the case of lists and tables with larger gaps within the line, visual guides shall be included to lead the eye (e.g. larger line spacing, horizontal lines, grouping of lines).

(3) The lines of lists and tables shall be grouped in sensible units. The individual groups shall be separated from each other by visual guides (cf. paragraph 2).

(4) Prose text shall be used sparingly and shall be kept in comprehensible style. With respect to ease of comprehensiveness the following is recommended

- a) use of precise, concrete and regularly used words,

- b) formulation of short and simple sentences, avoiding negative and passive statements and nominalisations,
- c) placement of enumerations at the end of sentence,
- d) use of identical words and sentence structures in case of the same circumstances.

#### 4.4 Marking and Accentuation

(1) If individual text passages must be marked to show their differing degree of importance, this shall, preferably, be carried out by typographical means. The various markings specified in the following paragraph shall be used uniformly, however, sparingly and not superposed on each other.

(2) If individual words or word groups need to be particularly accentuated, the following methods, e.g., may be used

- a) bold letters.
- b) italics,
- c) underlining,
- d) different fonts,
- e) different font size, or
- f) capital letters.

(3) In addition to using the means of text structuring (cf. Section 4.3) and of marking individual words and word groups (cf. paragraph 2), larger text passages can be accentuated using the following means:

- a) indenting and ex-denting,
- b) frames, and
- c) margin marks.

#### 4.5 Terms and Abbreviations

(1) Terms shall be chosen such that they are unequivocal and are as short as possible. The same word shall always be used for the same object.

(2) Different facts or circumstances (e.g. activities, conditions, components) shall be specified with different terms.

##### Note:

Thus, it should be avoided that one term is used with different meanings. For instance, the word "opened" should characterize only the condition and "(to) open" the activity for achieving that condition.

(3) In the operating manual the (alpha-numeric) power plant identification code shall be used in addition to the full length name of the systems and components of the power plant.

(4) In the operating manual the same terms and abbreviations shall be used as on-site within the plant. Only one abbreviation shall be specified for each term. Each abbreviation shall have only one meaning.

(5) Differences in meaning shall not alone depend on the abbreviations being written in small or in capital letters.

#### 4.6 Instructions

(1) The instructions shall specify the actions of the personnel (controls, switching operations, communication procedures) in a precise and unambiguous way.

(2) An instruction shall be structured and arranged to be in accordance with its particular purpose.

(3) Instructions shall be self-explanatory without the need of referencing other information outside of the operating manual. In case other sections within the operating manual are referenced, the section referred to shall be specified precisely and unambiguously.

(3) Instructions shall be formulated in the imperative form.

(4) Provided, the specifics of the particular task so allow (cf. paragraph 2), the instructions, particularly those regarding plant operation and systems operation, shall be sequentially arranged as single steps within a logical and chronological order that corresponds to the procedural sequence (step program).

(6) Individual steps shall contain the task to be performed (action verb) and the object concerned as well as the boundary conditions (e.g. specification of the location). They may be comprised of multiple actions. Prerequisites for the individual step shall be presented in advance of the step and shall be specified such that only one single procedure of steps is prescribed. Steps may be sensibly arranged in blocks of activities, e.g. with respect to holding points or intermediate goals.

(6) The presentation of step programs may employ graphic and typographic means.

(7) Those parts of the operating manual of which copies are to be used as check lists shall be written such that space is left for making the completion checkmarks.

#### 4.7 Safety Specifications

Those parts within the operating manual that belong to the safety specifications shall be set off from the other parts in a form that can be easily copied (e.g. by the word "Safety Specification", or its abbreviation "SSP", on the individual page).

### 5 Requirements for Part 0 of the Operating Manual (Table of Contents and Introduction)

(1) A table of contents shall list all parts of the operating manual and each of the respective chapters. Those chapters that are part of the safety specifications shall be marked accordingly. The layout shall be such as to give the best possible lucidity.

Part 0 shall also make reference to those parts of the safety specifications - such as the testing schedule - that are not contained in the operating manual.

(2) An additional chapter should be included which contains a general introduction to the operating manual. This should give a general overview of the structure of the operating manual. It may contain a short description of the contents of individual chapters. Selected examples may be used to describe the general layout of instructions and questionnaires, of alarms and displays, etc.

(3) A collation of the abbreviations and acronyms used in the operating manual shall be incorporated as part of the operating manual at an appropriate place.

### 6 Requirements for Part 1 of the Operating Manual (Plant Regulations)

The individual plant regulations shall be named identically as in this safety standard. Essentially, they specify the objectives

and provisions, the organizational framework and responsibilities, referencing, as required, the relevant standards to be observed.

#### 6.1 Personnel Organization

(1) All persons shall be listed by name whose names must be reported by the licensee to the licensing or supervisory authority, particularly in meeting the requirements of Sec. 7 para. 2 Atomic Energy Act or of the Radiological Protection Ordinance.

(2) For each of the named persons their range of responsibilities and assignments, their authorization as well as the regulations with regard to substitutes shall be specified.

In particular, the following shall be taken into consideration:

- a) responsibilities and jurisdictions under nuclear regulations in the areas of
  - aa) plant operation,
  - ab) plant maintenance,
  - ac) modifications of the plant or of operating documents,
  - ad) achieving and maintaining technical qualification,
  - ae) reporting of reportable events in accordance with the AtSMV Guideline.
- b) responsibilities and jurisdiction of the persons specifically authorized in the areas of
  - ba) nuclear safety,
  - bb) radiation protection,
  - bc) plant security.
- (3) The personnel organization shall be shown schematically in an organization chart.

#### 6.2 Control Room and Shift Regulation

The following points shall be specified in the control room and shift regulation:

- a) personnel composition of the shift and manning of the control room specifying the minimum required number and qualification (e.g. shift supervisor) of shift personnel for the different operating conditions of the plant (e.g. full-power operation, plant shutdown),
- b) requirements regarding change-of-shift procedures,
- c) requirements regarding keeping of the shift log,
- d) requirements regarding the administration of keys with safety relevance,
- e) type and extent of documents required for plant operation that must be kept available in the area of the control room as well as type and extent of the documentation of plant operation required in accordance with KTA 1404,
- f) requirements regarding the performance of shift tasks in the case of normal operation, of operational occurrences and of deviations from the operating manual.

#### 6.3 Maintenance Regulation

##### 6.3.1 General Requirements

The maintenance regulation shall meet the requirements specified in the pertinent safety standards and guidelines, e.g. Maintenance Guideline, IWRS II Guideline, VBG 1, VBG 2, VBG 30 and KTA 1401.

### 6.3.2 Procedure for the Planning and Execution of Tasks Regarding Maintenance and Technical Modifications

The procedure shall be specified for all steps starting from the initial reason for the maintenance and shall include work preparation, work release, work performance, notification of work completion, final testing and reestablishment of operable condition.

### 6.3.2 Documentation

With special regard to safety related systems and components, the procedure for the documentation of maintenance measures and findings shall be described.

## 6.4 Radiation Protection Regulation

### 6.4.1 General Requirements

(1) The radiation protection regulation shall meet the requirements of a radiation protection directive in accordance with Sec. 34 Radiological Protection Ordinance (StrlSchV).

(2) In preparing the radiation protection regulation the requirements of pertinent safety standards and guidelines, e.g. REI Guideline, IWRS II Guideline and KTA 1301.2, shall be taken into account.

### 6.4.2 Radiation Protection Organization

(1) The radiation protection organization shall be described. The radiation protection officers appointed in accordance with Sec. 29 para. 2 StrlSchV shall be listed by name, and the duties and responsibilities delegated to them and their plant-internal jurisdiction shall be specified.

(2) The functions of the radiation protection officers reaching into other technical areas shall be clearly recognizable and shall be presented in a clear schematic. Their cooperation with the specialists for industrial safety in accordance with Sec. 30 para. 3 StrlSchV as well as those for fire protection shall be described.

### 6.4.3 Specification and Monitoring of Radiation Protection Areas

(1) The duties with regard to installing and monitoring radiation protection areas shall be specified.

(2) With respect to the restricted-access areas, the exclusion areas and the monitored plant areas, regulations shall be issued concerning

- a) right of access,
- b) access and exit procedure, and
- c) personal conduct.

(3) For the monitored off-plant area, measures shall be specified as necessary ensuring that the regulations of the Radiological Protection Ordinance are properly adhered to.

### 6.4.4 Monitoring of Persons

(1) The duties regarding the radiation protection monitoring of persons having access to the restricted-access area shall be

specified.

In accordance with the Radiological Protection Ordinance these duties include, e.g. measurement of the personal dose (Sec. 63), monitoring that dose limit values are not exceeded (Sec. 51), contamination measurements and measures to be taken in case of a contamination (Sec. 64), incorporation measurements and measures to be taken in case of an incorporation (Sec. 64), medical supervision (Sec. 67), radiation protection instructions (Sec. 39), documentation of the radiation protection instructions, of the radiation protection measurements and the medical supervision (radiation protection register) (Sec. 62 and 63), updating of the radiation passports (Sec. 62), and the inspection, calibration and servicing of the personnel radiation monitoring equipment (Sec. 72).

(2) The procedure for the activities listed under paragraph (1) ensuring a complete monitoring of personnel, including contract personnel, shall be described.

### 6.4.5 Plant and Environmental Monitoring

(1) The duties with regard to plant and environmental monitoring shall be specified with special attention paid to Secs. 44 through 48 and Sec. 61 StrlSchV and the REI Guideline (e.g. the measurement and evaluation of local doses or local dose rates in radiation protection areas, of radioactivity concentrations in the room and exhaust air, of contamination of work places and physical objects, of the radioactivity discharge with air, of the radioactivity discharge with water, of the radioactivity and local dose in the environment).

(2) The measures for the tests, calibrations and servicing of the measurement equipment for plant and environmental monitoring shall be specified. These shall take the requirements, particularly, of the REI Guideline into account.

### 6.4.6 Storage and Handling of Radioactive Materials and Contaminated Objects

(1) The procedures for storage and handling of radioactive materials and contaminated objects, in particular, in accordance with Sec. 64 StrlSchV shall be specified (e.g., transport of objects out of the restricted-access areas, storage and handling of radioactive materials and fuel assemblies, intermediate storage and transfer of radioactive materials, decontamination of objects, protection against loss of radioactive materials).

(2) With respect to radioactive waste and residual materials, in particular, the organization, material flow, collection and sorting, packaging and transport, radiological measurements, identification marking, documentation and reporting procedures, storage conditions, the pretreatment, repackaging and conditioning, the release procedure and procedures for the transfer and return transfer of these materials shall be described.

In case the written material in accordance with this paragraph becomes too voluminous, an individual Waste and Residual Material Regulation may be introduced.

### 6.4.7 Managing the Radiation Protection Documentation

Type, extent and storage period of the radiation protection documentation shall be specified in accordance with Sec. 63 StrlSchV, Sec. 7 KTA 1301.2 and KTA 1404.

## 6.5 Guard and Access Regulation

(1) The administrative measures regarding general procedures of access, stay and exit of persons and of bringing in and removing objects shall be specified. These are, in particular:

- a) access authorization and regulations for personal conduct differentiated according to the different groups of persons (e.g. plant personnel; members of the licensing authorities, of technical expert organizations and of contracted companies; visitors),
- b) identification pass system (ranges of validity, application to different groups of persons),
- c) relative subordination, duties and authorization of the security personnel.

(2) Those measures requiring the observance of secrecy shall be specified outside of the operating manual in plant-internal guidelines.

## 6.6 Alarm Regulation

### 6.6.1 General Requirements

(1) The alarm regulation shall comprise, in a clearly arranged manner, measures to be taken by, and rules of conduct for, persons on the power plant site in case of events that could be dangerous to the personnel working at the plant, to the environment of the plant, or to the power plant itself.

(2) In preparing the alarm regulation, Sec. 38 StriSchV and the criteria for issuing alarms in accordance with the "Criteria for Alarming the Disaster Control Authorities" shall be taken into account.

(3) The extent and frequency of alarm drills (alarm test, personnel training) as well as the rescue routes and collecting points shall be specified.

### 6.6.2 Responsibility and Standby Service

(1) The persons shall be named who are responsible for initiating alarms, for carrying out the measures required in case of an alarm as well as for notifying and advising the proper authorities and aid organizations.

(2) Reference shall be made to the standby service plan containing the name, address, function and telephone number of all plant personnel to be notified for duty assignments in case of an alarm.

### 6.6.3 Notification, Alarm Signals, Rules of Conduct

(1) The notification procedure, including verification of the report, shall be described. It shall be stressed that the report must include information regarding the location and type of occurrence, name and telephone number of the person giving the report as well as the time of the report ("where, what, who and when").

(2) The triggering criteria, the alarm procedure, the signal sequence as well as the rules of conduct for the personnel shall be specified for all plant-internal alarms (personal accidents, fire alarm, evacuation alarm, escape alarm). KTA 3901 shall be observed.

(3) With respect to plant-external alarms (early-warning catastrophe alarm, catastrophe alarm) the triggering criteria, alarm procedures, the communication lines and the cooperation with the corresponding circle of people shall be specified.

### 6.6.4 Documentation of Alarms and Alarm Drills

Type, extent and storage period of the documentation required in conjunction with alarms and alarm drills shall be specified.

## 6.7 Fire Protection Regulation

### 6.7.1 General Requirements

The fire protection regulation shall contain the description of the measures regarding preventative and defensive fire protection. These shall be based on the applicable regulations and standards (e.g. KTA 2101.1, DIN 14 096-3, FwDV [1]).

### 6.7.2 Fire Protection Organization

The organization of the plant-internal fire brigade and of the personnel trained in fire protection shall be specified with special regard to

- a) structural and procedural organization and qualification,
- b) boundary conditions with respect to the readiness for duty,
- c) cooperation with the public fire departments.

### 6.7.3 Fire Prevention

The following basic requirements with respect to preventive fire protection shall be specified:

- a) measures with respect to meeting the design basis requirements regarding (maximum amount of) combustible materials,
- b) measures with respect to minimizing combustible materials necessary during operation,
- c) measures required in case of a non-availability of fire alarm and fire fighting equipment and a non-availability of structural fire protection measures, and
- d) measures to be taken in case of tasks presenting a special fire hazard.

### 6.7.4 Procedure and Responsibilities in Case of Fire

The procedures and responsibilities in case of fire shall be specified with special regard to

- a) notification,
- b) alarming, and
- c) fire fighting.

### 6.7.5 Miscellaneous

The following shall also be specified:

- a) fire alarm drills, and
- b) type of documentation of the drills and actual fire alarms.

## 6.8 First-Aid Regulation

The following points shall be described in the first-aid regulation taking VGB 109 as well as ZH 1/546 into account:

- a) the responsibilities of the
  - aa) person giving the alarm,
  - ab) shift supervisor,
  - ac) first-aid person / plant-internal medic,
  - ad) radiation protection officer,

- ae) nuclear safety officer,
- b) the alarming/notification concept (cf. Section 6.6, Alarm Regulation)
- c) the procedure in case of an accident involving the danger of contamination or incorporation.

## 7 Requirements for Part 2 of the Operating Manual (Plant Operation)

### 7.1 Pre-requisites and Conditions for Operation

- (1) This section shall contain:
  - a) All continuously applicable orders and conditions by the authorities concerning plant operation with respect to atomic energy law, water law, building law, immission protection law, and work protection law as far as these pertain to aspects of nuclear safety.  
The resulting requirements shall also be incorporated into the respective parts of the operating manual or other instructions.
  - b) permissible time intervals of non-availability for safety related components and the measures to be taken in case the permissible time intervals of non-availability are exceeded (power operation restrictions).
- (2) These requirements shall be organized in categories of those
  - a) that are independent of specific operating conditions, and
  - b) that are dependent on specific operating conditions (e.g. power operation, startup, shutting-down and shut-down operation).

### 7.2 Safety Related Limit Values

This section shall contain all limit values that

- a) are processed by the reactor protection system (reactor protection limit values),
- b) serve to protect the persons in the plant (e.g. radioactivity limit values with regard to monitoring coolant circuits, room atmosphere and local dose rates),
- c) indicate an impermissible exposure of the environment (e.g. radioactivity limit values with regard to monitoring stack discharge and liquid discharge),
- d) are intended as danger alarms in accordance with KTA 3501 to alert the shift personnel to manually initiate protective actions in case of incidents (Class S Alarms),
- e) are intended as danger alarms in accordance with KTA 3501 to alert the shift personnel to take corrective actions in case of malfunctions in the safety system (Class I Alarm).

### 7.3 Reporting Criteria

The general criteria for the reporting of special event to the supervisory authority are specified in the AtSMV guideline.

### 7.4 Normal Operation

- (1) This section shall contain the procedural instructions to be specified for start-up, shut-down and those operating procedures of the plant with all systems being in functioning order; this shall include descriptions of the interactions of the systems and subsystems.
- (2) The procedural instructions shall start out from clearly defined initial conditions (operating conditions of the main or auxiliary systems). They may be supplemented as required by graphic representations and diagrams.

## 7.5 Abnormal Operation

(1) This section shall contain the countermeasures to be specified for those cases of abnormal operation which have consequences beyond the limits of an individual system; this includes the automatically initiated measures as well as those measures to be manually initiated by the shift personnel. The description of the measures shall start out from clearly defined initial conditions.

(2) All abnormal operating conditions that are dealt with in the licensing procedure shall be included.

(3) For the individual cases of abnormal operation documents shall be prepared that, in a clear and concise form (so-called concise versions), shall contain the following information:

- a) Criteria for identifying the individual case of abnormal operation,

**Note:**

These could also refer to any auxiliary means giving information for identification and clarification of upset plant conditions and that help in the decision making process in these cases.

- b) important safety related automatic measures,

- c) desired goal of the major actions to be taken,

**Note:**

The intention of stating the desired goal is to enable the shift personnel to be in a position to check the effect of their actions and to identify deviations.

- d) the condition that should be achieved for the power plant and in which it can be maintained, as well as

- e) plant parameters to be particularly monitored.

(4) The documents in accordance with paragraph (3) are a part of the safety specifications.

(5) The documents in accordance with paragraph (3) shall, if necessary, be supplemented by detailed descriptions of the sequences of the abnormal operating cases (so-called detailed version).

(6) Both, in the concise version as well as in the detailed version documents reference may be made to other parts of the operating manual.

(7) If measures for the "prolonged shutdown" plant condition are to be provided these shall analogously be included in this section.

## 8 Requirements for Part 3 of the Operating Manual (Design Basis Accidents)

(1) This part of the operating manual shall contain the instructions regarding those measures that - with regard to the protection goals - are required in case of design basis accidents; this includes the automatically initiated measures as well as those to be initiated manually by the shift personnel.

Furthermore, those criteria shall be specified where it must be assumed that important safety functions cannot be anymore met by the systems as per design and where the shift personnel has to progress to plant internal accident management measures.

(2) All design basis accidents that are treated in the licensing procedure shall be covered in this presentation.

(3) Two different procedures for controlling the design basis accidents are permissible:

- a) the condition or protection goal oriented treatment of design basis accidents,
- b) the event oriented treatment of design basis accidents.

The condition or protection goal oriented procedures may be used alone or in combination with the event oriented procedures.

(4) Right at the beginning of this part of the operating manual an approach shall be specified to be applied in deciding which of the two procedures shall be applied in which way whenever a design basis accident occurs.

(5) With respect to the individual plant condition or event documents shall be prepared that, in a clear and concise form (so-called concise versions), shall contain the following information:

- a) Criteria for identifying the plant condition or the event,

**Note:**

These could also refer to any auxiliary means giving information for identification and clarification of design basis accidents and that help in the decision making process in these cases.

- b) safety related automatic measures,
- c) desired goal of the major actions to be performed,

**Note:**

The intention of stating the desired goal is to enable the shift personnel to be in a position to check the effect of their actions and to identify deviations.

- d) the condition that should be achieved for the power plant and in which it can be maintained,
- e) plant parameters to be particularly monitored.

(6) The documents in accordance with paragraph 5 are a part of the safety specifications.

(7) The documents in accordance with paragraph 5 shall, if necessary, be supplemented by detailed descriptions of the measures to be taken (so-called detailed versions).

(8) In the concise version as well as in the detailed version other parts of the operating manual may be referred to.

(9) If measures for the "prolonged shutdown" plant condition are to be provided these shall analogously be included in this section.

## 9 Requirements for Part 4 of the Operating Manual (Systems Operation)

(1) This part shall, for all systems, contain the procedural instructions regarding the operating procedures to be performed by the shift personnel (e.g. start-up, operation, shut-down, switch-over). Several systems may be dealt with collectively in accordance with the operational requirements.

(2) The procedural instructions shall start out from clearly defined initial conditions (e.g. initial positions or operating conditions of components or auxiliary systems). They may be supplemented by graphic representations, by diagrams and by special references.

(3) The fuse schematics for the safety related components shall be included. These shall contain the normal-operation values, the preliminary as well as the triggering limit values.

## 10 Requirements for Part 5 of the Operating Manual (Alarms / Hazard Alarms)

All alarms and hazard alarms and the corresponding countermeasures shall be presented in a system oriented collation. The alarm systems (e.g. computer) and the control stations where the alarms will register shall be specified.

## 11 Updating Service

(1) An updating service shall be installed to keep the operating manual up to date at all times. It shall ensure that

- a) any changes of circumstances that are a part of the operating manual are transferred, without delay and to the extent necessary for safe operation, to at least the operating manual in the control room and to its parts in the local control stations,
- b) any system specific information is in full conformance with the system diagrams and system descriptions,
- c) editorial mistakes (e.g. incorrect spelling, wrong acronyms) are corrected, and that
- d) a register is kept of the state of modification of the individual pages.

(2) An exchange procedure shall be arranged with the users of registered copies of the operating manual (e.g. frequency of exchange, report of receipt, postal address).

## Appendix A

## Regulations and Literature referred to within this Safety Standard

Regulations referred to in this safety standard are valid only in the version cited below. Regulations which are referred to within these regulations are valid only in the version that was valid when the latter regulations were established or issued.)

AtG		Act on the Peaceful Utilization of Nuclear Energy and the Protection against its Hazards (Atomic Energy Act) of December 23, 1959 (BGBl. I p. 814), in the version promulgated on July 15, 1985 (BGBl. I p. 1565), last revised by the Law of April 6, 1998 (BGBl. I p. 694)
StrlSchV		Ordinance on the Protection Against Damage and Injuries Caused by Ionizing Radiation Radiological Protection Ordinance - StrlSchV) of October 13, 1976 (BGBl. I p. 2905, 1977 p. 184, 269), in the version promulgated on 30. June 1989 (BGBl. I p. 1321, corr. p. 1926), last revised by the Ordinance of August 18, 1997 (BGBl. I p. 2113)
AtSMV		Ordinance on the Nuclear Safety Officer and the Reporting of Accidents and other Events (Nuclear Safety Officer and Reporting Ordinance - AtSMV) of October 14, 1992 (BGBl. I p. 1766)
AtVfV		Ordinance on the Procedure for Licensing of Installations under Sec. 7 of the Atomic Energy Act (Nuclear Licensing Procedure Ordinance - AtVfV) of February 18, 1977, last revised on February 3, 1995
Maintenance Guideline		Guideline Relating to the Procedure for the Preparation and Implementation of Maintenance Work and Modifications at Nuclear Power Plants of June 1978 (GMBI 1978 p. 342)
IWRS II Guideline		Guideline for the Radiation Protection of Personnel during the Execution of Maintenance Work in Nuclear Power Plants with Light Water Reactors; Part II: Radiological Protection Measures during Commissioning and Operation of the Plant
REI Guideline		Guideline on the Monitoring of Emissions and Immissions of Nuclear Facilities (REI) of June 30, 1993 (GMBI 1993 p. 502)
Criteria for Alarming the Disaster Control Authorities		Criteria for Alarming the Disaster Control Authorities by the Operators of Nuclear Facilities; recommendations by the RSK and SSK, 287 <sup>th</sup> session of the RSK and 126 <sup>th</sup> session of the SSK (BAnz 1995, No. 96)
VBG 1	(07/91)	General Requirements (Accident Prevention Regulation)
VBG 2	(01/93)	Thermal Power Plants and Heating Plants (Accident Prevention Regulation)
VBG 30	(01/87)	Nuclear Power Plants (Accident Prevention Regulation)
VBG 109	(10/94)	First Aid (Accident Prevention Regulation)
KTA 1301.2	(06/89)	Radiation Protection Considerations for Plant Personnel in the Design and Operation of Nuclear Power Plants; Part 2: Operation
KTA 1401	(06/96)	General Requirements Regarding Quality Assurance
KTA 1404	(06/89)	Documentation During the Construction and Operation of Nuclear Power Plants
KTA 2101.1	(12/85)	Fire Protection in Nuclear Power Plants; Part 1: Basic Principles
KTA 3501	(06/85)	Reactor Protection System and Monitoring Equipment of the Safety System
KTA 3901	(03/81)	Communication Devices of Nuclear Power Plants
DIN 1421	(01/83)	Outlines and Numbering of Texts; Sections, Paragraphs, Enumerations
DIN 1422-1	(02/83)	Publications in Science, Technology, Economics and Administration; Layout of Manually and Type Written Scripts
DIN 14 096-3	(04/83)	Fire Protection Regulation; Rules for the Preparation of Part C (for Persons with Special Task in Fire Protection)
ZH 1/546	(04/82)	First Aid in the Case of Increased Influence of Ionizing Radiation First-Aid Memorandum by the Main Association of Professional Trade Unions

## Literature

- [1] FwDV Fire Fighting Regulations for Voluntary Fire Fighters, published by G. Schueler, Celle