

Safety Standards

of the

Nuclear Safety Standards Commission (KTA)

KTA 1404 (2013-11)

**Documentation during Construction and Operation of
Nuclear Power plants**

(Dokumentation beim Bau und Betrieb von
Kernkraftwerken)

The previous version of this safety
standard was issued in 2001-06

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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Documentation during Construction and Operation of Nuclear Power plants

KTA 1404

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PLEASE NOTE: Only the original German version of this safety standard represents the joint resolution of the 35-member Nuclear Safety Standards Commission (Kerntechnischer Ausschuss, KTA). The German version was made public in Bundesanzeiger BAnz of January 17th, 2014. Copies may be ordered through the Wolters Kluwer Deutschland GmbH, Postfach 2352, 56513 Neuwied, Germany (Telefax +49 (0) 2631 801-2223; E-mail: info@wolterskluwer.de).

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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, 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 damage arising from the construction and operation of the plant (Sec. 7, para. 2, subpara. 3 Atomic Energy Act - AtG) in order to attain the protective goals specified in AtG and the Radiological Protection Ordinance (StrlSchV) and further detailed in the "Safety Criteria", the "Design-Basis Accident Guidelines" and in the Safety Requirements for Nuclear Power Plants (SiAnf).

(2) Criterion 2.1 of the Safety Criteria requires that the documents needed for the assessment of quality must be available. Further details concerning this requirement are contained in the "Documentation Principles" by the Federal Committee for Nuclear Energy.

(3) The documentation in nuclear power plants comprises all documents which serve as certificates in the licensing and supervisory procedure as well as all organizational regulations that are the basis for the safe operation.

(4) The purpose and function of the documentation are among others:

- a) Proving the existence of, or compliance with statutory prerequisites (e.g., licensing prerequisites in accordance with Sec. 7, para. 2 AtG);
- b) Describing the required condition of the power plant and the essential processes during its construction;
- c) Enabling an assessment of the actual condition of the power plant;
- d) Presenting the circumstances and provisions required for a safe operation of the power plant;
- e) Enabling the feedback of experience; and
- f) Providing a knowledge base for ageing management.

(5) The objective of the present safety standard is to specify type and depth of the documentation. It contains the general requirements regarding documentation as well the retention periods and place of storage of the documents. In this context it expands the requirements specified under safety standard KTA 1401, Sec. 12 'Documentation', under safety standard KTA 1402, Sec. 5.17 'Documentation' and Sec. 5.13 'Feedback of Experience' and under Decommissioning Guideline, Sec. 3.3, item g) and Sec. 5.2. The details concerning type, form and depth of the documentation is specified the safety standards KTA 1201, KTA 1202, KTA 1203 and KTA 1403, in the component-related KTA safety standards as well as in the building codes of the federal states, the "Federal Immission Protection Act (BImSchG)", the "Act on Environmental Impact Assessment (UVPG)", the "Act on the Regulation of the Water Household (WHG), the various Clean Water Acts of the federal states and, as required, additional acts and ordinances.

1 Scope

This safety standard shall be applied to the following:

- The documentation generated for the licensing and supervisory procedure within the framework of planing, erection, commissioning as well as operation and modifications of the power plant;
- All organizational regulations necessary for the safe operation;
- All documents that are used as knowledge base; and
- The storage of spare materials and material test specimens.

Note:

When, in accordance with the Decommissioning Guideline, the present safety standard is applied to decommissioning it is impor-

tant to note that the Sections 3, 4 and 5 as well as Table 9-1 KTA 1404 referenced by the Guideline relate to the previous version (2001-06). These respective sections have been replaced in the present safety standard by Sections 3 and 4 and by Tables 4-1 and 4-2.

2 Definitions

(1) Archiving

Archiving is understood to mean the proper storage of documents for a specified retention period at a specified place of storage.

Note:

In the present safety standard, the term archiving is used for that type of storage for which specific requirements are applicable with regard to spatial and administrative prerequisites.

(2) Operation documentation

Operation documentation comprises the documents compiled in the course of operation; these are:

- a) Safety-related operating records;
- b) Certificates with respect to maintaining the quality of the power plant and its components as well as the technical qualification of the personnel;
- c) Documents with respect to the radiological protection of the personnel and environment; as well as
- d) Additional certificates with respect to the compliance with regulations and provisions.

(3) Data carrier

A data carrier is a medium on which data are stored and from which this data can be recalled.

(4) Document

A document is the material unit of a carrier for documentary data. This term is used, both, for analog documents (usually in the form of paper) and for digital documents.

(5) Documentation

Documentation is the systematic compilation of documents.

(6) Final document file

Final document file is that part of the documentation which stays archived over the entire lifetime of the power plant or until the documented part is removed from the power plant.

(7) License documentation

License documentation is the compilation of all license provisions, conditional provisions, legal approvals, directives and decrees of the proper supervisory and licensing authorities as well as of all documents quoted in the license provisions.

Note:

This includes all documents generated under the building code and under the various acts regarding water utilization, immission control, environmental acceptability, nature conservation as well under other areas of law.

(8) Organization documentation

Organization documentation is the compilation of all documents containing the structural and procedural regulations that build the basis for the technical and administrative areas of operation of the power plant.

(9) Quality documentation

Quality documentation is the compilation of all quality certificates of the power plant and its parts and includes the design review documents.

(10) Reference location

A reference location is that particular place where the binding reference copy of the corresponding document is located (e.g., the control room, in case of the operating manual with its manually entered, red annotations).

(11) Stamping

Stamping is the certification that a document from the quality documentation has been reviewed with a positive result, particularly, in those cases where the actual values do not need to be recorded, i.e.,

- a) reviews that require only a simple yes or no statement,
- b) reviews where their execution and the required values are specified in the specification or test instruction.

(12) Process-technological documentation

The process-technological documentation comprises documents that describe the safety-related tasks and functions of components and systems and that support the operational management of the power plant.

(13) Duplicate document file

The duplicate document file is a compilation of selected valid documents in the form of copies or printouts (backup copies).

(14) Interim document file

The interim document file comprises those documents of the quality documentation which are important for verifying the manufacturing process but are not needed for describing the final condition of the power plant or its parts and, therefore, are not required to be transferred to the final document file.

3 General Requirements Regarding Documentation**3.1 General Principles**

(1) With respect to the information contained, the documentation shall be complete, explicit and unambiguous. The individual documents shall be mutually consistent.

(2) The documentation shall describe both the required state and the actual state of the power plant and its parts and of the organization. The present safety standard differentiates the parts of the documentation according to their function as follows;

- a) License documentation;
- b) Quality documentation;
- c) Operation documentation;
- d) Process-technological documentation; and
- e) Organization documentation.

A single document may fulfill more than just one of the functions above in which case it must meet all of the respective requirements specified under Section 4.

(3) The license applicant or licensee shall be responsible for creating, maintaining, updating and archiving the documentation. He may delegate tasks arising from these obligations to contractors.

(4) The structure, the documentation depth and the handling of the documentation from the time of its creation to archiving and final destruction of the documents shall be specified and described.

(5) When transferring documents to other or similar data carriers, it shall be ensured that the content of the documents is not falsified.

(6) Analog data carriers may be archived on microfilms or in digitalized form, provided, the additional requirements specified, respectively, under **Appendix A** or **Appendix B** are met. In this case all original documents, with the exception of the license documentation, may be destroyed unless it is required under legislations, standards, guidelines, license permits or legal directives that the document must be archived in its original form.

(7) The retention periods of the documents and their allocation to the final and interim document files are specified in **Tables 4-1, 4-2** and **5-1** through **5-4** according to the respective verification requirements of the licensing and supervisory procedure. After these retention periods have expired, the respective documents do not need to be archived anymore with regard to fulfilling any verification requirements.

(8) With regard to knowledge preservation, experience feedback and trend analyses (cf. Section 4.3.3, paras.(3) and (4) as well as Section 4.3.4) it is sensible to keep selected documents archived beyond their specified retention periods. The license applicant or licensee shall specify the corresponding procedure.

(9) The requirements specified under Section 3.3 do not apply to documents that, with regard to knowledge preservation, experience feedback and trend analyses, are kept beyond their retention period. The paper versions of these documents may be destroyed after they have been transferred to electronic media. The electronic archiving of these documents is not subject to the additional requirements specified under **Appendix B**.

3.2 Creation, Revision and Distribution

(1) The procedure for creating, revising, reviewing and implementing the documents including the way to handle manual (red) annotations shall be specified.

(2) An updating service shall be established to ensure that the documentation and the duplicate document file are complete and up-to-date. The updating service shall ensure

- a) that the documents are supplemented and updated to the required extent,
- b) that the users of excerpts from the documentation are informed promptly and without delay about the exchange of and supplements to the respective documents.

All changes introduced by manual annotations shall be transmitted to the updating service.

(3) The verification documents shall, basically, not be subject to revision. In case verification documents must be factually corrected or supplemented, these activities shall be performed by the same organizational unit that had signed or initialed the original document. The changes shall be marked. If this procedure is not possible, a supplementing document shall be generated.

(4) The distribution of the documents shall be specified. It shall be ensured that the addressed group of people can, at all times, gain access to the documents at the location specified for the respective documents.

Note:

The documents may also be made available via electronic procedures.

(5) The validity of the documents shall be clearly identifiable. Documents that are not valid anymore shall be marked accordingly.

3.3 Archiving**3.3.1 General requirements**

(1) The following requirements shall apply both to analog archiving as well as to electronic archiving.

(2) In addition, the requirements specified for microfilming under **Appendix A** or for electronic archiving under **Appendix B** shall be observed.

(3) The archiving procedure shall be specified and described

3.3.2 Archiving system

(1) A structured classification system (e.g., according to a hierarchical principle) with a detailed identification key shall be specified. This system shall fulfill the following functions:

- a) Accurate retrieval of the desired information; and
- b) Preclusion of any mix-ups with outdated information.

(2) Possibilities shall be given for a controlled amending and updating of the documentation as well as for checking its completeness.

(3) The information shall be protected against unauthorized changes and against loss by providing effective access authorizations and access controls.

3.3.3 Archiving location

(1) Analog documents shall be archived at the nuclear power plant site for the duration of their retention period. In the case of digitally archived documents, it shall be ensured that they are accessible at the nuclear power plant site.

Note:

The requirements for the place of storage of the duplicate document file are specified in Section 4.6.

(2) From the point in time of commissioning of the power plant, the documentation shall, for the duration of the retention periods of the documents, be protected against

- a) Fire;
- b) Flood water;
- c) Damaging magnetic, heat, light and moisture effects;
- d) Harmful organisms; as well as
- e) Unauthorized access by third parties.

(3) The organizational prerequisites shall be provided enabling the proper authorities, authorized experts and other authorized parties to gain access to the documents at all times

3.3.4 Document upkeep

(1) The documents shall be readable. The quality of the data carriers and their storage conditions shall be such that the contained information is preserved over the duration of the specified retention period.

(2) The availability and the readability of the documentation shall normally be ensured and checked by suitable measures and procedures (e.g., random visual inspections, legibility tests of the data carriers). Type, extent and frequency of these checks and tests shall be specified according to the requirements of the type of data carrier.

(3) In the case of data carriers with a limited durability, it shall be ensured by suitable storage techniques or by a timely transfer of the data to other data carriers that no loss of information detrimental to the contained information occurs.

3.4 Storage of Spare Material and Material Specimens

The spare materials and the material specimens to be kept as provided for in component-related KTA safety standards (e.g., KTA 3201.1) shall be stored on the nuclear power plant site in such manner that they are protected against detrimental ambient conditions, can be identified on the basis of their markings and that they can be handled.

4 Specific Requirements

4.1 License Documentation

(1) The license documentation shall be transferred to the final document file.

(2) The license documentation shall be stored separately within the final document file and shall be appropriately marked as such in a suitable manner.

4.2 Quality Documentation

(1) Insofar as no related specifications are contained in the component-related KTA safety standards, the depth of the quality documentation shall be specified in the license documentation or the design review documents.

(2) It shall be ensured that all documents required for documentation are generated, compiled and reviewed in parallel to the preceding manufacturing process.

(3) In the case of the quality documentation a distinction shall be made between

- a) Final document file (F), and
- b) Interim document file (I).

(4) The documents for the interim document file shall be retained at the manufacturer throughout the manufacturing process until the delivery and review of the documents intended for the final document file have been completed.

(5) Insofar as no related specifications are contained in component-related KTA safety standards, the correlation of the documents to the final document file or the interim document file shall be as specified in **Tables 5-1** through **5-4**.

(6) The design review documents may be used (e.g., stamping) for the verification of tests. Therefore, the design review documents including the test records shall be adapted to this purpose where necessary. The design review documents shall be transferred to the final document file. Any revisions of the design review documents shall be carried out in accordance with safety standard KTA 1401, Sec. 5.4.

(7) In order to properly reflect the actual condition of the power plant, its parts and replacement parts as well as of the auxiliary and operating media, the quality documentation shall be kept up-to-date with regard to

- a) maintenance measures,
- b) modifications and retrofitting.

If new verification documents are available, the quality documentation shall be updated accordingly. In this context, the requirements specified under Section 5 shall be observed.

(8) Those documents intended for the final document file shall be archived for the duration until the associated component is removed from the power plant. However, before destruction of the corresponding documents, the requirements specified under Section 3.1, para. (8), shall be observed.

4.3 Operation Documentation

4.3.1 Operating records

The data and results accumulated during operation of the power plant may be recorded and documented in various manners as required. The type of the documents and the retention periods shall be specified. In this context the facts listed in **Table 4-1** shall be taken into account.

4.3.2 Radiological protection

The data and results accumulated in connection with the radiological protection of persons and the environment and in connection with the handling of radioactive substances may be recorded and documented in various manners as required. The type of the documents and their retention period shall be specified. In this context the Radiological Protection Ordinance (StrlSchV) shall be observed. Typical radiation protection documents are listed in **Table 4-2**.

4.3.3 Inservice inspections

(1) The execution and results of the initial tests or inspections of the inservice inspections specified in the testing schedule in accordance with safety standards KTA 1201 and KTA 1202 shall be documented and shall be archived for the duration that the inspected parts are constituent parts of the power plant.

(2) The execution and results of the inservice inspections shall be documented.

(3) The documentation of performed inservice inspections shall basically be archived for the length of time that the inspected parts are constituent parts of the power plant. Exempted are those results that are within specified tolerances; these results need to be archived only until the respectively next inservice inspections performed in the same way unless the results are continually required for safety-related trend analyses (cf. Section 3.1, para. (8)).

(4) The retention period of meantime invalid test instructions shall be the same as the retention period specified for the results of the corresponding inservice inspections.

Note:

Test instructions are integral part of the organization documentation.

4.3.4 Maintenance records

Maintenance records shall be archived under consideration of Section 3.1, para. (8), until the next respective maintenance performed in the same way.

4.4 Process-technological Documentation

(1) The process-technological documentation comprises, in particular:

- a) System circuit plans and descriptions;
- b) Function diagrams and descriptions.

(2) The storage location and the reference locations of the respectively valid documents shall be specified. In this context, the requirements of the component-related KTA safety standards shall be observed.

(3) The process-technological documentation shall fulfill the requirements regarding traceability and are, therefore, subject to the requirements specified under Section 4.5, paras. (6) and (7).

4.5 Organization Documentation

(1) The organization documentation comprises the structural and procedural regulations required for the safe operation of the power plant. This documentation comprises, in particular:

- a) Operating manual;
- b) Testing manual;
- c) Emergency manual; and
- d) Documents regarding the management system including process descriptions.

The organization documentation may additionally comprise supplementing power plant-specific documents, such as:

- e) Organizational instructions;
- f) Operating instructions;
- g) Technical instructions;
- h) Quality instructions; and
- i) Maintenance instructions.

The structure of the organization documentation and the scope of application of the individual documents shall be specified.

(2) In order to ensure a uniform design of the individual document types (e.g., technical instructions), general requirements for the basic structure of these documents shall be specified.

Note:

General requirements for individual document types (e.g., operating manual, testing manual) are specified in the safety standards KTA 1201, KTA 1202, KTA 1203 and KTA 1402.

(3) The duplication of regulations for similar subjects in various documents shall be avoided.

(4) Taking the requirements specified under Section 3.1, para. (8) into account, the documents of the organization documentation shall continue to be archived until one year after they have become invalid, unless further reaching requirements exist regarding the retention periods in individual cases.

(5) On account of the traceability required in accordance with safety standards KTA 1201, KTA 1202 and KTA 1203, the invalid pages of the operating manual, testing manual and emergency manual shall be stored over the lifetime of the power plant. The same applies to documents that temporarily replace the operating manual, testing manual and emergency manual (e.g., shift instructions).

(6) For the documents for which traceability is required, it must be possible to establish the document history for any individual point in time, i.e., who carried out which change at what time and for what reason.

(7) For the documents which must be stored continuously because of the required traceability, the requirements of Section 3.3 apply. The paper versions of these documents may be destroyed after they have been transferred to electronic media. The electronic archiving of these documents is not subject to the additional requirements specified under **Appendix B**.

4.6 Duplicate Document File

(1) With regard to fulfilling the requirements in accordance with StrISchV, Sec. 53, para.(1), a duplicate document file shall ensure that, in the case of a limited accessibility to or a partial destruction or complete destruction of the documents on the nuclear power plant site, the licensee is enabled to safely and quickly cope with the consequences of design basis and other accidents and the authorities are enabled to carry out a comprehensive and fast determination of the damage involved. Content and documentation depth of the duplicate document file is detailed in **Appendix C**.

Note:

In accordance with the Decommissioning Guideline, the duplicate document file is required to be archived only until removal of the nuclear fuel from the power plant site.

(2) The documents of the duplicate document file shall be compiled and stored in such a way that, when required, it will be possible for a task force outside of the power plant to plan and initiate the measures regarding the attainment of the protective goals regarding:

- a) Controlling the reactivity;
- b) Cooling of the fuel assemblies;
- c) Containing of the radioactive substances;
- d) Limiting the radiation exposure;

as well as to plan and initiate the emergency measures regarding:

- e) Returning the power plant parameters to the realm where the protective goals are not violated anymore; or
- f) Lessening the consequences of a violation of the protective goals.

(3) The storage of the duplicate document file shall be such that, when required, its accessibility is not endangered by any influencing effects of the power plant that must be taken into consideration.

5 Requirements for the Documentation of Specific Technical Documents

5.1 General Requirements

(1) The specific technical documents (i.e., constructional, mechanical and electrical engineering documents) shall be subdivided according to

- a) those applying to planning; and
- b) those applying to design and construction.

(2) The planning documents shall comprise all documents on which the later construction is based and shall be in their final, reviewed and, if so required, approved form. Planning documents shall be transferred to the final document file.

(3) The detailing depth of the documentation may be graded according to the individual safety-related significance of the respective systems, components and individual parts of the power plant.

(4) The tests and inspections performed shall be certified either by individual certificates, by stamping marks in the design review documents or other suitable documents (e.g., check sheet, stamp mark list, attestation list).

(5) In the case of identically designed multiple components, the documents may be subdivided according to

- a) those that are mutually applicable; and
- b) those that are related only to individual components.

5.2 Structural Plant Components

5.2.1 Planning documents of building structures

The construction planning documents shall be subdivided as follows:

- a) Documents relating to the overall power plant; and
- b) Documents relating to individual building structures.

5.2.2 Documents of the final construction

The final construction documents shall be subdivided as follows:

- a) Planning documents of the final construction; and
- b) Certificates of the final construction.

5.2.2.1 Planning documents of the final construction

(1) The planning documents of the final construction including the respective explanatory reports and technical specifications shall be transferred to the final document file in their final form.

(2) Typical final construction plans are listed in **Table 5-1**.

5.2.2.2 Certificates of the final construction

(1) The certificates of the final construction shall be subdivided into those designated only for the interim document file and those designated for the final document file. Those documents certifying the proper construction and the quality of the building structures shall be transferred to the final document file.

(2) Typical certificates of the final construction together with their allocation to the intermediate or final document file are listed in **Table 5-1**.

5.3 Mechanical and Apparatus Engineering

(1) Unless the component-related KTA safety standards contain corresponding specifications, the allocation of the mechanical engineering documents to the interim or final document file shall be specified in the licensing or design review documents. The corresponding allocation of these documents is listed in **Table 5-2**.

(2) If it is specified for individual tests and inspections that they shall be certified by stamping marks, a test certificate is only required if the test result or the test procedure does not comply with the specified requirements and, consequently, a nonconformance report must be generated as specified in the licensing or design review documents.

(3) Those test certificates that were originally intended for the intermediate document file or were to be certified by stamping marks shall be transferred to the final document file if the test results deviated from required values and a nonconformance report was generated.

5.4 Electrical and the Instrumentation and Control Equipment

(1) Unless the component-related KTA safety standards contain corresponding specifications, the allocation of the documents with regard to interim or final document file shall be specified in the licensing or design review documents.

(2) For those documents that are not already license documents, the corresponding allocation is listed in **Tables 5-3** and **5-4**. The following equipment shall be allocated as listed in **Table 5-3**:

- a) Instrumentation and control equipment of the safety system;
- b) Accident monitoring system;
- c) Instrumentation regarding radiation protection and environmental monitoring as well as meteorological instrumentation;
- d) Communication equipment.

The following equipment shall be allocated as listed in **Table 5-4**:

- e) Electrical power supply of the safety system including the grounding, lightning protection and lighting equipment;
- f) Active and passive electrical components of safety-related systems.

Typical Operation Documents		Retention Period in years [a] F : final document file	
1	Records of inspection rounds and analyses		1 a
2	Simulation, interlocking and isolation manuals (engineered safety)		5 a
3	Switching logs and switching manuals, record books, key distribution log		5 a
4	Records concerning start-up and shutdown	F	
5	Records concerning refueling		10 a
6	Shift books including shift transfer records		10 a
7	Recorder chart paper		10 a ¹⁾
8	Records of the special operational monitoring		10 a
9	Records of the monitoring and measuring of activity discharges (Sec. 48 StrlSchV in combination with REI)		30 a ²⁾
10	Records on sequence of incidents	F	
11	Measuring records of environmental monitoring (Sec. 48 StrlSchV in combination with REI)		30 a ²⁾
12	Monthly reports (important operating data)	F	
13	Reports on incidents and unusual events (z. B. reportable events) as well as of the adopted measures	F	
14	Other reports generated within the framework of nuclear supervisory proceedings (e.g., regarding information notices)	F	
15	Certificates regarding personnel training and special exercises		5 a
¹⁾ Where suitably compacted data are transferred to the final document file, recorder chart papers do not need to be retained longer than for a period of five years. ²⁾ These values are specified in accordance with REI in the version cited in Appendix D. The specifications of the actually valid version of REI shall always be applied. The records shall be stored over the entire lifetime of the power plant, however, at least over a duration of 30 years.			

Table 4-1: Operation documents

Typical Radiation Protection Documents		Retention Period in years [a] F : final document file	
1	Participation records of radiation protection instruction (Sec. 38 para.(4) with para. (1), StrlSchV)		5 a ^{*)}
2	Participation records of radiation protection instruction (Sec. 38 para.(4) with para. (2), StrlSchV)		1 a ^{*)}
3	Measurement records of personal doses and body doses (Sec. 42, para. (1), StrlSchV)		30 a ^{*) 1)}
4	Certificates of the medical surveillance (Sec. 61, para. (3), StrlSchV)	³⁾	
5	Records of function tests and service checks of radiation measuring equipment (Sec. 67, para. (2), StrlSchV)		10 a ^{*)}
6	Records on the production, acquisition, transfer and other types of disposal of radioactive substances (Sec. 70, para. (6), StrlSchV)		30 a ^{*)}
7	Certificates on the leak tightness of enclosed radioactive substances and related inservice inspections (Sec. 66 and Sec. 69, para. (2), StrlSchV)		²⁾
8	Records on the effective clearance in accordance with Sec. 29, para. (3), StrlSchV in combination with Sec. 70, paras. (3) and (6) StrlSchV		30 a ^{*)}
8a	Registering of radioactive waste: electronic record system in accordance with Sec. 73, para. (2), StrlSchV; data storage after delivery to the State Collecting Facility or to the ultimate waste disposal (Sec. 73, para. (3), StrlSchV)		1 a ^{*)}
9	Records of radiation measurements in controlled areas (KTA 1301.2, Sec. 15)		10 a
10	Records of contamination measurements in accordance with Sec. 44, para. (2), item 3 StrlSchV if limit values are exceeded (Sec. 42, para. (3), StrlSchV)		30 a ^{*)}
11	Records concerning feedback of experience		10 a
12	Qualification certificates of radiation measuring equipment in accordance with KTA 1505, Sec. 7	F	
^{*)} These values are specified in accordance with StrlSchV in the version cited in Appendix D. The specifications of the actually valid version of StrlSchV shall always be applied. ¹⁾ These records shall be kept until the supervised person has or would have reached the age of 75 or for a duration of at least 30 years after termination of the associated employment. They shall be deleted 100 years after the birth date of the person concerned. ²⁾ The retention period is the same as documents related to inservice inspections (cf. Section 4.3.3). ³⁾ For the duration of performing work tasks as an occupationally exposed person			

Table 4-2: Radiation protection documents

Typical Documents of the Final Construction of Building Structures	Storage Type	
	Final (F) Document File	Intermediate (I) Document File
I Typical Constructional Plans for Building Structures		
Survey drawings	F	
Pile foundation and pile driving schemes	F	
Site and building plans	F	
Formwork plans	F	
Anchoring formwork plans	F	
Reinforcement layout plans	F	
Structural steelwork plans	F	
Fire protection and rescue route plans	F	
Pre-fabricated parts layout plans	F	
Plans for the structural waterproofing system and building drain system	F	
Air conditioning and ventilation plans	F	
II Typical Construction Certificates		
a) Certificates regarding the materials used		
Confirmation of compliance of the structural products with <ul style="list-style-type: none"> - the technical standards, - the general type approvals by supervisory building authorities, - the general test certificates by supervisory building authorities, - the approval for the individual application, in the form of a <ul style="list-style-type: none"> - Conformity 'CE' marking (certificate of conformity or declaration of conformity) or - Conformity 'Ü' marking (certificate of conformity or declaration of conformity), e.g., on the product itself, on its packaging or in the accompanying papers (e.g., delivery note)	F ¹⁾	(I)
Certificate of the quality of structural products in accordance with requirements of the building code or the building contract (e.g., delivery note)		I
b) Certificates regarding structure quality		
Certificates that the installation of structural products has been performed in compliance with regulations, in the form of, e.g., <ul style="list-style-type: none"> - installation records in accordance with the usage certificate, - quality tests and inspections and the documentation according to standards, - surveillance reports for structural parts and construction sections by the self-surveillance or by third-party surveillance 	F ¹⁾	(I)
Daily construction log or daily construction reports		I
Acceptance records	F	
c) Summary of typical construction works requiring a certification:		
Earthwork and foundation construction Pressure-retaining waterproofing Concrete and reinforced concrete construction Steel construction Steel internals Structural fire protection of the building site Decontamination coating Prestressed concrete Construction parts and types requiring a license under the building code		
¹⁾ In case an acceptance report is generated that contains the information regarding certification checks, this acceptance report shall be stored in final document file (F) while the individual certificates may be transferred to the intermediate document file (I).		

Table 5-1: Documents of the final construction of building structures

Typical Documents of the Mechanical and Apparatus Engineering	Storage Type	
	Final (F) Document File	Intermediate (I) Document File
I Design Documents ¹⁾		
Specifications	F	
Calculations, design specifications	F	
Itemized list of materials (ILM)	F	
Blue prints and drawings	F	
II Certification of Technical Quality		
1 Certification of manufacturing prerequisites		
Material qualification		I
Trial runs of the manufacturing process		I
Procedure qualification		I
2 Certifications of material tests		
Review of manufacturing prerequisites	F ²⁾	
Checks regarding workability		I
Material tests in the heat treatment or fabrication condition significant for the required material properties	F	
Interim material tests		I
Release of documentation	F	
3 Certifications of Final Inspections		
Review of manufacturing prerequisites	F ²⁾	
Final inspection of parts	F ²⁾	
In-process inspection of parts		I ²⁾
In-process surveillance		
- summary certificate	F	
- report		I
Final release of documentation	F	
4 Certificates of on-site assembly and erection	F ²⁾	
5 Certificates of commissioning tests and inspections	F ²⁾	
¹⁾ These may be contained in the design review documents		
²⁾ May be certified by stamping.		

Table 5-2: Documents of the mechanical and apparatus engineering

Typical Documents of the Instrumentation and Control Equipment	Storage Type	
	Final (F) Document File	Intermediate (I) Document File
I Design Documents		
Specifications	F	
Function diagrams	F	
Circuit diagrams	F	
Design specification	F	
Configuration identification documents (CID)	F	
II Certification of Tests and Inspections during Fabrication		
1. Type Testing		
(1) Test records (e.g., in accordance with KTA 3503, Sec. 7.2 or KTA 3505, Sec. 7.2)		I
(2) Test reports (e.g., in accordance with KTA 3503, Sec. 7.3 or KTA 3505, Sec. 7.3)	F	
(3) Test certificates (e.g., in accordance with KTA 3503, Sec. 7.4 and KTA 3505, Sec. 7.4)	F	
(4) Certificates of supplementary tests and inspections (e.g., qualification certificate)	F	
2. Factory test		
(1) Reports on the quality audits (e.g., in accordance with KTA 3507, Sec. 5.3.1)		I
(2) Certificates of product-related quality assurance measures (e.g., in accordance with KTA 3507, Sec. 5.3.1)		I
(3) Factory test certificate of the equipment (e.g., in accordance with KTA 3507, Sec. 5.3.2)	F	
III Certification of Tests and Inspections during Assembly and Erection		
1. Assembly, Erection and Commissioning		
(1) Records, reports, certificates		I
(2) Records, reports, certificates – with a relevance to safety	F	
(3) Test schedules, test reports and test certificates	F	
2. Calibration reports for the radiation measuring equipment		
	F	

Table 5-3: Documents of the instrumentation and control equipment

Typical Documents of the Electrical Equipment	Storage Type	
	Final (F) Document File	Intermediate (I) Document File
I Design Documents		
Specifications	F	
Function diagrams	F	
Circuit diagrams	F	
Design specification	F	
II Certification of Tests and Inspections during Fabrication		
1. Type Testing		
(1) Test records (test reports)		I
(2) Test certificates	F	
(3) Certificates of supplementary tests and inspections (performed in accordance with, e.g., KTA 3701, Sec. 4.16) regarding vibrations, operating conditions and design basis accident conditions	F	
2. Production (or piece) test, factory tests		
(1) Test records		I
(2) Test records – with a relevance to safety	F	
(3) Test certificates	F	
III Certification of Tests and Inspections during Assembly, Erection and Commissioning		
(1) Records, reports, certificates		I
(2) Records, reports, certificates – with a relevance to safety	F	
(3) Test schedules, test reports and test certificates	F	

Table 5-4: Documents of the electrical equipment

Annex A

Additional Requirements for the Microfilming of Documents to be Archived

A 1 General Requirements

If documents other than the originals are transferred to microfilms, it shall be ensured that the microfilm images are consistent with the original documents.

A 2 Procedure

In the procedure description (cf. Section 3.3.12, para. (3)) all quality assurance steps shall be specified that are required to ensure that the transfer of the documents to microfilms is

consistent and complete with regard to the original documents and that the microfilm has no technical defects.

A 3 Reading and Reproduction

(1) Suitable viewing equipment shall be provided for the reading of microfilms.

(2) It shall be ensured that reproductions (enlargements) can be created at all times that they are legible without requiring auxiliary equipment.

Annex B

Additional Requirements for Electronic Archiving

B 1 General Requirements

It is permissible that documents and records are archived electronically, provided, the following additional requirements are observed.

B 2 Electronic Archiving Procedure

(1) It shall be differentiated between the following two archiving procedures:

- a) Electronic storage of analog documents; and
- b) Electronic storage of originally digital documents.

(2) Analog documents shall be scanned and the scan results subsequently archived on data carriers. Both hardware and software shall be such as to ensure that the scan results are not falsified when transferred to the archiving system. The corresponding signatures shall be retained as images. In the procedure description (cf. Section 3.3.12, para. (3)) all required quality assurance steps shall be specified.

(3) The information of originally digital documents shall be transferred to data carriers including the respective formatting data. Both hardware and software shall be such as to ensure that the original digital documents cannot be falsified neither when transferred to the data carrier nor later on. The corresponding signatures shall be retained in their (original) electronic form.

B 3 Classification Principle

With regard to fulfilling the requirements specified under Section 3.3, the correlation between index, digitalized document and data carrier shall be ensured for the entire duration of the retention period.

B 4 Data Security

B.4.1 General Requirements

With regard to fulfilling the requirement that the archived data must be available in a readable form at all times for the entire duration of the retention period, it shall be ensured that the data is accessible and that the necessary software and hardware are available.

B 4.2 Securing documents against unauthorized changes and loss

(1) A security concept shall be established and implemented to assure that individual documents or even the entire archive can be restored.

Note:

Recommendations regarding the establishment of an IT security system are contained in the Basic IT Security Catalogues.

(2) Backup copies of the data and the software shall be made and shall be archived spatially separated from the original archive. The backup copies shall be updated on a daily basis.

(3) The storage location of the backup copies shall fulfill the same requirements as the storage location of the original data.

B 5 Requirements Regarding Software

Quality assurance measures shall be implemented to ensure that, with the introduction, replacement or modification of a software used for the electronic archiving, the requirements specified under Sections 3.3.2 and 3.3.4 will continue to be fulfilled.

Note:

General requirements in this context are specified in safety standard KTA1401, Sec. 3.

B 6 Reproduction of Electronically Archived Documents

(1) It shall at all times be possible to create printouts of electronically archived documents.

(2) The individual archiving procedure shall be such as to ensure that the contents and, if necessary, the images of the printouts are in full correspondence with the electronically archived documents. A complete color reproduction shall be enabled in those cases where the information contents is correlated to colors.

Annex C

Contents and Documentation Depth of the Duplicate Documentation

C 1 Operating Manual**C 1.1 Task**

All operation-related instructions, safety-related instructions, limit values and conditions including the plant regulation which are binding for all persons working in the nuclear power plant shall be compiled that are required for the specified normal operation of the power plant and for coping with design basis accidents.

Note :

In accordance with safety standard KTA 1201, Sec. 3, these data are contained in the operating manual.

C 1.2 Documentation depth

A copy of the complete operating manual shall be provided.

C 1.3 Objective

The operating manual shall help in the communication with, and the support of the active shift personnel and, if necessary, to enable initiating supplementary measures.

C 2 Emergency Handbook**C 2.1 Task**

All descriptions of the organization, responsibilities and tasks, all work task and procedural instructions, all specific documents and auxiliary means shall be compiled that are considered necessary for the control and mitigation of a course of events where design limit values are exceeded.

Note :

In accordance with safety standard KTA 1203, Sec. 3, these data are contained in the emergency manual.

C 2.2 Documentation depth

A copy of the complete emergency manual shall be provided.

C 2.3 Objective

The emergency manual shall help in the communication with, and the support of the active shift personnel and, if necessary, to enable initiating supplementary measures.

C 3 System Circuit Plans, System Descriptions, General Arrangement Plans**C 3.1 Task**

Those system circuit plans, system descriptions and general arrangement plans shall be compiled that will enable assessing the measures taken with respect to the protective goals.

C 3.2 Documentation depth

(1) The documentation depth of system circuit plans, system descriptions and general arrangement plans to be compiled shall be in accordance with the tasks expected to be performed.

(2) The following list of systems for which circuit plans and, if marked by an 'x', system description are required is typical for a pressurized water reactor. For other reactor types and, specifically, for each power plant the individual documentation depth shall be specified and, if necessary, adjusted accordingly.

Note :

The designated abbreviations of the systems is specified according to the Identification System for Power Plants (KKS)

Fuel pool cooling system	FAK	x
Fuel pool purification system	FAL	
Demineralized water supply system	GHC	
Seal water supply system	GHW	
Extra borating system	JDH	x
Reactor coolant pumps	JEB	
Reactor coolant piping system	JEC	x
Pressurizing system	JEF	x
Pressurizer relief system	JEG	x
Sealing fluid supply system	JEW	
Containment	JMA	
Leakage exhaust and monitoring system	JMM	x
H2 monitoring and concentration limiting system	JMU	x
Residual heat removal system	JNA	x
HP safety injection system	JND	
Borated water storage system	JNK	x
Functional testing system	JNP	x
Safety-related components cooling system	KA A	x
Coolant storage system	KAB	
Volume control system	KBA	x
Boric acid and demineralized water control system	KBC	
Chemical control system	KBD	x
Cold water supply for off-gas system	KJM	
Heating, ventilation and air-conditioning systems		
- Containment, interior	KLA	x
- Reactor building annulus	KLB	x
- Reactor auxiliary building	KLE	
Radioactivity monitoring system	KLK	x
Compressed air supply system	KLX	
Liquid waste processing system	KPF	
Liquid waste storage system	KPK	
Nuclear off-gas system	KPL	
Reactor building, plant drainage	KTA	
Reactor building, interior drainage	KTF	
Reactor building, annulus drainage	KTG	
Nuclear sampling system	KUA	
Accident specimen probe system	KUL	
Feedwater piping system	LAB	
Start-up and shutdown piping system	LAH	x
Start-up and shutdown pump system	LAJ	x
Emergency feedwater piping system	LAR	x
Emergency feedwater pump system	LAS	x
Main steam piping system	LBA	x
Pneumatic control system for main steam safety and relief valves	LBX	
Main condensate piping system	LCA	
Main condensate pump system	LCB	

Condensate desuperheated spray water system	LCE	
Steam generator blowdown system	LCQ	
Condenser system	MAG	
Air removal system	MAJ	
LP turbine bypass station including de-superheating spray system	MAN	
Main cooling water system	PA	
Service water for conventional plant area	PC	
Service water for secured plant area	PE	x
Closed cooling system for conventional plant area	PG	
Closed cooling system for secured plant area	PJ	x
Central gas supply system, incl. inert gas	QJB	
Chilled water system for conventional plant	QK	
Sampling system for conventional plant	QU	
Heating, ventilation, air-conditioning systems for conventional plant	SAD	
	SAC	x
	SAL	x
Central compressed air distribution system	SCB	
Fire fighting water system, conventional plant	SGA	x
Fire fighting water system, nuclear plant	SGB	x
Spray deluge systems, conventional plant	SGC	x
Spray deluge systems, nuclear plant	SGD	x
Diesel engine plant	XJ	x
Generator plant	XK	x

(3) The following list of general arrangement plans is typical for a pressurized water reactor. For other reactor types and, specifically, for each individual power plant, the documentation depth shall be specified and, if necessary, adjusted accordingly.

Fuel pool (including elevation view and all connections and volumes)	FAB	
Reactor pressure vessel (reactor vessel, reactor vessel closure and internals)	JA	
Control element drives	JDA	
Steam generators	JEA	
Core instrumentation	JKS	
Es-core instrumentation system	JKT	
Containment vessel (sectional views and developed view with all penetrations and locks)	JMA	
Feedwater storage tanks	LAA	

C 3.3 Objective

These documents shall help to enable

- a) Assessing the functional capability of the safety system,
- b) Planning and initiating
 - the measures with regard to attaining the protective goals, and
 - the emergency measures.

C 4 Site Layout Plans of Buildings and Facilities on the Nuclear Power Plant Site

C 4.1 Tasks

Site layout plans shall be compiled that shall give an overview of the arrangement of the buildings and access routes to the nuclear power plant site and to the individual buildings.

C 4.2 Documentation depth

Layout plans of the entire power plant area and of the access routes including the location of the buildings and of the pipes and cables connecting the safety systems between the buildings shall be provided.

C 4.3 Objective

These documents shall help to enable

- a) Assessing the possibilities for gaining access to the nuclear power plant site,
- b) Assessing the possibilities for gaining access to the buildings, and
- c) Planning and initiating necessary measures.

C 5 Building Plans (Including the Installation of the Components)

C 5.1 Tasks

Building plans shall be compiled that shall give an overview of the spatial arrangement and installation locations of the components within the respective buildings.

C 5.2 Documentation depth

(1) The documentation depth of the building plans (floor plans and sectional views) to be compiled shall be in accordance with the expected tasks to be performed.

(2) The following list of building plans (floor plans and sectional views) is typical for a pressurized water reactor. For other reactor types and, specifically, for each individual power plant, the documentation depth shall be specified and, if necessary, adjusted accordingly.

Switchgear building	UBA
Emergency power generating and central water chiller building	UBP
Containment interior	UJA
Reactor building annulus	UJB
Main steam and feedwater valve compartment	UJE
Reactor auxiliary building	UKA
Emergency feed building	ULB
Turbine building for steam turbine generator	UMA
Service water pump building	UQB
Cooling tower (service water)	URB

C 5.3 Objective

These documents shall help to enable

- a) Assessing the possibilities for gaining access to the compartments,
- b) Planning and initiating of necessary measures, and
- c) Assessing possible effects of design basis and other accidents.

C 6 Fire Protection Plans, Rescue Route Plans**C 6.1 Tasks**

Documents shall be compiled that permit the fighting of fires and that provide an overview over the existing fire zones and fire extinguishing equipment.

C 6.2 Documentation depth

Fire protection and rescue route plans shall be provided for the entire power plant area.

C 6.3 Objective

These documents shall help to enable

- a) Taking preparatory measures regarding damage control, and
- b) Assuring that external emergency organizations receive the necessary information.

C 7 Function Diagrams**C 7.1 Tasks**

Documents shall be compiled that document the electric functions of the safety system.

C 7.2 Documentation depth

(1) The documentation depth of the function plans of the systems to be compiled shall be in accordance with the expected tasks to be performed.

(2) The following list of systems is typical for a pressurized water reactor. For other reactor types and, specifically, for each individual power plant, the documentation depth shall be specified and, if necessary, adjusted accordingly.

Extra borating system	JDH
Pressurizing system	JEF
Pressurizer relief system	JEG
Leakage exhaust and monitoring system	JMM
H ₂ monitoring and concentration limiting system	JMU
Residual heat removal system	JNA
HP safety injection system	JND
Accumulator injection system, core flooding system	JNG
Borated water storage system	JNK
Functional testing system	JNP
Safety-related component cooling system	KAA
Heating, ventilation, air-conditioning systems for reactor building annulus	KLB
Radioactivity monitoring system	KLK
Emergency feedwater piping system, incl. storage (excl. emergency feedwater pump system)	LAR
Emergency feedwater pump system	LAS
Main steam piping system	LBA
Service water for secured plant	PE
Closed cooling water system for secured plant	PJ
Heating, ventilation, air-conditioning systems for conventional plant	SAC
	SAL
Diesel engine plant	XJ
Generator plant	XK

C 7.3 Objective

These documents shall help to enable assessing the functioning of the safety system

C 8 Conceptual Diagram of Power Plant Unit Protection**C 8.1 Tasks**

Documents shall be compiled that shall give an overview of the criteria for initiating power grid feed-in and start-up power grid feed-in including the auxiliary power transformer.

C 8.2 Documentation depth

The conceptual diagram of the plant unit protection (main grid and stand-by grid feed-ins as well as other power feed-in possibilities) shall be provided.

C 8.3 Objective

These documents shall help to enable assessing the auxiliary power supply and to enable planning and initiating measures regarding trouble-shooting.

C 9 Electrical Circuit Diagrams**C 9.1 Tasks**

Documents shall be compiled that shall give an overview of the auxiliary and emergency power supply system.

C 9.2 Documentation depth

The electrical circuit diagrams of the auxiliary and emergency power supply system shall be provided including the information on the electrical power loads connected to the busbars.

C 9.3 Objective

These documents shall help to enable planning and initiating electrical circuit switching measures (e.g., interconnection of busbars, external grid power supply)

C 10 Reports on Reactor Protection, Accident Monitoring and Radiological Protection Instrumentation**C 10.1 Tasks**

Documents shall be compiled that shall enable assessing the design, the functioning and, whenever necessary, the initiated measures.

C 10.2 Documentation depth

The following documents shall be provided:

- a) Reactor protection: General description of the associated process engineering, diagram of the processing of limits values,
- b) Accident monitoring including meteorological instrumentation: Description.
- c) Radiological protection instrumentation: Description.

C 10.3 Objective

These documents shall help to enable

- a) Assessing the functional capability of the reactor protection system and of the respectively triggered components,
- b) Monitoring the automatically initiated measures, as well as
- c) Assessing and analyzing a malfunction.

Appendix E Regulations Referred to in this Safety Standard

(Regulations referred to in this safety standard are valid only in the versions 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 atomic energy and the protection against its hazards (Atomic Energy Act – AtG) of December 23, 1959, revised version of July 15, 1985 (BGBl. I, p. 1565), most recently changed by Article 2 of the Act of July 23, 2013 (BGBl. I, p. 2553)
StrlSchV		Ordinance on the protection from damage by ionizing radiation (Radiological Protection Ordinance – StrlSchV) of July 20, 2001 (BGBl. I, p. 1714; 2002 I, p. 1459), most recently changed by Article 5, Sec. 7 of the Act of February 24, 2012 (BGBl. I, p. 212)
REI		Guideline for the emission and immission monitoring of nuclear facilities (REI) of December 7, 2005 (GMBI. 2006, No. 14-17, p. 254)
BImSchG		Federal immission protection act (BImSchG) of September 26, 2002 (BGBl. I, p. 3830), most recently changed by Article 3 of the Act of March 1, 2011 (BGBl. I, p. 282)
UVPG		Act on the environmental impact assessment (UVPG) of February 24, 2010 (BGBl. I, p. 2585), most recently changed by Article 12 of the Act of August 11, 2010 (BGBl. I, p. 1163)
WHG		Act on the regulation of the water household (WHG) of July 31, 2009 (BGBl. I, p. 94), most recently changed by Article 11 of the Act of August 11, 2010 (BGBl. I, p. 1163)
Safety Criteria	(1977-10)	Safety criteria for nuclear power plants of October 21, 1977 (BAnz. No. 206 of November 3, 1977)
Design Basis Accident Guidelines	(1983-10)	Guidelines for the assessment of the design of nuclear power plants with pressurized water reactors against design basis accidents as defined in Sec. 28, para. 3 StrlSchV (Design Basis Accident Guidelines) of October 18, 1983 (Addendum to BAnz No. 245 of December 31, 1983)
Safety Requirements	(2012-11)	Safety Requirements for Nuclear Power Plants of November 22, 2012 (BAnz of January 24, 2013)
Documentation Principles	(1988-02)	Principles regarding the documentation of technical documents by the applicant/licensee in the course of the construction, operation and decommissioning of nuclear power plants (BAnz. No. 56 of March 22, 1988)
Decommissioning Guideline	(2009-06)	Guideline for the decommissioning, safe enclosure and dismantling of plants or plant components in accordance with Sec. 7 AtG of June 26, 2009 (BAnz 2009, No. 162a)
Basic IT Security Catalogues.		Basic IT security catalogues issued by the Federal Office for IT Security (February 24, 2012), www.bsi.bund.de
KTA 1201	(2009-11)	Requirements for the operating manual
KTA 1202	(2009-11)	Requirements for the testing manual
KTA 1203	(2009-11)	Requirements for the emergency manual
KTA 1301.2	(2008-11)	Radiation Protection Considerations for Plant Personnel in the Design and Operation of Nuclear Power Plants; Part 2: Operation
KTA 1401	(2013-11)	General requirements for the quality assurance
KTA 1402	(2012-11)	Integrated management system for the safe operation of nuclear power plants
KTA 1403	(2010-11)	Ageing management in nuclear power plants
KTA 1505	(2011-11)	Suitability verification of the stationary measurement equipment for radiation monitoring
KTA 3201.1	(1998-06)	Components of the reactor coolant pressure boundary of light water reactors Part 1: Materials and product forms
KTA 3503	(2005-11)	Type testing of electrical modules for the safety related instrumentation and control system
KTA 3505	(2005-11)	Type testing of measuring sensors and transducers of the safety-related instrumentation and control system
KTA 3507	(2002-06)	Factory tests, post-repair tests and certification of satisfactory performance in service of

KTA 3701 (1999-06) modules and devices for the instrumentation and controls of the safety system
General requirements for the electrical power supply in nuclear power plants