

Safety Standards

of the
Nuclear Safety Standards Commission (KTA)

KTA 1402 (2017-11)

**Integrated Management System for the Safe Operation of
Nuclear Power Plants**

(Integriertes Managementsystem zum sicheren Betrieb von
Kernkraftwerken)

The previous version of this safety standard was issued in 2012-11

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

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Integrated Management System for the Safe Operation
of Nuclear Power Plants

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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 the Federal Gazette (Bundesanzeiger) on May 17, 2018. Copies of the German versions of the KTA safety standards may be mail-ordered through the Wolters Kluwer Deutschland GmbH (info@wolterskluwer.de). Downloads of the English translations are available at the KTA website (<http://www.kta-gs.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 objective to specify safety-related requirements, compliance of which provides the necessary precautions in accordance with the state of the art in science and technology against damage arising from the construction and operation of the facility (Sec. 7 para. 2 subpara. 3 Atomic Energy Act - AtG) in order to achieve the fundamental safety functions specified in the Atomic Energy Act and the Radiological Protection Ordinance (StrlSchV) and further detailed in the Safety Requirements for Nuclear Power Plants as well as in the Interpretations of the Safety Requirements for Nuclear Power Plants.

(2) According to Sec.7c para. 2 AtG the license holder is required to implement and utilize a management system, that allocates the appropriate priority to nuclear safety.

According to Requirement 1 "Organisational Requirements" of the Safety Requirements for Nuclear Power Plants (SiAnf), the company and plant management has the responsibility to ensure the safe operation of their nuclear power plants.

As detailed in SiAnf, Requirement 1, para. 1

- a) an integrated, process-oriented management system (IMS) shall be implemented and continuously improved,
- b) the company policies and goals, associated with attaining a high safety level and strengthening the safety culture, shall be specified and communicated,
- c) basic principles of the organisational and operational structure shall be specified and
- d) necessary resources shall be provided.

Furthermore, according to SiAnf, Requirement 1, para. 2, the safe operation of the plant shall be ensured, respecting the legislative, administrative and safety requirements.

(3) Essential to achieving these requirements is the establishment of clearly defined management structures by which it is ensured that all activities having a direct influence on the safe operation of nuclear power plants

- a) are recorded and described,
- b) are executed in a mutually coordinated fashion, and
- c) are continuously checked and improved.

(4) It is the purpose of the present safety standard to specify the requirements for the management system including the requirements for safe operation.

(5) Specific requirements regarding well defined partial aspects are specified in separate safety standards. Thus, the requirements regarding ageing management are specified in safety standard KTA 1403, regarding product-related quality assurance in KTA 1401, regarding documentation in KTA 1404, and regarding the operating manual in KTA 1201, the testing manual in KTA 1202 and the accident management manual in KTA 1203.

1 Scope

(1) This safety standard applies to the planning, execution, checking and improvement of activities that have a direct or indirect influence on the safe operation of stationary nuclear power plants with light-water reactors.

(2) This safety standard specifies those requirements for the integrated management system that are relevant to ensuring and continuously improving safety – even when pursuing other goals and requirements. However, although this safety standard requires that these other pursuits – such as economics, quality, environmental, occupational health and safety protection – are integrated into the management system, this safety

standard does not specify individual goals and requirements for these other aspects.

(3) This safety standard does not specify any direct requirements regarding safety culture. However, safety culture shall normally be furthered and supported by the management system.

Note:

Safety culture is furthered and supported by the management system in that, as specified under Sections 3 ff., it is required of this system that it

- a) supports a mutual understanding of the key aspects of safety culture within the corporation,
- b) provides the means with which the corporation supports individuals and groups to perform their tasks safely and successfully taking the interactions between man, technology and organizational aspects into account,
- c) strengthens the basic attitude for learning and questioning at all levels of the corporation, and
- d) provides the means by which the corporation continuously supports the development and improvement of safety culture.

(4) This safety standard considers the integrated management system as being an instrument that helps the corporation at all management levels to fulfill its responsibility for the safe operation of the nuclear power plant. The principle objective of the integrated management system is to ensure a continuous improvement process and a continuously learning organization. Accordingly, the primary recipient of the requirements specified in this safety standard for the integrated management system is the operating utility, which is expected to apply these requirements as basis for the development, introduction and application of a management system as well as for the internal reviews. An external review of the integrated management system should take this aspect into account. External reviews should not adversely affect the own initiative of the operating utility and their speedy application of improvement measures to the management system.

(5) Basically, the requirements regarding quality assurance measures for the processes specified under Section 5 are all presented in this safety standard. Any additional standards that must be taken into consideration are referenced.

2 Definitions

(1) Modifications

The term modifications comprises permanent and temporary changes to civil structures, to systems and components, software, operational limit values and conditions, or to organizational specifications. Exempted are replacements and reconstructions, provided, these do not have any effect on the respective nominal condition.

(2) Plant management

Plant management comprises those persons that manage and direct the plant at its topmost level. The plant management consists at least of the power plant director.

(3) Safe operation

Safe operation (of the power plant) includes the nuclear safety of the power plant as well the protection of persons within the plant and its environs from the harmful effects of ionizing radiation.

(4) Main person on standby

The main person on standby is a plant employee who is authorized as stand-in for the power plant director in the case of a simultaneous absence of the power plant director and his personal representative.

(5) Indicators

Indicators are characteristic values for surveilling and controlling the plant goals and for observing and surveilling the process performance and process results. These indicators show the degree to which the plant goals and process goals are achieved.

(6) Core competence

Core competence is the competence necessary for planning, performing, directing and surveilling all activities that are required for safe operation of a nuclear power plant.

(7) Power plant director

The power plant director is a plant employee who is ultimately responsible for safe operation of the power plant, in particular for the fulfillment of the requirements under the Atomic Energy Act and nuclear licenses. He is also responsible for the cooperation between all organizational units.

(8) Management system

A management system comprises all specifications, standardizations and organizational means provided for within the organization, that are required to plan all tasks relevant for the success of the organization, to execute them under controlled conditions and to survey and improve the extent to which the organizational goals are achieved.

Note:

In the present safety standard, the term management system always refers to a process-oriented integrated management system.

(9) Organizational congruence principle

The organizational congruence principle implies that duties, responsibility and authority are normally concurrent (congruent). Thus, an assignment of duties normally includes the assignment of the responsibility for performing these duties. In order to carry out the assigned duties, the corresponding authorizations (the authorizations for making decisions and for issuing instructions) are normally also assigned.

(10) Process

A process is the entirety of interrelated and interacting activities. A process converts inputs into results.

(11) Process goals

Process goals are concretely defined values either concerning the resulting conditions expected to later be achieved or concerning the required proper execution of the processes.

(12) Safety culture

Safety culture is determined by a safety-oriented attitude, responsibility and conduct of all staff required for ensuring the safety of the plant. For this purpose, safety culture comprises the assembly of characteristics and attitudes in a company and of individuals which establishes that, as an overriding priority, nuclear safety receives the attention required by their significance. Safety culture concerns both the organisation and the individual.

(13) Corporation

Corporation refers to an entity supported by an incorporation of any legal form (AG – Aktiengesellschaft; GmbH – Gesellschaft mit beschränkter Haftung; OHG – Offene Handelsgesellschaft; or other) which is the operating utility of a nuclear power plant and is in legal possession of the license required in accordance with Sec. 7 AtG. The corporation comprises the personnel, material means and legal rights including all organizational means required for the operation of the nuclear power plant. The corporation also comprises any participating, governing or otherwise connected enterprises (concerns) or parts of such enterprises that are recorded in the documentation of the management system of the operating utility

as performing tasks and carrying responsibilities relevant to the safe operation of the nuclear power plant.

(14) Corporate management

Corporate management consists of a person or group of persons at the topmost level of the corporation who attend to leading and directing the corporation and who carry the responsibility for radiological protection in accordance with StrlSchV.

Note:

In case of a legal person or a semi-autonomous partnership, the corporate management is the board of directors, or the company manager or another body of this corporation entitled as representative by law, statutes or contract.

(15) Corporate perspective

Corporate perspective comprises the aspects essential to the company such as safety, economic efficiency, quality, occupational health and safety protection, or the environment.

(16) Corporate policy

Corporate policy comprises the superordinate intentions and the orientation of the corporation. The corporate management uses corporate policy to define the basic values, the self-conception within the corporation and the basic behavior codex.

(17) Corporate goal (power plant goal)

Corporate goal is the specified basic orientation of the corporation (of the power plant).

(18) Improvement measures

Improvement measures may be corrective measures or preventive measures. Corrective measures and preventive measures, as defined in accordance with DIN EN ISO 9000, differ from each other thus: Corrective measures are measures taken after detection of defects or other unwanted situations to remove their cause and, therefore, serve to prevent a renewed occurrence of the defect or situation. Preventive measures on the other hand are measures taken in advance to remove the cause of possible defects or other unwanted situations with the intention of preventing an occurrence of the defect or situation in the first place.

3 Management System**3.1 Basic Requirements**

The management system shall comprise all activities with relevance to safe operation. In this context, safe operation shall always have the highest priority.

3.2 Primary Objectives

The primary objectives of the management system are

- a) to ensure safety,
- b) to continuously improve safety,
- c) to promote and improve the safety culture.

3.3 Interactions with Interested Parties

Interested Parties shall normally be identified and an appropriate strategy for an effective communication and information exchange regarding safety relevant issues shall normally be established.

3.4 Process Orientation

- (1) All activities within the corporation or the power plant that have any relevance to the operation of the power plant shall be identified.

(2) Those activities that have a direct or indirect influence on safe operation shall be described in a procedural form. These descriptions shall take

- a) the dangers and risks involved when performing the respective activities, as well as
- b) the safety-related internal and external requirements

into account.

Note :

The concrete design of an individual process is strongly dependent on the given organization of the respective nuclear power plant.

(3) Process goals, process inputs, process flow and process output as well as the criteria for the process assessment (such as indicators) shall be specified. Interfaces between the processes shall be identified and regulated.

(4) The organizational units and the functions (e.g., of the appointed person, of the on-site supervisor or of the shift supervisor) involved in the process flow shall be identified and specified for each individual step of the process. Insofar as activities with relevance to safe operation are performed by external companies (in particular, manufacturers, suppliers, other contractors, other nuclear power plants, operating utilities), the respective interfaces shall be regulated.

(5) All processes shall be well ordered and presented systematically structured in the form of a process model.

Note :

The processes may, for instance, be structured as

- a) management and leadership processes,
- b) core (or key) processes, and
- c) supporting processes.

(6) Whenever processes make use of information processing systems (integrated operation management systems), for instance during fault diagnosis and remedy, maintenance or system unlocks, they shall be introduced with the appropriate quality assurance. Taking their safety relevance into account, they shall be regularly and systematically reviewed and appropriately adjusted.

3.5 Integrated Approach

(1) The processes shall be designed taking the requirements resulting from different corporate perspectives into account, and they shall be conducted using an integrated approach.

Note :

The integrated approach shall normally ensure that in the case of competing requirements and goals, those relevant to nuclear safety and radiological protection are assigned the correct priority in accordance with their respective relevance.

(2) The operating utility shall normally determine and integrate the applicable requirements from statutory and sub-statutory regulations (e.g., regarding environmental protection, occupational health and safety protection) into the management system.

(3) In this context requirements from the areas quality assurance, risk management, plant security, safety oriented leadership and aspects of human-machine interaction shall normally be taken into account.

3.6 Plan-Do-Check-Act Cycle

With regard to a continuous improvement, the plan-do-check-act cycle (PDCA cycle) shall be applied to all relevant operational activities, to partial and entire processes and to the management system as a whole.

Note :

The systematic approach to be applied in this context comprises the planning, analysis and description of operational procedures, the implementation of specified guidelines, checking the effectiveness on the basis of definite criteria and, as far as necessary, the corrections directed at optimizing these procedures.

3.7 Opportunities and Risks

Within the integrated approach of the management system opportunities and risks shall be assessed, in order to develop corresponding strategies, objectives and measures.

3.8 Documentation of the Management System

(1) The management system shall be documented. The documentation of the management system shall include:

- a) Corporate and power plant policy,
- b) Corporate and power plant goals,
- c) Conceptual description of the management system specific to the power plant,
- d) Process documents (e.g., the process descriptions and related instructions for ensuring the effectiveness of planning, execution and supervision; the process model, indicators,
- e) Records regarding process results, and
- f) Records regarding the results from surveillance measures (i.e., reviews, audits).

Notes :

(1) The present safety standard does not contain specifics for the structure of the documentation regarding items a), b), c), e) and f).

(2) Not all instruction-type documents referenced in the process documents as applicable need to be archived, necessarily, within the documentation of the management system.

(2) The process documents should all have a uniform structure and each contain the elements specified in **Appendix A**.

(3) The process documents shall all be consistent with the additionally applicable documents referenced therein. The process documents shall be reviewed in regular intervals to ensure that they are kept up-to-date.

(4) A systematic procedure shall be specified, that controls the structure, scope, independent assessment and handling of the documentation.

4 Responsibilities of the Managements

4.1 Responsibilities of Corporate Management

4.1.1 Basics

Corporate management is responsible for ensuring safe operation. In this context, corporate management

- a) shall ensure that a management system as specified in the present safety standard is installed, maintained and reviewed and shall promote a continuous improvement of the management system,
- b) shall establish a clear corporate policy that emphasizes self-commitment of the corporation with regard to high safety standards and to strengthening safety culture,
- c) shall ensure that corporate policy and corporate goals are communicated and that they are implemented by plant management,
- d) shall establish the basic structural and procedural organization,
- e) shall ensure the availability of sufficient resources, and
- f) shall review in regular intervals whether the management system is still effective.