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Swiss Federal Nuclear Safety Inspectorate ENSI



Operational Documentation

Guideline for Swiss Nuclear Installations

ENSI-G09

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1 Introduction

The Swiss Federal Nuclear Safety Inspectorate (ENSI) is the regulatory authority for nuclear safety and security of the nuclear installations in Switzerland. ENSI issues guidelines either in its capacity as regulatory authority or based on a mandate in an ordinance. Guidelines are support documents that formalise the implementation of legal requirements and facilitate uniformity of implementation practices. They further concretise the state-of-the-art in science and technology. ENSI may allow deviations from the guidelines in individual cases, provided that the suggested solution ensures at least an equivalent level of nuclear safety or security.

2 Subject and scope

This guideline stipulates the requirements to be met by documentation for nuclear installations during the specified operation and post-operation phases.

The requirements stated in this guideline apply to operational documentation as per Annex 3 of the Nuclear Energy Ordinance (732.11) and to documentation as per the Ordinance on the Qualifications of Personnel in Nuclear Installations (732.143.1).

3 Legal basis

This guideline implements the basic legal requirements stated in:

- a. Article 41, paragraph 5, of the Nuclear Energy Ordinance (732.11)
- b. Article 37, paragraph 3, of the Ordinance on the Qualifications of Personnel in Nuclear Installations (732.143.1)

4 Classification

- a. Documents containing security-relevant information must be classified according to the principles stated in the Ordinance of 4 July 2007 on the Protection of Federal Information (510.411).
- b. Pursuant to Article 6, paragraph 1, letter c, of the Ordinance on the Protection of Federal Information, security-relevant information is deemed to be information which could detract from public safety if it were to become known.
- c. For classification as security-relevant information, the following criteria apply in particular:

1. Descriptions of components, systems, rooms, buildings or system dependencies are so detailed that possibilities for sabotage in respect of nuclear safety could be deduced from them.
2. Descriptions of operator actions are so detailed that possibilities for sabotage in respect of nuclear safety could be deduced from them.
3. Descriptions of initiating events, technical or radiological accident analyses are so detailed that possibilities for sabotage in respect of nuclear safety could be deduced from them.
4. Minimal cut sets from the Probabilistic Safety Analysis are cited.
5. Importance values from the Probabilistic Safety Analysis are cited in such detail that possibilities for sabotage could be deduced from them.
6. Security measures for the installations are described.
7. Transport operations involving radioactive substances are described in such detail that possibilities for sabotage could be deduced from them.
8. Security measures for the transport of radioactive substances are described.

5 Organisational documents

5.1 Power plant and overall operating regulations

- a. Power plant regulations must be available for nuclear power plants. Insofar as applicable, other nuclear installations must implement the requirements set out in section 5.1.1 in the form of overall operating regulations.
- b. The power plant regulations or the overall operating regulations must include a presentation of the organisation's structure in order to meet the requirements of Article 30, paragraph 1, of the Nuclear Energy Ordinance, with the help of an organisation chart. The organisation chart may be an appended document to which reference is made in the regulations.
- c. The power plant regulations or the overall operating regulations must identify the organisational units with positions responsible for safety-related functions.

5.1.1 General provisions

As a minimum, the content of the power plant regulations or overall operating regulations must include stipulations on the following aspects:

- a. The obligation to accord the priority stipulated in Article 22, paragraph 2, letter a, to nuclear safety in all activities
- b. The responsibility of the licensee as per Article 22, paragraph 1, of the Nuclear Energy Act, and of the holder of the position for technical operation of the installation as per Article 30, paragraph 4, of the Nuclear Energy Ordinance
- c. The functions and tasks of those organisational units that are of importance for nuclear safety
- d. The posts that are of importance for safety but are not included among the organisational units described in letter c
- e. The minimum shift staffing level and presence in the control room according to the mode of operation involved
- f. The tasks of the Safety Committee
- g. The tasks of the committee specified in Article 30, paragraph 3, of the Nuclear Energy Ordinance
- h. The duty stand-by engineer's authority to issue instructions to the shift leader and the leader of the security guard group when operation is disrupted
- i. The whereabouts of the duty stand-by engineer and the time available for him/her to reach his/her deployment location (cf. guideline ENSI-G07, section 7.2)
- j. A specification for the documentation of operational occurrences
- k. A specification for the use of regulations

5.1.2 Organisational shutdown criteria

- a. The power plant regulations must define the minimum staffing levels for the following personnel categories in power operation:
 1. Licensed personnel as per Article 25 of the Ordinance on the Qualifications of Personnel in Nuclear Installations
 2. Security guard personnel
 3. Recognised radiological protection personnel

- b. The power plant regulations must define the periods within which the installation must be brought into which operating mode if the requirements as per letter a are undercut.

5.2 Emergency regulations

The requirements for the emergency regulations are defined in section 4.1 of guideline ENSI-B12.

5.3 Radiation protection regulations

- a. The radiation protection regulations must describe the radiation protection tasks for the licensee derived from the statutory and official provisions, and the organisational units responsible for them must be defined.
- b. As a minimum, the content of the radiation protection regulations must include stipulations on the following aspects:
 - 1. Purpose and scope of these regulations
 - 2. Legal basis and operational fundamentals for the radiation protection
 - 3. The concept for technical and organisational measures to guarantee the radiation protection objectives
 - 4. Detailed descriptions of the radiation protection tasks that cover the aspects listed in Annex 2 or references to these descriptions
 - 5. The organisation chart for the radiation protection organisation
 - 6. Assignment of the radiation protection tasks to the organisational units
 - 7. Criteria for determining the minimum staffing levels for numbers of employees required in order to perform the radiation protection tasks
 - 8. Qualification of staff as per no. 7 for each organisational unit
 - 9. Authority to issue directives for radiation protection staff
 - 10. References to additional regulations

5.4 Management system

The requirements for the management system are defined in section 4.2 of guideline ENSI-G07.

5.5 Mission statement on safety culture

A mission statement on safety culture or intercoordinated basic documents deemed binding on the entire staff must define:

- a. How the concept of safety culture is understood in the nuclear installation
- b. The principles of the desired safety culture
- c. How good safety awareness is fostered
- d. How the effectiveness of the measures to foster good safety awareness is assessed.

6 Technical documents

6.1 Safety analysis report

6.1.1 Requirements for the safety analysis report of nuclear power plants

6.1.1.1 General requirements

- a. The safety analysis report must include at least the content listed in section 6.1.1.2.
- b. The description of the content specified in section 6.1.1.2 must be based on the requirements of IAEA Safety Standard GS-G-4.1.
- c. Reference may be made to documents included in the operational documentation for the nuclear power plant.
- d. Regulations, instructions and standards that are to be applied must be documented.
- e. The safety analysis report must make clear reference to the documents on which it is based, and these documents must be kept available.

6.1.1.2 Specific requirements

- a. The site, the safety design and the specified operation of the installation must be described. (Kommentar BID: statt "specified operation" evtl. "intended operation")
- b. The protection objective functions must be presented. In particular, the safety functions must be described in detail. (Kommentar BID: Ist "protection objective functions" der übliche Ausdruck für "Schutzzielfunktion"?)

- c. The licensed operating conditions and their technical basis must be documented.
- d. The design, structure, characteristics and mode of functioning of the safety equipment must be presented.
- e. In addition to section 6.1.1.1, letter b, the following requirements apply to the description of systems:
 - 1. For all systems credited in the deterministic safety analysis, the structural, technical and operational measures to ensure fire protection and escape routes must be described.
 - 2. The EMC and lightning protection measures in place for the safety-related systems must be described.
 - 3. For alternating current supply, the alternating current cabling must be described.
 - 4. Where relevant, the description of the systems must set out the safety-related hydrochemical measures and the monitoring parameters.
- f. In addition to section 6.1.1.1, letter b, the following requirements apply to the description of the design of the structural elements of the installation:
 - 1. Each building must be assessed individually.
 - 2. The systems installed in each building must be stated.
 - 3. The structure of individual buildings must be described and shown in the plan attachments.
- g. The current safety analyses as per guidelines ENSI-A01, ENSI-A05, ENSI-A08 and ENSI-G14 must be documented in summary. Important boundary conditions, assumptions and results must also be presented. The documents on which the information is based must be referenced.
- h. Safety-related aspects of the organisation of the nuclear power plant and the management system must be described.
- i. Normal operating procedures, emergency operating procedures, and Severe Accident Management Guidance (SAMG) must be documented in summary.
- j. The following operational aspects must be described:
 - 1. Provisions for recurrent tests/inspections and function tests
 - 2. Qualifications and basic and advanced training for staff
 - 3. Programme to evaluate operating experience

4. Programme to take account of human and organisational factors in case of changes
 5. Ageing management
- k. The strategies, processes, protection measures and monitoring measures in order to protect the staff and the public against ionising radiation must be presented. The requirements stated in Annex 3 apply to the description of radiological protection aspects in addition to section 6.1.1.1, letter b.
- l. In addition to section 6.1.1.1, letter b, the description of emergency preparedness must include the following content:
1. Definition of emergencies
 2. Emergency plans, such as emergency regulations and deployment strategies
 3. Tasks, duties and responsibilities of the stand-by engineer, emergency director, emergency staff and emergency teams
 4. Premises, escape and intervention routes, emergency lighting
 5. Process to maintain emergency preparedness
- m. The concept of IT security for programmable systems that can directly or indirectly impact the installation's nuclear safety must be described in a document classified as CONFIDENTIAL (cf. section 4) and which must be submitted separately.
- n. The non-radiological environmental influences of a nuclear power plant must be described.
- o. The internal provisions for the treatment of radioactive waste must be described.

6.1.2 Requirements for the safety analysis report of other nuclear installations

- a. The contents and level of detail of the safety analysis report for research reactors must be based on the requirements of IAEA Safety Standard SSG-20.
- b. The contents and level of detail of the safety analysis report for waste management facilities must be based on the requirements of IAEA Safety Standard GSG-20.
- c. For the interim storage facilities, the requirements of section 4.1 and Appendix 3 of WENRA's "Waste and Spent Fuel Storage Safety Reference Levels Report" must also be taken into account.

- d. The provisions as per letters a to c must be taken into account as appropriate for other nuclear installations.
- e. Documents referenced in the safety analysis report must be kept available.

6.2 Security report

The requirements in sections 6.2.1 to 6.2.7 apply to nuclear power plants. These requirements must be met by other nuclear installations to the extent to which they may be applicable.

6.2.1 Site and characteristics

- a. The surrounding area relevant to security must be illustrated on a topographic map with a maximum scale of 1:25,000.
- b. The particular characteristics of the site and the site specific threats (design basis threat) must be specified.
- c. The site must be assessed in terms of security aspects.

6.2.2 Perimeter with vehicle barrier and protected area

- a. The perimeter and the vehicle barrier must be illustrated on an overview plan.
- b. The technical, structural, organisational and administrative measures must be described and specified.
- c. The perimeter and vehicle barrier must be assessed in terms of compliance with the requirements of Article 22, paragraph 2, letters g and h, of the Nuclear Energy Act.
- d. The video systems for the physical protection system must be specified. Measures to compensate failures of video systems must also be described.

6.2.3 Guard-house and central alarm station

- a. The technical, structural, organisational and administrative measures relating to the guard-house and central alarm station must be specified.
- b. The processes in case of alarms must be specified.
- c. The guard-house and central alarm station must be assessed in terms of compliance with the requirements of Article 22, paragraph 2, letters g and h, of the Nuclear Energy Act.

6.2.4 Barriers

- a. The sequence of the physical barriers must be illustrated in an overview.
- b. The technical, structural, organisational and administrative measures for the operation of the barriers must be specified.
- c. The barriers must be assessed in terms of compliance with the requirements of Article 22, paragraph 2, letters g and h, of the Nuclear Energy Act, and the escape route concept, if it affects the physical security system.

6.2.5 Access and material flow control

- a. Technical, structural, organisational and administrative measures for access control and control of the flow of materials must be specified, in particular access by persons, vehicle entries and exits, and the delivery and discharge of materials.
- b. The process for issuing an access pass (credential) must be specified.
- c. The equipment for controlling access and material flows must be assessed in terms of compliance with the requirements of Article 22, paragraph 2, letters g and h, of the Nuclear Energy Act.

6.2.6 Organisation and training of security guards

The organisation and training of the security guards must be specified. As a minimum, this description includes the following points:

- a. Organisation chart
- b. Resources of the security guards (including guard dogs, if present)
- c. Arrangements with the police and external security partners (contract guards)
- d. Key concept
- e. Training concept, and its implementation

6.2.7 Reference list of administrative directives and instructions

The security report must incorporate a list of provisions and instructions relating to security.

6.3 Technical specifications for nuclear power plants

6.3.1 General requirements

- a. The technical specifications must be integrated in one document. Hard copies of the version of this document approved by the regulatory body must be kept in the main control room and the emergency control rooms.
- b. When defining the provisions in the technical specifications, all relevant operating modes and configurations of the installation due to maintenance must be taken into account.
- c. The provisions in the technical specifications must be stipulated clearly, in full, without contradictions and in an adequately specific manner. The units for indicative parameters must correspond to the displays in the installation.
- d. Limits, criteria, conditions, measures, periods and test cycles must be defined conservatively.

6.3.2 Scope of the technical specifications

- a. The technical specifications must define:
 1. Safety limits
 2. Triggering values for safety systems
 3. Operating limits
 4. Limiting conditions of operation (LCO), including requirements for tests and measures in case of noncompliance
- b. The technical specifications must also incorporate the conditions and environmental parameters stated in the general licence, the construction licence and the operating licence.
- c. The content must at least meet the requirements stipulated in sections 6.3.2.1 to 6.3.2.4.
- d. The cycle-specific limits for the operation of the reactor core defined in a separate document are regarded as part of the technical specifications.

6.3.2.1 Safety limits

- a. Safety limits must be stated for the process parameters necessary in order to comply with the protection objectives, insofar as they are not included in the limiting conditions of operation (LCO).
- b. Measures must be defined for cases where safety limits are violated.

6.3.2.2 Grading of safety-related parameters

Safety limits, triggering values for safety systems and operating limits must be graded in such a manner that:

- a. An adequate interval exists between operating limits and triggering values for safety systems to prevent the unwanted triggering of safety systems
- b. An interval exists between the triggering values for safety systems and safety limits that reliably prevents any violation of safety limits if the covering load case occurs.

6.3.2.3 Limiting conditions of operation (LCO)

- a. Limiting conditions of operation, monitoring and test/inspection requirements must be defined, as well as measures in case of noncompliance with the limiting conditions of operation, in particular for the equipment and parameters listed below:
 1. Mechanical and electrical equipment in safety classes SK 1 to SK 3 and 1E, and for mechanical and electrical equipment important for safety from the PSA (probabilistic safety analysis) perspective
 2. Physical reactor parameters that are relevant to safety
 3. Fire protection equipment in fire sections where fire scenarios could impact more than one item of equipment in a safety function
 4. The extinguishing water supply
 5. The external alternating voltage supply
 6. Equipment used to ensure or monitor the integrity of safety-relevant barriers
 7. The I-131 activity concentration in the primary coolant
 8. The safety-related hydrochemical parameters in the primary coolant
 9. The ventilation systems required for operation as specified and which are important in terms of radiation protection
 10. Permanently installed activity and dose rate measuring equipment and instrumentation for monitoring discharges of radioactive substances or those of importance for occupational protection
 11. Environmental parameters that are relevant for the functioning of safety systems as per the design basis (including environmental parameters for the heat sinks)
- b. The scope of equipment subject to a limiting condition of operation must be clearly defined. When drawing up requirements for operational readiness, a

distinction must be made between “in operation” and “ready to operate” conditions.

- c. Limiting conditions of operation and measures to be implemented if they are not met must take particular account of the combined unavailability of redundant or diversified items of equipment required for the same protection objective function. These also include the necessary auxiliary and supply systems.
- d. The following must be specified for every limiting condition of operation:
 - 1. Modes of operation where the limiting condition of operation must be met
 - 2. Requirements for monitoring (parameters, limits, inspection intervals to be monitored, or continuous monitoring and alarms)
 - 3. Failure criteria which, when met, indicate that the structures and equipment are no longer capable of functioning, so the relevant limiting condition of operation must be regarded as “not met”.
 - 4. Permitted periods for noncompliance with the limiting condition of operation
 - 5. Measures to be initiated if the limiting condition of operation cannot be met within the specified period, and periods for their implementation
- e. The permitted periods as per letter d no. 5 begin as soon as it is ascertained that the limiting condition of operation is not met.
- f. In cases where only one single system redundancy remains for compliance with a safety function, immediate function testing of this redundancy must be specified.
- g. If no system redundancy remains for compliance with a safety function, immediate shutdown of the installation must be specified where this is technically reasonable.
- h. If a limiting condition of operation cannot be met within the specified period, it should be specified (insofar as possible) that the installation must immediately be brought into an operating mode where the limiting condition of operation is no longer applicable.

6.3.2.4 Noncompliance with a limiting condition of operation due to maintenance

- a. In respect of maintenance work that results in noncompliance with a limiting condition of operation, the permissibility, duration and frequency of the work

must be specified in accordance with the operating mode and configuration of the installation.

- b. When restarting the installation after a planned maintenance outage, no maintenance that could lead to noncompliance with a limiting condition of operation is permitted.
- c. The risk-related requirements for maintenance as per section 6.3.2 of guideline ENSI-A06 must be met.

6.3.3 Basic document

The values and conditions defined in the technical specifications must be stated, with justifications, in a basic document. Reference must be made to deterministic and probabilistic safety analyses and operating experience to provide the justification.

6.4 Technical specifications for other nuclear installations

The technical specifications contain the specifically adapted regulations for the operation of the nuclear installation, insofar as they are important in terms of safety.

6.5 In-service inspection programme

Requirements for the documentation of recurrent in-service inspection programmes are defined in a separate guideline.

6.6 Ageing management programme

Requirements for the documentation and tracking of the ageing management programme are defined in guideline ENSI-B01.

6.7 Normal operating and emergency operating procedures

A transition between the normal operating and emergency operating procedures that influence nuclear safety by means of appropriate initiation and exit criteria must be ensured. This applies in particular to the initiation of accident management (cf. guideline ENSI-B12, section 4.4).

6.7.1 Normal operating procedures

- a. Normal operating procedures must include all instructions for actions by the operating personnel that are necessary for the safe normal operation of a nuclear installation.

- b. In particular, they must cover all conditions and operating modes of individual systems that are part of normal operation (e.g. filling, emptying, placing in readiness) and all operating modes, as well as recurrent tests and function tests of components, systems and the installation.
- c. In addition, normal operating procedures must include all instructions for actions required in order to bring anticipated operational occurrences under control in order to prevent accidents and return the installation to normal operation.
- d. If applied correctly, normal operating procedures must guarantee compliance with the requirements in the technical specifications.
- e. Normal operating procedures must ensure that if fault and hazard messages are generated, adequate information and instructions for actions are available to the operating staff so that the installation can be operated within the design limits.

6.7.2 Emergency operating procedures

- a. The emergency operating procedures must cover the sequences of events in accidents that are relevant to the safety of the installation in all operating modes.
- b. The measures to be taken must be derived according to a symptom-oriented treatment or treatment oriented towards protection objectives of the accident situation.
- c. Insofar as appropriate, provision may also be made for event-oriented treatment of accidents in the case of design-basis accidents.
- d. The instructions in the emergency operating procedures must be brief and clearly worded. As a minimum, they must include:
 1. Initiation criteria
 2. Instructions for monitoring/control of measures triggered automatically
 3. Instructions for monitoring/control of the plant configuration
 4. Instruction to initiate and verify the success of manual measures
 5. Additional measures to attain a stable and safe condition of the installation
- e. The instructions for measures to be initiated manually must show which sub-steps have to be undertaken, in which room or at which location the measures are carried out, and – if possible – the further procedure if a measure cannot be carried out successfully.

- f. As far as possible, the use of time allowances should be avoided when defining criteria for the initiation of measures.
- g. Emergency operating procedures must be structured so that:
 - 1. Control or manual implementation of urgent measures can take place promptly
 - 2. Control of safety-related installation parameters is requested regularly, on a recurring basis.
- h. The instructions in the emergency operating procedures must be consistent and free of contradictions. This means:
 - 1. The same terms must always be used to denote the same components, symptoms, switching actions and diagnostic enquiries.
 - 2. If it is necessary to use several emergency operating procedures at the same time, no contradictory actions must be requested.

6.8 Severe Accident Management Guidance (SAMG)

The requirements for Severe Accident Management Guidance (SAMG) are defined in section 4.4 of guideline ENSI-B12.

6.9 Probabilistic Safety Analysis (PSA)

The requirements for the documentation of current plant-specific PSAs are defined in guideline ENSI-A05.

6.10 Deterministic accident analysis

The results of the deterministic accident analysis must be documented comprehensively.

6.11 Technical descriptions

The provisions of Annex 3 of the Nuclear Energy Ordinance are applicable.

7 Operational records

7.1 Activity logs

- a. The activity logs must be complete, and must show the actual condition of the installation in each case.
- b. Insofar as applicable, they must at least include the records defined in sections 7.1.1 to 7.1.4.

7.1.1 Operating data

The following records are deemed to be operating data:

- a. Records of operational data (e.g. recording strips, electronic data carriers)
- b. Additional operating instructions
- c. Startup and shutdown programmes
- d. Records of tours of inspection by the operating staff, analysis protocols, key logbook
- e. Switching logs (locking logbook, lockout logbook, simulation logbook)
- f. For reactors: records of fuel element changes (e.g. core loading plans, transpositions)
- g. Fuel accounting
- h. Monthly and yearly reports as per guideline ENSI-B02
- i. Quarterly reports as per the Nuclear Energy Ordinance, Annex 5.

7.1.2 Events

The following records are deemed to be operating data:

- a. Event documentation (reports on events and follow-up measures) as per guideline ENSI-B03
- b. Internal reports on events and occurrences, and on the measures decided

7.1.3 Maintenance and inspection

The following records are deemed to be operating data:

- a. Regulations for and records of function tests
- b. Regulations for and records of repairs and maintenance
- c. Regulations for and records of inspections

- d. Documentation of recurrent tests.

7.1.4 Radiation protection

The following records are deemed to be operating logs:

- a. Records of
 - 1. Individual doses, job doses and partial body doses for work that requires radiation protection planning
 - 2. Measurement results for subsequent determination of the individual dose if a limit was exceeded or in case of suspected incorporation or violation of a limit
 - 3. Measurement results from personal contamination monitoring when guidance values are exceeded, if the contamination could not be eliminated easily
 - 4. Measurement results from periodic monitoring of nuclear facilities
 - 5. Measurement results from workplace monitoring for work that requires a radiological protection permit
 - 6. Measurement results from monitoring of releases
 - 7. Measurement results from monitoring of the surrounding environment
 - 8. Results of material and area clearance measurements subject to notification
 - 9. Measurement results in connection with the dispatch and receipt of transported radioactive goods and waste
- b. Records of participation in radiological protection instruction
- c. Records of preventive occupational health examinations of staff who are occupationally exposed to radiation, and results thereof
- d. Evaluation protocols from the recognised personnel dosimetry laboratory
- e. Accounting of radioactive radiation sources
- f. Results of periodic inspections of X-ray equipment

7.2 Shift log

- a. All circumstances and measures that are of importance for shift operation must be recorded in the shift log. This comprises the following content:
 - 1. Information about the normal condition

2. Information about deviations from the normal condition and comments regarding hazards to the installation, staff or surrounding area.
- b. The respective configurations of the installation at a predefined time must be entered and documented in the shift log.
 - c. The shift log must be kept in such a manner that prevailing operational circumstances which affect shift operation can be seen, and their progression can be reconstructed on the basis of the records.
 - d. The shift log must include the following records as a minimum:
 1. Names and functions of the shift members
 2. Name of the stand-by engineer on duty
 3. Changes to functions of individuals during the shift
 4. Key data on configuration of the installation at shift handover
 5. Brief description of changes to the installation configuration or operating mode
 6. Implementation of test programmes
 7. Brief description of disturbances (systems, components, shutdowns, control engineering) that are important for safety
 8. Recording of and justification for measures that deviate from operating procedures.

7.3 Guard report

- a. All circumstances and measures that are of importance for the physical protection system must be logged in the security guards' report. This comprises the following content:
 1. Information about the normal condition
 2. Information about deviations from the normal condition and comments regarding threats to the installation, staff or surrounding area.
- b. The security guards' journal must be maintained such that the course of the security operations can be reviewed.

8 Documentation as per Article 37 of the Ordinance on the Qualifications of Personnel in Nuclear Installations

For the staff who are important in terms of nuclear safety, the documentation as per Article 37 of the Ordinance on the Qualifications of Personnel in Nuclear Installations, must confirm that:

- a. They have been provided with the knowledge and skills required in order to carry out their activities
- b. Their personal aptitude and the suitability of their health have been verified as per Articles 23 and 24 of the Ordinance on the Qualifications of Personnel in Nuclear Installations
- c. An appointment has been made before they are assigned to carry out their activities at their own responsibility, if this is required according to section 6.3.1 of guideline ENSI-B10.

8.1 Licensed personnel

- a. The documentation must include records relating to attendance at training events or practical activities undertaken, as well as the results of learning goal checks that have been carried out.
- b. For courses and training activities, the key training content, the applicable regulations and the training methods used to attain the learning goals must be documented.

8.2 Unlicensed personnel

The scope and depth of the documentation must be adapted to the safety importance of the individual's activities so as to clearly show compliance with the requirements of section 6 of guideline ENSI-B10.

9 List of references

IAEA Safety Standard GS-G-4.1, Format and Content of the Safety Analysis Report for Nuclear Power Plants, 2004

IAEA Safety Standard SSG-20, Safety Assessment of Research Reactors and Preparation of the Safety Analysis Report, 2012

IAEA Safety Standard GSG-3, The Safety Case and Safety Assessment for the Predisposal Management of Radioactive Waste, 2013

WENRA Working Group on Waste and Decommissioning (WGWD), Waste and Spent Fuel Storage Safety Reference Levels Report, Version 2.1, February 2011

This guideline was approved by ENSI on 30 June 2014.

The Director General of ENSI: signed H. Wanner

Annex 1: Terms and definitions (as per the ENSI Glossary)

Condition of an installation

The condition of an installation is an operating condition or an accident condition. Operating conditions comprise normal operation and anticipated operational occurrences. Accident conditions comprise design-basis accidents and accidents beyond the design basis.

Triggering values for safety systems

A triggering value for a safety system is the value for a safety-related parameter which, if attained, exceeded or undercut, will trigger a function of a safety system.

Operating modes

An operating mode is a combination of thermal power or neutron flux, average temperature of the main coolant, and degree of tightening of the screwed joint for the reactor cover, as long as there are fuel elements in the core, defined in the technical specifications.

Anticipated operational occurrences

Anticipated operational occurrences are deviations from normal operation that do not lead to a requirement for safety systems.

(Normal) operating procedures

Normal operating procedures are instructions for actions by the operating personnel to ensure the safe operation of a nuclear installation in all operating modes not covered by emergency operating procedures.

Initiation criteria

Initiation criteria are criteria which, if met, mean that the emergency operating procedures must be applied.

Protection objective function

The term protection objective function denotes functions that are required to comply with the protection objectives at all four internal safety levels (1 to 4) of the defence in depth in the installation.

Severe Accident Management Guidance

Severe Accident Management Guidance (SAMG) denotes installation-specific technical aids for decision making to mitigate the effects of a serious accident. The objectives of SAMG are to end the core melt-down process, to maintain containment integrity and to minimise the release of radioactive substances.

Safety equipment

Safety equipment denotes the structures, systems and components (SSC) assigned to structure class BK I and safety classes SK 1 to 3 and 1E according to guideline ENSI-G01.

Safety function

A safety function is understood to mean a function that is required in order to meet the protection objectives at safety level 3 of the defence in depth. A safety function is part of a protection objective function.

Treatment of accidents, event-oriented

The condition of the installation or of individual systems (e.g. deviation from installation parameters, switching and availability conditions of systems and components, coincidence with specified conditions of other parameters, time behaviour, etc.) is assigned to a triggering event. The measures for dealing with accidents are implemented in sequence according to the instructions stipulated for this event.

Treatment of accidents, symptom-oriented (oriented towards protection objectives)

Measures to deal with accidents are defined in relation to the condition of the installation or of individual systems (e.g. deviation from installation parameters, switching and availability conditions of systems and components, coincidence with specified conditions of other parameters, time behaviour, etc.).

Emergency operating procedures

Emergency operating procedures are instructions for action by the operating staff of a nuclear installation in order to bring accidents under control.

Annex 2: Radiation protection tasks

- a. The following radiation protection tasks must be regulated in radiation protection regulations:
 1. Issuance, implementation and review of the requirements for the radiologically controlled area, including associated wastewater and ventilation systems (zoning concept)
 2. Monitoring and optimisation of activity inventories / concentrations
 3. Review of applications for modification, work and maintenance, and drafting of radiation protection plans
 4. Operating of installation/facility and site monitoring instruments
 5. Operating and/or commissioning of a recognised personal dosimetry laboratory
 6. Definition of access conditions, control of access to and exit from the zone(s)
 7. Issuance of directives and instructions on behaviour in the radiologically controlled areas, monitoring of behaviour
 8. Preparation of protection and monitoring measures and granting of “on-site radiation protection permits” for workplaces
 9. Radiological monitoring while work is in progress, and clearance of the workplace after completion of the work
 10. Handling of the company-owned and third-party calibration and testing sources as well as X-ray equipment
 11. Operation of decontamination equipment and laundry, carrying out and/or commissioning and monitoring the cleaning of buildings, commissioning and supervision of system and component decontamination
 12. Inactive clearance measurement of materials from controlled zones and areas in such zones
 13. Implementation of emission monitoring systems
 14. Implementation of immission monitoring as per the provisions in the discharge regulations
 15. Performance of radiation protection tasks for internal transfers and for the dispatch and reception of radioactive goods and nuclear fuel

16. Ensuring an adequate stock of radiation protection and measurement equipment, and ensuring that this equipment is in proper functioning order
 17. Coordination and monitoring of radiation protection instruction and training for the nuclear power plant staff
 18. Design and inspection of escape and intervention routes in accordance with radiation protection requirements.
- b. The following radiation protection tasks must be defined in the radiation protection regulations if they are not defined in the power plant regulations, in the overall operating regulations or in the emergency regulations:
1. Prevention of radiation accidents
 2. Analysis of radiological incidents and feedback of experience
 3. Systematic assessment and periodic review of the radiological protection indicators
 4. Recognition with notification and reporting duties.

Annex 3: Radiation protection aspects in the safety report

The safety report must describe the following aspects of radiation protection. Details may be given in other operational documents rather than in the safety report.

- a. Summarised overview of
 1. The inventory of radioactive substances, location in the installation/facility and potential for dispersion
 2. Other sources of radiation, in particular X-ray equipment
 3. Potential exposure paths.
- b. Systematic structure of the operational planning objectives, derived guidance values and intervention values in order to guarantee the radiation protection principles and compliance with the limits for the public, other personnel on site exposed to radiation, and staff who are occupationally exposed to radiation
- c. Concept together with technical and organisational measures:
 1. To prevent unnecessary activations
 2. To prevent the carry-over of contamination and deposits in the primary system
 3. To reduce activities and contamination in the installation.
- d. Concept for radiologically controlled areas (RCA) to enclose radioactive substances and limit direct exposition in order to protect the personnel and the public (including plans of RCA, showing the separation into zone and area types): the general requirements for the equipment of the RCA and the systems must be added to the RCA concept.
- e. Summarised overview of other generic and operational protective measures: these include structural and technical installations, protective equipment and also administrative directives and instructions to protect against direct exposure, contamination and incorporation in the installation, as well as direct exposure and exposure due to releases into the environment during normal operation and in case of anticipated operational incidents and design-basis accidents.
- f. Monitoring concept, together with generic and operational monitoring measures. For the measuring systems to monitor individuals, workplaces, rooms, systems including the cooling circuits, material releases, internal and external transport of radioactive materials, wastewater, stack exhaust air and the surrounding environment, the following aspects must be described:

1. Measuring task
 2. Importance for safety, classification
 3. Design bases for the measurement system, including sampling
 4. Monitoring or measurement method, structure/setup of measuring equipment, frequency of measurements or sampling; in addition, the methods and procedures used to assess the radioactive substances in exhaust air and wastewater for emission monitoring
 5. Measuring range, detection limit, calibration nuclide, traceability to metrological standards
 6. Alarm levels, including justification in respect of protection objectives
 7. Measurement, display, alarm and registration locations
 8. Supplies of electric power and media to the measuring system
 9. Periodic reviews.
- g. Processes for planning, preparation, follow-through and completion which guarantee the radiation protection principles in case of changes to installations and maintenance work, in particular the optimisation principle (ALARA: as low as reasonably achievable), accident prevention and experience feedback
 - h. Presentation showing how requirements about conventional occupational safety and health and environmental protection are taken into account in the planning processes and in operations scheduling
 - i. Assessment of exposure for the adjacent population, personnel not exposed to radiation on the site, and personnel occupationally exposed to radiation in the RCA in relation to the relevant installation configuration in normal operation and the associated activities
 - j. Health protection for personnel including structure and processes for individual dosimetry, preventive occupational health examinations and the plant's or facility's medical service
 - k. Explanation of the basic and advanced training programme, including instruction on radiation protection for the entire personnel.

