STUK

GUIDE **YVL A.6** / 15 NOVEMBER 2013

CONDUCT OF OPERATIONS AT A NUCLEAR POWER PLANT

continues

With regard to new nuclear facilities, this Guide shall apply as of 1 December 2013 until further notice. With regard to operating nuclear facilities and those under construction, this Guide shall be enforced through a separate decision to be taken by STUK. This Guide replaces Guides YVL 1.9 and YVL 1.13.

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Authorisation

According to Section 7 r of the Nuclear Energy Act (990/1987), *the Radiation and Nuclear Safety Authority (STUK) shall specify detailed safety requirements for the implementation of the safety level in accordance with the Nuclear Energy Act.*

Rules for application

The publication of a YVL Guide shall not, as such, alter any previous decisions made by STUK. After having heard the parties concerned STUK will issue a separate decision as to how a new or revised YVL Guide is to be applied to operating nuclear facilities or those under construction, and to licensees' operational activities. The Guide shall apply as it stands to new nuclear facilities.

When considering how the new safety requirements presented in the YVL Guides shall be applied to the operating nuclear facilities, or to those under construction, STUK will take due account of the principles laid down in Section 7 a of the Nuclear Energy Act (990/1987): *The safety of nuclear energy use shall be maintained at as high a level as practically possible. For the further development of safety, measures shall be implemented that can be considered justified considering operating experience, safety research and advances in science and technology.*

According to Section 7 r(3) of the Nuclear Energy Act, *the safety requirements of the Radiation and Nuclear Safety Authority (STUK) are binding on the licensee, while preserving the licensee's right to propose an alternative procedure or solution to that provided for in the regulations. If the licensee can convincingly demonstrate that the proposed procedure or solution will implement safety standards in accordance with this Act, the Radiation and Nuclear Safety Authority (STUK) may approve a procedure or solution by which the safety level set forth is achieved.*

Translation. Original text in Finnish.

1 Introduction

101. This Guide lays down requirements for the safe conduct of operations at a nuclear power plant. It addresses the direct operational activities of a nuclear power plant as well as closely related functions and procedures. Furthermore, the Guide specifies requirements concerning operational activities, the Operational Limits and Conditions the emergency operating procedures and the abnormal operating procedures (EOPs and AOPs).

Safety-enhancing conduct of operations and their clear documentation improve the safety of nuclear power plant operations at all the functional levels of the defence-in-depth principle.

102. Section 7 a of the Nuclear Energy Act (990/1987) stipulates that *the safety of nuclear energy use shall be maintained at as high a level as practically possible. For the further development of safety, measures shall be implemented that can be considered justified considering operating experience, safety research and advances in science and technology.*

103. Section 7 f(1) of the Nuclear Energy Act (990/1987) stipulates that *safety shall take priority during the construction and operation of a nuclear facility* and, furthermore, Section 7 f(5) stipulates that *the condition and operating experiences of any nuclear facility shall be systematically monitored and assessed.*

104. Section 111 of the Nuclear Energy Decree (161/1988) defines the regulatory oversight exercised by STUK in respect of operational activities as follows: *The Radiation and Nuclear Safety Authority (STUK) controls the operation of a nuclear facility to ensure that the operation of the facility is safe and complies with the licence conditions and the approved plans and that the operation also in other respects adheres to the Nuclear Energy Act and to the regulations issued by virtue of the Act. The control of the operation of a nuclear facility also involves the maintenance, repairs, inspections and tests of the nuclear facility systems, structures and components.*

105. The Government Decree on the Safety of Nuclear Power Plants (717/2013) lays down requirements for the management of human factors (Section 6); the prevention of accidents and mitigation of consequences (Section 12); the operation of a nuclear power plant (Section 23); Operational Limits and Conditions (Section 25); and condition monitoring and maintenance (Section 26).

106. General requirements related to the operational activities of a nuclear power plant are also specified in the other Series A YVL Guides. The requirements pertaining to the design of a nuclear power plant are specified in the Series B YVL Guides. These requirements have also implications for the requirements and limitations imposed on the conduct of operations. Aside from this Guide, requirements related to the Operational Limits and Conditions are also specified in the other YVL Guides.

2 Scope

201. The requirements of this Guide concern the period of operation of a nuclear power plant. The requirements of this Guide shall also apply during the construction, commissioning, and decommissioning of a nuclear power plant insofar as they are justified for ensuring the safety of the activities carried out during these stages. Where necessary, STUK will issue a separate decision as to the applicability of this Guide to other nuclear facilities.

3 Principles and basic requirements for the conduct of operations

301. In decision-making related to the operation of a nuclear power plant, the first priority shall be given to safety.

302. The safety of operational activities shall be assessed and improved on a continuous basis.

303. The procedures and instructions described in the management system, and a sound safety culture, shall be followed in the operation of a nuclear power plant.

304. The operating personnel shall take prompt measures in order to bring the plant to a safe and stable state if the shift team personnel cannot ascertain that the nuclear power plant is operating within the limits allowed by the Operational Limits and Conditions or if the plant behaves in an unexpected way.

305. The nuclear power plant shall not be returned to service following an unplanned shutdown unless start-up is demonstrated to be safe.

306. Written instructions shall be prepared for any foreseeable actions affecting safety.

307. The operability of systems, structures, and components shall be systematically monitored and verified.

308. The structure of the operating organisation as well as the duties, responsibilities, and operating practices of the personnel shall be defined in the plant's management system.

4 Operating organisation, responsibilities, and duties

4.1 Operations manager

401. The operations manager shall ensure that the operational activities of a nuclear power plant are conducted as planned and in compliance with the applicable safety regulations.

402. The operations manager shall define the safety objectives and requirements for operational activities.

403. The operations manager shall ensure that the safety objectives defined for operational activities are met.

404. The operations manager shall review and develop the operational practices in order to improve safety.

4.2 Shift teams

405. The shift supervisor shall be responsible for the safe operation of the nuclear power plant unit under his or her supervision.

406. The shift supervisor's duty shall be to monitor the state of the nuclear power plant unit entrusted to him or her and to act as the supervisor of the shift team.

407. The reactor and turbine operators shall monitor the state of the nuclear power plant unit and operate the nuclear power plant in compliance with the shift supervisor's instructions and plant procedures.

408. The field operators shall carry out monitoring and operational activities at the plant.

4.3 On-call safety engineer

409. The nuclear power plant organisation shall include an on-call safety engineer whose duty is to oversee the safety of the operation of the nuclear power plant independently of the shift teams.

410. In case problems related to operational events and failures arise, the on-call safety engineer's duty is to assess the plant's state and the actions of the shift team and to provide the shift supervisor with advice and support in decision-making as necessary.

411. In emergency situations, the on-call safety engineer shall independently monitor the plant's state and, as necessary and in compliance with his or her own instructions and authorisation, provide instructions to the shift supervisor for controlling the situation.

412. The on-call safety engineer shall come to the control room whenever required at any time of day within the response time used in the preparation of the emergency operating procedures.

4.4 Actions for supporting and overseeing operational activities

413. The safety of the operation of a nuclear power plant shall be supported by sufficient expertise in order to ensure that the shift team always has

sufficient support available for resolving any problems related to the safe operation of the plant.

414. A safety unit independent of direct operational activities shall oversee the safety of the operational activities.

4.5 Shift arrangements

415. The duration of the shifts, shift rotation, regular participation in training, and rest periods shall be taken into account when planning the shift system.

416. The implementation of the shift system shall be monitored.

417. The suitability of the shift system in terms of the safe operation of the nuclear facility shall be assessed on a regular basis and whenever changes are made to the shift system.

418. When planning the tasks of the shift teams, care shall be taken to ensure that the workload, participation in training, and the human factors related to the duration of the shifts, shift rotation, and rest periods do not affect the teams' ability to perform safety-related work.

5 Operational practices

5.1 Operation and monitoring of a nuclear power plant

501. The shift team shall monitor the state of the nuclear power plant on a regular basis by using the control room screens and measurements, testing the operability of components, and performing inspections and control tours of the plant facilities.

502. The nuclear power plant shall be operated in accordance with the Operational Limits and Conditions, operating orders, and instructions and compliance with them shall be supervised.

503. The shift teams shall deal with any failures, alarms, and abnormal conditions with due consideration and without delay in accordance with the plant procedures.

504. General surveillance shall be carried out during the control tours of the nuclear power plant facilities. The objectives and locations as well as the limit values to be monitored shall be defined for the control tours. Any non-conformances observed during the control tours shall be reported. Any observations suggesting a risk to safety shall be reported to the shift team in the control room without delay.

5.2 Main control room

505. The control room equipment, information systems, auxiliary devices and communications and alarm equipment necessary for the normal operation of the plant and accident management shall be defined and their operability ensured.

506. The control rooms necessary for operating the plant shall be kept operable at all times, and adequate working conditions for the control room operators shall be ensured.

507. The documents used for the control room duties shall be defined, approved, and kept up-to-date.

5.3 Testing

508. The nuclear power plant shall have in place a periodic testing programme for ensuring the reliable operation and condition of structures, systems, and components related to the safety of the plant.

509. The periodic testing procedures shall specify, among other things:

- the purpose of the test;
- the prerequisites for performing the test;
- instructions for performing the tests;
- the acceptance criteria;
- the processing and acceptance of the test results.

510. The person performing the periodic test shall assess the acceptability of the test results, but he or she is not in a position to approve the results.

511. The up-to-dateness and adequacy of the periodic testing programme and procedures, as well as the significance of the observations made during periodic testing, shall be periodically as-

sessed against the design bases and predefined criteria. The programme and procedures shall be revised and expanded where necessary.

512. Experts from the safety unit shall also participate in the assessment of the periodic testing programmes and the results obtained in the tests.

5.4 Shift turnover

513. All information with relevance to the safety and operation of the nuclear power plant, as well as the responsibility for operating the plant, shall be handed over at shift turnover.

514. The shift supervisor is responsible for the turnover of his or her shift. The shift team shall carry out the shift turnover on a duty-by-duty basis.

515. The practices and requirements related to shift turnover shall be described in the plant procedures.

5.5 Management of the risks associated with work duties

516. The risks related to nuclear and radiation safety associated with the execution of the work shall be identified in connection with work planning, and they shall be managed systematically.

517. The workers shall be capable of performing their work safely and be aware of the risks associated with their work.

518. The supervisor is responsible for the induction of his or her subordinates to their duties; no work may be commenced until the worker is familiar with all the duties involved.

519. A pre-task briefing session shall be arranged for the workers if the task in question is complex or rarely performed.

520. A post-job briefing session shall be arranged when necessary for supporting learning from the experiences gained.

521. A standard of cleanliness and order shall be maintained in the nuclear power plant facilities.

5.6 Control of the status of components and systems

522. A marking system shall be maintained at the nuclear power plant according to which all systems, structures, and components of the nuclear power plant are identified and marked.

523. A nuclear power plant shall have in place a work management system for the administrative management of work assignments.

524. The work management system shall take into account the shift supervisor's responsibility and duties regarding the safe operation of the plant.

525. Information about any faults in components and systems, the status of individual work assignments, and the operability of components shall be available in the work management system.

526. A nuclear power plant shall have in place systematic and documented requirements and procedures for the reliable alignment of components and systems.

527. The alignment of components and systems important to safety shall be periodically verified.

528. A nuclear power plant shall have in place systematic and documented procedures for the isolation, isolation tagging, and recovery of components and systems.

529. The operability of recovered components and systems shall be ensured through sufficient inspections and testing.

530. Temporary modifications related to the safe operation of the plant shall be designed, evaluated, and executed in accordance with specific plant procedures.

531. All temporary modifications shall be documented and clearly identified at the point of execution and at the relevant control post. The operating personnel shall be clearly informed of these modifications and of their implications for the operation of the plant.

532. The number of temporary modifications shall be kept to a minimum.

533. The duration of a temporary modification shall be minimised and a period of validity shall be specified for such a modification.

534. The temporary modifications shall be periodically reviewed to determine whether they are still needed.

6 Management of outages

601. The licensee shall ensure that safety is given the first priority in all decision-making related to the planning and execution of an outage. The safe execution of outages shall be ensured through proper outage procedures, instructions, and the licensee's resources.

602. The requirements and procedures pertaining to the planning and execution of the refuelling, maintenance, and repair outages of a nuclear power plant shall be specified in the licensee's procedures, and the requirements specified in such procedures shall also apply to parties external to the licensee's organisation.

603. The licensee shall make an advance evaluation of its resources and capabilities for executing outages in compliance with the pre-defined procedures. Performance in the execution of outages shall be assessed and developed for supporting learning from the experiences gained in the process.

604. With a view to unplanned repair outages, a list shall be kept at the nuclear power plant of the maintenance, inspection, repair, and modification work scheduled for the next outage.

605. The work to be carried out during an outage shall be organised into coherent work packages in order to simplify supervision and ensure safety.

606. With regard to refuelling and maintenance outages and extensive planned repair outages, the licensee shall:

- define the executing organisation and prepare the instructions to guide its operations;
- specify any special requirements for training, radiation protection, emergency response, fire protection, nuclear safeguards, and nuclear security;
- prepare a plan for work assignments that have a significant bearing on safety;
- prepare a plan for work assignments that have a bearing on radiation exposure and provide an estimate of the collective radiation dose of the workers;
- prepare a plan for work assignments and inspections related to fuel and control rods.

These plans, accompanied by graphs related to scheduling, shall be submitted to STUK for information no later than one month prior to the commencement of the outage. Special arrangements that pertain to security during outages and depart from the regular plant security plan shall be submitted to STUK for information as a separate document.

607. The licensee shall make plans for ensuring the safety functions during an outage. This shall be demonstrated in a report on the status of safety functions to be submitted to STUK for information two weeks prior to the commencement of the refuelling. The report shall present

- the operability of systems assuring reactor subcriticality and the procedures to be complied with;
- the operability of systems required for assuring adequate reactor water volume and the procedures to be complied with;
- the operability of systems assuring reactor and spent fuel decay heat removal and the procedures to be complied with;
- the periods of time during which leak tightness is required of the containment;
- the assurance of reactor overpressure protection;
- the operability of the required measuring and I&C systems;
- the operability of sub-systems ensuring the supply of electricity.
- a risk assessment of an annual outage in accordance with Guide YVL A.7.

The said report shall demonstrate that an individual component malfunction or a single erroneous operator action will not lead to the loss of the reactor make-up water injection option or loss of fuel cooling, or to a shutdown margin of less than one per cent.

608. The licensee shall design the reactor core in such a way that all requirements pertaining to fuel integrity and the safe operation of the reactor are fulfilled. The licensee shall demonstrate the fulfilment of the requirements by submitting a description of the reactor and fuel behaviour for approval no later than one week prior to the planned closing of the reactor pressure vessel head. The report shall

- specify the number of fuel assemblies to be loaded in the reactor by fuel type, including specific design characteristics;
- provide references to decisions by which the fuel assemblies to be loaded in the reactor have been approved for use;
- indicate the loading pattern of fuel assemblies in the reactor core;
- indicate the maximum linear power of the most limiting fuel rod in a fuel assembly;
- indicate the radial power distributions per fuel assembly and the average axial power distribution of the core at the various points of the operating cycle;
- indicate the thermal and shutdown margins;
- indicate the major parameters related to the reactor's physical feedback characteristics and/or core stability;
- indicate the fuel assembly-specific mean burnups and the highest local burnups (rod node burnups);
- provide a thermal analysis of the most limiting fuel rods in terms of their power history (linear power/burnup) (or reference to previously accepted analyses covering the operating conditions concerned);
- present the operational experience feedback on the types of fuel used;
- demonstrate the attainment of the design parameters pertaining to the use of fuel during the previous operating cycle.

609. The closing of the reactor pressure vessel head may commence after

- STUK has approved the descriptions of reactor and fuel behaviour covering the forthcoming operating cycle;
- STUK's inspections of the reactor pressure vessel, the primary circuit, and nuclear safeguards have been completed and no circumstances preventing the closing of the reactor pressure vessel head have been detected in the inspections;
- reactor overpressure protection has been made operable;
- permission to close the reactor pressure vessel head has been granted by STUK's representative and duly recorded in the relevant protocol.

610. The licensee shall apply from STUK for a permit to start up the nuclear power plant unit after refuelling, maintenance, and other extensive repair outages. The start-up permit application shall be submitted to STUK for approval approximately one week prior to the planned start-up date. If any changes essential to start-up readiness take place in the information submitted while the application is being reviewed by STUK, further information to supplement the application shall be promptly provided by the licensee. The application shall

- provide a summary of the completion of safety-significant tasks during the outage;
- indicate any significant defects detected during the outage and the then-current status of such defects;
- identify the tasks to be to performed as reported to STUK by the licensee but postponed to a later date and state the reasons for such postponement;
- indicate any unfinished tasks, tests, and inspections to be performed prior to plant start-up.

611. The verification of the start-up readiness of a nuclear power plant unit shall be carried out in compliance with the written procedures and duly documented. In addition to the unit responsible

for the plant's operation, other organisational units responsible for the execution of outages shall also participate in the verification of the plant's start-up readiness. The verification of the plant's start-up readiness shall be supplemented by an independent safety inspection.

612. The licensee shall request from STUK an inspection to verify start-up readiness in order to start up the nuclear power plant unit after refuelling, maintenance, and other extensive repair outages. The request for the inspection shall be submitted to STUK on a timely basis before the planned verification of start-up readiness. Sufficient time shall be reserved for the inspection to be conducted by STUK.

613. The licensee shall request from STUK an inspection to verify start-up readiness in the event of transients if the operation of safety systems has not been consistent with the assumptions made in the plant's deterministic safety analyses concerning the minimum performance of the systems in postulated accidents, of if the behaviour of the nuclear power plant unit cannot be demonstrated to have been safe. In such a case, the licensee shall provide STUK with an explanation of the causes, the safety significance of the abnormalities observed, and the preconditions for the safe start-up of the plant before the inspection to verify start-up readiness is conducted.

614. The licensee shall provide the STUK officer performing the inspection to verify start-up readiness with the documents necessary for ascertaining that

- any unfinished tasks specified in the start-up permit application have been brought to completion;
- any requirements specified in the STUK's decision concerning the start-up have been duly met;
- the periodic tests specified in the Operational Limits and Conditions have been successfully completed;
- the licensee has verified start-up readiness in compliance with the plant procedures and found it acceptable;
- in the event of a transients defined in requirement 613, the cause of the transient has been determined to the required extent and immediate corrective actions have been taken.

7 Operational documents

7.1 Preparation of operating procedures and related practices

701. Appropriate practices shall be put in place for the preparation, revision, updating, review, validation, approval, and implementation of operating procedures with due regard to the purpose and special characteristics of each procedure.

702. The procedures kept in the nuclear power plant's control rooms and other locations where they are consulted shall be duly approved and up-to-date at all times. Any outdated procedures shall be promptly removed from such locations.

703. All procedures relevant to the conduct of operations shall be submitted to STUK for information following the approval processing by the licensee.

704. The documents, procedures and Operational Limits and Conditions necessary for the operation of a nuclear power plant shall be readily available to the control room personnel.

705. The procedures shall cover all aspects of plant operations, including:

- administrative procedures pertaining to the actions of the shift team;
- the operation of the plant and its systems, including shutdown, annual outage, and start-up;
- the alignment of the plant and its systems;
- inspection and testing;
- the continuous monitoring of the plant;
- emergencies and disturbances as well as the management of severe accidents;
- alarm response;
- temporary modifications or additions.

706. The practices described in the procedures shall support the reliable performance of operator actions and cooperation within the shift.

7.2 Emergency operating procedures, abnormal operating procedures and severe accident management guidelines

707. Abnormal operating procedures covering anticipated operational occurrences shall be prepared for nuclear power plants so as to prevent the escalation of a transient into a situation compromising safety.

708. Emergency operating procedures covering postulated accidents and design extension conditions shall be prepared for nuclear power plants. These procedures shall provide instructions for bringing the plant to a controlled state. Procedures shall be specified for leading the plant from a controlled state to a safe state.

709. The objective of the emergency operating procedures prepared with a view to design extension conditions shall be to restore or compensate for lost safety functions and to initiate actions for preventing core damage.

710. Guidelines for managing severe accidents shall be prepared for nuclear power plants. The guidelines shall provide a description of the measures for mitigating the consequences of severe accidents.

711. The emergency operating procedures for postulated accidents and design extension conditions shall be symptom-based, or a combination of symptom-based and event-based procedures. If safety functions cannot be maintained with the active procedures, symptom-based procedures shall be put to use. The severe accident management guidelines shall be symptom-based.

712. The emergency and abnormal operating procedures shall be supported by analyses performed with realistic assumptions. Furthermore, the applicability of the procedures shall also be analysed in different system and component failure situations. The procedures shall be accompanied by background material illustrating the strategy underlying the procedure; the assumptions used in the preparation of the procedure; references to the analyses carried out in the preparation of the procedure; and other relevant background information.

713. The emergency and abnormal operating procedures, severe accident management guidelines, and any related instructions shall constitute a coherent set with consistent practices.

714. The emergency and abnormal operating procedures shall enable the operator to quickly identify the relevant procedure for responding to the plant state at hand. Entry and exit conditions shall be defined in the operating procedures for enabling operators to select the appropriate operating procedure, navigate the different operating procedures, and proceed from operating procedures to severe accident management guidelines when necessary.

715. The severe accident management guidelines shall be based on the severe accident management strategy and the related analyses.

716. The emergency and abnormal operating procedures and the severe accident management guidelines shall be verified and validated for ensuring that they are administratively and technically correct for the nuclear power plant unit concerned and compatible with the environment in which they are to be used.

717. The procedures and guidelines shall be systematically validated and verified. Validation shall also address the role of human factors in the procedures. The validation of the procedures and guidelines shall be based on simulations or other suitable methods, primarily by using a training simulator.

718. The emergency and abnormal operating procedures and severe accident management guidelines shall be kept up-to-date at all times in order to ensure that they remain fit for their purpose.

719. Instructions shall be drawn up for the field actions defined in the emergency and abnormal operating procedures and severe accident management guidelines.

7.3 Operating orders

720. Any power changes planned for a nuclear power plant or significant operator actions shall be effected through written operating orders.

721. The operating order shall be located in the control room. It shall state the objective of the task; the actions to be performed; the prerequisites for commencing the task; the safety requirements applicable during the performance of the task; and the planned timetable.

722. The procedures for the preparation and approval of operating orders shall be described in plant procedures.

7.4 Operating logs

723. Instructions shall be drawn up for the preparation and use of shift logs.

724. In a minimum, the operational state of the nuclear power plant and any changes in it, the main parameters, events and any significant operator actions taken, operational limits, and the composition of the shift shall be entered in the shift logs.

7.5 Operational Limits and Conditions (OLC)

725. The Operational Limits and Conditions (OLC) shall be so prepared that the nuclear power plant is operated in accordance with the design bases specified in the safety analysis report.

726. The correctness of the requirements set forth in the Operational Limits and Conditions shall be justified by plant design solutions, safety analyses and, where applicable, the results of commissioning tests.

727. The requirements and limits set forth in the Operational Limits and Conditions shall be based on deterministic analyses. The comprehensiveness and sufficient balance of the requirements and operational limits shall be verified by means of a probabilistic risk analysis (PRA). Any in-service preventive maintenance and testing shall be optimised and justified by means of a PRA. Detailed requirements concerning the PRA are set out in Guide YVL A.7 ”Probabilistic risk assessment and risk management of a nuclear power plant”.

728. The Operational Limits and Conditions shall be so prepared that, in the event of exceptional failure conditions, literal compliance with the Operational Limits and Conditions shall not result in a condition that is significantly worse in terms of safety.

729. The Operational Limits and Conditions shall be specific to each plant unit. The text of the Operational Limits and Conditions shall be clear and unambiguous, and any special terminology used shall be defined.

730. The Operational Limits and Conditions shall unambiguously define the operational states of the nuclear power plant unit concerned.

731. The Operational Limits and Conditions shall cover all operational states including power operation, shutdown and refuelling, any intermediate conditions between these states, and temporary situations arising out of service and testing.

732. The Operational Limits and Conditions shall specify the requirements by which the operability of systems, structures, and components is determined.

733. Any faults in components governed by the Operational Limits and Conditions shall be repaired without delay.

734. The Operational Limits and Conditions shall specify the requirements established for operating the nuclear power plant unit concerned covering:

- the process parameter limits that are critical in terms of the integrity of barriers, derived from the analyses serving as the design basis;
- the limits for the activation of protection and limitation systems;
- the basic requirements for safety systems to be complied with in different operational states, limit values, allowed deviations, operability requirements, the actions to be taken, and the time allowed to complete these actions;
- the periodic testing, inspection, and surveillance programmes for ensuring the operability of systems, structures, and components subject to operability requirements;

- the testing frequency, staggering, operational state, and the related instructions;
- any preventive maintenance giving rise to inoperability;
- the administrative requirements;
- the justifications for the requirements specified above.

735. The safety limits shall be established using a conservative approach in order to take uncertainties in the safety analyses into account to a sufficient degree of certainty.

736. Adequate margins shall be ensured between the limits and actuation settings for safety systems established in the Operational Limits and Conditions in order to avoid any inadvertent actuation of safety systems.

737. Where the requirements established in the Operational Limits and Conditions cannot be met, the actions for bringing the plant into a safe state shall be specified, and the time allowed to complete the actions shall be stated.

738. The number of different times allowed to complete actions shall be minimal.

739. The Operational Limits and Conditions shall specify the minimum staffing levels for the nuclear power plant in the control room area and on the plant site during the different operational states, as well as the conditions pertaining to the shift system. Additionally, the requirements concerning the availability of the on-call safety engineer and the response time within which he or she must arrive at the control room shall be specified.

740. The Operational Limits and Conditions shall state the administrative and technical requirements for starting up the nuclear power plant unit following an outage or transient.

741. The fulfilment of the requirements stated in the Operational Limits and Conditions shall be verified and documented prior to any planned change of the operational state of the nuclear power plant unit.

7.6 Practices pertaining to the Operational Limits and Conditions

742. The Operational Limits and Conditions shall be kept up-to-date at all times. The Operational Limits and Conditions shall be periodically reviewed and updated based on plant modifications, safety analyses, operating experience, and the most recent knowledge.

743. The process for amending or departing from the Operational Limits and Conditions shall be defined. Such amendments or departures shall be described and adequately justified by means of safety analyses and an independent safety review. Any amendments to or departures from the Operational Limits and Conditions shall be submitted to STUK for approval prior to their implementation.

744. As part of the exemption procedure pertaining to the Operational Limits and Conditions, the licensee shall demonstrate that the safety level of the nuclear power plant will not be materially impaired as a result of the departure and that it is not practically possible or feasible to avoid the departure.

745. In the event that the nuclear power plant is found to be at a state not consistent with the Operational Limits and Conditions, remedial actions shall be taken immediately in order to re-establish compliance with the requirements of the Operational Limits and Conditions. Such occurrences shall be investigated and the necessary corrective and preventive action taken. Such occurrences shall be reported to STUK as provided in Guide YVL A.10.

746. Nuclear power plant operators shall be highly knowledgeable of the Operational Limits and Conditions and their technical basis. The persons who make decisions related to the Operational Limits and Conditions shall be aware of the significance of their decisions to the safety of the plant.

8 Regulatory oversight by the Radiation and Nuclear Safety Authority

801. STUK oversees the operation of a nuclear power plant by means of documentary reviews; the licensee's reporting; on-site inspection tours; inspections specified in the periodic inspection programme; supervision of annual outages; oversight exercised by resident inspectors; and the steps taken based on operating experience and safety research results.

802. Any procedures with relevance to the conduct of operations shall be submitted to STUK for information following the approval processing by the licensee. Any amendments to the procedures will be reviewed by STUK.

803. STUK oversees the operation of a nuclear power plant based on regular reporting and reporting on operational events as provided for in Guides YVL A.9 and YVL A.10 in particular. Additionally, STUK shall receive notifications of events and actions related to the operation of the nuclear power plant as agreed with the licensee.

804. STUK's personnel will conduct inspection tours and make observations of the operation of the nuclear power plant on site. STUK's personnel will address any shortcomings observed where necessary.

805. STUK oversees the actions of the licensee and the operation of the nuclear power plant by means of the inspections specified in the periodic inspection programme. STUK will prepare a plan for each inspection stating the object of the inspection and any preparatory actions required from the licensee. The inspection results and any requirements to be imposed on the basis of them will be stated in the inspection protocol.

806. In addition to the review of the documentation provided by the licensee, STUK also oversees the execution of annual outages of the nuclear power plant through on-site inspection tours.

807. Serving as STUK representatives at the nuclear power plant, STUK's resident inspectors shall oversee the functions of the licensee. The resident inspectors acquire information pertaining to the actions of the licensee as deemed necessary for STUK's oversight purposes.

808. STUK assesses the operation of nuclear power plants and the necessary areas for improvement based on operating experience and safety research. STUK assesses the actions of the licensee and, where necessary, requests actions for ensuring continuous improvement of safety.

Definitions

Operational event

Operational event shall refer to a failure, flaw or non-conformity in safety functions, systems, components, structures or an organisation's activities that has a bearing on radiation safety or nuclear safety. Operational events also include emergencies and disturbances as well as events compromising radiation safety. Operational events also include events taking place during the construction phase.

Emergency situation

Emergency situation shall refer to an accident or event during which the nuclear power plant's safety has deteriorated or is in the danger of deteriorating or requires enhanced preparedness to act in order to ensure plant safety; emergency situations are classified on the basis of their severity and controllability as follows:

- an alert is a situation where the safety level of a nuclear power plant needs to be ensured in an exceptional situation.
- a site area emergency is a situation during which the nuclear power plant's safety deteriorates or is in the danger of deteriorating significantly.
- a general emergency is a situation during which there is danger of radioactive substance releases that may require protective measures in the vicinity of the nuclear power plant. (Government Decree 716/2013)

Temporary modification

Temporary modification shall refer to a provisional solution replacing an accepted solution pertaining to systems, structures and components or related methods and procedures that cannot be properly corrected without delay using established procedures.

Direct operational activities

Direct operational activities shall refer to all activities that directly concern the systems, structures and components of a nuclear power plant.

Operational activities of a nuclear power plant

Operational activities of a nuclear power plant shall refer to the operations subject to an operating licence engaged in by a licensee to operate a nuclear power plant. The operational activities of a nuclear power plant are considered to commence when measures to load nuclear fuel into the reactor are launched. The procedures of the operational activities are also employed during the commissioning and decommissioning of a nuclear power plant, yet they do not always have a direct bearing on nuclear safety and radiation safety.

References

1. Nuclear Energy Act (990/1987).
2. Nuclear Energy Decree (161/1988).
3. Government Decree on the Safety of Nuclear Power Plants (717/2013).
4. IAEA (2011) SSR-2/2 Safety of Nuclear Power Plants: Commissioning and Operation.
5. IAEA (2008) NS-G-2.14 Conduct of Operations at Nuclear Power Plants.
6. IAEA (2000) NS-G-2.2 Operational Limits and Conditions and Operating Procedures for Nuclear Power Plants.
7. WENRA Reactor Safety Reference Levels, January 2008.
8. IAEA (2006) Safety Report Series No. 48. “Development and review of plant specific emergency operating procedures”.