

Guide YVL A.6, Conduct of operations at a nuclear power plant

1 Scope of application

Guide YVL A.6 sets out the requirements for the safe operation of nuclear power plants. The requirements of Guide YVL A.6 apply to the nuclear power plant's operation phase. They apply during the construction, commissioning and decommissioning of a nuclear power plant to the extent that they are justified in view of ensuring the safety of operations during these stages. Where necessary, STUK will issue a separate decision as to the application of this Guide to other nuclear facilities.

2 Justifications of the requirements

The following establishes the most significant new requirements, or specifications for previous practices. The detailed references to the justification of the requirements have been listed.

2.1 Chapter 3 Principles of and basic requirements for operational activities

This chapter sets out the basic requirements for operating a nuclear power plant, which can be derived from the priority of safety or the requirements set for the management system. Bringing the nuclear power plant to a safe state in unclear situations and the requirements set for re-starting the nuclear power plant are part of WENRA's requirement level.

- 301.** Nuclear Energy Act (990/1987), Section 9; SSR-2/2 Req 1
- 302.** SSR-2/2 Section 3.2 e)
- 303.** SSR-2/2 Req 2 and Section 3.4
- 304.** WENRA H 7.1
- 305.** WENRA H 7.2
- 306.** SSR-2/2 Req 8 and Sections 4.26–4.27
- 307.** SSR-2/2 Req 31
- 308.** SSR-2/2 Req 3 and Section 3.8

2.2 Chapter 4 Operating organisation, responsibilities and duties

This chapter describes the duties in the organisation relevant to the safe operation of a nuclear power plant. The requirements of this chapter are generally based on the requirements of a developed management system. As individual matters, there are requirements for supervision by an on-call safety engineer and an independent safety unit. These are based on the need to have an independent, security-affirming party monitor normal operations as well as to have independent assurance of safety in cases of emergencies and operational occurrences. Reachability shall be defined in greater detail with regard to the on-call safety engineer because he or she is deemed to be integral to the personnel required for managing emergency situations. In the requirements concerning shift work, the aim is to ensure that factors affecting human activity are taken into account as part of shift system planning. This should also be taken into consideration in the planning of work requiring special attention and

accuracy. People's ability to adapt to various shift rhythms is individual and changes as they age. Because of this, the functionality of the shift arrangements shall be regularly assessed. However, an assessment is not required every year. The requirements are in line with the clarifications required in connection with the latest change in shift arrangements.

- 401. SSR-2/2 Sections 3.1 and 3.2 c) and NS-G-2.14 Section 2.4
- 402. SSR-2/2 Req 5 and Sections 4.1 and 4.2 and NS-G-2.14 Section 2.16
- 403. SSR-2/2 Req. 9 and NS-G-2.14 Section 2.17
- 404. SSR-2/2 Req. 9 and NS-G-2.14 Section 2.20
- 405. NS-G-2.14 Section 3.1
- 406. NS-G-2.14 Section 3.1
- 407. NS-G-2.14 Section 3.5
- 408. NS-G-2.14 Section 3.6
- 409. NS-G-2.14 Section 3.9
- 410. NS-G-2.14 Section 3.10
- 411. NS-G-2.14 Section 3.10
- 412. NS-G-2.14 Section 3.9 and WENRA LM 4.1
- 413. SSR-2/2 Section 3.8 and NS-G-2.14 Section 2.23
- 414. WENRA B 2.2
- 415. SSR-2/2 Sections 3.13 and 4.29 and NS-G-2.14 Section 4.1
- 416. SSR-2/2 Section 4.29 and NS-G-2.14 Section 4.5
- 417. SSR-2/2 Section 3.13 and NS-G-2.14 Section 2.20
- 418. SSR-2/2 Sections 3.12 and 4.29 and NS-G-2.14 Sections 4.1, 4.2 and 4.3

2.3 Chapter 5 Operational practices

With regard to the topics presented in this chapter, the practices of the current licence holders are, for the most part, on the level required by the Guide. No separate refuelling application is required; the corresponding information shall be submitted to STUK for information two weeks before starting the annual outage.

- 501. NS-G-2.14 Section 4.7, 4.34, 5.17
- 502. SSR-2/2 Section 3.4, Req 6 and Req 26
- 503. SSR-2/2 Section 7.9 and NS-G-2.14 Section 5.26
- 504. NS-G-2.14 Sections 4.34–4.42
- 505. NS-G-2.14 Section 6.1, 6.5, 6.6, 6.11
- 506. SSR-2/2 Req. 27 and NS-G-2.14 Sections 6.1, 6.5, 6.6
- 507. NS-G-2.14 Section 4.24
- 508. SSR-2/2 Req. 31
- 513. NS-G-2.14 Section 4.13
- 514. NS-G-2.14 Sections 4.16, 4.17 and 4.20
- 515. NS-G-2.14 Section 4.13
- 516. SSR-2/2 Req. 8, SSR-2/2 Req. 23 and Section 5.26, NS-G-2.14 Section 7.1
- 517. SSR-2/2 Section 5.26 NS-G-2.14 Section 7.33
- 518. WENRA D 2.1–2.3
- 519. SSR-2/2 Section 5.26 and NS-G-2.14 Sections 4.12 and 4.27
- 520. SSR-2/2 Section 5.26
- 521. SSR-2/2 Req. 28 and NS-G-2.14 Sections 6.20–6.26
- 522. SSR-2/2 Section 7.12 and NS-G-2.14 Section 5.1

- 523.** SSR-2/2 Section 8.8
- 524.** SSR-2/2 Section 8.10 and NS-G-2.14 Sections 7.5–7.6
- 525.** SSR-2/2 Section 8.8 and NS-G-2.14 Sections 7.5–7.6
- 526.** SSR-2/2 Section 8.10 and NS-G-2.14 Section 5.5
- 527.** SSR-2/2 Section 8.2 and NS-G-2.14 Sections 5.5 and 5.8
- 528.** SSR-2/2 Section 8.10 and NS-G-2.14 Section 7.6
- 529.** SSR-2/2 Section 8.10
- 530.** WENRA Q.5.2 and SSR-2/2 Section 4.39
- 531.** WENRA Q.5.1 and SSR-2/2 Section 4.41
- 532.** WENRA Q.5.3 and SSR-2/2 Section 4.41
- 533.** WENRA Q.5.3 and SSR-2/2 Section 4.41, NS-G-2.14 Section 5.39
- 534.** WENRA Q.5.4 and NS-G-2.14 Section 5.39

2.4 Chapter 6 Management of outages

A few individual requirements are set out for the management of outages, and document and licensing procedures are specified particularly in regard to individual outages. Naturally, the requirements in the other chapters of the Guide also apply during outages and complement the general requirements related to outages. Requirements for preparation and learning from experience have been established at a general level.

- 601.** SSR-2/2 Sections 8.19 and 8.20
- 602.** SSR-2/2 Req. 32 and Sections 8.21 and 8.22
- 603.** SSR-2/2 Sections 8.18 and 8.24
- 605.** NS-G-2.14 Section 7.21
- 607.** NS-G-2.14 Section 7.20
- 613.** WENRA H 7.2 and WENRA B 2.2
- 614.** WENRA H 7.2

There is no need to submit a separate refuelling plan in advance; only the actual refuelling plan is approved as part of the reactor and fuel behaviour analysis. The use of the reactor can be supervised by monitoring the realisation of the design parameters related to fuel usage.

The requirement for an inspection to verify start-up readiness, in case a certain operation of a safety system has not met the single failure criterion or if the behaviour of the nuclear power plant cannot be shown to have been safe, is based on STUK's obligation to monitor that the operation of nuclear power plants is safe. In such a case, the licence holder shall provide STUK with an explanation of the causes and the safety implications of the non-conformances observed and the conditions for the safe start-up of the plant before the inspection to verify start-up readiness is conducted. This definition obliges the licence holder to demonstrate the safety to STUK, and the adequacy of this demonstration shall be evaluated based on the material presented by the licence holder before the inspection to verify start-up readiness. This way, the authority can utilise a natural and formal inspection point, which cannot be bypassed through the licence holder's one-sided procedures prior to processing by STUK.

2.5 Chapter 7 Operational documents

The requirements established in this chapter within the scope of general operational activity are based on existing best practices. The requirements for procedures related to emergencies and operational occurrences as well as the management procedures of severe accidents are based on the WENRA requirements. The requirements for Operational Limits and Conditions are largely based on the WENRA requirements or the IAEA's guides. Significant requirements that have been proposed included processing the guides in terms of their validation and justification and documenting this process. Preparing background documentation corresponds with the current best practices; background documentation already exists for operating Finnish nuclear power plants as well as those under construction. The significance of verification and validation has been highlighted in the current guides, and licence holders are required to use advanced methods to have the guides approved. The requirements determining the content of the Operational Limits and Conditions are based on the IAEA's guides and the WENRA's requirements. A particular point is the requirement for preparing justifications for the requirements of the Operational Limits and Conditions, which corresponds with the current best practices. The justifications exist in some form for operating Finnish nuclear power plants and those under construction, but their more unambiguous role in terms of content needs to be developed.

- 701. SSR-2/2 Sections 7.1 and 7.4
- 702. SSR-2/2 Sections 7.1 and 7.4, NS-G-2.14 Section 4.24, NS-G-2.2 Section 8.1
- 703. SSR-2/2 Section 7.1
- 704. SSR-2/2 Section 7.1 and WENRA H 3.1
- 705. NS-G-2.2 Sections 8.1–8.3
- 706. NS-G-2.2 Sections 8.5–8.6
- 707. SSR-2/2 Req. 26 and NS-G-2.2 Section 8.4
- 708. WENRA LM 1.1 and 2.1
- 709. WENRA LM 1.1 and 2.2
- 710. WENRA LM 1.1, 2.3 and 3.3
- 711. WENRA LM 2.4.
- 712. WENRA LM 3.1 and SSR-2/2 Section 7.3
- 713. WENRA LM 3.1
- 714. WENRA LM 3.2
- 715. WENRA LM 3.3
- 716. WENRA LM 4.1
- 717. WENRA LM 4.2
- 718. WENRA LM 5.1
- 719. SSR-2/2 Section 7.1 and NS-G-2.2 Section 8.18
- 720. NS-G-2.2 Section 8.1, based on prevalent practices
- 721. NS-G-2.2 Section 8.1, based on prevalent practices
- 722. NS-G-2.2 Section 8.1, based on prevalent practices
- 723. NS-G-2.14 Section 4.50
- 724. NS-G-2.14 Section 4.50
- 725. SSR-2/2 Req. 6 and Section 4.6 and WENRA H 1.1
- 726. SSR-2/2 Section 4.7 and WENRA H 2.1
- 727. YVL 2.8 and NS-G-2.2 Section 3.16

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- 728. SSR-2/2 Sections 4.13 and 4.15
- 729. NS-G-2.2 Sections 3.12 and 10.1
- 730. NS-G-2.2 Sections 3.11 and 3.12
- 731. WENRA H 4.1
- 732. NS-G-2.2 Section 3.12
- 733. SSR-2/2 Section 8.14
- 734. SSR-2/2 Section 4.10, NS-G-2.2 Section 3.5 and WENRA H 1.2, 6.1, 6.3 and 9.1
- 735. WENRA H 5.2
- 736. WENRA H 5.1
- 737. WENRA H 6.2
- 738. NS-G-2.2 Section 3.12
- 739. WENRA H 8.1 and SSR-2/2 Sections 4.6 and 4.7
- 740. WENRA H 7.2
- 741. NS-G-2.14 Sections 4.55 and NS-G-2.2 Section 8.2
- 742. WENRA H 2.2
- 743. WENRA H 2.3
- 744. NS-G-2.2 Section 3.14
- 745. WENRA H 10.1 and 10.2
- 746. WENRA H 3.2

3 International provisions concerning the scope of the Guide

The Guide is strongly based on the IAEA's regulations. The requirements are based on the IAEA's guides:

- SSR-2/2 Safety of Nuclear Power Plants: Commissioning and Operation
- NS-G-2.14 Conduct of Operations at Nuclear Power Plants
- NS-G-2.2 Operational Limits and Conditions and Operating Procedures for Nuclear Power Plants.

The requirements of Guide YVL A.6 include requirements from sections: WENRA Safety Reference Levels for Existing Reactors, September 2014; H: Operational Limits and Conditions and LM: Emergency Operating Procedures and Severe Accident Management Guidelines (a few training-related requirements are included in Guide YVL A.4 "Organisation and personnel of a nuclear facility").

Furthermore, in drafting the Guide the background material used included IAEA (2006) Safety Report Series No. 48. "Development and review of plant specific emergency operating procedures".

The writing style of the Guide corresponds with Finnish nuclear safety thinking. The majority of the individual requirements in the IAEA's guides have either become common or been ignored or their wording has been clearly changed. This way, the focus could be kept on requirements in the YVL Guide; this has helped keep the YVL Guide applicable to Finnish nuclear power plants.

4 Impacts of the Tepco Fukushima Dai-ichi accident

Taking into account an accident concerning the entire plant site is a special area in terms of assessing the content of the Guide. The wording of the emergency

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procedure requirements is based on the phrase “nuclear power plant”, which therefore covers all nuclear power plant units. An accident that concerns all units at the same time is, therefore, part of the coverage required from the guides. In this case, all accident management equipment that is under construction in the nuclear power plant, including new equipment, should be part of the scope of application of the Guide. The Guide contains a reference to providing instructions on the necessary measures to be taken in the field.

During the previous update round in 2013, the need for symptom-based guides was discussed, and the WENRA requirements were seen as outdated in terms of terminology in this regard. The requirement for event-/symptom-based guides was specified so that both approaches can be taken with regard to presumed accidents. Symptom-based guides shall, however, be used if the safety functions are lost and cannot be returned. Accordingly, it was not necessary to change the emergency terminology because the Finnish term has been widely approved in established language and it follows the English terminology.

5 Needs for changes taken into account in the update

The needs for changes due to changes made to international and national laws/regulations and the change proposals made in connection with the preparation of the YVL Guide implementation decisions (SYLVI) together with others recorded in STUK’s change proposal database have been considered when updating the requirements. In addition, the possibilities to reduce the so-called administrative burden have been considered.

In the update of the Guide, only a few items of Guide YVL A.6 have been changed.

Requirement 741a, concerning the limits for the release of radioactive substances in the Technical Specifications, shall be moved to this Guide from Guide YVL A.1 “Regulatory oversight of safety in the use of nuclear energy” (requirement A22). Guide YVL A.6 is a more logical place for the requirement concerned.

The references to Government Decree 717/2013 were updated to concern STUK regulation STUK Y/1/2018. The references to the IAEA regulations were brought up to date.

No changes were found that aimed at reducing the administrative burden.