

Guide YVL A.4, Organisation and personnel of a nuclear facility

1 Introduction

The objective of the Guide is to promote good people management to ensure the best possible management of competence, resources and personnel motivation factors with respect to the safety of the nuclear facility. The requirements aim to take into account management features special to nuclear organisations, even though these do not essentially differ from the generally appreciated and acknowledged good practices.

Guide YVL A.4 presents the requirements for the organisation, personnel, competence and people management required during the different phases of the nuclear facility's life cycle. The majority of the requirements apply to the operation stage of the nuclear facility. Additionally, the Guide defines the competence requirements and qualification procedures for positions that require approval by STUK. The Guide also describes the regulatory oversight related to the organisation and personnel of a nuclear facility.

In the update, the aim has been to clarify the function-related terminology used in the Guide. The Guide provides definitions for the terms 'function important to safety' and 'significant function with respect to safety'. Functions important to safety shall refer to all functions where the individuals performing the function have a direct or indirect effect on the safety of the nuclear facility at the various stages of its life cycle. Some functions important to safety are referred to as 'significant functions with respect to safety' in accordance with the terminology used by STUK in the Regulation on the Safety of a Nuclear Power Plant (STUK Y/1/2018) and Regulation on the Safety of Disposal of Nuclear Waste (STUK Y/4/2018). According to the regulations, the licensee shall designate significant functions with respect to safety separately. Some significant functions with respect to safety are such that the appointed persons must have approval by STUK in accordance with the Nuclear Energy Act (990/1987) or the Radiation Act (859/2018). Functions requiring separate approval by STUK, and the associated requirements, are presented in Annexes A–F to the Guide.

The term 'function critical to safety' is also used in the Guide. By definition, it shall refer to a function that calls for special vigilance and concentration or physical effort under difficult conditions. A function critical to safety is also always a function important to safety.

The hierarchy of function-related terms used in the Guide is illustrated in Figure 1.

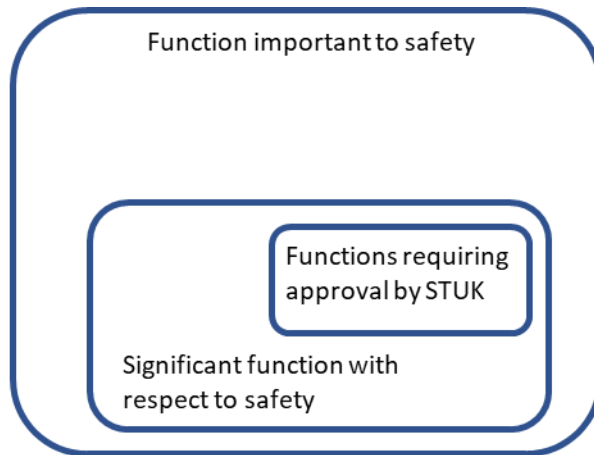


Figure 1. The hierarchy of function-related terminology.

2 Scope of application

This Guide applies to all the stages in the life cycle of a nuclear facility, and the requirements are applicable to the licensee, the licence applicant and, as appropriate, the suppliers. This requirement may, if agreed on, be deviated from only insofar that a requirement or a part of a requirement is not at all applicable to the operating stage that the license applicant or a supplier important to safety is in. The justification for this is that the requirements set forth in the Guide primarily refer to generally approved and appreciated good management practices, meaning that they are widely applied also outside the nuclear sector.

3 Justifications of the requirements

3.1 Chapter 3 Organisation and competence management that promote safe operation

Structurally, Chapter 3 begins with the requirements concerning the competence and organisational structure required for the safe operation of a nuclear facility, followed by the requirements concerning the planning, maintenance and development of the necessary resources and competence. Requirements for management and management skills related to a nuclear facility are presented in this Chapter. Finally, special requirements related to the different stages of the nuclear facility's life cycle are presented.

3.1.1 3.1 Competences and organisational structure

301. The requirement leaves the responsible party with the responsibility vested in them to define the competences necessary for the safe use of nuclear energy and justify the sufficiency of their concept. The requirement concerns the organisational competence of the licensee/licence applicant. This requirement is based on WENRA (B1.1) and GSR Part 2 and NS-G-2.4 by the IAEA.

The Radiation and Nuclear Safety Authority shall verify the concept of the responsible party against its own requirements. The Radiation and Nuclear Safety Authority finds

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it important that, for example, the following competences are sufficient for safe use of nuclear energy:

Leadership and organisation, including

- safety management
- quality management
- control of operations and resources (e.g. personnel, competences, knowledge, money, time, networks, documents)
- people management and legislation related to managerial duties and responsibilities
- project management
- change management
- research and development, development of operations
- interpersonal, communication, coaching, training, group work and co-operative skills
- understanding of human behaviour and human-technology-organisation interaction
- learning skills, learning from events and operating experience
- understanding of organisational behaviour (e.g. organisational psychology)
- safety culture and evaluation and development of safety culture.

Nuclear and radiation safety management, including

- safety design, identification and understanding of the safety significance of nuclear and plant safety
- regulations and guidelines related to the different stages of the nuclear facility's life cycle
- conduct of operations at the nuclear plant
- behaviour of the nuclear facility in case of operational occurrences, emergencies and accidents
- emergency response
- radiation protection
- security arrangements
- fire and rescue operations
- nuclear material safeguards
- safety analyses (deterministic analyses and probabilistic risk assessment, PRA)
- operating experience feedback
- nuclear waste management and decommissioning of the nuclear facility
- transport of radioactive substances.

Technology used in the nuclear facility, including

- nuclear facility technology (electrical, I&C, material and mechanical technology, fire protection, layout design)
- procurement, transport and storage of nuclear fuel
- reactor physics and dynamics
- thermal engineering and flow dynamics
- chemistry (radiochemistry, process water chemistry, groundwater chemistry, etc.)

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- geotechnics (geology, rock construction, rock mechanics, geohydrology, geochemistry)
- development of plant safety, ageing management and maintenance such as testing and surveillance, inspections
- construction technology.

Guide YVL A.3, "Leadership and management for safety", also sets out general requirements for the licensee's competences and organisation.

302–302a. The responsible party shall have sufficient personnel and competences to bear their overall responsibility under all conditions as stipulated in the legislation. Under Section 7 i of the Nuclear Energy Act (990/1987), *the holder of the licence granting the right to use nuclear energy shall have a sufficient number of qualified personnel suitable for the related tasks*. The requirement is also presented by WENRA (B3.5 and B3.6) and the IAEA's GSR Part 2. If external competences are used, the licensee shall have the expertise to evaluate and control the quality of the externally sourced competences.

303. This requirement is presented by WENRA (B1.1).

The organisational structure and necessary minimum personnel resources are defined to ensure operation, chain of command and reporting under all conditions, including emergencies. The number of licensed control room personnel shall be sufficient to ensure that even long-lasting unanticipated absences do not lead to an uncontrollable increase in working hours. The licensee may use various simulated situation exercises to justify that the number of personnel is sufficient. There shall be adequate resources and structures in place for the management of human factors.

304. This requirement is presented by WENRA (B1.3), and it is also based on the Nuclear Energy Act and the Nuclear Energy Decree (161/1988).

306. This requirement is based on WENRA (D2.1, D3.2 and D3.6).

307. This requirement is presented by WENRA (D3.2). The use of nuclear energy and a nuclear facility as a working environment presents special requirements for the personnel and functions, and it is the responsibility of the licensee to take this into account in all operations. The requirement also applies to supplier personnel working outside the nuclear facility site, such as designers, when the work is significant in terms of nuclear and radiation safety.

3.1.2

3.2 Human resources planning and resource requirements

308. The first part of this requirement is presented by WENRA (B3.3).

The life cycle of a nuclear facility is very long. Ensuring the safe operation of the nuclear facility throughout the entire life cycle requires continued personnel development and adequate resources. Personnel resources and continuation of competences shall be ensured by functional human resources planning and development measures. Performance of duties essential to safe operation must not be dependent on one person alone.

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This requirement is based on Regulations STUK Y/1/2018 and STUK Y/4/2018.

309. This requirement is presented in the Nuclear Energy Act and the Radiation Act (Section 28). New duties requiring approval by STUK are the responsible manager for decommissioning of a nuclear facility and the radiation protection officer.

310–312. The requirements are presented by WENRA (B3.1–B3.2 and D2.4).

313. This requirement is presented by WENRA (B1.2, B3.4) and in Regulations STUK Y/1/2018 and STUK Y/4/2018. Safety assessments shall take into account changes in the number and quality, including competences, of the personnel.

314. This requirement is based on requirements and guidelines set out in the IAEA documents SSR-2/2, NS-G-2.8 and NS-G-2.4.

3.1.3 3.3 Competence development

315–318. These requirements are based on WENRA (D1.1–D1.2).

Ensuring the safe operation of the nuclear facility throughout the entire life cycle requires continued and versatile personnel development and adequate resources. Personnel resources shall be continuously ensured by functional human resources planning and development measures.

Special features of the nuclear sector require that safety significance is emphasised in all operations. It must be understood that operational safety can also be jeopardised indirectly, and the licensee shall ensure competence also in operations carried out through the networks.

319. This requirement is based on the IAEA guide NS-G-2.8.

320. Organisational and personnel learning can be promoted in many different ways, some examples of which are listed in the IAEA document TECDOC 1204, "A systematic approach to human performance improvement in nuclear power plants: Training solutions". The method of learning selected should be one that best supports the topic of the training and learner's needs.

3.1.4 3.4 Competence development programmes and competence assessment

3.4.1 Competence development programmes

321. Section 119 of the Nuclear Energy Decree requires that the persons participating in the use of nuclear energy meet the qualification requirements set and that proper training has been arranged for them. According to Regulations STUK Y/1/2018 and STUK Y/4/2018, the competence of the persons performing significant functions with respect to safety shall be verified.

322. This requirement is presented by WENRA (D3.1). In addition to the basic and refresher training, the training programmes shall include training that complements competence in accordance with the principle of continuous improvement.

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323. The requirement for the overriding priority of safety is presented in the IAEA's requirement GSR Part 2 and guide GS-G-3.1, "Application of the Management System for Facilities and Activities".

Special features of the nuclear sector require that all operations emphasise the significance of the overriding priority of safety and activities in accordance with the plans and instructions.

324. This requirement is based on the IAEA guide NS-G-2.8.

The licensee shall ensure by induction that each person understands the safety significance of their work and possess the necessary competence to work in a safe way.

325. This requirement is based on the Nuclear Energy Act, Regulations STUK Y/1/2018 and STUK Y/4/2018, and WENRA (R5.2–R5.3). Special features of the nuclear sector include awareness and management of risks. The risk management procedure includes protection against accidents. Everyone working at the facility must know how to proceed in case of disturbances and emergencies. One factor highlighted in the analyses conducted after the Fukushima accident has been the organisation-wide management capabilities in case of emergency situations and accidents.

3.4.2 Function-specific training requirements

326. This requirement is presented by WENRA (D3.6).

Special features of the nuclear sector require that all operations emphasise the significance of the overriding priority of safety and that it shall be possible to train for actions critical to safety in practice.

327. This requirement is presented by WENRA (J1.4). Operating experience is an important source of learning. With operating experience feedback, the personnel learns to pay attention also to weak signals and near misses. Therefore, it is important to ensure that the operating experience feedback experts are sufficiently competent to lead the investigations into the events. Participation of the other personnel in the analyses of the events also increases the understanding of the role of competence and safety significance in a wider organisational perspective.

328. This requirement is presented by WENRA (LM6.1). A prerequisite for the operation of a nuclear facility is the ability to handle any disturbances and emergencies in a safe manner.

329. This requirement is presented by WENRA (LM6.2).

330. This requirement is presented by WENRA (LM6.3).

Chapter 3.4.3 Competence assessment and verification of qualifications

331. This requirement is based on Regulation STUK Y/1/2018 and WENRA (D2.1–D2.2). The requirement applies to the licensee personnel's competence requirements.

332 and 332a. These requirements are based on WENRA (D2.1–D2.2 and D4.1–D4.2).

333. This requirement is presented by WENRA (D4.2). Licensees may have their own internal approval procedures for, for example, the simulator trainers, safety engineers, radiation protection assistants and divers.

334. This requirement is presented in the Nuclear Energy Act (Section 7 i) and by WENRA (D2.1).

335. This requirement is presented in the Nuclear Energy Act (Section 7 i) and by WENRA (D4.1).

336. This requirement is based on the IAEA requirement GSR Part 2 and guide GS-G-3.1.

3.1.5

3.5 Competence development resources

337. This requirement is based on the requirement concerning the licensee's overall responsibility and responsibility to ensure the necessary expertise for the use of energy as laid down in the legislation (Nuclear Energy Act, Section 7 i, Regulations STUK Y/1/2018 and STUK Y/4/2018). The requirement is also based on the IAEA documents SSR-2/2, NS-G-2.8 and GS-G-3.1. Resources necessary for competence development also include the time needed by the personnel for learning and studying.

338. This requirement is based on the IAEA guides SSR-2/2 and NS-G-2.8.

339. This requirement is based on the IAEA guide NS-G-2.4.

340. This requirement is based on the IAEA guide NS-G-2.8. In a multicultural environment, it must be ensured that the language skills of the participants are adequate to participate in the training or there must be other arrangements in place to ensure that the participants are able to understand and assimilate the content of the training.

341. This requirement is presented by WENRA (D2.3).

342. This requirement is presented by WENRA (D3.3).

342a. This requirement is presented by WENRA (O3.5).

343. In order for the training to be considered appropriate, the simulator intended to be used for training shall be approved by the licensee. As regards the technical implementation, the approval shall be based on a generally applied industry-standard (ANSI).

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344. Before the commissioning of a new nuclear facility, the competence of the prospective operators in the nuclear facility in question shall be ensured, meaning that a replica training simulator shall be available for use at least one year prior to the loading of fuel.

345. This requirement is presented by WENRA (Q4.2–Q4.3). The replica accuracy of the training simulator shall be ensured by simulator maintenance routines. Small changes may be followed-up and surveyed, but in case of larger changes, the appropriateness of the changes can only be ensured by a sufficiently extensive testing programme.

In the nuclear sector, human factors shall be managed carefully, meaning that systematic maintenance of the replica accuracy and functionality of the training simulator are especially important.

346. This requirement is based on the Nuclear Energy Decree (Section 35). The license applicant shall also submit any reports that STUK considers necessary.

3.1.6 3.6 Leadership and management skills

347. This requirement is based on documents GSR Part 2 and GS-G-3.1 by the IAEA and Regulations STUK Y/1/2018 and STUK Y/4/2018.

348–349. These requirements are based on the IAEA guide NS-G-2.8.

350–352. These requirements are based on the IAEA document GSR Part 2.

In the nuclear sector, safety culture plays an important role in the safety of the operations. The competences and actions of supervisors, including the managers, are essential in creating and developing the culture. To achieve the safety goals, it is crucial that the supervisor acts in an exemplary manner as well as interacts with the personnel and guides the actions in a manner that highlights ensuring the importance of both safety as an overriding priority and competence.

353. This requirement is based on WENRA (B2.3) and the IAEA documents GSR Part 2 and GS-G-3.1.

354–354a. These requirements are based on, for example, the spirit of the guidance given by the NRC in the USA and the IAEA documents GSR Part 2 and GS-G-3.1. Changes in social behaviour are often indicative of impaired working ability and well-being, so the supervisors shall monitor the working ability of the personnel comprehensively. The responsibility of the employer to maintain working ability is laid down, for example, in the Occupational Safety and Health Act.

Certain duties in the nuclear sector require special vigilance and concentration or physical effort (e.g. transfer of fuel in a nuclear power plant, diving work) under difficult conditions (e.g. radiation, temperatures, lack of space). Such functions critical to safety and the associated allowed working hours must be determined, and the working hours must be monitored to minimise human errors and ensure safety.

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355. This requirement is based on the IAEA requirement GSR Part 2 and guide GS-G-3.1.

356. The requirement is based on WENRA (D2.1–D2.2) and the IAEA guide GS-G-3.1. In addition, in the IAEA document TECDOC 1024, "Selection, competency development and assessment of nuclear power plant managers", the requirement to assess competence and performance applies to the managers in particular.

The managers and supervisors play such an important role with respect to safety that it shall be ensured that the persons in charge of the organisation are best qualified and suitable for their respective duties. This must be monitored by systematic procedures.

3.1.7 3.7 Special requirements related to the different stages of a nuclear facility's life cycle

3.7.1 Decision-in-principle

357. This requirement is based on legislation. According to Section 24 of the Nuclear Energy Decree, a party applying for a decision-in-principle shall supplement the application with, for example, a description of the expertise available to the applicant and any other information considered necessary by the authorities. Construction and commissioning of a nuclear facility is an extremely challenging and complex project, requiring preliminary plans for all stages of the facility's life cycle, starting from the very beginning.

3.7.2 Construction licence

358–359. Requirement 358 and description 359 are based on the Nuclear Energy Act (Sections 7 i and 7 k) and Nuclear Energy Decree (Sections 32 and 35). Section 19 of the Nuclear Energy Act requires that the applicant shall have the necessary expertise available.

360. This requirement is based on Section 35 of the Nuclear Energy Decree. The means by which the knowledge obtained in the design and construction stages shall be managed throughout the entire life cycle of the nuclear facility must be planned and ensured already in the construction licence stage. The life cycle of a nuclear facility is considerably longer than a career of an individual, meaning that the expertise and competence necessary in the different stages, and continuous management of the knowledge obtained during the stages, shall be ensured in a systematic manner.

3.7.3 Design, construction and commissioning

361. According to section 7 f of the Nuclear Energy Act, the holder of a construction licence shall be responsible for the nuclear facility's construction in accordance with safety requirements. Of the many parties involved in the construction and commissioning stages, not all belong to the licensee's organisation, have experience in the nuclear sector or come from Finland. Nevertheless, the overall responsibility of the safety of the facility lies with the licensee. Therefore, the licensee shall have expertise and procedures to bear the responsibility in a controlled manner.

WENRA requirement D2.3 on the operating organisation requires the licensee to establish and maintain training and competence records on individuals with tasks important to safety. A procedure as referred to in the requirement may, for example, constitute such a record.

362. This requirement is based on legislation (Nuclear Energy Act, Section 20, Nuclear Energy Decree, Section 119).

362a. New requirement based on legislation (Radiation Act, Chapter 5).

363. This requirement is based on legislation (Nuclear Energy Act, Sections 7 i and 7 k; Nuclear Energy Decree, Sections 32 and 35).

364–365. These requirements are based on Regulations STUK Y/1/2018 and STUK Y/4/2018. The number of licensed control room personnel and shift crew shall be sufficient under all conditions. The licensee may use various simulated situation exercises to justify that the number of personnel is sufficient.

3.7.4 Operation

366. This description is based on legislation (e.g. Nuclear Energy Act, Section 7 k).

367. This requirement is based on Guide YVL A.1, “Regulatory oversight of safety in the use of nuclear energy”, and the IAEA guide SSG-25.

368. This requirement is based on Section 7 g of the Nuclear Energy Act and Section 34 of the Nuclear Energy Decree. The life cycle of a nuclear facility is considerably longer than a career of an individual, meaning that the expertise and competence necessary in the different stages, and continuous management of the knowledge obtained during the stages, shall be ensured.

3.7.5 Decommissioning

368a. This new description is based on the Nuclear Energy Act (Section 7 k).

369. This requirement is based on the IAEA document GSR Part 2 and Section 34a of the Nuclear Energy Decree. These competence areas are emphasised in the decommissioning stage.

3.2 Chapter 4 Regulatory oversight by the Radiation and Nuclear Safety Authority

This Chapter describes the regulatory oversight by the Radiation and Nuclear Safety Authority in the different stages of the nuclear facility’s life cycle.

3.2.1 4.1 Oversight in general

401. This requirement is presented in the Nuclear Energy Act and the Nuclear Energy Decree (e.g. Section 63 and Chapter 5, respectively).

402–403. These requirements are based on the Nuclear Energy Act and the Nuclear Energy Decree (e.g. Sections 7 i, 7 k and 63; and Chapter 5, respectively).

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404. This requirement is based on the Nuclear Energy Act (Section 63). Oversight measures by the Radiation and Nuclear Safety Authority are necessary to enable it to state its opinion on the responsible party's organisation, the adequacy of the expertise and the qualifications of the personnel.

3.2.2 4.2 Decision-in-principle

405. This requirement is based on the Nuclear Energy Act and the Nuclear Energy Decree (Section 63 and Chapter 5, respectively).

3.2.3 4.3 Construction licence

406–407. These requirements are based on legislation (e.g. Nuclear Energy Act, Sections 7 i and 63; Nuclear Energy Decree, Chapter 5).

3.2.4 4.4 Construction and commissioning

408–409. These requirements are based on legislation (e.g. Nuclear Energy Act, Section 63; Nuclear Energy Decree, Sections 108–110).

410. This requirement is based on the Nuclear Energy Decree (Section 35). The license applicant shall also submit any reports that STUK considers necessary.

3.2.5 4.5 Operating licence

411–412. These requirements are based on legislation (e.g. Nuclear Energy Act, Section 63; Nuclear Energy Decree, Chapter 5).

3.2.6 4.6 Operation

413. This requirement is based on legislation (e.g. Nuclear Energy Act, Sections 7 r, 55 and 63; Nuclear Energy Decree, Section 119).

Subheading 4.7 has been removed. No changes have been made to the requirements concerning the renewal of the operating licence or the periodic safety review.

414–415. These requirements are based on legislation (e.g. Nuclear Energy Act, Sections 7 r and 55; Nuclear Energy Decree, Chapter 5).

3.2.7 4.8 Decommissioning

415a. New requirement based on legislation (e.g. Nuclear Energy Decree, Section 34 a).

416. This requirement is based on legislation (e.g. Nuclear Energy Act, Sections 7 g and 55; Nuclear Energy Decree, Section 34 a).

3.3 Guide Annexes A–F

Annexes A–F describe competence requirements and approval procedures for persons who require specific approval from the Radiation and Nuclear Safety

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Authority. The Nuclear Energy Act, the Nuclear Energy Decree and the Radiation Act place requirements on significant functions with respect to safety, and the persons and their deputies who perform them.

3.3.1 **Annex A Responsible manager and his/her deputy**

A01–A07. The Nuclear Energy Act and the Nuclear Energy Decree set requirements on the responsible manager and his or her deputies. According to Section 7 k of the Nuclear Energy Act, a responsible manager shall be appointed for the construction of a nuclear facility, operation of a nuclear facility and decommissioning of a nuclear facility. The Guide now includes requirements A04a and A07a concerning the responsible manager for decommissioning.

According to Section 7 k of the Nuclear Energy Act, it is the responsible manager's task to ensure that the provisions, licence conditions and regulations issued by the Radiation and Nuclear Safety Authority (STUK) concerning the safe use of nuclear energy, the arrangements for security and emergencies, and the nuclear safeguards are complied with.

The responsible manager plays a key role in terms of bearing the overall responsibility vested in the licensee, and therefore the responsible manager and his or her deputy shall be employed by the licensee. The deputy shall also occupy the position required by the task and possess adequate authority and the actual prerequisites required for bearing the responsibility vested in him or her.

The reason for the separate requirements for the responsible manager in the construction, operation and decommissioning stage of a nuclear facility is that different duties are emphasised in different stages. An addition to requirement A03, the duties of the responsible manager for the construction now include a requirement that STUK shall also be informed of any significant observations related to the quality and safety management of design and construction.

A08–A09. As the overall responsibility for safety rests with the licensee, the licensee shall, in its application, provide its assessment of the aptitude, training and sufficiency of work experience of the person proposed as the responsible manager. In addition, the Radiation and Nuclear Safety Authority shall verify the competence and aptitude by its own methods.

A10. As the responsible manager is approved by the Radiation and Nuclear Safety Authority, the licensee must maintain up-to-date information on persons who hold this position, and also inform the Radiation and Nuclear Safety Authority of any changes.

A11–A12. The Radiation and Nuclear Safety Authority may, at its discretion, set particular restrictions and conditions related to the applicant. This way, a person who does not fulfil all the conditions set for a responsible manager at the time of approval but will do so after the implementation of agreed actions, can be approved as the responsible manager or his or her deputy.

A13. Due to the separately enacted approval procedure, it is justified to have clear requirements also for the cancellation procedure. This is also justified from the point of view of the legal protection of the individual. This requirement presents the

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grounds on which the approval may be revoked in whole or in part. The complexity of the grounds make them impossible to describe exhaustively; instead, depending on the situation, the matter shall be resolved by a decision separately justified. The requirement outlines the basic principles on which the approval may be revoked in whole or in part.

3.3.2 Annex B Person in charge of security arrangements and his or her deputy

Requirements for the person in charge of security arrangements and his or her deputy are set forth in the Nuclear Energy Act, the Nuclear Energy Decree and Guide YVL A.11, "Security of a nuclear facility".

B01. Duties of the person in charge of security arrangements and his or her deputy are also described in Guide YVL A.11. Section 7 i of the Nuclear Energy Act requires the licensee to appoint a separate person in charge of security arrangements. The requirement describes the duties of the person in charge of security arrangements in more detail. According to Section 9 of the Nuclear Energy Act, the responsibility for the safe use of nuclear energy rests with the licensee, and the responsibility cannot be shared. In the case of responsibilities, it is justified that the persons in question shall be employed by the licensee.

B02. This requirement describes the competence requirements for the person in charge of security arrangements in more detail. According to Section 7 i of the Nuclear Energy Act, the licensee shall have a sufficient number of qualified personnel suitable for the related tasks. The requirement presents the competence requirements considered as justified to meet the requirement to demonstrate professional qualifications in accordance with the Nuclear Energy Act. Since the authorities have a role in many situations related to the security arrangements in the use of nuclear energy, it is justified that the person in charge of security arrangements shall be sufficiently familiar also with the basic principles and legislation governing the actions of said authorities.

B03. According to Section 7 i of the Nuclear Energy Act, the person in charge of security arrangements shall be approved by the Radiation and Nuclear Safety Authority. The professional qualifications of the person shall be justified in the application.

B04. According to Section 7 i of the Nuclear Energy Act, the Radiation and Nuclear Safety Authority shall assess the competence and suitability of the person in charge through a qualification procedure.

B05. This requirement specifies more detailed regulations concerning the validity of the qualification of the approved person. It is justified to allow an approval to be granted for a fixed period of time where relevant. It is justified to oblige that the Radiation and Nuclear Safety Authority shall be informed of any personnel change so that the regulatory authority always possess up-to-date information of the persons in charge.

B06. In some cases, it may be necessary to add certain conditions or restrictions as prerequisites for approval. These shall be considered on a case-by-case basis.

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B07. When necessary, changing the conditions related to the approval is justified to keep the qualifications of the person up-to-date.

B08. Due to the separately enacted approval procedure, it is justified to have clear requirements also for the cancellation procedure. This is also justified from the point of view of the legal protection of the individual. This requirement presents the grounds on which the approval may be revoked in whole or in part. The complexity of the grounds make them impossible to describe exhaustively; instead, depending on the situation, the matter shall be resolved by a decision separately justified. The requirement outlines the basic principles on which the approval may be revoked in whole or in part.

3.3.3 **Annex C Person in charge of emergency arrangements and his or her deputy**

Requirements for the person in charge of emergency arrangements and his or her deputy are set forth in the Nuclear Energy Act, the Nuclear Energy Decree and Guide YVL C.5, "Emergency arrangements of a nuclear power plant".

C01. Duties of the person in charge of emergency arrangements and his or her deputy are also described in Guide YVL C.5. Section 7 i of the Nuclear Energy Act requires the licensee to appoint a separate person in charge of emergency arrangements. The requirement describes the duties of the person in charge of emergency arrangements in more detail. According to Section 9 of the Nuclear Energy Act, the responsibility for the safe use of nuclear energy rests with the licensee, and the responsibility cannot be shared. In the case of responsibilities, it is justified that the persons in question shall be employed by the licensee.

C02. This requirement describes the competence requirements required of the person in charge of emergency arrangements in more detail. According to Section 7 i of the Nuclear Energy Act, the licensee shall have a sufficient number of qualified personnel suitable for the related tasks. The requirement presents the competence requirements considered as justified to meet the requirement to demonstrate professional qualifications in accordance with the Nuclear Energy Act. Since the authorities have a role in many situations related to the emergency arrangements in the use of nuclear energy, it is justified that the person in charge of emergency arrangements shall be sufficiently familiar also with the basic principles and legislation governing the actions of said authorities.

C03. According to Section 7 i of the Nuclear Energy Act, the person in charge of emergency arrangements shall be approved by the Radiation and Nuclear Safety Authority. The professional qualifications of the person shall be justified in the application. The professional qualifications shall include sufficiently comprehensive knowledge in the power plant's operational and radiation safety as well as basic knowledge in the rescue or security sector.

C04. According to Section 7 i of the Nuclear Energy Act, the Radiation and Nuclear Safety Authority shall assess the competence and suitability of the person in charge through a qualification procedure.

C05. This requirement specifies more detailed regulations concerning the validity of the qualification of the approved person. It is justified to allow an approval to be

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granted for a fixed period of time where relevant. It is justified to oblige that the Radiation and Nuclear Safety Authority shall be informed of any personnel change so that the regulatory authority always possess up-to-date information of the persons in charge.

C06. In some cases, it may be necessary to add certain conditions or restrictions as prerequisites for approval. These shall be considered on a case-by-case basis.

C07. When necessary, changing the conditions related to the approval is justified to keep the qualifications of the person up-to-date.

C08. Due to the separately enacted approval procedure, it is justified to have clear requirements also for the cancellation procedure. This is also justified from the point of view of the legal protection of the individual. This requirement presents the grounds on which the approval may be revoked in whole or in part. The complexity of the grounds make them impossible to describe exhaustively; instead, depending on the situation, the matter shall be resolved by a decision separately justified. The requirement outlines the basic principles on which the approval may be revoked in whole or in part.

3.3.4 Annex D Person in charge of nuclear safeguards and his or her deputy

Requirements for the person in charge of nuclear safeguards and his or her deputy are set forth in the Nuclear Energy Act, the Nuclear Energy Decree and Guide YVL D.1, "Regulatory control of nuclear safeguards".

D01. Section 7 i of the Nuclear Energy Act requires the licensee to appoint a separate person in charge of nuclear safeguards. The requirement describes the duties of the person in charge of nuclear safeguards in more detail. The person in charge of nuclear safeguards is responsible for the obligations of the licensee/responsible party at the plant site or another equivalent site (i.e. plant and the associated plant area pursuant to the Additional Protocol to the Safeguards Agreement, as well as services inherent to the operation of the plant).

Since nuclear safeguards require attending to the security of nuclear material, it is necessary that the person in charge of nuclear safeguards and the person in charge of security arrangements shall co-operate closely. According to Section 9 of the Nuclear Energy Act, the responsibility for the safe use of nuclear energy rests with the licensee, and the responsibility cannot be shared. In the case of responsibilities, it is justified that the persons in question shall be employed by the licensee.

D02. This requirement describes the competence requirements required of the person in charge of nuclear safeguards in more detail. The person in charge of nuclear safeguards shall be conversant with the use of the plant (incl. nuclear fuel and its properties as well as other nuclear use items), plant operation-related activities in the plant area and services inherent to the operation of the plant, such as procurement of nuclear fuel. The person shall be conversant with legislation and have sufficient knowledge of the international contractual arrangements in nuclear safeguards to attend to the duties in his or her responsibility. The position requires good skills in English. Experience of, for example, reactor engineer duties are

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considered an advantage for the position of the person in charge of nuclear safeguards.

D03. According to Section 7 i of the Nuclear Energy Act, the person in charge of nuclear safeguards shall be approved by the Radiation and Nuclear Safety Authority. The professional qualifications of the person shall be justified in the application.

D04. According to Section 7 i of the Nuclear Energy Act, the Radiation and Nuclear Safety Authority shall assess the competence and suitability of the person in charge through a qualification procedure.

D05. This requirement specifies more detailed regulations concerning the validity of the qualification of the approved person. It is justified to allow an approval to be granted for a fixed period of time where relevant. It is justified to oblige that the Radiation and Nuclear Safety Authority shall be informed of any personnel change so that the regulatory authority always possess up-to-date information of the persons in charge.

D06. In some cases, it may be necessary to add certain conditions or restrictions as prerequisites for approval. These shall be considered on a case-by-case basis.

D07. When necessary, changing the conditions related to the approval is justified to keep the qualifications of the person up-to-date.

D08. Due to the separately enacted approval procedure, it is justified to have clear requirements also for the cancellation procedure. This is also justified from the point of view of the legal protection of the individual. This requirement presents the grounds on which the approval may be revoked in whole or in part. The complexity of the grounds make them impossible to describe exhaustively; instead, depending on the situation, the matter shall be resolved by a decision separately justified. The requirement outlines the basic principles on which the approval may be revoked in whole or in part.

3.3.5 Annex E Control room operators

Requirements regarding the operators are presented in the Nuclear Energy Act and Regulation STUK Y/1/2018.

E01. This requirement is based on Section 7 i of the Nuclear Energy Act. Due to the role and nature of the position, the operator shall be employed by the licensee.

E02. It is justified to require that persons serving as the shift supervisors' immediate superiors have shift supervisor competence and a valid approval, i.e. a licence. It is also justified to require that the chief simulator instructor and the on-call safety engineers have the same level of competence than the shift supervisors, but with the possible exclusion of a valid approval, i.e. a licence. Their competence shall be verifiable by other means.

E03–E06. The work of a nuclear power plant operator and a shift supervisor is demanding and essential to nuclear safety. The operator shall know and understand the processes and systems of a nuclear power plant, and their behaviour under

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various conditions. The requirements present the minimum level required to accomplish this competence. A successful accomplishment of the competence shall be reliably verifiable in several different ways.

E07. Justifications are required for maintaining an approval decision for several operator positions at the same time. In this case, special work shift and further training arrangements, incl. supplementary simulator training is required to maintain the operator's competence. Due to the requirement of the above special arrangements to maintain qualification for several operator positions, this kind of arrangement cannot, as a rule, be considered a permanent concept.

E19. A Fail grade from the plant tour prevents the approval decision from being granted. In case of lack in the competence, however, a Pass grade may include a requirement for further training.

E25. Typically, STUK appoints 1 or 2 supervisors for oral examinations.

E29–E30. The requirement specifies the minimum amount of simulator training required.

E32. The nature of the duties of a deputy for an operations engineer shall be such to allow the demonstration of an equivalent competence level.

3.3.6 Annex F Radiation protection officer and his or her deputy

The new Annex F contains new requirements based on the Radiation Act (859/2018) and the Decree of the Ministry of Social Affairs and Health on Ionising Radiation (1044/2018).

The new radiation protection officer position is largely equivalently with the previous radiation safety officer factually and as regards qualifications.

Requirements concerning the radiation protection officer are presented in the Radiation Act, Sections 28, 41–42 and 44, and the Decree of the Ministry of Social Affairs and Health on Ionising Radiation, Chapters 2–3 and Appendix 5.

F01. New requirement based on legislation (Radiation Act, Section 28).

F02. New requirement based on legislation (Radiation Act, Sections 41, 42 and 44, Appendix 5).

F03. New requirement based on legislation (Decree of the Ministry of Social Affairs and Health on Ionising Radiation, 1044/2018).

F04. New requirement based on legislation (Radiation Act, Section 42).

F05. New requirement. This requirement specifies more detailed regulations concerning the validity of the qualification of the approved person. It is justified to allow an approval to be granted for a fixed period of time where relevant. It is justified to oblige that the Radiation and Nuclear Safety Authority shall be informed of any personnel change so that the regulatory authority always possess up-to-date information of the persons in charge.

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F06. New requirement. In some cases, it may be necessary to add certain conditions or restrictions as prerequisites for approval. These shall be considered on a case-by-case basis.

F07. New requirement. When necessary, changing the conditions related to the approval is justified to keep the qualifications of the person up-to-date.

F08. New requirement. Due to the separately enacted approval procedure, it is justified to have clear requirements also for the cancellation procedure. This is also justified from the point of view of the legal protection of the individual. This requirement presents the grounds on which the approval may be revoked in whole or in part. The complexity of the grounds make them impossible to describe exhaustively; instead, depending on the situation, the matter shall be resolved by a decision separately justified. The requirement outlines the basic principles on which the approval may be revoked in whole or in part.

4 International provisions concerning the scope of the Guide

The Guide includes requirements by WENRA concerning the organisation, personnel and competences. In addition, the Guide has been prepared ensuring that the requirements therein are in line with the IAEA guides SF-1, "Fundamental Safety Principles", and GSR Part 2, "Leadership and Management for Safety" insofar the IAEA requirements concern the organisation, personnel or competences and are not discussed in other YVL Guides. It has also been ensured that the requirements in Guide YVL A.4 are in line with the requirements in Guide YVL A.3.

The Guide also takes into account requirements set forth by the IAEA in SSR-2/2, "Safety of Nuclear Power Plants: Commissioning and Operation", and NS-G-2.4, "The Operating Organization for Nuclear Power Plants" insofar these are not included in Guide YVL A.6, "Conduct of Operations at a Nuclear Power Plant".

In addition, references used in preparing the Guide include IAEA instructions NS-G-2.8, "Recruitment, Qualification and Training of Personnel for Nuclear Power Plants", and GS-G-3.1, "Application of the Management System for Facilities and Activities", as well as IAEA documents TECDOC 1024, "Selection, Competency Development and Assessment of Nuclear Power Plant Managers", and TECDOC 1204, "A Systematic Approach to Human Performance Improvement in Nuclear Power Plants: Training Solutions". Requirements set forth by authorities in other countries, such as the NRC in the USA and SSM in Sweden, have also been referred to in preparing the Guide.

5 Impacts of the Tepco Fukushima Dai-ichi accident

After the Fukushima accident, there has been renewed focus on the safety-oriented and preventive organisational measures. The nature of operations subject to a licence includes the notion that the licensee shall consider regulatory requirements as minimum requirements only. The guiding principle shall be continuous development of the operation to clearly exceed said minimum requirements.

Experience from Fukushima have been taken into account in, for example, requirements 303, 311, 312 and 328–330 of the Guide.

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6 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.

Amendment of the Radiation Act means that a radiation protection officer shall be appointed for the use of nuclear energy. The new Annex F to the Guide was added to cover this position.

Following the update of the Nuclear Energy Act, Section 7 k now includes a responsible manager for decommissioning. Requirements related to this are included in Annex A to the Guide.

The competence requirements in Annex B have been supplemented, and the requirements on demonstrating the operators' professional skills in Annex E have been further specified.

Terms related to the duties and positions at a nuclear facility have been further specified, harmonised and defined in the update of the Guide. Some requirements have been divided for the sake of clarity.

In connection with the update, overlaps with Guides YVL A.1, A.3, A.5, A.6 and A.7 were reviewed and corrected.

The requirements of the Guide do not contain any possibilities for administrative burden reduction.