GUIDE YVL C.5

EMERGENCY ARRANGEMENTS OF A NUCLEAR POWER PLANT

Definitions

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 and 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 are binding on the licence holder, while preserving the licence holder's right to propose an alternative procedure or solution to that provided for in the regulations. If the licence holder can convincingly demonstrate that the proposed procedure or solution will implement safety standards in accordance with this Act, the Radiation and Nuclear Safety Authority may approve the procedure or solution.*

With regard to new nuclear facilities, this Guide shall apply as of 3 February 2020 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 Guide YVL C.5 (15.11.2013).

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STUK • SÄTEILYTURVAKESKUS
STRÅLSÄKERHETSCENTRALEN
RADIATION AND NUCLEAR SAFETY AUTHORITY
Osoite / Address • Laippatie 4, 00880 Helsinki
Postiosoite / Postal address • PL / P.O.Box 14, FI-00811 Helsinki, FINLAND
Puh. / Tel. (09) 759 881, +358 9 759 881 • Fax (09) 759 88 500, +358 9 759 88 500 • www.stuk.fi

1 Introduction

101. This Guide describes a nuclear power plant's emergency arrangements. According to Section 3(7) of the Nuclear Energy Act (990/1987) [1], *emergency arrangements mean advance preparation for accidents or events impairing safety at the nuclear facility or in its site area or other places or vehicles where nuclear energy is used.* Preparation also applies to exceptional situations that require the intensification of preparedness to act in order to ensure the safety level of the plant. This Guide contains detailed requirements on how a nuclear power plant licensee shall plan, implement and maintain emergency arrangements. **[**2020-01-20 **]**

102. The Nuclear Energy Act (990/1987) and Decree (161/1988) [2] present the most important basic requirements for a nuclear power plant's emergency arrangements. Radiation and Nuclear Safety Authority Regulation on the Emergency Arrangements of a Nuclear Power Plant (STUK Y/2/2018) [3] sets forth the general regulations concerning nuclear power plant's emergency arrangements. According to Section 9(1–2) of the Nuclear Energy Act (990/1987), *the licence holder shall be under an obligation to ensure the safe use of nuclear energy. It shall be the licence holder's obligation to carry out such security and emergency arrangements and other arrangements necessary for the limitation of nuclear damage which do not rest with the authorities.* **[**2020-01-20 **]**

103. Chapter 16 of the Radiation Act (859/2018) [18] present requirements pertaining to limiting radiation exposure in emergency exposure situation. Chapter 9 of the Government Decree on Ionizing Radiation (1034/2018) [4] lays down the applicable reference levels of exposure for emergency exposure situations. **[**2020-01-20 **]**

104. The Rescue Act (379/2011) [20] and the Ministry of the Interior's Decree on External Rescue Plans for Sites Posing a Special Hazard (612/2015) [10] present requirements pertaining to the command of operations, formulation of an external rescue plan for accidents affecting nuclear power plants, and the participation of other authorities in rescue operations. The Decree of the Ministry of the Interior (774/2011) [11] sets forth requirements for an advance information bulletin to be issued to those in the public potentially subject to radiation exposure during an emergency exposure situation, and the Decree of the Ministry of the Interior (612/2015) sets forth requirement for organizing large scale emergency exercises (co-operation exercises). STUK's Guides VAL 1 "Protective measures in the early phase of a nuclear or radiological emergency" [14] and VAL 2 "Protective measures in the intermediate phase of a nuclear or radiological emergency" [15] ratified by the Ministry of the Interior presents action levels for the protection of members of the public, foodstuffs and production facilities, as well as workers participating in handling the situation **[**2020-01-20 **]**

105. The requirements for the assessment of environmental radiation situation by computation calculations and for on-site meteorological and environmental radiation monitoring are given in Guide YVL C.4 “Assessment of radiation doses to the public in the vicinity of a nuclear facility”. The measurement of releases of radioactive substances are discussed in Guide YVL C.3 “Limitation and monitoring of radioactive releases from a nuclear facility”. **[**2020-01-20 **]**

2 Scope of application

201. The requirements of Radiation and Nuclear Safety Authority Regulation on the Emergency Arrangements of a Nuclear Power Plant (STUK Y/2/2018) and this Guide concern emergency arrangements of a nuclear power plant. As applicable, the Guide shall also be applied to other nuclear facilities and to the transport of nuclear materials and waste, as required by the degree of the threat caused by a nuclear accident at the facility or during transport. **[**2020-01-20 **]**

202. Accident analyses under Guide YVL B.3 ”Deterministic safety analyses for a nuclear power plant” shall be required from nuclear power plants and other nuclear facilities for whose operation requires a licence under Section 20 of the Nuclear Energy Act. In a severe accident at a nuclear power plant, significant amounts of radioactive substances may be released into the environment, which requires actions to protect the public and co-operation with the rescue authorities. At other nuclear facilities, the radiation impacts of an accident mainly affect facility premises and the immediate vicinity of the facility where the accident occurs. **[**2020-01-20 **]**

203. STUK gives a separate decision, where necessary, on how to apply this Guide to other nuclear facilities or their operation as well as to the transport of nuclear materials and waste. **[**2013-11-15 **]**

204. Chapters 3 to 5 of this Guide sets forth the requirements for emergency arrangements pertaining to a nuclear power plant's operating licence and operation. Other phases of the life cycle of a nuclear power plant and the related emergency arrangement requirements are given in Chapter 6. **[**2013-11-15 **]**

3 Emergency arrangement requirements

3.1 Emergency plan and its drafting

301. The licensee shall prepare and maintain an emergency plan. The plan shall present a description of the planning, implementation and maintenance of emergency arrangements. **[**2013-11-15 **]**

302. The emergency plan shall describe the measures to be initiated in emergency situations, and it shall include the instructions on how to carry out these measures. The emergency plan shall include at least the following:

- the classification of emergency situations and the description of events and accidents on which it is based
- the emergency response organisation
- the alarms, notifications and communications arrangements
- emergency situation management and performance of situation assessments
- the safety of workers and radiation protection
- the radiation measurements undertaken at the nuclear power plant, site area and precautionary action zone during an emergency situation
- provision of information to the public
- the premises, equipment and accessories
- termination of emergency situations and recovery measures
- actions to ascertain the causes of the emergency situation and to learn from the emergency situation
- measures pertaining to the licensee’s rescue operations
- the emergency response organisation’s instructions for emergency situations
- a description of how emergency preparedness is maintained.

[2020-01-20 **]**

303. Under Section 3(6) of Regulation STUK Y/2/2018, *emergency arrangements shall be consistent with the operation, fire protection and nuclear security of a nuclear power plant* in such a way that the safety of the individuals working at the nuclear power plant and its environment are assessed as a whole. **[**2020-01-20 **]**

304. The emergency plan shall also describe the key authorities acting in emergency situations, such as the organisation managing rescue operations and STUK’s emergency response organisation and their main duties. The duties of the nuclear power plant's emergency response

organisation shall be presented in such a way that the plan determines what the responsibility of the nuclear power plant in the management of an emergency situation is, and how activities are aligned with the rescue operations of the authorities, STUK's activities as well as with the external rescue plan prepared by the authorities for an accident at a nuclear power plant. **[**2020-01-20 **]**

305. The licensee's management system shall name the persons or organisational units responsible for preparing and maintaining the emergency plan. A radiation protection expert shall be used for preparing and maintaining the emergency plan (Government Decree on Ionizing Radiation 1034/2018, Section 18). **[**2020-01-20 **]**

305a. When defining the duties of the emergency response organisation, in addition to overall planning, attention shall be paid to the planning of activities in the different sectors. **[**2020-01-20 **]**

306. The licensee shall obtain STUK's approval for the emergency plan and any amendments thereto and deliver the approved emergency plan and any amendments to the Rescue Department. The amendments to the emergency plan shall be submitted to STUK for approval prior to their implementation if the emergency plan or instructions and the actions to be taken in an emergency situation are essentially modified. Updates to the contact information of the emergency plan and minor changes or specifications to the operating instructions that do not change the content of activities may be submitted to STUK for information. **[**2020-01-20 **]**

3.2 Emergency planning

307. Under Section 4(1–2) of Regulation STUK Y/2/2018, *the licensee shall be prepared to carry out the measures required by emergency situations, the analysis of emergency situations and the consequences thereof, assessment of the anticipated development of emergency situations, the mitigatory actions needed to control or limit the accident, the continuous and effective exchange of information with the authorities, and communications to the media and the general public. When analysing the situation, the technical status of the plant and release of radioactive substances, or threat thereof, and the radiation situation inside the plant and in the site area and emergency planning zone shall be assessed.*

Under Section 3(1–5) of Regulation STUK Y/2/2018, *emergency arrangements shall be planned to ensure that emergency situations are quickly brought under control, the safety of the individuals in the site area is assured, and timely action is taken to prevent or limit radiation exposure to the public in the emergency planning zone.*

Planning shall take account of simultaneous emergency situations occurring in all nuclear facilities in the site area and their potential consequences, especially the radiation situation on the site and in the surrounding area and the possibilities to access the area. Planning shall take account of the fact that the emergency situation could continue for a prolonged period. Planning shall be based on analyses of the time-behaviour progress of severe accident scenarios resulting in a potential release. In such a case, variations in the state of the plant, the development of events as a function of time, the radiation situation at the plant, radioactive releases, radioactive release routes and weather conditions shall all be taken into account. Planning shall take account of events deteriorating safety, their controllability and the severity of consequences, and threats related to unlawful action and the potential consequences thereof.

Accident scenarios shall be updated as required by plant modifications. In emergency planning, combinations of nuclear and other hazards (including external hazards, Guide YVL B.7 ”Provisions for internal and external hazards at a nuclear facility”) as well as hazards relating to unlawful action and their potential consequences shall be taken into account. **[**2020-01-20 **]**

308. The radiation situation in the vicinity of the nuclear power plant resulting from an accident shall be analysed at various distances and for various periods of time, taking both internal and external radiation doses into consideration. The impact of protective measures shall be discussed. **[**2013-11-15 **]**

309. The radiation situation of the plant and site area shall be analysed to plan the operations and radiation protection to be initiated during emergency situations. **[**2013-11-15 **]**

310. Under Section 2(2) of Regulation STUK Y/2/2018, *emergency situations shall be classified on the basis of their severity and controllability:*

- *An alert is a situation where the nuclear power plant's safety level needs to be ensured in an exceptional situation.* The alert and its causes shall be promptly communicated to STUK and the regional emergency response centre who notifies the rescue authority. In an alert, the nuclear power plant’s emergency response organisation shall be invited to convene in the scope required.
- *A site area emergency is a situation during which the nuclear power plant’s safety deteriorates or is in the danger of deteriorating significantly.* In the event of a site area emergency, to be immediately alarmed are the nuclear power plant’s emergency response organisation, STUK and the regional emergency response centre who in turn alarms the rescue authorities.
- *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. In the event of a general emergency, to be immediately alarmed are the nuclear power plant's emergency response organisation, STUK and the regional emergency response centre who alarms the rescue authorities.

[2020-01-20 **]**

311. The emergency plan shall include the classification of emergency situations. In addition, examples of various emergency situations shall be presented. The plant's operating procedures prepared for managing transients and accidents may also be used in the identification of situations. **[**2013-11-15 **]**

312. Under Section 4(3) of Regulation STUK Y/2/2018, *in emergency situations, the licensee shall be prepared to carry out radiation monitoring in the site area and in the precautionary action zone. The licensee shall also take meteorological measurements and shall be capable of assessing the dispersion of radioactive substances in the emergency planning zone during an emergency situation.* **[**2020-01-20 **]**

312a. Under Section 3(7a) of the Radiation and Nuclear Safety Authority Regulation STUK Y/2/2018, *receiving external assistance in an emergency situation shall be prepared for when planning emergency arrangements.* The external assistance may be material or, for example, experts coming to the site. In terms of receiving assistance, assistance from Finland and abroad shall both be prepared for. In regard to emergency planning, aspects to be considered include logistics and the access rights and workspaces of the persons coming to render assistance. **[**2020-01-20 **]**

3.3 The emergency response organisation and its tasks

313. Under Section 6 of Regulation STUK Y/2/2018, the tasks and responsibilities of the emergency response organisation shall be specified. They shall be presented in the emergency plan and procedures. **[**2020-01-20 **]**

314. Under Section 11(2–4) of Regulation STUK Y/2/2018, *the licensee is in charge of matters related to nuclear safety and radiation safety at the nuclear power plant. In an emergency situation, the emergency manager of the nuclear power plant, as specified in the emergency plan, shall initiate and direct the work of the emergency response organisation at the power plant.*
The nuclear power plant's emergency manager issues recommendations for protecting the public to the director of rescue operations, until the Radiation and Nuclear Safety Authority announces responsibility for issuing such recommendations. The nuclear power plant's

emergency manager shall ensure that personnel who are familiar with nuclear safety and radiation safety are designated to assist the director of rescue operations. **[**2020-01-20 **]**

315. Sections 147 and 148 of the Nuclear Energy Decree contain provisions concerning the management responsibilities for rescue operations and security arrangements. **[**2020-01-20 **]**

316. If the emergency manager is not at the plant when an accident occurs, the shift supervisor shall act in his or her stead until the emergency manager arrives and assumes command responsibility. **[**2020-01-20 **]**

317. The emergency manager shall take care of the following tasks with support from the emergency response organisation:

- assessment of the situation and determination of the emergency action level
- alerting the emergency response organisation
- managing plant safety
- looking after the safety of the personnel including the emergency response organisation at the site area
- organising the alarming and notification of the authorities
- securing the transport and care of those injured
- assessment of the plant's technical status, radiation situation and radioactive releases, as well as assessment of dispersion of radioactive releases and dose impacts within the emergency planning zone
- preparation of radiation measurements and sampling at the plant, on site area and precautionary action zone
- mitigation and management of damage as well as the decision-making on the corrective measures needed
- decision-making on the extent of the activities of the emergency response organisation
- decision on the possible continuation of operation of other plant units within the site area, and agreeing on the necessary co-operation
- organising event log keeping
- informing the emergency response organisation, power plant personnel and authorities
- assessment of the INES rating describing the severity of the event by means of the international INES scale
- organising communication
- direction of evacuation of the site area together with the rescue authority
- issuing recommendations, if needed, for the evacuation of the public of the precautionary action zone and for carrying out other protective measures in the emergency planning

zone until STUK announces its responsibility for the issuance of recommendations
- termination of the emergency situation and emergency response organisation's activities.

[2013-11-15 **]**

318. The emergency plan shall describe how the duties listed in requirement 317 are allocated and how they are implemented. For this purpose, the plan shall contain a description of the emergency response organisation, its tasks and distribution of responsibilities. In addition, the arrangements for obtaining technical support for the operational personnel shall be taken care of. Action teams shall be available to mitigate the consequences of the emergency situation (such as damage containment, corrective actions, fire-fighting). **[**2020-01-20 **]**

319. A sufficient number of trained persons shall be assigned in the emergency plan to perform tasks of the emergency response organisation. These individuals shall be nominated for the tasks primarily so that they take care of duties in the emergency response organisation similar to those they are responsible for under normal circumstances. The emergency organisation's emergency workers shall be nominated. **[**2020-01-20 **]**

320. The contact arrangements of all teams shall be such that a sufficient number of trained individuals for emergency situations can always be made available to the power plant without delay. The sufficiency and availability of resources for circumstances of an extended duration shall be assessed. If required, persons with similar technical experience and emergency training shall be reserved from external sources (domestic nuclear energy companies and research centres, neighbouring countries). **[**2013-11-15 **]**

3.4 Preparedness to act

321. Under Section 9 of Regulation STUK Y/2/2018, *in an emergency situation, the licensee shall take the measures required under the emergency plan and other necessary measures without delay in order to control the situation and prevent or limit radiation exposure.* Under Section 6(2), *the licensee shall ensure that the personnel needed in emergency situations are promptly available. There shall also be enough personnel to bring a long-term emergency situation under control.*
A nuclear power plant shall have the preparedness at all times to initiate operations immediately in an emergency situation. The emergency plan shall describe the plant's constantly available organisation and the fully manned response organisation. The licensee shall be prepared to continue the operation of the emergency response organisation without interruption over the entire course of the emergency situation and to supplement the organisation and shift the personnel if the situation requires it. **[**2020-01-20 **]**

322. The plan shall give a target time period during which, at the latest, the emergency response organisation is fully operational. The availability of the members of the emergency response organisation shall be regularly tested, and on the basis of the test results it shall be determined how quickly and how widely the emergency response organisation would have been reached and would have been ready to act in the plant emergency facilities. **[**2013-11-15 **]**

3.5 Alarms, notifications and communications arrangements

323. Under Section 10(1–2) of Regulation STUK Y/2/2018, *the licensee shall notify the Radiation and Nuclear Safety Authority and the regional emergency response centre concerned without delay of any declaration of an emergency situation and the classification of the emergency situation in compliance with Section 2(2). During an emergency situation, the licensee shall submit to the director of rescue operations as referred to in Section 34 of the Rescue Act and the regional rescue service concerned as well as to the Radiation and Nuclear Safety Authority a current situation assessment on the event and any relevant decisions concerning the nuclear power plant and justifications thereof.* **[**2020-01-20 **]**

324. The licensee shall plan reliable procedures for alarming and communicating with those at the site area, the plant emergency response organisation and the authorities' emergency response and rescue organisations, including the contents of the alarm messages and notifications. Alarms, notifications and communication procedures for situations defined in the emergency plan shall be agreed upon with the external organisations. The licensee's emergency procedures shall demonstrate measures to assure the recording of spoken alarms and the most important messages. **[**2013-11-15 **]**

3.6 Management of an emergency situation

325. On the basis of a situation assessment defined in requirement 307, the measures to manage the situation as well as to prevent and limit radiation exposure shall be planned. In addition, situation assessments are needed to plan the protective measures for emergency workers and the public as well as for communication. **[**2013-11-15 **]**

326. Release of radioactive substances and the resulting radiation effects at the plant, on the site area and in the environment shall be prevented or mitigated as effectively as possible. **[**2020-01-20 **]**

327. Under Section 20(3) of Regulation STUK Y/1/2018, *for operational occurrences and accidents, appropriate procedures for the identification and control of incidents shall be available.* The organisation operating a nuclear power plant shall be responsible for the plant's

safe operation under all operational conditions and accident scenarios. In emergency situations, the licensee shall arrange a person to support the shift manager in the main control room. His/her task shall be to assist the operating shift in the assessment of nuclear safety. **[**2020-01-20 **]**

328. The licensee shall plan the procedures by which the operational and mitigatory measures are planned, approved and implemented during emergency situations. STUK's approval is not required for the operational and mitigatory measures needed in emergency situations, but they shall be reported to STUK. If needed, STUK shall present recommendations to the licensee on actions and plant situation management in emergency situations. **[**2013-11-15 **]**

329. The licensee shall ensure that the various units of the emergency response organisation and the rescue authorities and STUK have sufficient and consistent information about the situation. The assessment of the situation shall be carried out as quickly as possible and presented in a clear manner. It shall include an assessment of the plant state as well as a forecast of its progress and possible releases. The communication and data transfer needed for the situation assessment shall be arranged in such a way that it interferes as little as possible with the activities of the nuclear power plant's emergency response organisation, the control room in particular. For this reason, liaison officers, automated data transfer equipment and the software and equipment needed for maintaining and communicating a situation assessment shall be reserved for liaison and data transfer. In addition, in an accident, the licensee shall send liaison officers to the rescue services command centre and to the local information centre. In regard to the reservation of liaison officers, the persons needed to assist the police in threat situations shall also be considered. **[**2020-01-20 **]**

3.7 Safety of workers and radiation protection

330. Under Section 4(4–5) of Regulation STUK Y/2/2018, *to prepare for an emergency situation, the licensee shall have appropriate staff alarm systems, places of assembly in the site area, evacuation arrangements, the necessary personnel protective equipment, radiation measuring instruments and iodine tablets available. In addition to permanent and temporary personnel working at the site area, arrangements shall also consider all emergency workers and helpers arriving in the site area during an emergency situation. The licensee shall provide arrangements for contamination measurements of personnel, and their decontamination.* **[**2020-01-20 **]**

331. Section 134 of the Radiation Act sets forth requirements for the radiation protection of persons taking part in protective actions in an emergency exposure situation:

An employer shall designate emergency workers in advance and determine their tasks in an emergency exposure situation in advance. An emergency helper's participation in protective measures shall be voluntary. An emergency worker's participation in protective measures shall be voluntary, provided that there is a probability that the exposure is higher than the reference level referred to in section 132(1). Protective measures that may result in exposure to radiation may not be assigned to pregnant or breastfeeding individuals or individuals younger than 18 years of age.

The occupational exposure of emergency workers and emergency helpers must be kept lower than the dose limits of workers to the extent possible. If this requirement cannot be met, the limitation of radiation exposure is subject to the reference levels referred to in section 132.

The monitoring of exposure conditions referred to in section 92 shall be arranged to emergency workers and emergency helpers in an emergency exposure situation. The employer is responsible for the monitoring of emergency workers' exposure conditions. The party having the work done is responsible for the monitoring of emergency helpers' exposure conditions, unless otherwise agreed between the employer and the party having the work done. Emergency workers and emergency helpers shall immediately be notified of any radiation dose higher than the reference level to which they have been exposed.

Section 135 of the Radiation Act sets forth requirements for the special medical surveillance of persons participating in protective measures:

Emergency workers and emergency helpers exposed in an emergency exposure situation shall be arranged special medical surveillance in accordance with section 97. Special medical surveillance shall furthermore be arranged for those emergency workers and emergency helpers in an emergency exposure situation who separately request it.

The employer is responsible for the special medical surveillance of an emergency worker. The municipality is responsible for the special medical surveillance of an emergency helper.
[2020-01-20 **]**

331a. Section 13 of the Government Decree on Ionizing radiation sets forth requirements for the dose limits of employees:
The effective dose of a radiation worker may not be higher than 20 millisieverts a year.
The equivalent dose of the lens of the eye may not be higher than 100 millisieverts during a time period of five consecutive years. However, during a single year, the dose may not be

higher than 50 millisieverts.
The equivalent dose of skin may not be, as an average dose, higher than 500 millisieverts a year on the most exposed skin area the size of a quadrat centimetre.
The equivalent dose of hands, arms, feet and ankles may not be higher than 500 millisieverts a year. **[**2020-01-20 **]**

331b. The Government Decree on Ionizing Radiation sets forth requirements for the radiation exposure in radiological emergencies:

Section 46 Reference levels for emergency workers and helpers:
The reference level of exposure resulting from an emergency exposure situation for emergency workers and helpers is, as an effective dose, 100 millisieverts a year.
In a situation involving the saving of lives, the prevention of serious health effects caused by radiation or preventing an accident from growing worse, the reference level for emergency workers and helpers is 500 millisieverts as an effective dose a year.

Section 48 Using reference levels in a radiological emergency:
In an emergency exposure situation, the aim must be to carry out the protective measures in such a way that the dose attributable to the radiation exposure remains lower than the reference level for the emergency exposure situation, taking into account all of the exposure pathways. However, doses higher than the reference level are acceptable if the situation is, due to its extent or seriousness, of the kind in which the dose remaining lower than the reference level cannot be ensured with protective measures or if it would require measures of the kind that would cause unreasonably extensive damage in relation to the benefits to be achieved.
[2020-01-20 **]**

332. Under Section 47(2) of the Government Decree on Ionizing Radiation:
The operator and authorities shall, in their emergency plan, prepare for the radiation protection of the emergency workers and helpers for whom they are responsible, which shall facilitate keeping their dose below the reference level for a radiological emergency.
The licensee shall plan the procedures for the performance of radiation work in an emergency. In particular, actions in the event that there may be exposure to large doses of radiation shall be planned. In work planning, the goal shall be to limit radiation exposure to less than 50 mSv.
[2020-01-20 **]**

333. In an emergency situation, attention shall be paid to the establishment and monitoring of the radiation situation at the work site, instructions given on the lengths of stay times and the possibilities to reduce radiation exposure. Procedures for the decontamination of workers and

equipment shall also be arranged in advance. In addition, access control and procedures for communicating with those working in radiation hazardous areas at the plant and site area as well as with measurement teams in the precautionary action zone shall be planned. **[**2013-11-15 **]**

334. Protective equipment shall be reserved for persons working in an emergency exposure situation to limit the intake of radioactive substances through the skin and into the body. **[**2020-01-20 **]**

335. The radiation doses of those in the site area and the measuring teams active in the precautionary action zone during an emergency situation shall be monitored as required by the radiation situation. To monitor radiation exposure, a dosimeter that records the measurement result shall be used and also a real-time dosimeter, where necessary. **[**2020-01-20 **]**

336. Dose monitoring shall be arranged so that the readings of dosimeters and the accumulation of doses is monitored regularly. Individual doses shall be recorded after the performance of each separate task, where necessary. Exposure caused by internal radiation shall also be assessed. **[**2013-11-15 **]**

337. Data on radiation exposure incurred in an emergency situation shall be recorded and reported to STUK's dose register separately from radiation doses incurred during normal operation. Analyses of the exposure conditions and the measures taken shall also be recorded in the dose register. A radiation dose of over 50 mSv shall be reported to STUK without delay. **[**2020-01-20 **]**

338. Radiation doses of the rescue personnel and other corresponding external personnel working at the site area shall be reported to STUK's dose register without delay after their work in an emergency situation has been completed. **[**2020-01-20 **]**

339. The licensee shall be prepared to help the rescue authorities in rescuing injured workers, in first aid and in the transport of those needing medical care. The procedures shall take into account the possible contamination of patients. **[**2013-11-15 **]**

340. When the emergency situation has been terminated and the immediate measures necessary for limiting a radiation hazard and bringing a source of radiation under control have been performed, the dose limits stipulated shall apply to protection work and other measures seeking to mitigate the consequences of the accident. If the Government decides in accordance with Section 137 of the Radiation Act to shift to an existing exposure situation, the reference values confirmed by the Radiation and Nuclear Safety Authority based on Section 140 of the Radiation Act shall be applied in terms of occupational exposure. **[**2020-01-20 **]**

3.8 Radiation measurements and release assessment

341. The licensee shall be prepared to evaluate the amount and nuclide composition of a release of radioactive substances in all accidents or the threat of a release. For this purpose, measurement procedures feasible for implementation inside the plant and in the site area shall be planned in advance, in order to identify and determine exceptional releases. A nuclear power plant shall be prepared to continuously monitor releases of radioactive substances and to evaluate any exceptional releases of radioactive substances at all relevant release rates. **[**2020-01-20 **]**

342. To prepare for emergency situations, the licensee shall prepare the measurement plans for radiation measurements inside the plant, at the site area and in its vicinity in the precautionary action zone. The plans shall take the local conditions into account, and they shall also describe the degree of personnel readiness, schedule of operations, quantity and types of measurement equipment, reporting of the measurement results, and personal protective equipment. Plans for sampling shall also be drafted. The licensee shall plan the operations of the measurement teams in advance together with the rescue authority and the Radiation and Nuclear Safety Authority. **[**2020-01-20 **]**

343. During an emergency situation, the licensee shall be prepared to apply and complement the measurement and sampling plans to meet the requirements of the prevailing situation. If the radiation conditions enable this, the data on the location and composition of the radioactive release and potential fallout relayed by fixed radiation measurement stations in the surroundings should be complemented by measurement teams in the precautionary action zone. In order to rapidly obtain an overall picture of the radiation situation, the power plant's measurement team shall, as far as is possible considering the team's radiation safety and other matters, measure the highest external radiation dose rate and determine the corresponding airborne concentrations of the most important nuclides from samples of air taken at a number of distances from the point of release. **[**2013-11-15 **]**

344. The measurement team working in the area surrounding the power plant shall be capable of measuring external dose rates and taking air samples when necessary for the purpose of laboratory analysis at the site area and its vicinity. In addition, it shall be possible to measure essential radionuclides and communicate the measurement results to the emergency response organisation of the power plant. **[**2013-11-15 **]**

345. The environment measurement teams shall have vehicles in their use suited for measurement activities, and channels for communicating with the emergency response organisation working at the nuclear power plant. The measurement routes and locations shall be planned in advance. **[**2013-11-15 **]**

3.9 Providing information to the public

346. In an emergency situation, the licensee shall be prepared to make announcements to the mass media and the public. **[**2013-11-15 **]**

3.9.1 Prior information

347. Section 4 of the Decree of the Ministry of the Interior (774/2011) sets forth the requirements on the information to be given in advance to the public on a situation involving a radiation hazard:
The operator (licensee) of a nuclear facility shall, in co-operation with the rescue department and the Radiation and Nuclear Safety Authority, ensure that the public has the following at its disposal:
1. basic information about radioactivity and its effects on human beings and the environment
2. information on various types of radiological emergencies and their effects on the public and the environment
3. information on emergency measures planned to alert, protect and assist the public in a radiological emergency, and information about the authorities responsible for the measures
4. instructions on the actions to be taken in radiological emergencies.
The Regional State Administrative Agency shall ensure that the information described in Subsection 1 is kept up-to-date and distributed at least every three years to the public potentially exposed in a nuclear emergency as well as whenever there are significant changes to that information. This information shall be continuously available to the public. **[**2020-01-20 **]**

348. In co-operation with the authorities in charge of the rescue operations, the licensee shall see to it that the bulletin(s) is/are distributed to the public in the emergency planning zone (within a radius of about 20 km from the nuclear power plant). In the precautionary action zone, attention shall especially be given not only to permanently occupied residences but also to recreational dwellings (leisure residences, recreational centres etc.). **[**2013-11-15 **]**

3.9.2 Providing information during an event

349. The information to be issued during a radiological emergency is described in Section 5 of the Ministry of the Interior Decree (774/2011). Responsibility for communications concerning the accident rescue operations rests on the director of rescue operations Only the director of rescue operations may issue instructions and orders to the public. STUK follows and assesses situations involving a radiation danger or threat of it, and provides information about them to other authorities as well as the public. The licensee shall be prepared to provide information via the mass media about the event and its severity. There shall always be readiness to provide information if the situation significantly changes. In its communications, the licensee shall take into account the communications of the authorities. **[**2013-11-15 **]**

350. For the purpose of communications, the licensee shall, in an emergency situation, tentatively assess the level of the event using the international INES scale. Provision shall also be made for any changes in the preliminary rating as the situation develops or more details emerge. The rating along with its justifications shall be delivered to STUK without delay. If the INES level of an accident changes as the situation progresses, the level may be determined at several different points in time. The rating shall show that the level is based on the current situation and that the level may change. **[**2013-11-15 **]**

3.10 Premises, equipment and accessories

3.10.1 Premises, equipment and accessories

351. Under Section 4(6-9) of Regulation STUK Y/2/2018, *to manage emergency response operations, there shall be an emergency response centre, which shall be able to maintain proper working conditions during an emergency situation, and which shall also be available during prolonged power failures. There shall be a designated centre outside the site area from which to direct the plant's emergency response operations, if the emergency response centre is not available. There shall be reliable communication and alarm systems in place to manage emergency response operations for the purposes of internal and external communications of the nuclear power plant. The licensee shall ensure that there are automatic data transmission systems in place to send information essential in terms of the emergency operations to the emergency response centre of the Radiation and Nuclear Safety Authority.*
In order to prepare for emergency situations, the nuclear power plant shall have premises, equipment, accessories and devices for the management, situation assessment, alerting, communications, data transfer and recording, planning and repair, fire protection, assembly and decontamination of personnel, first aid, dose monitoring as well as radiation measurements and

laboratory activities to facilitate the operation of the emergency organisation. **[**2020-01-20 **]**

352. The emergency response facilities shall be planned so that they enable the effective management of activities, situational assessment, the planning of operations required by the situation, laboratory functions and communicating the situation assessment to the plant's emergency response organisation, rescue authorities and STUK during the emergency situation. **[**2013-11-15 **]**

353. The facilities shall be equipped with the sort of equipment, systems and software that are needed for the formulation, maintenance, presentation, storage and data transfer related to the situation assessment. The facilities and instruments shall be available also when large quantities of radioactive substances have been released at the site area. In the design of premises, the possible loss of electricity shall be taken into account. **[**2013-11-15 **]**

354. In exceptional circumstances, there shall be preparedness to use mobile equipment to ensure electrical and water supply and other functions. The emergency plan and related supporting procedures shall provide comprehensive instructions on the utilisation of the equipment, but also training needs to be arranged. **[**2013-11-15 **]**

355. The facilities of the emergency response organisation and the other personnel working during an emergency situation at the plant shall be planned so that it is possible to work therein safely and for long periods (including water, food, rest and sanitary facilities) during the emergency situation. Access routes between the premises shall be sufficiently quick and safe in order to limit radiation exposure. Access control shall be planned so that the total number of people at the plant is known. **[**2013-11-15 **]**

356. It shall be possible to ensure the functional capacity of the emergency response organisation's operational facilities for at least a 24-hour period without material supplements or the recharging of DC batteries in situations where the loss of electricity supply occurs. There shall be sufficient water and fuel reserves at the plant area as well as the possibility for the recharging of DC batteries so that the functional capacity of the operational facilities can be guaranteed for a period of 72 hours, also under rare external events. **[**2020-01-20 **]**

357. In emergency situations, the Radiation and Nuclear Safety Authority (STUK) shall send experts to the nuclear power plant. Working space shall be arranged for STUK's representatives so that they can monitor the management of the plant's emergency organisation's operations and maintenance of the situation assessment. **[**2013-11-15 **]**

358. The emergency organisation shall have an adequate amount of personal protective equipment available for emergency situations. There shall be a sufficient stock of the

consumables required for the decontamination of persons and equipment. Equipment and consumables shall be stored and placed appropriately in such a way that they are quickly available for the various teams. **[**2020-01-20 **]**

359. An adequate number of fixed and mobile measurement equipment shall be continuously operable and available at the nuclear power plant to assess the radiation situation at the nuclear power plant, at the site area and in the precautionary action zone. The mobile measurement equipment shall be located so that it can be quickly deployed by the various teams. The licensee shall have sufficient fixed measurement equipment in continuous operational readiness for the assessment of weather conditions and dispersion of releases in the emergency planning zone. **[**2013-11-15 **]**

360. A record shall be kept on the quantity, location and operability of the premises, equipment and accessories. **[**2013-11-15 **]**

3.10.2 Alert and communications systems, reserve emergency response centre

361. The control rooms, emergency response centre and the facilities of the technical support group shall be equipped with redundant alarm and communications systems to alert those in danger at the site area and in the immediate vicinity of the plant, to launch operations in an emergency situation and to keep in touch with the command and operational units of the emergency organisation, rescue operations command centre and STUK. The audibility of alarms installed outdoors shall cover the site area and its immediate vicinity. The alerting of personnel connected with the licensee’s operations in the support areas (housing and storage areas etc.) shall be ensured both indoors and outdoors. **[**2013-11-15 **]**

362. Talking connections between the control room and emergency command posts shall be secured by mutually independent communications systems. The number of connections shall be sufficient to ensure communications adequate for every situation. Back-up satellite phones shall be provided for the purpose of overcoming exceptional contact problems. The measurement, operational and repair personnel inside the plant, at the site area and in the precautionary action zone shall have the necessary equipment to keep in contact with the command post. **[**2013-11-15 **]**

363. The control room and the emergency response centre shall be equipped with recording communication devices. **[**2013-11-15 **]**

364. The licensee shall arrange, for the communication of situational information, an automatic data transfer and display system from the power plant's process computer to STUK as well as to the emergency response centre of the power plant and to the technical support team. The

system shall be capable of sending information simultaneously from all plant units. The information update speed shall be sufficient to take care of the situation. The reliability and operation of the system shall be assessed in various situations. In the provision for a failure or malfunction in the system, a compensatory procedure shall also be planned. **[**2013-11-15 **]**

365. The contents of transferred data shall be planned such that all data significant for situation assessment and progress is transferred. Data on the status of plant systems and measured parameters shall be transmitted. The data transmission system must be capable of supplying information on both the current situation and the previous one for a sufficiently long time to enable monitoring of the progress of the situation. In planning data transfer, clear displaying of information shall also be taken into account. The data transmitted data shall include at least:

- reactor main parameters
- primary circuit main parameters
- secondary circuit main parameters (pressurised water reactor)
- make-up water and emergency cooling systems
- decay heat removal systems
- containment main parameters
- the most important reactor and plant protection signals
- the most important electrical systems
- radiation situation at the plant unit
- radiation situation at the site area
- radiation situation in the vicinity
- meteorological data.

[2013-11-15 **]**

366. The licensee shall arrange the transfer of the measurement results of on- and off-site measurement teams to STUK’s emergency response organisation and to the rescue operations command centre as well as the transfer of calculated environmental radiation situations and their prognoses to the licensee’s emergency situation command posts and to STUK.
[2013-11-15 **]**

367. Outside the site area, there shall also be a centre intended for commanding the plant’s emergency response activities under exceptional situations. In selecting the location for this facility and planning its equipment and structures, attention shall be paid to the fact that the facility shall be accessible even if an accident has occurred at the site area and access to the site is blocked. In planning the operations, a situation of long duration shall be taken into

consideration. The essential instructions, instruments and equipment from the perspective of commanding emergency response activities shall be located in the facility, and the required independent communications connections shall also be in place to ensure communications necessitated by the situation also when normal communications network operations are blocked. **[**2020-01-20 **]**

3.11 Termination of emergency situations and recovery measures

368. Under Section 12(1) of Regulation STUK Y/2/2018, *the emergency plan shall define the criteria governing the termination or reduction of measures taken due to an emergency situation. A precondition for the termination of measures is that the nuclear power plant has been brought into a safe state, releases of radioactive substances do not exceed the thresholds set for normal operation and the necessary recovery measures are initiated.* **[**2020-01-20 **]**

369. Under Section 12(2) of Regulation STUK Y/2/2018, *if rescue operations continue after the termination of the emergency situation, the licensee shall be prepared to engage in co-operation corresponding to that which occurs during an emergency situation.* **[**2020-01-20 **]**

370. Recovery measures include at least the following:

- identification of changes in the nuclear power plant's structures, systems or components which impact maintaining the plant in a safe state and managing radioactive substances
- actions which may be needed to keep the plant in a safe state and to prevent and reduce releases
- evaluation of radiation doses caused by an accident
- the necessary decontamination measures and efficient waste management planning
- event analysis including its causes and preparation of an event report.

[2013-11-15 **]**

3.12 Emergency situation records

371. The licensee shall plan procedures for recording data on the course of the events and decisions made in emergency situations. **[**2013-11-15 **]**

4 Maintenance of emergency preparedness

4.1 Plan, facilities and equipment

401. Under Section 8(4) of Regulation STUK Y/2/2018, *emergency arrangements shall be regularly evaluated. When developing the emergency arrangements, attention shall focus on the experience gained from the exercises, experiences and conclusions drawn concerning the management of emergency situations, as well as on research and technical developments.* **[**2020-01-20 **]**

402. The emergency plan and instructions shall be regularly updated by revising them regularly at least once a year. Changes to contact details and software shall be made without delay. Lessons identified in exercises or otherwise, technological development in the field and changes in the operating conditions and legislation shall be taken into account in developing the plan. **[**2013-11-15 **]**

403. The objective in the planning and maintenance of emergency response facilities shall be the ensuring of essential functions in corresponding exceptional circumstances on which the power plant's safety requirements under Guides YVL B.1 "Safety design of a nuclear power plant" and YVL B.7 "Provisions for internal and external hazards at a nuclear facility" are based. The conventional functions closely related to the emergency response facilities and those necessitated by nuclear situation assessment shall be ensured in a similar manner. **[**2020-01-20 **]**

404. The facilities used in emergency situations shall have the necessary equipment available such that prompt action can be taken without delay. The operability of all facilities, equipment and devices shall be regularly verified. The alarms as well as communication and data transfer connections shall be tested regularly at least once a month according to a separate programme. Defects, disturbances and deficiencies detected in the testing or otherwise shall be fixed without delay. The significance of the defects and weaknesses detected shall be assessed to identify potential improvement needs. Devices intended for emergency situations shall also be tested during exercises. **[**2013-11-15 **]**

4.2 Training

405. The licensee shall appoint a person responsible for the nuclear facility's emergency arrangements as well as a deputy for this person. Only a person approved by the Radiation and Nuclear Safety Authority (STUK) under Section 7 i of the Nuclear Energy Act can be appointed to this task. **[**2013-11-15 **]**

406. Under Section 8(1–2) of Regulation STUK Y/2/2018, *the licensee shall arrange emergency training for all nuclear power plant personnel and other permanent or temporary employees working at the site area. The licensee shall arrange emergency exercises on an annual basis. At least once every three years the emergency exercise shall be arranged as a co-operation exercise with the authorities.*
The training shall address accident procedures relating to alarms, places of assembly at the site area and exit from the site area. Furthermore, an overall picture of the emergency response organisation's operation during emergency situations shall be given. **[**2020-01-20 **]**

407. Basic training needed in each task shall be arranged for the persons of the emergency response organisation prior to appointment to the task. Persons part of the emergency response organisation shall be provided with annual refresher training and advanced training. Attention shall be given in the training of all teams of the emergency response organisation to the radiation situation at the plant during an accident and actions required by it. The training shall also pay attention to deficiencies and improvement needs identified during emergency exercises. **[**2013-11-15 **]**

408. Under Section 8(3) of Regulation STUK Y/2/2018, *the licensee shall draw up at least a three-year training plan to ensure that training is given on all aspects of preparedness to act at regular intervals. The emergency exercises shall be evaluated based on the set preparedness objectives.* The implementation of the training plans shall be reported annually, and this report as well as the training plans shall be submitted to the Radiation and Nuclear Safety Authority for information. **[**2020-01-20 **]**

409. The licensee shall arrange training possibilities for the organisations participating in the rescue operations on nuclear power plant emergency arrangements. **[**2020-01-20 **]**

409a. Under Section 8(7) of Regulation STUK Y/2/2018, *the licensee shall ensure that permanent and temporary personnel working at the site area as well as all emergency workers and helpers arriving in the site area during an emergency situation receive appropriate instruction as required by the emergency situation. The licensee shall prepare in advance material for the instruction given during an emergency situation.*

The instruction may also involve hand-outs and presentations of written and other materials. The licensee shall ensure that the persons instructed during the situation have understood the content of the instruction. **[**2020-01-20 **]**

4.3 Emergency exercises

410. Emergency exercises shall be held during the operation of the nuclear power plant at least once a year, and more frequently when necessary if several reactors and plant types are located in the same plant site. The objective of these emergency exercises is to ascertain the appropriateness of the facilities, devices and equipment reserved for emergency situations; the suitability, compatibility and scope of the operating instructions and software; and the capability of the organisation to identify potential needs for modifications or improvements. **[**2013-11-15 **]**

411. The annual emergency exercise shall cover a significant part of the emergency plan's activities. The licensee shall ensure that all sectors are exercised over longer time spans. Simultaneous emergency situations of several nuclear facilities located at the same site area shall also be exercised. In addition, situation exercises involving one or several sectors of emergency response shall be arranged to become acquainted with the performance of the tasks, improve co-operation and enhance operations. The threat of unlawful action shall be included in some of the exercises. **[**2013-11-15 **]**

412. According to Section 48 of the Rescue Act (379/2011), *the rescue department and the business or industrial operator* [the licensee] *shall [--] organise exercises to ensure the workability of the external rescue plan. The implementation of the external emergency plan and the organisation of exercises are supervised by the regional state administrative agency.* During the operation of a nuclear power plant, co-operation exercises shall be held in co-operation with the operator and the other authorities participating in rescue activities at least once every three years (Ministry of the Interior Decree 612/2015, Section 8). The licensee shall participate in the planning, organising and implementation of these exercises. **[**2020-01-20 **]**

413. An exercise plan shall be prepared for an emergency exercise. The date and participants of the annual exercise may be announced in advance but the exercise situation shall mainly be concealed such that it is only known to trainers, observers and evaluators designated by the exercise management. Exercises involving some sectors only may be training-type activities by nature, where the exercise situation may be announced in advance. **[**2013-11-15 **]**

413a. A detailed plan for the emergency exercise drawn up by the licensee shall be submitted to STUK for information before the exercise. **[**2020-01-20 **]**

414. The annual emergency exercise shall be evaluated. For this purpose, evaluators shall be present to follow the exercise. The exercise participants' experiences and suggested improvements shall be collected at, for example, an evaluation meeting held after the exercise, by post-exercise interviews or by means of written feedback. **[**2013-11-15 **]**

415. An assessment report shall be prepared on the exercise, stating any observed defects or development areas and actions decided based on them. The report prepared on the exercise shall be submitted to STUK for information within three months from the exercise. **[**2013-11-15 **]**

416. A record on the trainings and exercises shall be kept to evaluate the scope and quality of activities. A record shall be kept on everyone who has taken part in the training and exercises in order to ensure the regular participation of all those who have been assigned to take care of emergency response duties. **[**2013-11-15 **]**

4.4 Peer Review

417. The licensee shall arrange internal audits and applicable peer reviews covering all sectors of emergency arrangements. Regular peer reviews shall be carried out during the plant's operation and, for applicable parts, before commissioning a new plant unit. **[**2013-11-15 **]**

5 Rescue operations and actions to protect the public

5.1 Rescue-operations related requirements for the licensee

501. Under Section 13(3) of Regulation STUK Y/2/2018, *the licensee shall maintain continuous preparedness to assist in rescue work in an emergency situation. Such measures shall be practised in co-operation with the relevant authorities. Plans for measures related to rescue operations shall be included in the emergency plan.* **[**2020-01-20 **]**

502. The licensee is obliged to comply with the rescue operations orders that are issued by the authority having command responsibility for the rescue operations. **[**2013-11-15 **]**

503. Under Section 11(3) of Regulation STUK Y/2/2018, *the nuclear power plant's emergency manager issues recommendations for protecting the public to the director of rescue operations, until the Radiation and Nuclear Safety Authority announces responsibility for issuing such recommendations.* STUK shall assume responsibility for the issuing of recommendations when it has adequate information on the situation. STUK informs the licensee and the director of rescue operations of the assumption of responsibility. Even after this, the power plant's emergency response organisation has to make situation assessments as regards accident progress and consequences thereof and relay them to STUK and the rescue operations command centre. **[**2020-01-20 **]**

504. The nuclear power plant shall have an effective and adequately backed-up alarm system for alarming the personnel. The alarming of those at the site area shall be ensured by making checks at the site. **[**2013-11-15 **]**

505. Reliable and smooth evacuation of persons at the site area shall be planned in advance. The vehicles and routes used for exiting the site area shall be planned, the exit time required shall be estimated, and the personnel trained to the extent required by these operations. Exiting the plant area shall be recorded. The need for evacuation protection, dose measurements and any need for decontamination shall be also planned for the possibility of exceptional natural conditions and contamination situation of the site area. **[**2013-11-15 **]**

506. In Section 48 of the Rescue Act (379/2011), it is regulated on the obligation of the licensee to participate in the drafting of the external rescue plan as well as communicating on the plans and arranging exercises preparing for a nuclear power plant accident. Via these exercises, the functionality of the plan is assured. **[**2013-11-15 **]**

507. The licensee shall distribute iodine tablets in advance to the public in permanent and leisure accommodations as well as in work places in the precautionary action zone. The

distribution shall be repeated regularly in accordance with the expiration of the iodine tablets. **[**2013-11-15 **]**

508. In co-operation with the responsible rescue authorities, the licensee shall in advance plan how to alarm those at the site area and in the vicinity of the nuclear power plant (audibility of the power alarm at the site area and housing areas) who may be in immediate danger during an accident. The plan shall address the alerting of those at the site area and in its vicinity, the provision of information on the situation, the issuing of operating instructions, activities in the places of assembly and evacuation from the site area. A reliable mobile phone system may also be used in alarming. **[**2013-11-15 **]**

509. The licensee shall plan in advance in co-operation with the rescue authority and other official and responsible parties on how safe passage to the site area shall be ensured and, if required, how it can be restored sufficiently under all natural conditions and in other exceptional situations. **[**2013-11-15 **]**

5.2 Rescue-operations management arrangements and co-operation in an accident

510. The command of rescue operations is based on the Rescue Act. According to Section 23(1–2) of the Rescue Act, *the Ministry of the Interior directs and steers rescue services and maintains oversight of their coverage and quality, is in charge of the preparedness and organisation of rescue services at national level, coordinates the activities of various ministries and sectors in the field of rescue services and their development and carries out other duties provided for the Ministry of the Interior in this Act. Regional state administrative agencies maintain oversight of rescue services and their coverage and quality within their area of operation. Regional state administrative agencies also support the Ministry of the Interior in duties laid down in Subsection 1 and carry out other duties provided for regional state administrative agencies in this Act.*
According to Section 24(1) of the Rescue Act, *municipalities are jointly responsible for rescue services in rescue service regions (regional rescue services), as further provided below in this Act.* According to Section 34(1,3) of the Rescue Act, *unless otherwise agreed, the director of rescue operations comes from the rescue service region where the accident or dangerous situation began. The rescue authorities of the Ministry of the Interior have the right to issue orders concerning rescue operations and decide on the director of rescue operations and his or her area of operation.* The regional emergency response centre receives the accident notice from the power plant and alarms the authorities. **[**2020-01-20 **]**

511. Management of rescue services by the Ministry of the Interior and the Regional State Administrative Agency primarily includes the acquiring of the necessary resources and

allocating them to the right areas, the maintenance of a situation assessment and, based on it, the issuing of orders and instructions to lower levels of management. The regional rescue authorities and the municipal authorities for their part are responsible for the actual rescue operations as well as organising and managing other measures needed in the situation. **[**2020-01-20 **]**

512. In the plans prepared in provision for a nuclear power plant accident, it is assumed that when rescue operations are initiated the rescue authority of the regional rescue department acts as the director of rescue operations and initiates the alarm and rescue operations necessary to protect the public. **[**2013-11-15 **]**

513. STUK maintains preparedness to act in nuclear facility emergency situations. In an emergency situation, STUK acts as an expert authority providing support to authorities in charge of rescue operations. STUK follows and assesses the situation and its progress as well as the appropriateness of actions taken to manage the situation at the nuclear power plant. STUK's situation assessment team keeps in touch with the nuclear power plant's emergency response organisation, sends a plant team to the accident site and monitors the data on the status of the plant and its surroundings received via automatic data transfer from the nuclear power plant. **[**2013-11-15 **]**

514. STUK conducts an overall assessment of the situation and its progress. It assesses the safety significance of the accident from the viewpoint of the public, the surrounding area and society, issues instructions and recommendations for the necessary protective actions and reports the safety significance of the situation to the public as well as to domestic and foreign co-operation organisations. STUK issues recommendations on protective actions to the director of rescue operations and other co-operation organisations who, based on the recommendations, decide what actions are necessary in their own administrative sector. **[**2020-01-20 **]**

514a. In considering recommendations for protective actions, the prevailing situation, the benefits and drawbacks arising from them and the justification of the protective actions under those specific circumstances shall be considered. **[**2020-01-20 **]**

515. STUK's Guides VAL 1 "Protective measures in the early phase of a nuclear or radiological emergency" and VAL 2 "Protective measures in the intermediate phase of a nuclear or radiological emergency" lay out procedural levels to protect the public, foodstuffs and production facilities, as well as for the protection of employees participating in taking care of the situation. **[**2020-01-20 **]**

515a. Section 45 of the Government Decree on Ionizing Radiation sets forth that the reference level of exposure resulting from an emergency exposure situation to members of the public is, as an effective dose, at least 20 and at most 100 millisieverts a year. Based on Section 132 of the Radiation Act, STUK confirms the reference levels of exposure for an emergency exposure situation for members of the public. STUK shall assess the situation and lower the reference level as soon as possible considering the situation. The reference level can be lowered under the starting level of 20 mSv on a case-by-case basis. **[**2020-01-20 **]**

516. The objective of protective action taken in a radiation hazard is to keep radiation doses caused to members of the public as low as reasonably achievable. Even in the severest radiation hazard, the objective is that, after the implementation of protective actions, radiation dose does not exceed the reference level of 20 mSv during the first year. During the entire situation, the need to implement new protective actions as well as to modify, continue or terminate those already implemented shall be evaluated. **[**2020-01-20 **]**

6 Requirements during the various stages of the life cycle of a nuclear power plant

6.1 Decision-in-principle and the preceding environmental impact assessment

601. Under Section 24(2)(6) of the Nuclear Energy Decree, the application for a decision-in-principle shall be supplemented with an assessment report drawn up according to the Act on the environmental impact assessment procedure (252/2017) [19]. **[**2020-01-20 **]**

602. According to the list of projects in Annex 1 of the Act on Environmental Impact Assessment Procedure, the assessment procedure shall be applied to nuclear power plants and other nuclear reactors under Subsection 7 b of the Annex, and under Subsection 7 d of the Annex to, for instance, facilities designed for the treatment of irradiated nuclear fuel or high-level radioactive waste and the final disposal of irradiated nuclear fuel. **[**2020-01-20 **]**

603. Under Section 4(1)(10) of the EIA Decree (277/2017) [21], an EIA report shall include *a proposal for measures to avoid, prevent, mitigate or eliminate identified significant detrimental environmental effects.* An EIA report shall thus contain a description of the nuclear facility's potential accident situations, how to provide against them, their impact on the environment as well as how to prevent and mitigate detrimental effects. **[**2020-01-20 **]**

604. When a decision-in-principle application is under review, the suitability of the plant's location shall be assessed. Under Section 8 of Regulation STUK Y/1/2018, *the impact of local conditions on safety and on the implementation of the security and emergency arrangements shall be considered when selecting the site of a nuclear facility. The site shall be such that the impediments and threats posed by the plant to its surroundings remain extremely small and heat removal from the plant to the environment can be reliably implemented.* **[**2020-01-20 **]**

6.2 Construction licence

605. Under Section 35(1)(6) of the Nuclear Energy Decree, the licensee shall submit to STUK, when applying for a construction licence, a preliminary plan for emergency which describes the fundamental principles of emergency arrangements. The approval of the Radiation and Nuclear Safety Authority (STUK) shall be obtained for the preliminary emergency plan. **[**2013-11-15 **]**

606. If the site where a new plant unit is under construction has operating plant units, the impact of the building site shall be taken into account in the emergency plan and emergency instructions of the operating plant units. **[**2013-11-15 **]**

607. During the construction licence stage at the latest, the licensee shall appoint a person under Section 7 i of the Nuclear Energy Act whose responsibility will be to look after the emergency arrangements of the nuclear facility as well as a deputy for this person. Only a person approved by STUK may be appointed for this task. **[**2013-11-15 **]**

608. The construction licence application shall include a description of the nuclear power plant's rooms vital for emergency response. These include the emergency response centre, other facilities intended for the emergency response organisation's use, the premises for repair operations, dose monitoring, radiation protection equipment, laboratory facilities and also premises possibly shared by the plant units if there are plant units already in operation at the site area. **[**2013-11-15 **]**

609. The most important policy decisions as regards equipment to be used in emergency situations shall be included in the construction licence application such as data transmission for relaying the plant situation to STUK, other means of communication, the environmental radiation monitoring network and the weather monitoring system. **[**2013-11-15 **]**

610. Under Section 35(1)(1) of the Nuclear Energy Decree, the construction licence application shall include a Preliminary Safety Analysis Report, which shall include i.a. a description of the nuclear facility's behaviour during accidents. **[**2020-01-20 **]**

611. The licensee shall co-operate with local or regional rescue authorities in making provisions against potential emergency situations at the new plant unit. **[**2013-11-15 **]**

6.2.1 Additional requirements for site areas with operating plant units

612. The construction site shall have a plan for emergency situations that describes i.a. the alerting procedures, places for personnel assembly and exiting the construction site during an accident at the operating plant units. **[**2013-11-15 **]**

613. The construction site employees shall receive training on what to do in emergency situations, and instructions for the construction site shall be drafted for emergency situations. The impact of the construction site on the operations required by an emergency situation shall also be taken into account in operating plant units' emergency response organisation's emergency training. **[**2020-01-20 **]**

614. At the construction site, attention shall be given in preparation for emergency situations to, for instance, the audibility of alarms, assembly places of construction site personnel and the related arrangements as well as access control to document those exiting the construction site. Also to be ensured is a transport capacity adequate for the evacuation of personnel working at

the construction site, control of traffic from the site area and dose monitoring of personnel possibly staying at the construction site (e.g. security guards). **[**2013-11-15 **]**

6.3 Construction phase

615. The licensee shall prepare an emergency plan in accordance with Section 36(1)(7) of the Nuclear Energy Decree as well as operating instructions and other documents, instructions and supporting material relating to operation during an emergency situation. **[**2013-11-15 **]**

616. The licensee shall assign the personnel belonging to the emergency organisation and initiate their training. **[**2013-11-15 **]**

617. The emergency response facilities and control rooms shall be equipped with the equipment and accessories required during emergency situations. **[**2013-11-15 **]**

618. The licensee shall contribute to the drawing up of the rescue authority's external rescue plan and take part in their emergency training. **[**2013-11-15 **]**

6.3.1 Additional requirements for site areas with operating plant units

619. The emergency plan of operating plant units shall be updated by taking into account the construction of the new plant unit. The functionality of the plan shall be tested in emergency exercises. **[**2013-11-15 **]**

620. In assigning people to the emergency response organisation, the combined resources shared between the operating plant units shall be taken into account. **[**2013-11-15 **]**

6.4 Operating licence and commissioning

621. Under Section 7 of Regulation STUK Y/2/2018, *the licensee shall ensure that a nuclear power plant unit being commissioned has adequate emergency arrangements in place prior to the import of nuclear fuel into the plant unit. The emergency arrangements shall comply with the emergency plan before fuel is transferred into the reactor. An emergency exercise shall take place before fuel is transferred into the reactor to demonstrate that the emergency arrangements function properly.* **[**2020-01-20 **]**

622. The licensee shall finalise the emergency plan and instructions and attach them to the operating licence application to form the plan for emergency arrangements described in Section 36(1)(7) of the Nuclear Energy Decree. STUK's approval shall be obtained for the emergency plan. **[**2020-01-20 **]**

623. The licensee shall classify the emergency situations on the basis of their severity and manageability in accordance with requirement 310 for the dimensioning of the emergency

arrangements and activities. **[**2013-11-15 **]**

624. The provision of equipment to the emergency response facilities as well as the testing of equipment and communications shall be completed. **[**2013-11-15 **]**

625. The licensee shall arrange comprehensive training and exercises for those persons assigned to the emergency response organisation as well as training for all power plant personnel on the operations required in an emergency situation. **[**2013-11-15 **]**

626. Co-operation with the rescue authorities shall be continued ensuring that the external rescue plan in provision against an accident at the nuclear power plant is up-to-date and that a public information bulletin and iodine tablets have been distributed to the public in the precautionary action zone. **[**2013-11-15 **]**

627. Assessments and experiences shall be collected from the emergency exercise and the corrective action shall be made on their basis, and the emergency plan and instructions shall be updated where necessary. **[**2013-11-15 **]**

6.5 Operation of the nuclear power plant and operating licence renewal

628. The Regulation STUK Y/2/2018 and Chapters 3 to 5 of this Guide present the requirements for the emergency arrangements during operation and their updating. **[**2020-01-20 **]**

6.6 Decommissioning

629. A plant unit is decommissioned step by step and its emergency arrangements and their scope are based on accident and risk analyses as presupposed by the threat resulting from nuclear damage at the facility. In addition, possible other plant units in production use at the site area shall be taken into account in the emergency arrangements. **[**2013-11-15 **]**

630. The licensee shall update the emergency plan when a plant unit contained in the plan is decommissioned. The plan shall be updated as decommissioning proceeds such that it always corresponds to the status of the plant units covered by it. When a nuclear facility has been decommissioned under the Nuclear Energy Act and its remaining buildings and land area have been exempted from regulation in accordance with Guide YVL D.4 ”Predisposal management of low and intermediate level nuclear waste and decommissioning of a nuclear facility”, the licensee’s responsibility for the nuclear facility’s emergency arrangements expires. **[**2020-01-20 **]**

7 Regulatory oversight by the Radiation and Nuclear Safety Authority

701. The Radiation and Nuclear Safety Authority (STUK) oversees the construction and operation of nuclear power plants in the manner presented in Guide YVL A.1 ”Regulatory oversight of safety in the use of nuclear energy”. This Guide sets out, among other things, the general procedures which shall be followed when updating documents approved by STUK. **[**2020-01-20 **]**

702. STUK reviews and approves the plan (preliminary emergency plan) referred to in Section 35(1)(6) of the Nuclear Energy Decree and the report (emergency plan) referred to in Section 36(1)(7) of the Decree as well as their amendments. **[**2020-01-20 **]**

703. STUK makes regular inspections involving emergency arrangements, on, for example, instructions, facilities and equipment as well as emergency training. Any changes to the emergency arrangements that have occurred are reviewed during the inspections in addition to the experiences and feedback derived from emergency exercises. This inspection area also contains automatic environmental radiation monitoring, meteorological measurements and the tools for dispersion prognoses. **[**2013-11-15 **]**

704. STUK reviews the annual and longer-term emergency training plans submitted for information and their implementation summary. STUK follows the realisation of the emergency training plans and participates, where needed, in the training sessions. **[**2013-11-15 **]**

705. STUK participates in the annual exercises and in the planning of the co-operation exercises arranged every three years together with the licensee and the most important authorities participating in the exercise. STUK reviews the detailed plan for the emergency exercise with scenarios submitted for information by the licensee. STUK assesses the operation of the licensee during the exercise and co-operation between the licensee and authorities. STUK reviews the exercise report submitted for information and monitors the implementation of actions taken based on the shortcomings or development needs identified during the exercise. **[**2013-11-15 **]**

706. STUK oversees the licensee’s co-operation with the rescue authorities during emergency exercise planning, emergency exercises and emergency training. **[**2013-11-15 **]**

8 References

1. Nuclear Energy Act (990/1987). **[**2013-11-15 **]**

2. Nuclear Energy Decree (161/1988). **[**2013-11-15 **]**

3. Radiation and Nuclear Safety Authority Regulation on the Emergency Arrangements of a Nuclear Power Plant (STUK Y/2/2018). **[**2020-01-20 **]**

4. Government Decree on Ionizing Radiation (1034/2018). **[**2020-01-20 **]**

5. Preparedness and Response for a Nuclear or Radiological Emergency Safety Requirements, IAEA Safety Standards, General Safety Requirements No. GSR Part 7, Vienna, 2015. **[**2020-01-20 **]**

6. Arrangements for Preparedness for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GS-G-2.1, Vienna, 2007. **[**2013-11-15 **]**

7. Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Material Safety Guide, IAEA Safety Standards Series No. TS-G-1.2 (ST-3), Vienna, 2002. **[**2013-11-15 **]**

8. Radiation Protection and Safety Radiation Sources: International Basic Safety Standards, Interim Edition, General Safety Requirements Part 3, No GSR Part 3 IAEA, Vienna, 2014. **[**2020-01-20 **]**

9. Preparation, Conduct and Evaluation of Exercises to Test Preparedness for a Nuclear or Radiological Emergency, Emergency Preparedness and Response, IAEA, Vienna 2005. **[**2013-11-15 **]**

Ministry of the Interior’s Decree on External Rescue Plans for Sites Posing a Special Hazard (612/2015). **[**2020-01-20 **]**

11. Decree of the Ministry of the Interior on the Provision of Information in a Radiological Emergency (774/2011). **[**2013-11-15 **]**

12. EU Council Directive 2013/59/Euratom, laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom, 5 December 2013 (BSS directive, radiation safety standards directive). **[**2020-01-20 **]**

13. Removed. **[**2020-01-20 **]**

14. Guide VAL 1 Protective measures in the early phase of a nuclear or radiological emergency (2013). **[**2020-01-20 **]**

15. Guide VAL 2 Protective measures in the intermediate phase of a nuclear or radiological emergency (2013). [2020-01-20]

16. IEC-EN-50849 Sound Systems for Emergency Purposes (2017). [2020-01-20]

17. Radiation and Nuclear Safety Authority Regulation on the Safety of a Nuclear Power Plant (STUK Y/1/2018). [2020-01-20]

18. Radiation Act (859/2018). [2020-01-20]

19. Act on Environmental Impact Assessment Procedure (252/2017). [2020-01-20]

20. Rescue Act (379/2011). [2020-01-20]

21. Government Decree on the Environmental Impact Assessment Procedure (277/2017). [2020-01-20]

Definitions

Precautionary action zone

Precautionary action zone shall refer to an area extending to a distance of approximately five kilometres from the nuclear power plant, where land use restrictions are in force. (STUK Y/2/2018)

Radiation safety incident

Radiation safety incident means an event or situation that compromises or may compromise radiation safety and unplanned medical exposure. (Radiation Act 859/2018)

Helper in an emergency

Helper in an emergency means a person other than an emergency worker who provides assistance in protective measures or participates in other work necessary for society in an emergency exposure situation. (Radiation Act 859/2019)

Emergency exposure situation

Emergency exposure situation means a situation in which the consequences of a radiation safety incident require or may require special measures to limit or reduce the radiation exposure of persons participating in the emergency work or protective measures or the exposure of members of the public. (Radiation Act 859/2018)

Emergency worker

Emergency worker means a person with a pre-determined task in an emergency exposure situation and who may be exposed to ionizing radiation in the course of the emergency work or protective measures in an emergency exposure situation. (Radiation Act 859/2018)

Severe accident

Severe accident shall refer to an accident in which a considerable part of the fuel in a reactor or the spent fuel in a fuel pool or storage loses its original structure. (Nuclear Energy Decree 161/1988)

Emergency arrangements

Emergency arrangements shall refer to advance preparation for accidents or events impairing safety at the nuclear facility or in its site area or other places or vehicles where nuclear energy is used. (Nuclear Energy Act 990/1987)

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.

(STUK Regulation Y/2/2018)

Emergency planning zone

Emergency planning zone shall refer to an area extending to a distance of approximately 20 kilometres from the nuclear power plant and for which authorities shall draft an external rescue plan referred to in Section 48(1)(1) of the Rescue Act (379/2011). (STUK Y/2/2018)

Site area

Site area shall refer to an area in use by nuclear power plant units and other nuclear facilities in the same area, and to the surrounding area, where movement and stay are restricted by the Decree of the Ministry of the Interior issued under Chapter 9, Section 8 of the Police Act (872/2011). (STUK Y/2/2018)