Guide YVL B.2, Classification of systems, structures and components of a nuclear facility

1 Introduction

Basic requirements for the classification of systems, structures and components of nuclear facilities and for classification-related quality, quality control and design have been presented in the Nuclear Energy Act and STUK regulations.

According to Section 7b of the Nuclear Energy Act (990/1987), *the safety of a nuclear facility shall be ensured by means of successive levels of protection independent of each other. This principle shall extend to the operational and structural safety of the plant.* This section requires that the safety of the facility must not be dependent on just one system, structure or component, but designing of facilities shall prepare for their failure with the help of defence-in-depth concept by means of successive levels of protection independent of each other. This principle shall be applied both functionally and structurally.

According to Section 7e of the Nuclear Energy Act, *compliance with requirements concerning the safety of a nuclear facility shall be proven reliably*. This means that the fulfilment of safety-related requirements of a nuclear facility shall be demonstrated with the help of reliable deterministic and probabilistic calculation methods. These methods also help to form an understanding of the safety significance of systems, structures and components, which is also the starting point for their classification.

According to Section 4 of the Radiation and Nuclear Safety Authority Regulation on the Safety of a Nuclear Power Plant (STUK Y/1/2018) regarding the safety of nuclear power plants, *the safety functions of a nuclear facility shall be defined and the related systems, structures and components classified on the basis of their safety significance.* In addition, *requirements set for and the actions taken to ascertain the compliance with the requirements of the systems, structures and components implementing safety functions and connecting systems, structures and components shall be commensurate with the safety class of the item in question.*

Thus, the regulation requires that the safety functions of a nuclear power plant shall be defined and their quality level and quality level verification shall be connected based on their safety significance, i.e. they are dependent on the safety class of the systems, structures and components.

According to Section 5 of the Radiation and Nuclear Safety Authority Regulation on the Safety of Disposal of Nuclear Waste (STUK Y/4/2018) regarding the safety of disposal of nuclear waste, *the safety functions and long-term safety functions for the operation of the nuclear waste facility shall be defined, and the implementing and related systems, structures and components shall be classified, while taking into account their purpose, on the basis of their significance in terms of operational safety, long-term safety or both, if necessary.*

The quality requirements that apply to systems, structures and components in different safety classes are given in Guides YVL A.3 “Leadership and management for safety”, YVL B.1 “Design of the Safety Systems of a Nuclear Facility” and in various E-series YVL Guides in various fields of technology.

Sections 35 and 36 of the Nuclear Energy Decree (161/1988) require that the classification document be submitted to STUK as part of the construction and operating licence application process. According to the decree, the classification document *shows the classification of structures, systems and components important to the safety of the nuclear facility on the basis of their significance with respect to safety.*

2 Scope of application

Guide YVL B.2 shall apply to the safety and seismic classification of nuclear facilities, the processing of the classification document and the requirements for parts of the facility resulting from the classification during its design, construction and operation.

3 Justifications of the requirements

3.1 Principles of safety classification

According to Section 7e of the Nuclear Energy Act, *compliance with requirements concerning the safety of a nuclear facility shall be proven reliably*. This Section 7e of the Nuclear Energy Act involves requirement 301 on the classification of systems, structures and components to different classes with the help of deterministic and probabilistic analyses based on the estimated safety significance. Thus, the safety class relates to the requirements related to the design, quality and quality management of systems. The definition of an appropriate quality assurance level is the main goal of the safety classification, so the reliability targets (or simply the reliability values and common cause failure probabilities) provide a good reference value to how well their faultlessness shall be ensured.

Based on the deterministic safety analysis, the significance of systems, structures and components and their sub-functions and properties to the behaviour and defence-in-depth of the facility shall be recognised.

In addition, the safety class shall be examined in view of the risk significance. Requirements for the preparation and use of the PRA are presented in Guide YVL A.7 “Probabilistic risk assessment and risk management of a nuclear power plant”, wherein requirement 313 requires that *the PRA shall be applied to determine the safety classification of structures, systems and components in accordance with Guide YVL B.2. It shall be ensured by the PRA that the safety classification of every structure, system and component corresponds to its safety significance. The PRA application regarding safety classification shall be submitted to STUK for information with the safety classification document*. When defining the safety classification, no general difference is expected between the deterministic and risk-based aspect, as long as the safety classification is done functionally, that is not according to the principle “the further away from the reactor, the smaller the safety class”. The latter principle works very well with specific mechanical strength and integrity requirements, because close to the reactor the pressure and temperature endurance requirements and challenges caused by failures to the safety functions are high; whereas functionally the significance of the different systems and components is essential, for example for starting and maintaining of the safety functions. Generally speaking, the same safety functions are important in the risk analysis as in the safety analysis. Changing the requirements resulting from the safety class and even the safety class itself can be considered, if the quality assurance level required based on the class is contradictory with what has been demonstrated in the PRA in terms of the risk significance of the item in question. This shall also observe the common cause failure that could result from design and use errors due to lacking quality assurance. Calculating the deterministic class by quantitative risk grounds requires always also good justifications in view of the deterministic safety analysis and defence-in-depth.

The safety classification has been divided into two sections: a functional classification and structural classification involving dispersion barriers. The functional classification recognises the significance of the operation of the systems and components, for example, in view of managing initial events. The safety classification based on dispersion barriers involves above all the prevention of leak situations (that is especially challenging initial events).

According to Section 7b of the Nuclear Energy Act, the safety of a nuclear facility shall be ensured by means of successive levels of protection independent of each other and this principle shall extend to the operational and structural safety of the plant. Section 4 of the Radiation and Nuclear Safety Authority Regulation on the Safety of a Nuclear Power Plant (STUK Y/1/2018) presents the basic requirements for the classification of systems, structures and components on the basis of their safety significance.

The principle for the safety classification of the systems, structures and components of nuclear power plants shall follow the defence-in-depth principle. On the other hand, the safety classification does not have a direct connection to the defence-in-depth principle or the classification of situations and events, instead components belonging to different safety classes are on different protection levels and they are needed for processing the events in different classes. The task of components belonging to the highest safety class 1 is to make sure that the plant remains in the normal operational status, and components of safety class 2 are essential in the management of key disturbances and accidents. Components of safety class 3 are found on every protection level.

Figure 1 presents in a simplified manner how components belonging to different safety classes are used to manage operational statuses and events of the plant at different levels.

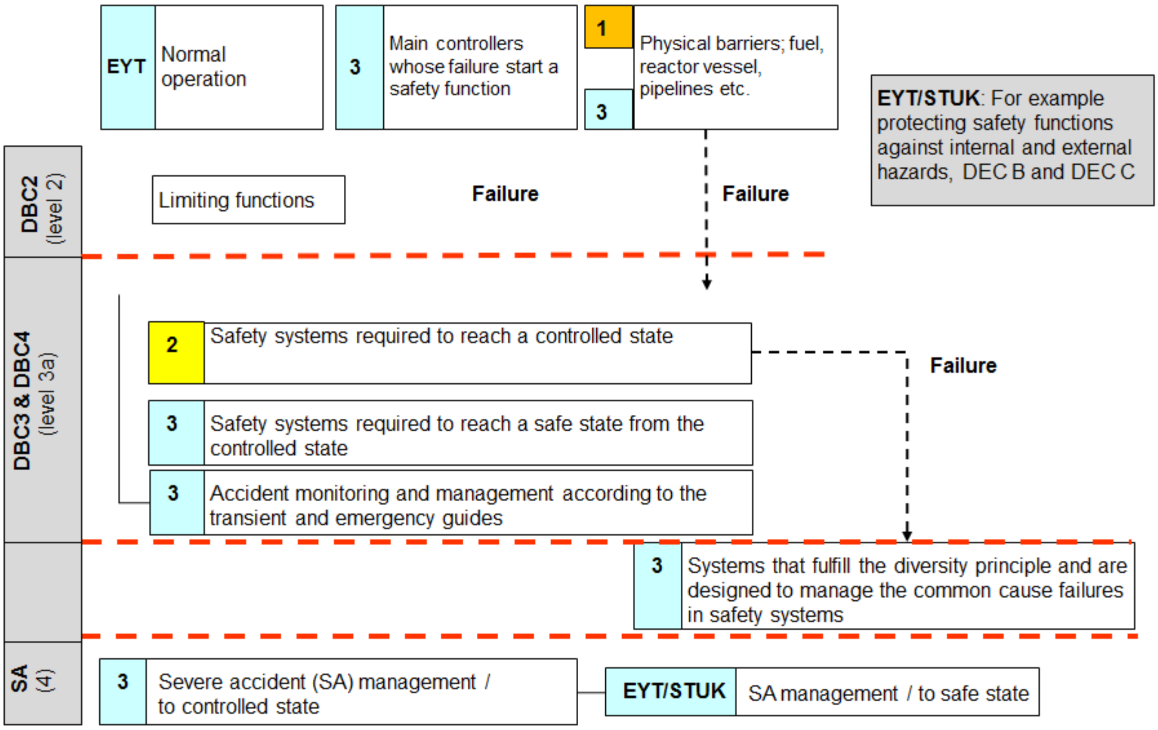

Figure 1.

As is required in requirements 305 and 306, the safety class of a structure of component is defined according to functional classification grounds (those related to safety functions, Section 3.2 of the guide) or structural classification grounds (those related to structural strength, integrity and leaktightness, Section 3.3 of the guide) based on which of these requires the highest safety class. One component (location) may have two defined safety classes, that is a functional and structural safety class. This has also been referred to in the explanatory memorandum of the Radiation and Nuclear Safety Authority Regulation (STUK Y/1/2018): *The safety classification is divided into a structural safety classification based on the dispersion barriers for radioactive substances and a functional safety classification based on the safety functions that work to ensure the integrity of the dispersion barriers.* Even a component (location) may include several parts or sub-entities that do not all need to be in the same class. Requirements targeting different parts of a component can come from different safety classes in such a case. This applies, in particular, to so-called main components (e.g. steam generator, main coolant pump, reactor internals). In cases where a component has been divided in view of the classification to several sub-entities, monitoring is the same for all sub-entities.

According to requirement 307, components defined as a safety class boundary shall be assigned to a higher safety class. When a system in safety class 2 or 3 contains liquid or gas is connected to a system in a lower safety class, the safety class boundary may be defined to be, for example:

- a passive device which reduces the flow so much that the system will remain operable even if a failure occurred in a lower safety class system; examples of flow limiters are a small pipe fitting, a throttle or a shaft gasket

- a valve which is normally kept closed
- the outer of two shut-off valves normally kept open, either of which can be closed so quickly that the system will remain operable even if a failure occurred in a lower safety class system
- a check valve with its flow direction towards a higher safety class system
- a safety or relief valve.

In electricity distribution systems, for example, a fuse, current limiter or breaker that is automatically tripped by overcurrent can be used as separation elements.

The requirement presented in Section 4 of the regulation (STUK Y/1/2018) has been defined in requirements 308 and 309 that the safety functions of a nuclear power plant shall be defined and their quality level and quality level verification shall be connected to their safety significance, i.e. they are dependent on the safety class of the systems, structures and components. When defining safety class-related quality and reliability requirements, it should be remembered that the higher the safety class, the better assurance (confidence level) is required when demonstrating the fulfilment of the requirements. Thus, for example, demonstrating the qualification and reliability of the protection system typically requires more solid documentation than what is needed in the lower classes. The quality requirements may observe a different location of use with respect to similar components.

3.2 Classification principles related to safety functions

Requirements 310 and 311 present the general classification principles related to safety functions. When establishing a safety classification, it is necessary to define the function or property on which the classification is based. The system may have several sub-functions whose safety significance and safety class determine the safety class of the participating systems, structures and components (or those impacting them in case of failure). The primary control system needed to implement a system function or sub-function shall be of the same safety class as the function it controls.

The system-level classification shall be implemented further on the structural and component level. This means that the system may have different sub-functions that are used to classify the different system parts according to their safety significance. Thus, the safety classification integrally involves the definition of the function or property to which the classification and corresponding requirements are connected. Therefore, it is important that the function or property (or combination thereof), which is important to safety, is defined in connection with the safety classification of a system’s sub-functions.

For how long a safety function can be implemented when a system fails (that is what is the time available for repairing) can be case-specifically observed when defining the safety class or requirement level of a system. Primarily, the classification shall be defined according to the requirements presented in Guide YVL B.2 and possible deviations shall be applied separately. Typically, this regards, for example, the air-conditioning and ventilation systems.

Safety class 1 includes the nuclear reactor cooling circuit (primary circuit). This regards the structures and components of the primary circuit whose failure would result in a primary circuit leak that cannot be compensated for by systems pertaining to normal plant operation. Safety class 1 does not, however, apply to the primary circuit with regard to its active functions that belong to a lower safety class.

Systems functionally classified to safety class 2 are presented in requirements 312 and 312a. Controlled state shall refer to a state where a reactor has been shut down and the removal of its decay heat has been secured. In addition, releases of radioactive substances are under control in accordance with the set criteria. In such a case, systems classified to safety class 2 are connected to the above-mentioned safety functions. These safety systems (such as the reactor core emergency cooling system, safety valves of the primary and/or secondary circuits) are needed to limit the consequences of accidents and to prevent their development into serious accidents.

The systems implementing the containment isolation function in postulated accidents and the necessary support systems for the implementation of the function are separately mentioned in requirement 312a. In terms of the other event categories (extension conditions of postulated accidents, severe reactor accidents), the implementation of the isolation function shall observe at least the same safety class as with the other safety functions in the situation in question.

Systems to be classified in safety class 2 depend on the plant type. For example, at plants, where the safety functions are based on passive systems, the systems classified to safety class 2 (process, electrical and I&C systems) are different than at plants, where the safety functions are implemented solely by active safety functions. Safety class 2 shall also include the support systems necessary for the systems implementing safety class 2 functions, such as electrical and cooling systems.

Requirement 313 presents the systems to be classified in safety class 3.

In item 1), the basis of the classification is time available to the operator. If the plant can be kept in a controlled state with the help of safety class 2 systems as long as is necessary, the systems needed in reaching a safe state can be classified to safety class 3.

Item 3) regards the systems, structures and components that implement the diversity principle. The diversity principle is applied to safety functions that limit the consequences of anticipated operational occurrences and class 1 accidents. The diversity principle is applied to prepare for common-cause failures in the actual safety systems (involving reactor shut down and cooling and the prevention of the dispersal of radioactive substances). Requirements regarding these events and the related safety systems have been presented in more detail in Guide YVL B.1 “Safety design of a nuclear power plant”.

The systems, structures and components mentioned in item 4) belong to safety class 3, unless they belong to a higher safety class for some other reason. These systems typically include different limitation functions, such as a partial scram or locking functions, that are applied to prevent the propagation of the occurrence so that the actual reactor protection system does not need to intervene in the progress of the event.

With regard to item 6), requirement 112 of Guide YVL E.11 “Hoisting and transfer equipment of a nuclear facility” presents in more detail which hoisting device units and hoisting accessories used for hoisting and transfer at nuclear facilities belong to safety class 3. Item 6) of requirement 313 is not limited solely to the systems involved in the handling of spent nuclear fuel, because systems involved in the handling of fresh nuclear fuel may also cause upon failure the consequences listed in the item and an appropriate safety class is required.

Based on item 9), safety class 3 includes systems that have been designed for cooling of spent fuel. This refers, for example, to cooling in the fuel pools but also to possible other systems that have safety significance for fuel cooling.

Items 10) and 11) regard the functional prevention of the dispersal of radioactive substances, if the components or structures containing radioactive substances are damaged or operate erroneously. Systems preventing significant dispersion of radioactive substances outside the containment belong to safety class 3. Inside the containment, it shall be assessed whether a consequence can involve a significantly higher than normal radiation exposure of the workers. The process of defining the safety class of plant parts related to preventing the dispersion of radioactive substances shall also observe, among other things, the classification requirement presented in item 3 of requirement 319 in view of ensuring structural strength, integrity and leaktightness.

Item 12) regards facilities where measures important for plant safety or necessary for the management of accident or emergency situations are conducted and where it has to be possible to operate without protective equipment during normal operation and in so-called emergency situations. The facilities may also have normal air-conditioning.

Requirement 314 presents the EYT/STUK systems. EYT/STUK is not a class of its own but it includes part of the systems belonging to class EYT and the components and structures belonging to it belong to class EYT. Guide YVL B.1 “Safety design of a nuclear power plant” presents requirements on what information of the EYT/STUK systems shall be delivered to STUK. STUK may require at its discretion similar additional information from systems other than those listed in requirement 314. PRA, for example, may reveal items with risk significance.

In item 6) of requirement 314, significant dispersion of radioactive substances into the environment means that releases can be created in a short period of time where the inflicted dose is more than one-tenth of the radiation dose caused by the plant’s releases in a year.

3.3 Classification criteria to ensure structural strength, integrity and leaktightness

Structures and components to be classified in safety class 1 on structural grounds are presented in requirement 316. Nuclear fuel refers to fresh nuclear fuel for which design and quality requirements have been set in the design phase that observe the whole service life of fuel from manufacture to final disposal. Requirement 316 does not apply to cranes or fuel handling equipment.

Physical dispersion barriers – fuel, primary circuit, containment – are classified with a high class, because upon rupture they have the potential to cause especially difficult initiating events and/or because maintaining their integrity after the initiating events is the main task of the safety functions. Mechanical safety properties may involve integrity, leaktightness, environmental conditions and functionality; i.e. the classification of mechanical components shall examine their significance in view of both dispersion barriers and safety functions. In addition, the integrity properties may also involve dispersion barriers or safety functions indirectly, for example, via risks caused by missiles, fire and floods. Functional factors and those related to dispersion barriers shall be observed when classifying plant parts.

Item 3) of requirement 319 mentions a significant release of radioactive substances on-site or to the environment. In view of plant facilities, STUK interprets this as a release that prevents access to the plant facilities or the resulting radiation exposure of workers may be significantly higher than normal.

3.3.1 Safety classification principles of piping

Piping shall be classified like all structures and components into safety classes 1, 2, 3 and EYT based on their safety significance. Piping parts, valves, pumps, safety accessories and other pressurised accessories primarily belong to the same safety class as piping.

Requirements 320 and 321 present how the classification can be applied to small-diameter piping. According to requirement 321, *the classification of small-diameter piping is not lowered if a leak in the pipe results in the loss of the safety function on which the classification is based.* This applies also to a situation where the rupture of small-diameter piping causes a (significant) releases of radioactive substances.

3.4 Seismic classification

After a design-basis earthquake, safe ramp-down shall take place as planned without significant radioactive releases and the plant shall manage possible consequences of the earthquake. In order to achieve this goal, the systems, structures and components to be classified in the highest seismic class S1 are defined in requirement 325.

With regard to item 5) of requirement 325, STUK interprets that significant spreading of radioactive substances inside the plant refers to spreading that prevents the implementation of the safety functions (this may also entail accessibility of facilities, if local actions are needed to safeguard safety functions). Significant spreading of radioactive substances outside the plant refers to release that causes a dose of 5 mSv or greater to an individual members of the public laid down in the Nuclear Energy Decree.

Item 6) regards the systems (and structures and components) that are needed to achieve the safe state. So, not all systems, structures and components that can be used to achieve the safe state need to be classified in class S1.

Item 8) naturally applies, for example, to the emergency response centre, but not the weather mast and other similar systems or components that are not essential for emergency response activities.

According to item 10), seismic class S1 shall include fire extinguishing systems that are needed to safeguard the use of facilities containing safety-classified components during fire situations.

3.5 Classification document

As is stated in item 104 of Guide YVL B.2, Sections 35 and 36 of the Nuclear Energy Decree (161/1988) require that the classification document be submitted to STUK as part of the construction and operating licence application process.

Requirement 332 presents a list of things to be presented in the classification document. Case-specifically it can be agreed that some of them (e.g. classification and principle diagrams) can be presented elsewhere, in connection with the preliminary or final safety analysis report (PSAR/FSAR) or in separate documents.

Requirement 332 does not separately require the presentation of basic safety functions with their classifications and plant-level safety functions and sub-functions derived from them. However, the verification of the fulfilment of requirements 304–306 shall involve the presentation of the functions upon which the classification of the systems, structures and components is based. The classification document is a natural place for this.

Item 3 of requirement 332 requires to present the correspondence between the safety class and quality requirements. This refers, for example, to the presentation of the principles according to which the quality requirements are defined based on the safety class to different component types.

Information required in items 6–8 of requirement 332 shall be presented in system-specific component location lists. Item 5 does not require lists of the systems in classes EYT and EYT/STUK, but a possible seismic class and environmental condition information of structures and components shall be presented also in these classes.

Both the functional and structural safety class shall be presented for the component locations, if applicable. For example, the functional and structural safety class of the main coolant pumps differ significantly from each other, same applies to some systems containing radioactive substances.

Item 8 of requirement 332 requires the presentation of environmental conditions used as design bases. Environmental conditions to be considered shall include, as appropriate, temperature, pressure, radiation, vibration, electromagnetic effects, humidity and combinations of these conditions.

Requirement 334 requires that *the classification of buildings, structures and the facility's main components and their physical location at the facility shall be presented in drawings or in some other manner appropriate for presenting building classification*. The drawings shall present, for example, the classification of the buildings, reactor and fuel pools and the building where they are located. The drawings do not, however, need to go into details. Requirement 334 mentions buildings separately, for the sake of clarity, in addition to structures, even though buildings are structures.

Requirements 336 and 336a present requirements regarding process system diagrams. With regard to piping classification, the diagrams shall present the safety class, seismic class and possible quality class.

According to requirement 337, the classification document shall be kept up-to-date during the nuclear facility’s operation. Any changes to the classification document shall be approved by STUK. Any changes to and supplements of the safety classification shall be approved in connection with the processing of the system documentation. Changing a previously valid safety class shall be considered, if new data on the safety significance of the target in question so requires.

4 International provisions concerning the scope of the Guide

4.1 WENRA

Requirements regarding the WENRA safety classification are presented in item Issue G: Safety Classification of Structures, Systems and Components. The requirements have been divided into three sections: Objective, Classification process and Ensuring reliability. The following presents how the different requirements have been observed in the YVL Guides.

1. Objective

All SSCs important to safety shall be identified and classified on the basis of their importance for safety.

The requirement is observed in Section 4 of Radiation and Nuclear Safety Authority Regulation STUK Y/1/2018 and in requirements 301, 302 and 304 of Guide YVL B.2.

2. Classification process

2.1 *The classification of SSCs shall be primarily based on deterministic methods, complemented where appropriate by probabilistic methods and engineering judgment.*

The requirement has been observed in requirement 301 of Guide YVL B.2.

2.2 *The classification shall identify for each safety class:*

- *The appropriate codes and standards in design, manufacturing, construction and inspection;*
- *Need for emergency power supply, qualification to environmental conditions;*
- *The availability or unavailability status of systems serving the safety functions to be considered in deterministic safety analysis;*
- *The applicable quality requirements.*

The requirement does not directly relate to Guide YVL B.2. The requirements are presented in YVL Guides B.1 “Safety design of a nuclear power plant”, A.3 “Leadership and management for safety” and A.6 “Conduct of operations at a nuclear power plant”.

3. Ensuring reliability

3.1 *SSCs important to safety shall be designed, constructed and maintained such that their quality and reliability is commensurate with their classification.*

The requirement has been observed in Section 4 of Radiation and Nuclear Safety Authority Regulation STUK Y/1/2018.

3.2 *The failure of a SSC in one safety class shall not cause the failure of other SSCs in a higher safety class. Auxiliary systems supporting equipment important to safety shall be classified accordingly.*

The requirement has been observed in requirement 310 of YVL B.2 and in Guide YVL B.1 “Safety design of a nuclear power plant”.

4.2 Requirements of IAEA regarding safety classification

In the IAEA Guides, the safety classification is covered in guides SSR-2/1 Safety of Nuclear Power Plants: Design and SSG-30 Safety Classification of Structures, Systems and Components in Nuclear Power Plants.

In guide SSR 2/1, the requirements regarding safety classification are on quite a general level and in Finnish legislation the requirements have been observed in Section 4 of Radiation and Nuclear Safety Authority Regulation STUK Y/1/2018 and requirements 301 and 302 of Guide YVL B.2.

IAEA guide SSG-30, which actually regards safety classification, has been written to be technology neutral, that is it applies to all nuclear power plants of different types. For this reason, the guide is slightly different in nature than classification guide YVL B.2, which only targets light water reactors. However, the requirement level of the guide is the same leading to the same result in terms of safety classification as the classification prepared based on Guide YVL B.2. The starting point of the guide is the same defence-in-depth principle as in Guide YVL B.2. Safety classification has not been directly divided into structural and functional classification like we have. The aspect of structural and functional classification as the basis of classification is, however, included in the guide.

5 Impacts of the Tepco Fukushima Dai-ichi accident

A new requirement (item 3 of requirement 314 regarding the allocation of systems in class EYT/STUK that are needed to bring the plant to a controlled state in a rare external event, in part due to the Fukushima accident) was added to the previous version of Guide YVL B.2, which was published in 2013. In this update, the requirement has been defined so that the systems shall enable achieving a safe state.

The Fukushima accident did not result in other new requirements in this guide.

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.

Few of the requirements have been defined in connection with the update and the text of the explanatory memorandum has been supplemented to clarify the purpose of the requirements. The consideration of the possibilities to reduce the administrative burden have in some cases led to requirement level relaxations. For the most part, the changes apply to functional safety class 3 and class EYT/STUK, seismic class S1 and content requirements of the classification document.

In requirement 310, the systems were extended to also apply to safety class 1 and, in addition, requirement 311a was added, based on which the reactor coolant system (primary circuit) belongs to SC1. In the explanatory memorandum, this has been defined so that safety class 1 does not, however, apply to the active functions of the primary circuit.

It has been defined in requirement 312 that safety class 2 shall include also the support systems necessary for the systems implementing safety functions in postulated accidents. In addition, a new requirement 312a has been added, based on which plant parts implementing containment isolation in postulated accidents shall be classified functionally to safety class 2. This is a clarification in line with the current classification practise and does not bring about any change to the requirement level.

Requirement 313, which applies to systems to be classified in safety class 3, has undergone, for example, the following changes:

- From the beginning of the requirement, a restriction has been removed, which stated that only systems *implementing safety functions* accordant with the items shall be classified to safety class 3. The items state as are which systems shall be classified to safety class 3.
- In item 1, it has been further specified that "after anticipated operational occurrences, postulated accidents and design extension conditions DEC A", because the systems used in normal ramp down do not need to be in safety class 3. This observes the current classification practise.
- Item 2 has been defined so that safety class 3 shall include systems designed to manage severe reactor accidents so that the plant can be brought to a controlled state. Systems of class EYT/STUK can be used in the transition from a controlled state to a safe state, as is presented in item 4 of requirement 314.
- Item 6 defines that the requirement applies to spent nuclear fuel damage, because fresh fuel damage does not pose a significant risk to radiation safety. In addition, the requirement has been extended to also apply to other significant radiation exposure possibilities. The requirement still applies to all systems involved in handling nuclear fuel, because failure of systems involved in handling

of fresh nuclear fuel can also cause, for example, spent fuel damage or other radiation exposure.

- The aim has been to formulate the previous item 7 so that all fixed activity measurements are not in SC3: for this reason, the item has been divided into two items 7 and 8.
- The new item 11 presents a classification requirement to systems that prevent the dispersion of radioactive substances inside the containment.
- It has been specified in item 12 what kinds of systems necessary for upholding working conditions shall be classified to safety class 3. Previously, the requirement item mentioned only upholding of the control room conditions, but now it has been specified which and what kinds of facilities it applies to.
- Item 13 has been clarified (with a reference to requirement 5214 of Guide YVL B.1) in terms of what kind of instrumentation shall be classified to safety class 3.

Requirement 314, which applies to systems to be classified in class EYT/STUK, has undergone the following changes:

- The requirement (previous item 1) stating the a system shall be classified to class EYT/STUK, if the system has a plant-specific risk significance as a consequence of initiating events caused by its failure, has been removed.
- Item 1 (previously item 2) has been supplemented with the security arrangements. The previous version of the guide did not take a stand on the classification of security arrangements, on those cases, references were made to Guide YVL A.11 “Security of a nuclear facility”.
- Item 3 (previously item 4) has been changed so that it shall apply to systems needed to achieve a safe state and not just a controlled state in the DEC B and DEC C situations.
- A new item 4 has been added, according to which bringing the plant from a controlled state to a safe state in severe reactor accidents can involve EYT/STUK systems. The change is based on changes in Regulation STUK Y/1/2018 and Guide YVL B.6.
- A new item 5 has been added, which regards cooling implemented by the diversity principle of spent nuclear fuel and heat transfer from nuclear fuel to a secondary, final heat sink.
- A new item 6 has been added, according to which are classified the systems that include structures and components whose failure can cause significant dispersion of radioactive substances.

Requirement 325, which regards systems, structures and components to be classified in seismic class S1, has undergone the following changes:

- Item 1 has been changed so that class S1 is required up to the outer isolation valves of the containment on the main steam pipes, including the isolation valves. Previously, S1 was required up to the turbine trip valves, which cannot be considered reasonable considering the lower safety significance of the turbine plant.
- Item 2 has been supplement, among other things, with piping connecting to the primary circuit.

- Item 4 has been changed so that it applies to all postulated accidents and not just class 1 accidents. The new wording corresponds better to the requirement level of, for example, Guide YVL B.7.

Items 1 and 13 of the content requirements (requirement 332) of the classification document have been removed. They required the presentation of the marking system and software and their recording equipment.

Smaller changes, for example, corrections to inflections of words or specifications have been made, for example, to requirements or items 202, 301, 303, 316, 325, 330 and 332.

The item referring to the Nuclear Energy Decree regarding the submittal of the classification document has been moved to the beginning of the guide in item 104. References have been updated, for example, so that they refer to the corresponding STUK regulation instead of a government decree.

In this round of updates, two requirements were divided into several requirements (requirements 302 and 336).