

Guide YVL E.1, Authorised inspection body and the licensee's in-house inspection organisation

1 Scope of application

The authorised inspection organisations referred to in Section 60a of the Nuclear Energy Act (990/1987) perform assessment tasks, specified in the YVL guides of specific technical areas, of the conformity of safety class 2 and 3 pressure equipment, other mechanical components as well as steel and concrete structures.

2 Justifications of the requirements

2.1 Chapter 2.1 Nuclear Energy Act and Nuclear Energy Decree

The use of inspection organisations for the supervision and inspection of pressure equipment, structures and mechanical components at nuclear facilities is based on the Nuclear Energy Act (990/1987). The change in the Nuclear Energy Act (410/2012), which transferred some of the inspection tasks away from STUK and extended the use of inspection organisations from pressure equipment to other components, entered into force on 1st of October 2012. In this context, Section 60a of the Nuclear Energy Act, "Control of pressure equipment", was further specified such that STUK's control of the inspection organisations was added to the first paragraph and the acts that the inspection organisation must follow when performing public administration tasks were added to the fifth paragraph. When the Nuclear Energy Act was amended (905/2017) on 1st of January 2018, a new paragraph (new paragraph 5) was added to Section 60a, but this addition has no effect on the inspection activities of authorised inspection bodies or the licensee's in-house inspection organisations. Section 75 of the Nuclear Energy Act contains provisions on the procedure that the licensee can use to appeal a decision by the inspection organisation. Section 78 of the Nuclear Energy Act contains provisions on the obligation of inspection organisations to observe secrecy.

Inspection organisations approved by STUK to perform their tasks may perform conformity assessment only after STUK has approved the design bases for the component or structure in question. The inspection organisations assess the conformity of components against these design bases and the YVL guides. The inspection organisations are not entitled to deviate from STUK decisions or YVL guides. The interpretation of the YVL guides is the responsibility of STUK.

Section 113b of the Nuclear Energy Decree (161/1988) specifies the procedure used to approve an inspection organisation to perform the tasks specified in the YVL guides. Section 117b of the Nuclear Energy Decree sets requirements for the content of STUK's decision of approval.

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2.2 **Chapter 3.2 Authorised inspection bodies inspecting nuclear pressure equipment as well as steel and concrete structures and mechanical components**

Procedures for assessing the competence of inspection organisations typically include accreditation against the generally applicable EN ISO/IEC 17020 standard for inspection organisations, the technical standards in the field and the requirements for a notified body (EC framework decision 768/2008). The decree entered into force in Finland on 1st of January 2010. The implementation and technical content of the tasks of inspection organisations depend on the components or structures that they inspect. The detailed requirements for inspection organisations are presented in the YVL guide on assessment bodies of nuclear facilities. The inspection organisation appeal an approval from STUK to perform the inspection organisation activities of its choice. In its approval decision, STUK defines the areas in which STUK considers the inspection organisation competent to act. This inspection organisation is referred to as an “**authorised inspection body**” (AIO).

STUK supervises the activities of authorised inspection bodies by performing inspections on the plant site and assessing inspection decisions. An inspection programme (TTO, inspection programme for inspection organisations) is also being developed for the supervision of inspection organisations. In addition, STUK organises informal meetings with the purpose of ensuring the uniform activities of inspection organisations. If STUK observes significant deficiencies in an inspection organisation’s activities, its authorisation may be cancelled.

2.3 **Chapter 3.3 General division principle of inspection responsibilities for a nuclear facility’s pressure equipment**

The supervision of nuclear facilities follows a graded, risk-informed approach. Accordingly, the equipment and components of a nuclear facility are classified in safety classes 1–3 and class EYT, the class for equipment with no safety significance. Safety class 1 is the highest, and it includes the reactor pressure vessel and nuclear fuel. Safety class 2 includes equipment immediately required for accident management, and safety class 3 includes equipment ensuring that the facility can cope with operational occurrences and guaranteeing long-term safety in accident situations.

STUK inspects the equipment in safety class 1 and the most significant equipment in safety class 2. Less significant equipment in safety class 2 as well as safety class 3 belong to authorised inspection bodies approved by STUK. For class EYT, the procedures of the Pressure Equipment Act are applied as regards the structural plan and construction inspection of the pressure equipment.

The licensee may have a second-party inspection organisation, i.e. a type B inspection organisation in accordance with the EN standards. This organisation, which is the licensee’s in-house inspection organisation, may be used for on-site inspections of equipment that is the least significant for the safety of nuclear facilities as specified in the Government Decree on Pressure Equipment (1548/2016, sections 7 and 8). The general requirements for this inspection organisation are consistent with those for authorised inspection bodies but, due to its position alone, it does not

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have the opportunity to perform third-party inspections like an authorised inspection body. The E-series YVL guides specify the inspection tasks that can be performed by the licensee's in-house inspection organisation.

2.4 Chapter 2.4 Division of inspection responsibilities

Guide YVL E.1 presents an indicative table on the division of inspection responsibilities between STUK, an authorised inspection body, the licensee's in-house inspection organisation and a notified body in accordance with the Pressure Equipment Act. The component-specific E-series YVL guides present the more detailed division of inspection responsibilities for the component type in question.

TVO has statistics on the inspections of the facility under construction in Olkiluoto, according to which authorised inspection bodies (AIO's) has performed approx. 67% of the inspections of mechanical components and piping in safety class 3, and STUK approx. 33%. The number of piping inspections performed on the site is significant, and the division of responsibilities according to the table has been such that STUK inspects approx. 15% (SC 1 and SC 2), AIO approx. 64% (SC 3 and EYT) and TVO approx. 22% (EYT SEP) of the piping systems.

With the introduction of Guide YVL E.1 in 2013, the area of responsibilities of an authorised inspection body expanded to include not only pressure equipment instructions but also the inspections of other mechanical components as well as steel and concrete structures.

The table in Appendix A of Guide YVL E.1 provides general instructions that are further specified in the field-specific YVL guides.

2.5 Chapter 2.5 International practices concerning inspection organisations

Development of inspection procedures on the conventional side and new approach within the EU

Uniform EU directives have been used in the conventional industry for dozens of years. In 2008, the European Commission decided on a new approach on the conventional side: the New Legal Framework. From the beginning of 2010, this procedure has been applied in practice within the scope of 10 directives, at the same time placing stricter requirements for notified bodies and more specific requirements for accreditation bodies as well as introducing the supervision of accreditation bodies. According to the new approach, directives are written on the general level, and technical details are specified under the directive by harmonised standards. The aim is to create a common market within the European Union, so that an inspection by a notified body is valid in all EU member states.

The international standard EN ISO/IEC 17020:2012 "Conformity assessment" specifies the activities of inspection organisations. FINAS shall assess all new (non-accredited) inspection organisation applications in accordance with the standard.

In order for the organisation to become a notified body, the accreditation body must perform the assessment against the requirements for a notified body. This shall be indicated in the accreditation decision.

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From the beginning of 2010, the management systems of bodies audited and certified can only have been assessed by assessment bodies meeting the requirements of EN ISO/IEC 17021:2011.

In the United States, inspection organisations must meet the requirements of ASME QAI-1-2010 "Qualifications for Authorized Inspection" (Revision of ASME QAI-1-2005), in order to perform inspections according to the "ASME Boiler and Pressure Vessel Code, Section III, Divisions 1 and 3". ASME QAI-1-2010 sets requirements for the inspection organisation, nuclear technology inspectors and their supervisor. The NRC takes part in the work of the standards committee and assessment body. In principle, the level of requirements in the United States corresponds to what is required by Guide YVL E.1 in Finland. However, the approach to setting requirements is different in the US.

3 International provisions concerning the scope of the Guide

The IAEA requirements for authority activities are applicable to the supervision of components and structures and also apply to authorised inspection bodies. These requirement documents include:

- GSR Part 1 General, Legal and Regulatory Framework for Safety, 2010
- GS-R-3 The Management System for Facilities and Activities, 2006
- IAEA Safety Standards, Use of External Experts by the Regulatory Body, General Safety Guide No. GSG-4

The basic requirement level of Guide YVL E.1 corresponds to the level set for notified bodies by the Pressure Equipment Directive. In addition, demonstration of conformity to requirements as well as a management system in accordance with Guide YVL A.3 "Leadership and management for safety" are required. The starting point is that inspections moved away from STUK are performed at the same grade as STUK performed them in accordance with similar procedures.

The requirements of Guide YVL E.1 have been written so that the guide only presents those requirements that are additional to the requirements of EN ISO/IEC 17020:2012. The guide requires the fulfilment of the requirements of the standard. Type A independence requirements are applied to an authorised inspection body and type B requirements to the licensee's in-house inspection organisation.

4 Impacts of the Tepco Fukushima Dai-ichi accident

No factors have arisen that would affect the contents of Guide YVL E.1.

5 Needs for changes taken into account in the update

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

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During the update, some small further specifications were made to the requirements of the guide regarding security clearance of the personnel of authorised inspection bodies (AIO) (the new Security Clearance Act entered into force on 1 January 2015; Sections 19–21) (requirement 602 and new requirement 1117). In addition, any connections with other regulations were examined (incl. the new Pressure Equipment Act and Act on Notified Bodies). These caused no changes. All references to regulations were checked and updated.

A period of 13 months has been added to requirement 603, specifying the period during which a person may be disqualified from performing inspections upon entering the employment of the authorised inspection body in order to ensure the independence of the inspection organisation. The specification of this period clarifies the uncertainty about this matter. In addition, it improves the use of the inspection organisation's resources, since the earlier "disqualification period" was 24 months.

A new requirement (1101a) was added to the guide, specifying that the licensee must present the plant unit-specific division of inspection responsibilities to STUK for approval.

A new appendix (Appendix D) was added to the guide, providing descriptions of the requirements regarding the independence of inspection organisations.

The administrative burden was not reduced much in the guide.