Säteilyturvakeskus
Finnish Centre for Radiation and Nuclear Safety

YVL-ohje
YVL Guide

YVL 5.5

7 June 1985

1 (23)

Second, revised edition

Translation

SUPERVISION OF ELECTRICAL AND INSTRUMENTATION SYSTEMS AND COMPONENTS AT NUCLEAR FACILITIES

CONTENTS

Helsinki 1986
Government Printing Centre

ISBN 951-46-9331-0
ISSN 0781-4321
VAPK/monistus/1986

PL-P.O.BOX 268
SF-00101 HELSINKI
FINLAND

Ydinturvallisuusosasto
Department of Nuclear Safety
Kalevankatu 44

Puh.-Tel.
(90) 616 71

Telex
122691 STUK-SF

STUK 41.01 1985

8085035600 -- 12/6354/PTP

1 GENERAL

The general guidelines for the supervision of nuclear facilities carried out by the Finnish Centre for Radiation and Nuclear Safety (STUK) are set forth in Guide YVL 1.1 "The Institute of Radiation Protection as the supervising authority of nuclear power plants" /1/. This guide shows in more detail how the Finnish Centre for Radiation and Nuclear Safety supervises the electrical and instrumentation systems and components of nuclear facilities.

The various phases of the supervision are presented in section 2. Each phase is dealt with separately, and the effect of the safety class on the scope of supervision is discussed. The principles for the safety classification of the electrical and instrumentation systems and components are set forth in Guide YVL 2.1 "Safety classification of nuclear power plant systems, structures and components" /2/. Section 3 contains requirements for the environmental testing of the electrical and instrumentation components that are needed in accident conditions, and section 4 deals with the quality assurance and quality control of electrical and instrumentation components.

The supervision of radiation monitoring systems and equipment takes place according to Guide YVL 7.11 "Radiation monitoring systems and equipment in nuclear power plants" /3/. The supervision of pump motors and valve actuators takes place according to Guides YVL 5.7 "Inspection of nuclear power plant pumps" /4/ and YVL 5.3 "Inspection of Nuclear power plant valves" /5/.

The documents required in this guide are submitted to the Finnish Centre for Radiation and Nuclear Safety as per Guide YVL 1.2 "Formal requirements for the documents to be submitted to the Institute of Radiation Protection" /6/.

Compliance with the acts and decrees on electrical installations, as well as with the regulations on electrical safety, is supervised by the Electrical Inspectorate.

2 PHASES OS SUPERVISION

2.1 Pre-inspection of systems

The Finnish Centre for Radiation and Nuclear Safety performs a pre-inspection of systems for all electrical and instrumentation systems belonging to Safety Classes 1, 2 and 3.

In connection with the review of the applications for a construction permit and an operating license, the pre-inspection of systems is accomplished as a review of the Preliminary and Final Safety Analysis Reports and the related topical reports. The pre-inspection of a system that is modified or supplemented during the operation of the nuclear facility can be performed on the basis of separate pre-inspection documents. In this case, the Final Safety Analysis Report shall be revises accordingly without delay.

It shall be shown in the pre-inspection documents of electrical and instrumentation systems that the requirements presented in Guide YVL 1.0 "Safety criteria for design of nuclear power plants" /7/ have been met. Systems in Class EYT (non-nuclear) shall be treated to the extent that is necessary to show that the above mentioned requirements have been met.

Whenever applicable, the pre-inspection documents of electrical and instrumentation systems shall include the information that is required in Chapters 7 and 8 of the

U.S. NRC Regulatory Guide 1.70 "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants" /8/. In preparing the pre-inspection material, it is to be noted that e.g. the following items shall be included:

- design bases of the system
- description of the operation of the system
- analysis of the system.

Of these, the design bases of the system and a general description of the operation of the system shall be presented in the Preliminary Safety Analysis Report. Of the analysis of the system, a concise analysis of operation is sufficient. The Final Safety Analysis Report contains the design bases, a detailed description and analysis of operation, and possibly a reliability analysis.

Design bases

A number of design principles concerning protection systems are presented in IAEA Safety Guide 50-SG-D3 "Protection System and Related Features in Nuclear Power Plants" /9/, which shall be taken into account, whenever applicable. Detailed design criteria concerning protection systems can be found e.g. in standards KTA 3501 "Reaktor-schutzsystem und Uberwachung der Sicherheitseinrichtungen" /10/ and IEEE 279 "Criteria for Protection Systems for Nuclear Power Generating Stations" /11/. These standards can be used, provided that Guide YVL 1.0 /7/ does not set forth more stringent requirements.

A number of design principles concerning instrumentation and control are presented in IAEA Safety Guide 50-SG-D8 "Safety-Related Instrumentation and Control Systems for Nuclear Power Plants" /12/, which shall be taken into account, whenever applicable. Detailed design criteria concerning accident instrumentation can be found e.g. in

U.S. NRC Regulatory Guide 1.97 "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident" /13/. This guide can be used, provided that Guide YVL 1.0 /7/ does not set forth more stringent requirements.

A number of design principles concerning electrical systems are presented in IAEA Safety Guide 50-SG-D7 "Emergency Power Systems at Nuclear Power Plants" /14/, which shall be taken into account, whenever applicable. Detailed design criteria concerning electrical systems can be found e.g. in standards KTA 3701 "Übergeordnete Anforderungen an die elektrische Energieversorgung des Sicherheitssystems in Kernkraftwerken" /15/ and IEEE 308 "IEEE Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations" /16/. These standards can be used, provided that Guide YVL 1.0 /7/ does not set forth more stringent requirements.

Besides the above-mentioned general guides and standards, more detailed instructions and regulations are also needed in the design of the systems. Instructions of this kind with respect to the electrical and instrumentation systems and components of nuclear power plants have been set forth e.g. in many IEC, KTA and IEEE standards and in the U.S. NRC Regulatory Guides. It shall be shown in the pre-inspection documents of the system which guides and standards are applied in the design and implementation of the system. Alternatively, a compilation of the applicable standards and series of guides, as well as any deviations from them, can be given, for instance, in a topical report.

Description of operation

In the description, the operation of the system is dealt with in the normal operating conditions of the

plant, as well as during postulated accidents and anticipated transients. The description concentrates on issues that are essential to safety. All the necessary graphs and figures shall be attached to the description.

Analysis

The analysis of the systems comprises the following items

- functional analysis
- reliability analysis.

It shall be shown in the functional analysis that the system fulfils the requirements in Guide YVL 1.0 /7/ and in the standards, as well as the functional requirements established for the system. The functional analysis shall be supplemented with a fault and impact analysis, whenever needed. If necessary, reference can be made to the accident analyses that relate to the system. A functional analysis shall be performed on all electrical and instrumentation systems belonging to Safety Classes 1, 2 and 3.

The pre-inspection of systems also includes an inspection of the system reliability analyses that are required in connection with the probabilistic safety analysis of the plant. The purpose with the inspection is to ensure the balanced design of the system and its parts. More detailed instructions for performing reliability analyses are given in a separate YVL guide.

Instrumentation of fluid systems

The normal control instrumentation of a fluid system in Safety Class 1, 2 or 3 is reviewed in connection with the pre-inspection of that system. The information to be given of the instrumentation that is important to safety

shall include at least

- a summary of the data on the use of measurements (symbol, type, purpose, range, uses, protection and alarm limits)
- data on the control of components important to safety
- basic diagrams of control circuits.

The data can be presented in the form of a topical report concerning several systems in connection with the Final Safety Analysis Report.

2.2 Pre-inspection of components

The Finnish Centre for Radiation and Nuclear Safety performs a component-specific pre-inspection on the following electrical and instrumentation components

- electrical and instrumentation components in Safety Classes 1 and 2
- electrical and instrumentation components that are needed in accident situations and that are subject to special requirements concerning environmental qualification.

In the component-specific pre-inspection, it is ascertained that the components are of a type that fits their purpose and that their quality will be assured well enough. The pre-inspection documents include

- description of manufacturer
- design bases
- description of operation
- data on type tests and operating experience
- quality control program.

The pre-inspection documents of a component are also valid for its spare parts that equal the original. A separate request shall be made in order to have eventual modifications accepted.

2.2.1 Description of manufacturer

The purpose with the description is to give a picture of the expertise of the component manufacturer. It shall include a presentation of the organization confirmed by the firm's management and disclosing, for instance, the definitions of duties, areas of responsibilities and the arrangements made for quality assurance. The description of quality assurance can be based on the quality assurance manual that is used by the company. The manufacturer shall have the facilities to test the operation of the component in a sufficiently varied manner.

2.2.2 Design bases

The design bases present the functional requirements for the component in the various operational states of the plant. These include

- accuracy, stability, signal/noise ratio, sliding of calibration, hysteresis, response time, repeatability, loadability
- time that the component shall maintain operability without calibration or service.

The operating conditions and the resulting design criteria are presented. These include

- power, voltage, current, and frequency ranges within which the component shall remain operable
- temperature, humidity, pressure, pressure shocks, vibration, radiation, and the flow of

surrounding medium
- fire resistance.

The standards that are used in determining the design bases of the component are presented.

2.2.3 Description of operation

The description of operation concentrates on issues that are essential to safety. The description can be based on the documents delivered by the manufacturer. The operating parameters of the component are presented.

The purpose with the description is to show that the component meets the design bases set for it.

2.2.4 Data on type tests and operating experience

The purpose with the data on type tests and operating experience is to show that the component operates reliably and is not susceptible to disturbances caused by external factors that it may be subjected to. The type tests depend on the intended purpose and operating conditions of the component. Acceptable type tests are presented in several IEC and IEEE standards.

As concerns components that are of a standard type and that have been used for various purposes for a long time, the type tests can at discretion be replaced with thorough data on operating experience. Requirements concerning the type tests of electrical and instrumentation components needed in accident situations are set forth in section 3 of this guide.

The type test programs and results, or the data on operating experience replacing the type tests, are presented in the pre-inspection documents. If it is intended that the type tests be replaced with data on

operating experience, a description is given of the principal uses of the similar components manufactured before. The longest operating times of these components at nuclear facilities are also listed, as well as the available data on faults.

As concerns all components, it is recommended that a list be presented of the uses of similar components by the same manufacturer.

2.2.5 Quality control program

The purpose with the quality control program is to systematically present the quality control measures, as well as the related inspection and testing methods that are applied to the component. The quality control program includes

- an inspection and testing plan
- inspection and testing instructions.

When necessary, a description shall be given of the manufacture of the component with the purpose of presenting a general picture of the manufacturing processes and the accomplishment of quality control in the various phases of manufacture.

The inspection and testing plan presents the quality control measures that are taken with respect to the component during its manufacture, factory testing, installation and commissioning. The plan shall show the implementing organization for each measure, as well as the control organization, if any. Components in Safety Classes 1 and 2 shall as a rule be subjected to component-specific functional tests in connection with their manufacture.

Inspection and testing instructions shall be presented on all measures that are important to the safety function of the component and that are mentioned in the inspection and testing plan. The instructions shall deal with the procedure, scope, requirements and reporting of the inspections and tests. In details, reference can be made to applicable standards.

2.3 Supervision during manufacture

As considered necessary, the Finnish Centre for Radiation and Nuclear Safety supervises the manufacture of those electrical and instrumentation components that undergo a component-specific pre-inspection by the Centre.

During audits, the inspectors of the Centre shall be given a possibility to acquaint themselves with the organization, manufacturing processes and quality assurance of the factory. For the audits, the Centre shall well in advance be provided with the manufacturing schedule of the components, which shows the times for the most important inspections and tests in the quality control program.

The following inspections are carried out in connection with the audits:

- visual inspection of components
- reviewing the results of quality control during manufacture
- supervision of tests at the factory or review of the results.

2.4 Supervision during installation

As considered necessary, the Finnish Centre for Radiation and Nuclear Safety supervises the installation of

electrical and instrumentation components in Safety Classes 1, 2 and 3.

For the supervision during installation, the Centre shall well in advance be provided with information concerning the duties and responsibilities of the parties taking part in the installation, the installation schedule, the procedures to be applied in the documentation of the course of the installation, and the scope of the inspections that will be carried out after the installation.

In connection with the audits, the inspectors of the Centre follow the quality assurance activities of the parties in installation work, acquaint themselves with the installation procedures, and follow the inspections and tests relating to the installation (such as inspections of the wiring in switchboxes, comparison of electrical circuits with the circuit diagrams, calibrations and linearity checks of sensors and transmitters, inspections of the logic of logic circuits, commissioning of buses, and tests of rotating electrical devices).

In connection with the audits, the inspectors of the Centre perform visual inspections of components. In these it is especially assessed whether the component complies with the description given in the pre-inspection documents and whether the component with its cables is suitable to the environment.

Requirements concerning the quality assurance procedures during installation are given in section 4 of this guide.

2.5 Commissioning inspection

The Finnish Centre for Radiation and Nuclear Safety performs a commissioning inspection on all electrical and instrumentation components that have undergone a

component-specific pre-inspection by the Centre.

The commissioning inspection is divided into following sections

- reviewing the results of quality control (as far as they have not been reviewed in connection with the supervision during manufacture and installation)
- reviewing the results of the electrical measurements and tests of the component
- updating the comments given in the earlier supervisory phases.

In the construction phase of a nuclear facility, commissioning inspections are a prerequisite for the final inspection of the plant. In the operating phase of a facility, a commissioning inspection shall be carried out within one month after the installation has been completed, unless there is a requirement to the contrary in the decision on the pre-inspection of the component. A written request for a commissioning inspection shall be sent well before the date of inspection.

2.6 Supervision of start-up testing

The Finnish Centre for Radiation and Nuclear Safety supervises the testing of electrical and instrumentation systems in accordance with Guide YVL 2.5 "Preoperational and start-up testing of nuclear power plants" /17/. Accordingly, the Centre reviews the start-up testing plans, follows the performance of the tests at the plant, and reviews the result documents of electrical and instrumentation systems in Safety Classes 1, 2 and 3. The result reports of start-up testing shall be submitted to the Finnish Centre for Radiation and Nuclear Safety for approval within one month after the completion of the

tests. The general start-up testing plans are presented in the construction phase as part of the Preliminary and Final Safety Analysis Reports.

2.7 Supervision during operation

Periodic tests

The Finnish Centre for Radiation and Nuclear Safety supervises that electrical and instrumentation systems and components are used and tested according to the requirements presented in the Technical Specifications. The Centre accomplishes this by performing regular audits at nuclear facilites in accordance with a separate plan.

The interval to be followed in the periodic testing of electrical and instrumentation systems is determined in the Technical Specifications. The detailed instructions concerning these periodic tests shall be submitted to the Finnish Centre for Radiation and Nuclear Safety for information. The Centre is informed of the performance of the tests only in separately defined cases. The results of the periodic tests are reviewed in connection with the above-mentioned regular audits.

Service and maintenance

The organization taking care of the service and maintenance of electrical and instrumentation components, its operation, as well as the documentation relating to service and maintenance are described in the quality assurance program that is applied during operation. The requirements concerning the extent and contents of the regular maintenance of various objects are included in system-specific service and maintenance instructions. Section 4 of this guide contains some requirements concerning the quality assurance procedures that are

applied during operation. The Finnish Centre for Radiation and Nuclear Safety supervises the service and maintenance of electrical and instrumentation systems in connection with the regular audits it performs.

Repairs and modifications

The Finnish Centre for Radiation and Nuclear Safety is informed of the faults in electrical and instrumentation components in accordance with Guide YVL 1.5 "Reporting nuclear power plant operation to the Institute of Radiation Protection" /18/.

The Centre supervises the repairs and modifications of electrical and instrumentation systems and components to the same extent as the original construction. The modifications that are planned for electrical and instrumentation systems in Safety Classes 1, 2 and 3 and for cmponents that are within the scope of pre-inspection shall have the approval of the Finnish Centre for Radiation and Nuclear Safety before the modification work is begun. Modifications for systems in Class EYT need an approval granted by the Centre only if the modifications affect the fulfilment of the general safety criteria /7/. The new components that are needed for the modifications undergo a pre-inspection and a commissioning inspection and they are controlled during manufacture and installation, as stated above in this guide. The modified section of a system undergoes start-up testing according to the same principles as the original system. More detailed requirements concerning the supervision of repairs and modifications are given in Guide YVL 1.8 "Supervision of repairs and modifications on nuclear power plants during operation" /19/. The procedures that are applied in the supervision of shutdowns are set forth in Guide YVL 1.13 "Supervision of shutdowns at nuclear power plants" /20/.

Gathering of failure data

The Finnish Centre for Radiation and Nuclear Safety requires that data are gathered on the faults and repairs of electrical and instrumentation components during the operation of the plant. Among the data to be recorded are, for instance, the failure statistics of components and the summaries of important repairs. The Finnish Centre for Radiation and Nuclear Safety shall have access to the data to be recorded.

3 ENVIRONMENTAL TESTING OF ELECTRICAL AND INSTRUMENTATION COMPONENTS NEEDED IN ACCIDENT SITUATIONS

In the design of electrical and instrumentation components for nuclear facilities, attention shall also be paid to the environmental conditions in which the components are supposed to operate. As concerns the electrical and instrumentation components that are needed in accident situations, the Finnish Centre for Radiation and Nuclear Safety requires that their operability be shown empirically in the conditions in which the components must operate during accident situations. Component-specific results of the type tests are submitted to the Centre together with the pre-inspection documents mentioned in section 2.2 of this guide.

It shall be defined in the Safety Analysis Report or in the related topical report which electrical and instrumentation components must retain their operability in accident conditions. The information on the components is supplemented with bases for their need to operate, as well as with data on the required time of operation, and on the accident situations in which the components must operate. Besides components located inside the

containment, the survey shall also deal with such electrical and instrumentation components that are located outside the containment and that may have to operate in exceptional environmental conditions in accident situations.

Electrical and instrumentation components must be able to operate also during an accident that occurs towards the end of their service life. To ascertain the operability, the components shall be subjected to a series of accelerated ageing tests and thereafter to tests that correspond with the accident situation. The tests must form a uniform series of tests, in which the same test piece is subjected to all anticipated environmental stresses. The testing methods that are used can be based on international standards or on some other procedures accepted by the Finnish Centre for Radiation and Nuclear Safety. The thermal ageing of electric insulators shall be based on the determination of activation energy with the Arrhenius, EAP or some other similar method which can ensure that the accelerated ageing test does not underestimate the actual ageing. If other methods are used, their applicability shall be substantiated.

The tests are usually carried out so that first comes thermal ageing and ageing through irradiation, then mechanical tests, and finally the actual accident tests. The test sequence shall always be substantiated. To the accident tests belong irradiation, which equals the accident situation, and an accident test, which includes stresses caused by temperature, pressure and humidity, and rapid changes in conditions. During the test it shall be possible to spray the components with water, which has a composition corresponding with the water occurring in accident conditions. If some components can be left under the water that covers the bottom of the containment during an accident and if they are nevertheless

supposed to operate, their ability to operate shall be shown also in these conditions. Detailed testing requirements are presented in U.S. NRC Regulatory Guide 1.89 "Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants" /21/.

It shall be shown that the electrical and instrumentation components that are located inside the containment can retain their operability also during hydrogen fires that may occur in connection with an accident, if the components need to operate in accident situations in which the occurrence of hydrogen fires is possible.

In addition to the type tests, the condition of electrical and instrumentation components that are needed in accident situations must be followed regularly for the whole operating life of the plant. Especially the follow-up program of cables shall be based on studies that are made on samples of cables taken from the containment. The follow-up programs shall be presented to the Finnish Centre for Radiation and Nuclear Safety as a topical report supplementing the Final Safety Analysis Report.

4 QUALITY ASSURANCE AND QUALITY CONTROL OF ELECTRICAL AND INSTRUMENTATION COMPONENTS

4.1 Quality assurance

According to Guide YVL 1.0 /7/, structures, systems and components important to safety shall be designed, manufactured and installed so that their quality level and the inspections and tests needed for verifying the quality level are commensurate with the importance of the safety functions to be performed.

To ensure this quality level, there shall be a quality

assurance program. It presents the systematic procedures which are followed during the design, construction and operation of a nuclear facility in activities affecting safety.

For the construction and operating phases of a nuclear facility, there shall be quality assurance programs on electrical and instrumentation engineering. These programs present the measures that are needed for assuring the quality level of electrical and instrumentation components in Safety Classes 1, 2 and 3. The programs can form a part of a more extensive quality assurance program. General requirements concerning the contents of quality assurance programs have been presented in Guide YVL 1.4 "Quality assurance program for nuclear power plants" /22/. The programs shall be submitted to the Finnish Centre for Radiation and Nuclear Safety for approval as per Guide YVL 1.1 /1/. The associated instructions and procedures are submitted to the Centre for information.

The quality assurance program that is applied during construction shall deal with the quality assurance activities of the various parties associated with design, manufacture, installation and commissioning. The program shall describe, for instance, the organizations, duties and responsibilities of the various parties, the procedures to be followed in documentation, and the arrangements made for inspections and tests in the manufacturing, installation and commissioning phases.

The quality assurance program that is applied during operation shall include the procedures for performing periodic service and tests and for assessing the test results, for making repairs and modifications, for replacements with spare parts, for urgent repairs, and for ensuring and maintaining the accuracy of measuring

equipment. In addition, procedures shall be presented for ensuring that the quality level of the electrical and instrumentation components needed in accident situations is maintained for the service life of the plant.

4.2 Quality control

Quality control means quality assurance activities whereby it can be shown that products and processes comply with the established requirements /22/. To ensure that the requirements in the quality assurance programs are met, the Finnish Centre for Radiation and Nuclear Safety requires that the general quality assurance programs be supplemented with quality control programs, which include detailed instructions for inspections in the manufacturing, installation and commissioning phases of components.

A component-specific quality control program for the components mentioned in section 2.2 shall be submitted to the Finnish Centre for Radiation and Nuclear Safety for approval in connection with the pre-inspection documents. In addition, the various safety classes shall be provided with general plans for the organization of quality control in the manufacturing, installation and commissioning phases. The plans shall be submitted to the Finnish Centre for Radiation and Nuclear Safety for approval prior to each phase. The electrical and instrumentation components in all safety classes must undergo receiving and installation inspections. The same quality control program can be used during construction and operation.

5 BIBLIOGRAPHY

1 STUK Guide YVL 1.1 "The Institute of Radiation Protection as the supervising authority of nuclear power plants"

2 STUK Guide YVL 2.1 "Safety classification of nuclear power plant systems, structures and components"

3 STUK Guide YVL 7.11 "Radiation monitoring systems and equipment in nuclear power plants"

4 STUK Guide YVL 5.7 "Inspection of nuclear power plant pumps"

5 STUK Guide YVL 5.3 "Inspection of nuclear power plant valves"

6 STUK Guide YVL 1.2 "Formal requirements for the documents to be submitted to the Institute of Radiation Protection"

7 STUK Guide YVL 1.0 "Safety criteria for design of nuclear power plants"

8 U.S.NRC Regulatory Guide 1.70 "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants"

9 IAEA Safety Guide 50-SG-D3 "Protection System and Related Features in Nuclear Power Plants"

10 KTA 3501 "Reaktorschutzsystem und Uberwachung der Sicherheitseinrichtungen"

11 IEEE 279 "Criteria for Protection Systems for Nuclear Power Generating Stations"

12 IAEA Safety Guide 50-SG-D8 "Safety-Related Instrumentation and Control Systems for Nuclear Power Plants"

13 U.S.NRC Regulatory Guide 1.97 "Instrumentation for Light-Water-Cooled Nuclear Power Plants To Assess Plant and Environs Conditions Duirng and Following an Accident"

14 IAEA Safety Guide 50-SG-D7 "Emergency Power Systems at Nuclear Power Plants"

15 KTA 3701 "Übergecrdnete Anforderungen and die elektrische Energieversorgung des Sicherheits-systems in Kernkraftverken"

16 IEEE 308 "IEEE Standard Criteria for Class 1E Power systems for Nuclear Power Generating Stations"

17 STUK Guide YVL 2.5 "Preoperational and start-up testing of nuclear power plants"

18 STUK Guide YVL 1.5 "Reporting nuclear power plant operation to the Institute of Radiation Protection"

19 STUK Guide YVL 1.8 "Supervision of repairs and modifications on nuclear power plants during operation"

20 STUK Guide YVL 1.13 "Supervision of shutdowns at nuclear power plants"

21 U.S.NRC Regulatory Guide 1.89 "Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants"

22 STUK Guide YVL 1.4 "Quality assurance program for nuclear power plants"

In the event of any difference in interpretation of this guide, the Finnish version shall take precedence over this translation.