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SUPERVISION OF SAFETY RELIEF VALVES IN NUCLEAR FACILITIES

CONTENTS

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1 GENERAL

This guide is followed by the Finnish Centre for Radiation and Nuclear Safety (STUK) in supervising safety relief valves in Safety Classes 1, 2 and 3 and in Class EYT (non-nuclear). The classification criteria are given in Guide YVL 2.1 /1/.

The general word "safety relief valve", as used in this guide, also includes relief valves, safety valves and non-reclosing pressure relief devices.

The supervision of safety relief valves comprises the following phases:

- review of the construction plan
- supervision of manufacture and construction inspection
- commissioning inspection
- inservice inspections
- supervision of maintenance during operation.

This guide deals with each supervisory phase separately and studies the effect of the safety class on the scope of supervision.

The supervision of a safety relief valve is determined according to the component or piping that has the most demanding safety class and that is protected from over-pressure by the safety relief valve, even if the valve were not directly connected to this component or piping.

In addition to what is said above, the safety relief valves that are in Class EYT and take care of the over-pressure protection of pressure vessels and Group "A" piping subject to inservice inspections as per Guide YVL 3.0 /4/ shall meet the same requirements as valves in Safety Class 3.

The documents that deal with safety relief valves or their operation shall apply the definitions used in standards ANSI B 95.1-1977 /2/ or DIN 3320, 1972 /3/.

Safety relief valves shall meet the requirements that are presented in Guide YVL 2.4 /10/ concerning the over-pressure protection and regulation of pressure in the primary circuit and steam generators of a PWR plant during transients.

2 CONTENTS OF THE CONSTRUCTION PLAN

The construction plan of safety relief valves in Safety Classes 1, 2 and 3, as well as that of the safety relief valves in Class EYT that must meet the same requirements as valves in Safety Class 3, shall be submitted to STUK for approval as per Guide YVL 1.2 /12/.

2.1 Description of manufacturer

The extent of the description is determined on the basis of the safety class and the structural and functional demands placed on the valve.

The purpose of the description is to give a picture of the expertise and technical facilities of the manufacturer of the valve parts that contain pressure or affect the operation of the valve. The description shall include a presentation of the organization confirmed by the firm's management. It shall show the definitions of duties, responsibilities, competences 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 description shall include the above-mentioned data

also on the subcontractors and consultants that take part in the manufacture or quality control of the safety relief valve. The application for the acceptance of the quality control department of the manufacturer or a testing facility and testing pesonnel is filed according to Guide YVL 1.3 /11/.

If the document is essentially similar to one that has been submitted to STUK previously, a reference to the previous document, together with any modifications or supplements, is sufficient.

2.2 Design bases

The design bases include the information that is necessary for checking the choice of materials, structural solutions, strength calculations, quality control program, flow-related dimensioning, operation, and operational preconditions.

Of the requirements and boundary conditions that have been set for the safety relief valves in the primary circuit and in the steam generators of a PWR plant, at least the following are presented:

- system and component symbols
- safety class
- design pressure and temperature
- normal operating pressure and temperature
- forces and torques caused by piping or other structures on the valve
- sizes and rates of significant thermal transients, and how many times the valve is under loading
- evaluation of the operation of the mechanical components that have an adverse effect on the function of the safety relief valves or evaluation of the phenomena caused by the operation of the system

- temperature and state of the medium in normal operating conditions and during transients; sudden phase changes, chemical effects
- required relieving capacity
- opening pressure, range and tolerances
- allowable pressure rise during discharge
- range of closing pressure
- requirements set by the system concerning the time of operation of the safety relief valve; opening and closing times
- static and dynamic back pressure, minimum and maximum
- allowable pressure loss in the inlet pipe of the safety relief valve
- tightness requirements
- data on the environment of the safety relief valve in normal operating conditions and during transients; chemical effects, temperature, pressure, humidity, radioactivity, and duration of exceptional conditions
- fire resistance.

In the case of other safety relief valves, the data that are necessary for checking the strength, applicability and operation of the valve are picked from the above list.

2.3 Description of materials

The purpose of the description of materials is to show the acceptability and applicability of the materials to their intended use. The construction materials and welding filler materials shall meet the requirements in Guide YVL 3.9 /19/. The description shall include a construction and filler material list, specifying each part and joint.

2.4 Quality control program

The purpose of the quality control program is to describe

the quality control of the valve, as well as the inspection and testing procedures applied.

The quality control program comprises
- inspection plans
- inspection instructions.

The quality control program shall be so prepared that there are no discrepancies between it and the description of materials.

In Safety Class 3, no separate quality control program is required if the necessary inspections have been presented in other documents. This also involves those valves in Class EYT that must meet the same requirements as valves in Safety Class 3.

2.4.1 Inspection plans

Inspection plans shall be presented on the quality control measures that are taken with respect to materials, procedure tests and work tests, manufacture and the finished product.

The inspection plans shall cover the parts that are essential to the reliable operation of safety relief valves.

The inspection plan shall show

- part- or weld-specific numbering in accordance with the drawings
- name of the part
- standard marking of the base material and the filler material
- recording of inspections as per inspection instructions
- time of inspection (fabrication of material, manufacture

of valve, installation)
- inspector and/or supervisor (e.g. manufacturer, supplier, accepted testing facility).

The procedure and work tests that relate to manufacture are necessary for the pressure containing parts of safety relief valves in Safety Classes 1 and 2. Other safety relief valves undergo these tests only if they are required in the design standard.

If the procedure tests have already been carried out earlier, the quality control program is supplemented with their plans and results. The plans of the procedure and work tests to be performed during manufacture are included in the quality control program.

2.4.2 Inspection instructions

Inspection instructions shall be presented on all inspections that are mentioned in the inspection plans. The instructions shall show the method, manner, scope, requirements and reporting of the inspection. In details, reference can be made to standards.

The most usual quality control measures to be presented in the inspection instructions can be grouped as follows:

- identification and marking of construction materials; material certificates
- taking of test pieces; testing batches
- destructive testing
- non-destructive testing
- supervision of welding; welders' competence
- supervision of heat treatment
- dimensional inspections of structure
- visual inspection
- pressure and leak tests

- performance tests of the safety relief valve.

The pressure and leak test shall be made according to the standard used in design. If no such standard exists, a separate plan is presented in Safety Class 1, and Standard SFS 3321, or a corresponding standard, is followed in the other safety classes.

2.5 Dimensioning of safety relief valves

The purpose of the dimensioning is to show that the dimensions and shapes of the safety relief valve meet the requirements on strenght and operability set forth by the system.

2.5.1 Strength

The dimensioning concerning strength is divided into two parts: basic dimensioning and stress analysis.

The input values that are used for basic dimensioning are the design conditions of the safety relief valve, generally excluding temperature fluctuations and repeated loads.

The aim in a stress analysis is to treat the loads affecting the structure as truthfully as possible. Therefore the input values also include temperature fluctuations, dynamic loads and repeated loads.

The dimensioning claculations are illustrated with drawings, which show the loads, the system data and the necessary dimensions.

In the dimensioning of the valve strength, one can use some procedure which has been accepted by STUK and shows that the valve will last for the planned service life. A procedure of this kind could be the dimensioning method of

the valve manufacturer supplemented with the operating experience gathered of the valve. However, the operating experience shall be analysed so that it gives a clear picture of the sufficiency of the dimensioning in the system conditions in question. The following is an example of dimensioning principles.

The basic dimensioning of safety relief valves in Safety Class 1 is made according to ASME Boiler and Pressure Vessel Code, Section III (ASME Code, Section III), NB-3500 and Code Case N-100 or a corresponding standard.

Besides the basic dimensioning, valves in Safety Class 1 shall be subjected to a stress analysis in accordance with ASME Code, Section III, NB-3500 or a corresponding standard, with the following specifications:

- an account shall be given of the flexibility and fatigue-resistance of a bolt joint and a cover
- NS < 102 mm (4 in) valves shall be subjected to a simplified fatigue study according to ASME Code, Section III, NB-3500, if they are under considerable fatigue loading.

Safety relief valves in Safety Classes 2 and 3 are accordingly dimensioned following ASME Code, Section III, NC-3500 and ND-3500 and Code Case N-100 or some other nuclear power plant standard accepted by STUK. In the dimensioning, it is also possible to use the standards in series SFS 2610, provided that special attention is paid to quality control.

In addition to internal pressure, the safety relief valves in Safety Classes 2 and 3 shall be dimensioned against the highest possible force coming from the piping and the reacting force during discharge. If the valve is under considerable fatigue loading, it shall be subjected

to a simplified fatigue analysis in accordance with ASME Code, Section III, NB-3500.

The durability of the sealing surfaces in the safety relief valve shall be ascertained with the following studies in Safety Classes 1 and 2.

- surface pressure calculations
- impact velocity
- experimental studies and operating experience.

2.5.2 Flow characteristics

Here it is explained in more detail how the flow-related design bases of section 2.2 have been accomplished.

At least the following items shall be presented:

- Bases for the determination of the relieving capacity, operating speed and location required by the safety relief valve in normal operating conditions and during transients.

- The procedure and calculations for determining the relieving capacity of the safety relief valve; the relieving capacity and operating speed of the chosen valve.

- When the safety relief valve is spring-loaded, the flow force and spring force that affect the valve disk are presented as a function of the stem lift.

- The pressure loss of the inlet and discharge pipes if the mass flow to be discharged is 10 % higher than the rated relieving capacity.

- If the piping connected to the safety relief valve or

the formation of condensate affect the opening or closing times, estimates of the effects are presented in Safety Classes 1 and 2.

- Reacting forces during discharge.

Whenever applicable, the above bases are also presented on pilot devices.

To avoid harmful over-dimensioning of a safety relief valve, one shall, whenever necessary, use several valves which have suitably graded opening pressures.

2.6 Drawings

The purpose of the drawings is to show the assembly and details of the structure in such a way that the dimensions, shapes and manufacture of the component with their allowable tolerances can be seen in sufficient detail.

The drawings shall be unambiguous and clear. They shall show

- connection with other documents (reference and identification data)
- assembly data with part and material lists
- the dimensions and shapes used in the dimensioning or acquired thereof, with the necessary tolerances
- types, locations and dimensions of joints and fixtures
- coating of materials
- clearances, fixes and passes essential to the operation
- supporting in sufficient detail.

The drawings shall contain the information required in Standards SFS 2223 and SFS 2610.

2.7 Data on the pilot devices and additional loading of the valve

The data on the pilot devices shall include at least

- manufacturer
- operating principle with diagrams
- accuracy, stability and response time of operation
- testing facilities (in place/in bench; whole safety device/pilot devices separately; from the control room/on the spot; operating status of the plant during testing)
- driving power required by the electrical pilot devices (1-phase or 3-phase a.c./d.c., voltage and frequency limits, supply power) and the bus supplying it
- type, pressure, temperature and quality (purity, composition etc) of the medium used by a pneumatic pilot device or a device operating on its own medium
- protection and insulation class
- fire resistance
- ratio of additional loading to the opening force in opening pressure
- the function of the main valve in case the pilot devices fail
- dimensioning concerning strength, flow characteristics and electrical properties.

As a rule, the pilot devices with their pipes and conductors are placed in the same safety class as the main valve.

2.8 Data on the connection of the valve to the piping

A safety relief valve shall be connected to the piping in such a way that it retains all the facilities for operation. These facilities include, for instance:

- Connection to the pressure vessel without a closing

device.

- Minimum cross-sectional area of the inlet and discharge pipes. If discharge pipes are joined together, the discharge area of the combined discharge pipe shall be increased sufficiently and the safety relief valves balanced for back pressure.
- A sufficient distance between the safety relief valve and a component causing pressure pulses, turbulences and other such disturbances to the operation of the valve. A disturbing component of this kind can be a piston pump, pipe bend, choking flange, etc. If the safety relief valve is not applicable to cutting pressure peaks, protection against pressure peaks shall be analysed separately.

If there is a good reason for placing stop valves before and/or after a safety relief valve, the following points shall be taken into account:

- The stop valve shall be of such size and type that it does not choke or disturb the flow adversely.
- The information how the stop valve is locked in the open position shall be presented.

The above points also apply to the stop valves of pilot-valve pipes.

If a non-reclosing pressure relief device and a safety relief valve are installed in series, it shall be studied how to prevent a pressure rise and formation of condensate in the space between the pressure relief device and the safety relief valve (for instance, due to pitting of the rupture disk). The non-reclosing pressure relief device shall be of such construction that no fragments can come

off obstructing the operation of the valve.

The pipes connected to a safety relief valve are dimensioned in accordance with Guide YVL 3.3 /13/ paying attention to reacting forces.

An account shall be given of the gradients and drainage of the pipes that are connected to safety relief valves.

The discharge pipes of a safety relief valves shall be placed in such a way that the discharge does not endanger the personnel or the environment.

2.9 Data on type tests

The type tests comprise the tests that are performed for determining the relieving capacity of a safety relief valve type and for ascertaining its proper mechanical operation, as well as the performance tests and compatibility tests of the main valve and any pilot devices.

STUK considers the procedures presented in Standard ASME Boiler and Pressure Vessel Code, Section III, NB-7800, ND-7800 /5/ acceptable as concerns the determination of the relieving capacity of a safety relief valve. In addition, the procedures presented in ASME PTC 25.2-1966 /6/, in ISO 4126, 1979 /7/, in VdTÜV-Merkblatt, Sicherheitsventil 100, 1974 /8/, and in VdTÜV-Merkblatt, Berstsicherung 100, 1969 /9/ are considered acceptable both for determining the relieving capacity and for making type performance tests.

The construction plan shall include a description of the type tests in Safety Classes 1 and 2.

The environmental tests of electrical equipment shall be performed according to Guide YVL 5.5 /18/ and the pertinent

standards.

2.10 Data on operating experience

As concerns the previously manufactured similar safety relief valves, the reference nuclear facilities with the data on faults and reclamations shall be given as the data on the operating experience of safety relief valves in Safety Classes 1 and 2.

3 SUPERVISION OF MANUFACTURE AND CONSTRUCTION INSPECTION

At its discretion, STUK performs audits to assess the competence of the manufacturer of valves. This must be taken into account when preparing documents on procurement.

STUK supervises the manufacture of safety relief valves in Safety Classes 1 and 2 by performing audits at the factory, as deemed necessary. The inspectors of STUK shall be given an opportunity to familiarize themselves with the organization, manufacturing processes and quality assurance of the factory. For the audits, STUK shall in good time be presented with the manufacturing schedule of the valves, which also shows the most important inspection and testing times prescribed in the quality control program.

If STUK considers it necessary to supervise the manufacture of valves in the other safety classes, it will give a separate notification thereof. The manufacture of all safety relief valves shall take place under the supervision of a supervisor of manufacture. However, he need not be officially approved by STUK.

The construction inspection is performed on all safety relief valves in the nuclear facility according to Guide 1.15 /14/. The electrical equipment of a safety

relief valve is not subjected to a construction inspection.

4 COMMISSIONING INSPECTION

An inspector employed by STUK performs a commissioning inspection on all safety relief valves in Safety Classes 1, 2 and 3 and in Class EYT as part of a commissioning inspection that can encompass whole systems or suitably chosen sub-systems. An inspector employed by STUK does not perform a commissioning inspection on safety relief valves that only protect piping in Group EYT/B. The power company shall see to it that also these safety relief valves are properly controlled and inspected.

A valve can be finally accepted in a commissioning inspection only after it has been installed in its place.

A request for a commissioning inspection shall be sent to STUK in good time before the date of inspection. Procedures relating to commissioning inspections are in general outline described in Guide YVL 3.7 /15/.

A commissioning inspection is divided into two phases as follows:

- verification, which is carried out after the installation of the system has been completed
- performance tests of the equipment, which are carried out on a system that has passed the verification.

The electrical pilot devices of a safety relief valve are subjected to a commissioning inspection as per Guide YVL 5.5.

4.1 Verification

In the verification, it is ensured that the installed

system and its accessories have undergone a review of the construction plan and a construction inspection and that their requirements have been met.

During the verification, the inspector shall be presented with the following documents concerning a safety relief valve that protects a system, provided that a review of the construction plan has been compulsory for the valve:

- an approved construction plan and a decision on the approval, as well as a written account of the fulfilment of the conditions in a conditional decision
- approved construction inspection records of the safety relief valve and its installation.

If the approval of the construction plan of the safety relief valve is not necessary, the approved construction inspection records of the valve and its installation shall be presented. To make possible the approval of these safety relief valves in inspections of construction and installation, the above-mentioned requirements on construction and type acceptance shall be follwed, whenever applicable.

4.2 Performance tests of a safety relief valve

In the performance tests of a safety relief valve, it is inspected that the valve operates reliably and has a sufficient relieving capacity in operating conditions. The performance tests can be made only after the safety relief valve and the system protected by it, with their accessories, have been accepted in the verification.

Licenses of supervision and sealing for the testing of safety relief valves can be granted on the same grounds as corresponding licenses of construction inspection. Records on the supervision and results of the tests shall

be shown to the commissioning inspector.

In a performance test, the operation of the safety relief valve is shown in realistic conditions (medium, temperature, pressure).

The performance test of the reactor vessel safety relief valves is made after pre-adjustment, during the so-called hot test before the reactor is loaded with nuclear fuel.

The performance test of secondary circuit safety relief valves can be made after the pre-adjustment of the valves, while the reactor is operated at the lowest power level making the test possible.

In exceptional cases (danger or system transient caused by the test, or other such justifiable reason), the operation of the safety relief valve can be tested in a sufficiently well equipped test bench. The documents required in section 4.1 shall be presented also when the performance test is carried out in a test bench. The conditions in the bench shall be equal to the realistic operating conditions of the safety relief valve and it shall be possible to control the back pressure in Safety Classes 1 and 2. In Safety Class 3 and in Class EYT, the test bench shall be well suited to its purpose. The volume of the tank that is connected to the bench and the power of the bench shall be such that the impeccability of continuous valve operation can be ascertained.

If it takes an exceptionally high power to achieve continuous discharge of the safety relief valve and the valve is of minor importance to nuclear safety, the valve can be accepted in the commissioning inspection by ascertaining the start-to-leak pressure in the test bench. However, before this is done, the condition of the seats and the position of the control rings affecting

the opening pressure difference and closing pressure difference (Öffnungsdruckdifferenz, Schliessdruckdifferenz /3/) shall be inspected visually. The results achieved by the valve manufacturer in type tests and in tests performed during product development are to be used as a basis in the evaluation. Similarly, it is inspected visually that the valve disk can achieve a sufficient lift. If the quality of the testing medium and the temperature differ from the medium and temperature in the system, the impact of these differences shall be taken into account in the adjustment of the valve.

When necessary, the reacting forces and vibrations during the discharge of a primary circuit and a secondary circuit safety relief valve are measured in connection with the performance test.

In assessing the acceptability of a performance test, special attention is paid to the following points:

- The valve opens at the correct pressure (start-to-leak pressure and the pressure when the valve is completely open).
- The valve closes flawlessly at the correct pressure (the closing pressure difference is sufficient).
- The mechanical operation of the valve is flawless (no chatter or flutter is detected, the valve disk achieves a sufficient lift).
- The relieving capacity of the valve is sufficient; during discharge, the pressure does not exceed the design pressure by more than 10 % while the pressure-generating equipment or system works at full power.
- The valve operates at the correct speed.

- The valves close tightly enough.

- The equipment affecting the control and operation of the valves (e.g. electrical and pneumatic equipment) work as planned.

The performance test is repeated often enough in order to ascertain the reliability of the valve. Between the tests, there shall be an interval long enough for stabilizing the temperatures.

After a completed performance test, it shall be possible to seal the safety relief valve so that the opening pressure and time, as well as the closing pressure and relieving capacity, cannot be changed without breaking the seal.

The inspection of a non-reclosing pressure relief device encompasses at least the data on the nameplate, the certificate of a type test and a properly completed installation.

5 INSERVICE INSPECTION

An inspector employed by STUK performs the inservice inspections of the safety relief valves in Safety Classes 1, 2 and 3, and in Class EYT if the valve must meet the requirements of Safety Class 3. The inservice inspections of the other valves in Class EYT can be performed by an inspector approved by STUK.

A valve-specific inspection plan is prepared for the inservice inspections and submitted to STUK for approval. The program shall show the intervals and times of the performance tests (at the end of an operating cycle before maintenance, after maintenance, in the operating

condition of a nuclear facility), the place of testing (in place/in bench), the times of internal examinations, the non-destructive examinations as per Guide YVL 3.8 /17/, and the supervisors of the inspections. The program shall also include those safety relief valves that are not supervised by STUK in inservice inspections.

The operator of the nuclear facility shall have a valve-specific follow-up system whereby it is possible to follow the operating experience of the valve with the purpose of assessing its reliable operation. Changes to the testing intervals are made on the basis of the above-mentioned data on operating experience. A description of the follow-up system shall be submitted to STUK for information.

The performace test of safety relief valves is carried out following the principles of the previous section "COMMISSIONING INSPECTION". The relieving capacity is measured if it has been adjusted.

6 MAINTENANCE DURING OPERATION

6.1 General

A file shall be compiled of the safety relief valves that are supervised by STUK, including their actuators and pilot devices. All service, repair and other maintenance actions taken with respect to these devices are recorded in this file.

6.2 Preventive maintenance

For the preventive maintenance of safety relief valves in Safety Classes 1, 2 and 3, the power company shall prepare a pre-maintenance program. The purpose of the preventive maintenance actions is to eliminate unexpected

operating disturbances of the valves. Typical actions of this kind are, for instance, replacement of outdated parts, follow-up of the operation of the valve, etc.

STUK controls the actions relating to preventive maintenance by reviewing the component files and by supervising the testing of safety relief valves.

6.3 Reparative maintenance

Reparative maintenance means actions which aim at restoring a malfunctioning or inoperable safety relief valve or its pilot devices to a condition corresponding with the original plans. Requirements concerning repair work and its supervision are presented in more detail in Guide YVL 1.8 /16/. In the case of major repairs, STUK is provided with pre-inspection documents. The repaired valve shall undergo comparable inspections and quality control actions as the original valve. After the actions relating to reparative maintenance, an inspector employed by STUK inspects the repair work and supervises the testing of the valve.

6.4 Modifications

Modifications are maintenance actions after which the safety relief valve and its actuator or pilot device no longer conforms to the original design.

Modifications are carried out in accordance with Guide YVL 1.8 and sections 2...4 of this guide.

6.5 Spare parts

For each safety relief valve and its part, the power company shall have a spare part service system, which regularly monitors both the adequacy and the consumption

of available spare parts.

The approved pre-inspection plan of the safety relief valve and its actuator or pilot device also holds good in the case of spare parts. If any modifications are made, they must be approved separately. Spare parts undergo a construction inspection to the same extent as the original parts.

7 BIBLIOGRAPHY

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

2 ANSI B95.1-1977, Terminology for Pressure Relief Devices

3 DIN 3320, 1972, Sicherheitsventile, Begriffe

4 STUK, Guide YVL 3.0, Nuclear power plant pressure vessels. General guidelines on inspection

5 ASME Boiler and Pressure Vessel Code, Section III, NB-7800, ND-7800

6 ASME PTC 25.2-1966, Safety and Relief Valves with Atmospheric or Superimposed Back Pressure Before Discharging

7 ISO 4126, 1979, Safety Valves - General Requirements

8 VdTÜV-Merkblatt, Richtlinien für die Bauteilprüfung von Sicherheitseinrichtungen gegen Drucküberschreitung, Sicherheitsventil 100, 1974

9 VdTÜV-Merkblatt, Richtlinien für die Bauteilprüfung von Berstsicherungen, Berstsicherung 100, 1969

10 STUK, Guide YVL 2.4, Over-pressure protection and pressdfure control during disturbances in the primary circuit and steam generators of a PWR plant

11 STUK, Guide YVL 1.3, Mechanical components and structures of nuclear power plants. Inspection licenses

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

13 STUK, Guide YVL 3.3,Supervision of the piping of nuclear facilities

14 STUK, Guide YVL 1.15, Mechanical components and structures in nuclear installations. Construction inspection

15 STUK, Guide YVL 3.7, Start-up inspection of nuclear power plant pressure vessels

16 STUK, Guide YVL 1.8, Supervision of repairs and modifications on nuclear power plants during operation

17 STUK, Guide YVL 3.8, Nuclear power plant pressure vessels. Inservice inspections

18 STUK, Guide YVL 5.5, Supervision of electrical and instrumentation systems and components at nuclear facilities

19 STUK, Guide YVL 3.9, Nuclear power plant pressure vessels. Materials and filler metals.

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