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

NUCLEAR POWER PLANT PRESSURE VESSELS.
GENERAL GUIDELINES ON INSPECTION

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1

GENERAL

This guide describes, on the basis of Guide YVL 1.1, the general licensing procedure for, and inspections of, nuclear power plant pressure vessels with respect to design, manufacture, quality control and operation.

The Act on Pressure Vessels (98/73) and Amendments (566/75) and the Statute on Pressure Vessels (549/73) and Amendments (672/75 and 636/77) are also applicable to pressure vessels used at a nuclear power plant as provided in this guide. The Resolutions of the Council of State and the Ministry of Trade and Industry and appropriate SFS Standards are brought to bear on nuclear power plant pressure vessels as well, as set forth in this guide.

This guide is binding on those nuclear power plants the construction of which was commenced after April 1, 1978. Section 6 is, however, applicable to also those power plants that are under construction or in operation when this guide becomes effective.

This guide implies no great changes in the control of nuclear power plant pressure vessels. The designations of pressure vessel inspections are modified to correspond with the terms used in the Statute on Pressure vessels, wherefore the previously used term 'pre-inspection' does not appear in this text.

The new control measures replacing the pre-inspection are

- the approval of a manufacturer presented in section 2
- the general approval of materials presented in section 3
- the inspection of the construction plan presented in section 5

In addition, location plans for pressure vessels as well as the outlines of inservice inspections shall be included in the Preliminary Safety Analysis Report. The classification document specifies on which pressure vessels a stress analysis shall be made.

1.1

Authority

The supervising authority of nuclear power plant pressure vessels is the Institute of Radiation Protection (IRP) (549/73 Chapter 5). However, such pressure vessels as serve exclusively maintenance purposes during the construction of a nuclear power plant are regulated by the Technical Inspectorate. (TI).

1.2

Scope of Application

This guide applies to all pressure vessels at a nuclear power plant, excluding those regulated by TI as set forth in sub-section 1.1. The steam boilers (auxiliary boilers) located on the site of a nuclear power plant are subject to rules and regulations included in this guide where appropriate. Separate instructions for control of pumps, valves and reactor containments of reinforced concrete will be issued by the IRP. This guide is not applicable to pressure vessels of Class EYT mentioned in TI Guide 14/77/P.

1.3

Licenses and Inspections

A brief description of the licensing and inspection procedures associated with the design, manufacture, quality control and operation of pressure vessels at nuclear power plants is given below.

General licenses and approvals

- manufacturing license
- approval of the supervisor of manufacture
- approval of materials
- approval of companies and inspectors to carry out quality control inspections
- approval of construction inspectors
- approval of the operation supervisor licenses

Component-specific licenses, activities and approvals

- inspection of the construction plan
- inspection of the location plan
- construction inspection
- commissioning inspection
- operating license
- inservice inspections

1.4

Definitions

Terms conforming to the Statute on Pressure Vessels are used in this guide unless otherwise stated.

Pressure means over-pressure; the unit of pressure used is megapascal (MPa)

Pressure vessels are divided into pressure tanks and piping. Pressure vessels that are part of a nuclear steam supply system are not called boilers.

Piping means any external network of pipes, or pipe line, including necessary equipment, attached to a pressure tank. The design limit set forth in standard SFS 2610 is used as the design and inspection limit between the piping and the pressure tank.

A weld seam constituting the design limit is considered as a part of the piping.

Safety Class is determined on the basis of the classification document approved by the IRP in accordance with Guide YVL 2.1.

Dangerous liquid and gas. The dangerous nature of the contents is taken into account in the classification effected in accordance with Guide YVL 2.1.

Inspection book means a record, compiled and preserved as agreed with the IRP, containing documents on plans, approvals, inspections etc.

Manufacturing license means the manufacturing license mentioned in section 2 of this guide.

Supervisor of manufacture means the individual mentioned in sub-section 2.2 of the guide.

The IRP has no regional organization. Therefore, when terms like a regional office, or regional manager are used in the Statute on Pressure Vessels or other regulations, they shall be taken to mean the IRP in matters related to nuclear power plant pressure vessels unless otherwise instructed by the IRP.

1.5

Pressure Vessels Requiring Registration

The following pressure tanks at a nuclear power plant shall be registered:

- those pressure tanks of Safety Class 1, 2 or 3 where the product of the numerical values of highest permissible operating pressure (MPa) and volume (m³) is greater than 0.1;
- pressure tanks of Class EYT as provided in the Statute on Pressure Vessels and amendments thereto (the contents of pressure vessels of this class are not considered dangerous)

1.6

Division of Pipings into Groups A and B

Pipings of Safety Class 3 or EYT are divided into groups A and B as follows:

The following pipings belong to Group A:

Piping of Safety Class 3

- 1) which is dimensioned on the basis of the creep or fatigue strength of the material

- 2 which contain substances conducive to corrosion and wear
- 3 where the product of the numerical values of the highest permissible operating pressure (MPa) and the nominal size (mm²) squared is greater than 10³

Piping of Class EYT

- 1 which is dimensioned on the basis of the creep or fatigue strength of the material
- 2 which contains substances conducive to corrosion or wear
- 3 which contain steam or gas with a maximum temperature of 120° C, and where the product of the numerical values of highest permissible operating pressure (MPa) and nominal size (NS) squared (mm²) is greater than 10³ or
- 4 Which exclusively contains liquids with a min. temperature of 100 °C and max. temperature of 120 °C; and the product of the numerical values of highest permissible operating pressure and nominal size (NS) squared (mm²) is greater than 10⁵ or
- 5 which contains exclusively steam, liquid or gas with a temperature higher than 120 °C, and product of the numerical values of highest permissible operating pressure and nominal size squared is greater than 10⁴.

All other piping belongs to Group B.

1.7

Pressure Vessels Containing Dangerous Substances

If a pressure vessel contains dangerous liquid or gas or other dangerous substances, the provisions of the relevant legislation shall be complied with - in addition to the regulations set forth in this guide.

2

MANUFACTURER

This section describes for which activities related to the manufacture and quality control of pressure vessels a license is required.

2.1

Manufacturing License

Pressure vessels may be manufactured only on a license issued by the competent supervising authority. The manufacturing license for pressure vessels of Safety Class 1 or 2 shall be issued by the IRP. Pressure vessels of Safety Class 3 or Class EYT may in Finland be manufactured on a license granted either by the TI or IRP. A copy of the license issued by the TI shall be sent to the IRP.

In filing the application for a pressure vessel manufacturing license with the IRP, the procedure presented in Guide YVL 3.4 shall be followed. The application shall describe what work phases (i.e. welding, moulding heat treatment, finishing) the manufacturer will carry out. As a rule, a welded sample of proficiency is required as a condition for the license.

Normally, the IRP inspects the factory prior to issuance of a manufacturing license.

In case the manufacturer engages sub-contractor to participate in the design or manufacture of the pressure vessel, or to carry out quality control inspections, an explanation of this shall be included in the license application.

Sub-contractors are subject to the same regulations, where applicable, as the manufacturer.

A foreign manufacturer of a pressure vessel of Safety Class 1 or 2 shall comply with Guide YVL 3.4, or he may opt for an alternative course of action: the required information on the manufacturer is provided on the audits during which an inspector in the employ of, or recognized by, the IRP supervises a number of activities. He supervises the manufacture and testing of samples performed as part of the destructive procedure testing as required by the quality control programme; further, he supervises the manufacture of the pressure vessel and related non-destructive tests on a random-check basis. The power company is required to make the necessary arrangements for these inspecting visits.

2.2

Supervisor of Manufacture

A prerequisite for issuance and continued validity of a manufacturing license is that the pressure vessel is manufactured under surveillance of a supervisor of manufacture approved in accordance with Guide YVL 3.4

Provisions on the supervisor of manufacture as well as on applying for supervisory rights are found in Chapter 4 of the Statute on Pressure Vessels and Chapter 7 of the Resolution of the Ministry of Trade and Industry (MTI).

2.3

Quality Control

Inspecting rights for a quality control organization and inspectors are applied for following the procedure presented in Guide YVL 1.3.

If the manufacturer inspects only his own products, the application for inspecting rights for the quality control department and inspectors can be filed simultaneously with the application for a manufacturing license.

2.4

Up-dating Information Pertaining to the Manufacturing License

The manufacturer is required to keep the IRP informed of developments pertaining to the manufacturing license by submitting revised documents, for approval if need be, on changes specified in Guide YVL 3.4.

3

MATERIALS

Only approved materials and welding filler materials may be used for the manufacture of a nuclear power plant pressure vessel.

A description of the procedure for the general approval of materials to be used for pressure vessels is given in this section. A more detailed account of the procedure is found in Guide YVL 3.9.

The component-specific approval of a material is granted in connection with the inspection of the construction plan. A valid manufacturing license for a pressure vessel is required as well. The suitability of the material for intended use shall be demonstratable on the basis of a standard, for example, and due allowance shall be made for operating conditions when selecting materials. The procedure for a component-specific approval of a material is presented in section 5.

3.1

Approval of Materials

The SFS Standards on pressure vessels as confirmed by the Finnish Standardization Board serve as a basis for approval of materials for pressure vessels. The following general requirements are the basis for material criteria.

The following materials shall be used for manufacture of pressure vessels

- 1 pressure vessel steels conforming to the standards SGS 1100 or 1150
- 2 structural steels conforming to the standard SFS 200 as provided on the use of structural steel for pressure vessels in the standard SFS 2033
- 3 steel pipes, forgings and castings conforming to SFS standards as provided on their use for pressure vessels
- 4 other materials conforming to SFS standards as provided on their use for pressure vessels

In addition to materials conforming to aforementioned SFS standards, materials approved by the Finnish representation in the NGS (Nordiska Gruppen för Stålbestämmelser), or by the IRP or TI are considered as generally acceptable to be used for pressure vessels.

Other materials which are approved by an authority equivalent to the IRP or TI in the country of manufacture are acceptable in Finland as such in Safety Class 3 and Class EYT. A description of this shall be included in the construction plan. As for Safety Classes 1 and 2, the general acceptability of materials shall be demonstrated by submitting to the IRP more extensive descriptions of the process, such as results of the testing performed prior to the initial approval.

Other materials need be approved by the IRP as well. A separate application for approval is filed.

3.2

Approval of Welding Materials

In Finland, welding materials approved by the IRP or TI shall be used in welding nuclear power plant pressure vessels.

The qualification of welding materials for intended use can be demonstrated by testing them according to standards SFS 2224, SFS 2225 or SFS 3656.

Materials that cannot be tested as required by the standards listed above may be shown to be qualified for intended use through sufficiently extensive testing in connection with the procedure test, for example.

Welding materials approved for a specific purpose by a body in the manufacturing country equivalent to the IRP or TI may as well be used for manufacture of pressure vessels to be imported into Finland. A description of the approval shall be presented to the IRP when the construction plan is submitted for approval.

The use of welding materials in specific components and welds shall be presented and submitted for approval together with the construction plan.

3.3

Effect of Neutron Radiation on Material Properties

Materials for use in areas subjected to neutron radiation during operation may be selected only when it is known how their properties are changed by radiation. Research findings describing the change of properties shall be submitted to the IRP at the time of the filing of the application for approval of materials.

A detailed surveillance programme for monitoring the change in material properties shall be delivered to the IRP together with the construction plan.

3.4

Testing and Marking of Materials

Inspections and material testing are carried out by a material testing institute or inspector recognized by the supervising authority. Inspection and material testing rights can be had on application to the IRP following Guide YVL 1.3.

The materials used in manufacture of a pressure vessel shall be clearly identifiable during all phases of the work.

Material that in the manufacture of the pressure vessel or otherwise turns out to be unsuitable must not be used. The material may not contain cracks, laminations or other flaws that affect the strength of the pressure vessel. Minor defects existing in the material or caused by the manufacturing process may be repaired but only using methods conforming to the material standards.

4

DESIGN, MANUFACTURE AND QUALITY CONTROL

This section deals with the functional and technical requirements for the design, and quality control of pressure vessels.

The design, manufacture and quality control of pressure vessels in Safety Class 1 and of the most important vessels in Class 2 shall meet the criteria set forth in Guide YVL 1.4.

The principles presented in this section are applicable to imported pressure vessels as well.

4.1

Design

Pressure vessels shall be designed to meet the criteria set forth in Guides YVL 3.1, 3.2, 3.3, and 3.5 as well as SFS Standards.

The design criteria for pressure vessels in Safety Classes 1, 2 and 3, like the technical standard for quality control for example, are not dealt with in detail in YVL Guides and Standards. Therefore, it is appropriate that a document describing the design and quality control criteria for each unit at the facility is prepared before the component-specific construction plans, and submitted to the IRP for approval. The review of the document takes about half a year.

4.2

Manufacture

The pressure vessel is fabricated in accordance with the design and construction plan approved by the IRP and the license conditions as well as under surveillance of a recognized supervisor of manufacture.

Standards SFS 1105, 2218, 2223, 2224, 2225, 2226, 2229, 2775, 3326 and 3656 shall be complied with in welding a pressure vessel unless the IRP approves of, or requires, other methods when reviewing the construction plan. The welding of pressure vessels of Safety Class 1 and 2 must be based upon the results obtained in the procedure tests preceding the operation. When parts are joined to the pressure frame by welding, the same regulations apply as in welding the pressure frame itself.

If it is required that the pressure vessel be subjected to heat treatment after completed welding, all welding following the heat treatment is permitted only when it is done in compliance with a repair plan approved by the IRP.

The heat treatment of a pressure vessel is subject to regulations set forth in standards SFS 1105 and 2223. In case these standards cannot be applied, the heat treatment shall be effected in compliance with some other standard or guide approved as part of the construction plan.

4.3

Quality Control

Quality control shall be carried out by an organization independent of the manufacturing process and approved according to Guide YVL 1.3.

Inspection instructions and the quality control programme approved by the IRP as part of the construction plan must be adhered to in quality control.

If the construction plan does not contain a quality control programme, the inspections are carried out according to standards SFS 2226, 3207, 3284 3286 and 3287 or separate inspection instructions approved by the IRP.

The quality control inspections shall be timed so that they give a reliable indication of the quality of the finished product. The chronological order of the various operations must be presented in the construction plan.

The manufacture, installation and quality control of pressure vessels of Safety Class 1 and of the most important pressure vessels in Safety Class 2 shall be supervised by a competent organization independent of the named operations. A plan for the implementation of supervision shall be submitted to the IRP as part of the construction plan, or separately.

When a deviation from the acceptable limit defined in the quality control programme or appropriate standards is detected, a deviation report is prepared. If the deviation is significant, the report, giving a description and the cause of the deviation and a potential repair plan, shall be sent to the IRP for approval following the procedure laid down for the construction plan.

The records control and deviation reports and other resultant documentation of quality control activities shall be presented for inspection when the construction inspection is made, and then appended to the inspection book and handed over to the purchaser of the pressure vessel. The power company is required to preserve these documents with care throughout the service life of the pressure vessel. The IRP and the supervisor of operation shall have access to the material.

5 INSPECTIONS

This section deals with the official inspections that are conducted before the pressure vessel is placed in service.

5.1 Inspection of the Construction Plan

5.1.1

General

A construction plan shall be made for the pressure vessel. Manufacture may not begin before it is approved by the IRP. The holder of the operating license (the power company) is required to submit the construction plan in triplicate for review as provided in Guide YVL 1.2. The examination of the plan determines whether the pressure vessel meets the criteria set forth in the guide. Additional requirements concerning the structure and inspection of the pressure vessel are issued to ensure safe operation.

This guide applies also to the construction plan of pressure vessels to be imported.

A stress analysis shall also be made on a pressure vessel when required by Guide YVL 3.5. The stress analysis must be approved by the IRP prior to the commissioning of the nuclear power plant.

In the construction inspection, the IRP inspectors are authorized to approve of deviation reports of minor changes made in the construction plan approved by the IRP. Similarly, they are entitled to approve of plans for minor repairs and modifications of pressure vessels.

5.1.2 Pressure Tanks

A construction plan conforming to Guide YVL 3.1 shall be made for pressure tanks of Safety Class 1 and 2. For tanks in Safety Class 3 or EYT, a construction plan in accordance with Guide YVL 3.2 is required.

5.1.3 Piping

The construction plans are approved as separate units defined by the design limits in the various Safety Classes as follows:

1. Safety Classes 1 and 2

The approval is granted following the provisions in Guides YVL 3.1 and 3.3. The IRP may issue special orders deviating from the guides when required by the operating conditions, intended use or size of the piping.

2 Safety Class 3 and Class EYT

The approval is granted following the Guide YVL 3.3

An approval of the so called piping description, presenting the principles of the construction plan, is required of all piping in Safety Class 3 or EYT. The piping description shall contain at least the following information:

- a description of the piping area involved
- materials including references to standards
- dimensioning standards
- standards of supports
- welding instructions
- quality control standards or programmes
- pressure test results

Excluding the instances listed in Guide YVL 3.3, no IRP approval of a construction plan for Group A piping is required if the piping description has been found acceptable.

No IRP approval of a construction plan for Group B piping is required.

5.2

Inspection of Location Plan

The inspection of the location plan for pressure vessels is part of the inspection of the Preliminary and Final Safety Analysis Reports mentioned in Guide YVL 1.1. Information on the location of the pressure vessels shall be included in the aftermentioned documents.

The location of pressure vessels shall meet the criteria set forth in standards SFS 3206, 3323, 3330, 3331, 3332 and 3333. Moreover, it must be ensured that the pressure vessel is accessible enough to enable the inservice inspections conducted with Guide YVL 3.8.

5.3

Construction Inspection

5.3.1

General Requirements

The pressure vessel shall be subjected to a construction inspection which consists of examination of the quality control documentation, control of the implementation of the construction plan and quality of the work and a pressure test.

The request for an inspection shall be submitted to the IRP as provided in Guide YVL 1.2. The request must be made early enough so that the pressure vessel can

be inspected during manufacture. If accessibility to some part of the pressure vessel becomes more difficult as the manufacture proceed, the part involved shall be inspected before the work is continued.

The construction inspection is conducted in conformity with standard SFS 3270 unless otherwise instructed in the guide. Records shall be kept of the inspection.

The data required by Standard SFS 3270 shall be stamped on the pressure frame and nameplate of the pressure vessel during the construction inspection.

The inspector is required to verify whether the data printed on the frame and the nameplate conform to existing regulations, and to stamp the registration mark on the pressure frame and the registration mark and his own signet on the nameplate.

5.3.2

Pressure Tanks in Safety Classes 1, 2 and 3

The construction inspection of pressure tanks in Safety Class 1, 2 and 3 is conducted in accordance with sub-section 5.3.1 General Requirements. A more extensive inspection than that required by Standard SFS 3270 can be made as needed, and it may include a leak test, for example. As a rule, the IRP conducts the construction inspection of pressure vessels manufactured abroad.

The IRP shall be notified of commenced manufacture of a pressure vessel in Safety Class 1 and 2 and kept informed of the progress of the work.

5.3.3

Pressure Tanks in Class EYT

The construction inspection is conducted in accordance with sub-section 5.3.1 General REquirements. In case of an imported pressure vessel, certain parts of the construction inspection can be performed abroad by an inspector recognized by the IRP. Such partial inspections include the proficiency of welder, a visual inspection - of parts that are inaccessible in a finished product - and a pressure test, provided that an acceptable certificate of such an inspection is presented. However, a prerequisite for approval of such inspections is that they are conducted in accordance with the guides and construction plan approved by the IRP, and that no occasion to repeat the inspection arises.

5.3.4

Pressure Vessels Not Requiring Registration

Pressure vessels that need not be registred are subject to following regulations:

- 1) The construction inspection is made by an inspector employed, ordered or recognized by the IRP in accordance with Standard SFS 3270.

The inspector is approved by the IRP on application as provided in Guide YVL 1.3.

- 2) Serially produced pressure vessels are inspected individually as well.
- 3) The owner is under obligation to preserve the documents compiled on, and serving as a basis for, the construction inspection of piping.
- 5) No construction inspection is required if the product of the numerical values of highest permissible operating pressure (MPa) and volume (m^3) is not greater than 0.001.

5.3.5 Piping

The construction inspection of piping is made following the regulations laid down in sub-section 5.3.1 where applicable.

Pipings in Safety Class 3 are subject to the following regulations:

- 1) The construction inspection is carried out by an inspector ordered or recognized by the IRP.
- 2) The construction inspection shall be conducted in accordance with the relevant guide approved by the IRP.
- 3) The owner is under obligation to preserve the documents compiled on, and serving as a basis for, the construction inspection of the piping involved.
- 4) No construction inspection is required if the piping belongs to Group B. The power company shall assure that the piping is installed in accordance with relevant regulations and plans.

5.3.6 Inspection Book

The manufacturer, or importer, of the pressure vessel shall put together all the documents on the pressure vessel to be registered into an inspection book which is handed over to the owner or holder of the pressure vessel when the construction inspection is held. The supervisor of pressure vessel operation must have access to the book.

5.4 Commissioning Inspection

A pressure vessel may not be put to service until it is approved in an commissioning inspection. The inspection is made by the IRP. The pressure vessel, may,

be used in preparation for actual operation with a written permission given, and in compliance with the conditions imposed, by the IRP.

The commissioning inspection is conducted to verify that the pressure vessel has been approved in the construction inspection and that it is fitted with necessary accessories that function as designed. Compliance with the location plan and the competence of operation supervisor is checked and the general inspection of the facility conducted independently of the commissioning inspection.

The commissioning inspection is carried out according to Guide YVL 3.7.

No commissioning inspection is conducted of piping belonging to Group B.

6

OPERATION

6.1

Operating License

The inspector performing the commissioning inspection issues a preliminary operating license for the pressure vessel by making a note of it in the inspection record.

The IRP issues a written operating license for a nuclear power plant pressure vessel without a specific application upon approval of the commissioning inspection. The operating license shall be preserved at the facility over the entire life of the pressure vessel. The operator, operation supervisor and the authorities must have access to the license.

The IRP may, on the basis of an inspection, withdraw the license or modify its conditions, if the pressure vessel does not satisfy relevant criteria, or if it is operated in violation of existing regulation.

6.2

Inservice Inspection

6.2.1

Inservice Inspections Required by the Statute on Pressure Vessels

The inservice inspections to be conducted for a registered pressure vessel in operation include a full inspection, internal inspection and operating inspections. The piping referred to in Chapter 11, Paragraph 2 of the Resolution of the Ministry of Trade and Industry shall also be subjected to inservice inspections. They are made by the IRP. The dates for inspections are determined by the Resolution (69/75) of the Ministry of Trade and Industry on the Application of the Statute on Pressure Vessels and marked in the

operating license and the record kept on inspections. Standards SFS 3334 and SFS 3338 are followed in in-service inspections where applicable. In certain cases, the above regulations cannot be observed because of the radioactive contents of the pressure vessel.

6.2.2

Inservice Inspections Required by Guide YVL 3.8

Inservice inspections in accordance with Guide YVL 3.8 shall also be made. They are conducted by an inspection agency recognized by the IRP. The application for approval as an inspector is filed with the IRP following the procedure laid down in Guide YVL 1.2.

For inspections, the owner of the nuclear power plant is under obligation to prepare a summary programme complete with the objects, scope, methods and dates of inspection. The summary programme shall be submitted to the IRP early enough so that the Institute can review it before giving the requested statement on the license for the plant unit involved.

Prior to commissioning, a so called preservice inspection is made, the results of which can be compared with the findings of subsequent inservice inspections. A detailed programme for preservice and subsequent in service inspections shall be prepared and submitted to the IRP for approval at least one month in advance of each inspections. Activities related to inservice inspections are dealt with in Guide YVL 3.8.

6.3

Additional Inspections

Additional inspections are conducted because of repairs and modifications made in the pressure vessels, or because of changes in the operating parameters, modes or pressure vessel accessories. Additional inspections are conducted by the IRP or an inspector approved by the IRP to carry out required inspections. Standards SFS 3334 and SFS 3338 are applicable to these inspections.

6.4

Operator and Supervisor of Operations

For each registered pressure vessel, a supervisor of operation and his alternate or alternates, shall be appointed. (Chapter 14 of the Statute on Pressure Vessels 549/73). They must have the knowlegde and competence required by Chapters 25 and 26 of the Statute on Pressure Vessels. The IRP grants approval as a operation supervisor and alternate(s) in response to written application.

The operation supervisor shall personally control the operation and condition of the pressure vessel and communicate with the IRP on matters related to supervision and inspections. Further, the supervisor must assure that the inservice inspections of the pressure vessel can be carried out at appointed times and that the required entries in the inspection book are made by him (Statute on Pressure Vessels 549/73, Chapter 25)

A sufficient number of operators shall be appointed for the pressure vessels at the facility by the owner of the nuclear power plant. The operator is responsible for personally manipulating the pressure vessel during operation. He shall be at least 18 years of age and competent in his work.

The operator shall operate and tend the pressure vessel according to the orders and instructions given by the operation supervisor.

6.5

Damages; Reporting Damages

When a pressure vessel is damaged, the operation supervisor shall immediately notify the IRP of the event. In case of personnel injury, or damage to property or environment, the supervisor is also required to report the event to the chief of police in the district where the pressure vessel is situated.

The Institute of Radiation Protection will immediately assign an expert to investigate the damage. The operation supervisor shall assure that the damages and the threat to the environment are kept to a minimum and the scene of the accident blocked off. He is also under obligation to assist the authorities in the investigation of the causes of damages. (Chapter 29 of Statute on Pressure Vessels).

6.6

Repairs and Modifications; Spare Parts

If the structure of a pressure vessel is to be modified, the construction plan shall be submitted for approval with respect to the modification following the same procedure as in the case of a new pressure vessel.

The regulations concerning the design, manufacture and installation of pressure vessels apply to the design, performance and control of repairs and modifications as well.

A note of each repair or modification is made in the inspection book. In case of a pressure vessel that is not required to be registered, a description of the actions taken shall be appended to other pressure vessel documents.

Spare parts shall be inspected in the same way as the parts they are meant to replace.

6.7

Decommissioning and Returning to Service

The regulations concerning inservice inspections presented in sub-section 6.2.1 are not applicable to a pressure vessel if the authorities are notified in writing that the pressure vessel is taken out of service. If the pressure vessel is disused for more than a year, an operating inspection is required when it is returned to use. An operating inspection shall also be conducted when the pressure vessel is moved to another place. The IRP:s permission is required for removal. A full inspection of the repaired pressure vessel is required before it is returned to service, unless the inspector deems that the effect of the repairs on the operating safety of the pressure vessel can be assessed to sufficient degree in some other way.

7

LITERATURE

7.1

Acts and Statutes and Resolution of the Council of State and Ministries

98/73	Act on Pressure Vessels
566/75	Act on Amendments to Chapter 9 of the Act on Pressure Vessels
549/73	Statute on Pressure Vessels
672/75	Statute on Amendments to the Statute on Pressure Vessels
70/75	Resolution of the Ministry of Trade and Industry on Pressure Vessels Specified in Chapter 4 of the Statute on Pressure Vessels
71/75	Resolution of the Ministry of Trade and Industry on Pippings Connected to Pressure Vessels
197/42	Standardization Act
837/71	Resolution of the Council of State on Dimensioning of Pressure Vessels and their Parts
619/71	Resolution of the Council of State on Pressure Vessel Materials
232/71	Resolution of the Council of State on Welding of Pressure Vessels
356/57	Atomic Energy Act
7/73	Act on Amendments to Atomic Energy Act
74/77	- " -
75/58	Atomic Energy Statute
735/70	Statute on Amendments to the Atomic Energy Statute
555/73	- " -
75/77	- " -
536/74	Act on the Institute of Radiation Protection
103/75	Statute on the Institute of Radiation Protection
124/76	Statute on Fees Charged for Safety Control of Nuclear Power Plants

7.2

Guides Issued by the Institute of Radiation Protection and Technical Inspectorate

YVL 1.1	The Institute of Radiation Protection as the Supervising Authority of Nuclear Power Plants
YVL 1.2	Formal Requirements for the Documents Submitted to the Institute of Radiation Protection
YVL 1.3	Acceptance of Separate Inspecting Bodies to Carry Out Inspections of Main Components and Systems of Nuclear Power Plants
YVL 1.3	Quality Control of Nuclear Power Plant Components. Licensing of Inspection Agencies and Inspectors
YVL 1.4	Quality Assurance Programme for Nuclear Power Plants
YVL 2.1	Safety Classification of Nuclear Power Plant Systems, Structures and Components
YVL 3.1	Nuclear Power Plant Pressure Vessels. Construction Plan. Safety Classes 1 and 2
YVL 3.2	Nuclear Power Plant Pressure Vessels. Safety Class 3 and Class EYT
YVL 3.3	Nuclear Power Plant Piping. Construction Plan
YVL 3.4	Nuclear Power Plant Pressure Vessels. Manufacturing License
YVL 3.5	Nuclear Power Plant Pressure Vessels. Stress Analysis
YVL 3.7	Nuclear Power Plant Pressure Vessels. Inservice Taking Inspection
YVL 3.8	Nuclear Power Plant Pressure Vessels. Inservice Inspections
YVL 3.9	Nuclear Power Plant Pressure Vessels. Materials

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List of pressure vessels not subject to rules and regulations concerning manufacture inspection and operation

7.3

Standards

SFS 200, 1100, 1101, 1105, 1150, 2033, 2218, 2223, 2224, 2225, 2226, 2229, 2610, 27775, 3206, 3207, 3270, 3284, 3286, 3287, 3323, 3326, 3329, 3330, 3332, 3333, 3334, 3338, 3656