Finnish Centre for Radiation and Nuclear Safety as the regulatory authority for the use of nuclear energy

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Authorization

The Finnish Centre for Radiation and Nuclear Safety (STUK) issues detailed regulations concerning the safety and physical protection of nuclear power plants and safeguards by virtue of Section 55, paragraph 2, point 3 of the Nuclear Energy Act (990/87), Section 29 of the Decision of the Council of State on the General Regulations for the Safety of Nuclear Power Plants (395/91), Section 11 of the Decision of the Council of State on the General Regulations for Emergency Response Arrangements at Nuclear Power Plants (397/91) and Section 13 of the Decision of the Council of State on the General Regulations for Physical Protection of Nuclear Power Plants (396/91).

The YVL guides are rules any individual licensee or any other organization concerned shall comply with unless some other acceptable procedure or solution is presented to STUK by which the safety level laid down in an YVL guide is achieved.

Translation. Original text in Finnish.

1 General

General bases for the use of nuclear energy and for regulatory control are enacted in the Nuclear Energy Act (990/87) and Decree (161/88).

Use of nuclear energy requires the decisions referred to in the Nuclear Energy Act. According to Section 9 of the Nuclear Energy Act, it shall be the licensee's obligation to take care of the safety of the use of nuclear energy and of such physical protection, emergency response and other arrangements necessary to reduce nuclear damage, as do not rest with the authorities.

According to Section 55 of the Nuclear Energy Act, regulatory control of the use of nuclear energy rests with STUK. In addition, STUK shall be responsible for taking care of the regulatory control of physical protection, emergency response arrangements and safeguards of nuclear materials. Chapters 8 and 10 of the Nuclear Energy Act and Chapter 15 of the Nuclear Energy Decree deal with the obligations of and the regulatory rights vested in STUK and the control over the use of nuclear energy exercised by the Centre.

The Advisory Committee on Nuclear Safety appointed by the Council of State acts in cooperation with STUK for the preparatory review of issues relating to the safe use of nuclear energy. The Committee's duties are laid down by Decree (164/88). The Committee issues statements on STUK's request. If need be, the Committee also submits suggestions within the scope of its functions.

This guide summarizes STUK's regulatory functions during nuclear power plant licensing, construction and operation. This guide is also applied to other nuclear facilities.

For the purposes of this guide, nuclear power plant shall refer, in the first place, to a nuclear facility having a thermal power greater than 50 megawatts which is equipped with a nuclear reactor intended for electricity generation. According to Section 11, paragraph 2 of the Nuclear Energy Act, such a facility is a nuclear facility of considerable general significance the construction and operation of which requires the following decisions:

- Decision in Principle of the Council of State,
- construction licence and
- operating licence.

In accordance with Section 9 of the Nuclear Energy Act, a licensee whose operations generate or have generated nuclear waste must take care of all nuclear waste management measures and their appropriate preparation, and is responsible for their costs. Nuclear waste management is dealt with in this quide only where it is closely associated with licensing and operation of nuclear power plants. This guide is not concerned with decommissioning of nuclear power plants or disposal of reactor waste and spent nuclear fuel.

2 Review of licence applications submitted in accordance with the nuclear energy act

2.1 Decision in Principle of the Council of State

2.1.1 Application and its review

The construction of a nuclear power plant requires the Decision in Principle of the Council of State stating it is in line with the overall good of society. According to Section 15 of the Nuclear Energy Act, the Decision in Principle shall be given to Parliament for review so that Parliament may reverse the Decision in Principle as such or may decide that it remains in force as given.

The regulations concerning the application for and the review of the Decision in Principle are contained in Sections 12 – 15 of the Nuclear Energy Act and Sections 23 – 30 of the Nuclear Energy Decree.

In the application, one or several plant site and plant type options may be given on which a decision will be made later.

The application shall be supplemented with the documents listed in Section 24 of the Nuclear Energy Act.

In accordance with Section 12 of the Nuclear Energy Act, STUK shall make a preliminary safety assessment of the application. The safety assessment deals with the potential for complying with the provisions of the Nuclear Energy Act and Decree and with the provisions of the Decisions of the Council of State /1,2,3/ issued by virtue of Section 81 of the Nuclear Energy Act.

When preparing the safety assessment, STUK invites comments on the assessment from the Advisory Committee on Nuclear Safety and, where necessary, also from other expert organizations.

The Council of State considers the making of the Decision in Principle in accordance with Section 14 of the Nuclear Energy Act. STUK therefore presents in its safety assessment whether factors have arisen indicating a lack of sufficient prerequisites for constructing a nuclear facility as prescribed in Section 6 of the Act. Furthermore, STUK takes a stand on the fulfillment of statutory requirements as regards the issues to be reviewed by STUK.

2.1.2 Documents to be submitted to the Finnish Centre for Radiation and Nuclear Safety

In addition to the documents referred to in Section 24 of the Nuclear Energy Act, whoever applies for the Decision in Principle shall forward to STUK the documents dealing with the plant options in question. The documents aim to prove that the plant options in question can be realized in conformity with the regulations in force. For each facility option, the documents shall cover i.a. the following items:

- description of the facility and its reactor, primary circuit and containment as well as other safety systems,
- reference to facilities which have served as models and a description of the most important changes in comparison to them,
- description of the safety analyses performed for the facility and
- general plans for the facility's implementing organization, the suppliers of the facility and the most important systems and components as well as quality assurance during implementation.

As regards each facility option, STUK requests, at its discretion, other information necessary for the preliminary safety assessment.

2.2 Construction licence

2.2.1 Licence application and its review

A nuclear power plant construction licence shall be applied for from the Council of State. The application for a licence and its review are dealt with in Sections 16, 17, 18, 23, 24 and 25 of the Nuclear Energy Act and Sections 31, 32, 35, 37, 38, 39 and 40 of the Nuclear Energy Decree.

The application shall be supplemented with the documents listed in Section 32 of the Nuclear Energy Decree.

STUK issues a statement on the application for a construction licence. The statement is supplemented with a safety assessment. When preparing the safety assessment, STUK invites statements on it from the Advisory Committee on Nuclear Safety and, where necessary, also from other expert organizations.

The prerequisites for granting a construction licence are prescribed in Sections 18 and 19 of the Nuclear Energy Act. In its safety assessment STUK takes a stand on the fulfillment of statutory requirements as regards the issues to be reviewed by STUK.

2.2.2 Documents to be submitted to the Finnish Centre for Radiation and Nuclear Safety

The documents to be submitted to STUK when applying for a construction licence are listed in Section 35 of the Nuclear Energy Decree. In addition, the applicant has to forward to STUK the Preliminary Probabilistic Safety Assessment. The requirements for these documents are described below. STUK gives a statement on the construction licence

application only after having approved of the essence of each of these documents by a separate decision.

Preliminary Safety Analysis Report

The purpose of the Preliminary Safety Analysis Report (PSAR) is to demonstrate that safety regulations and factors affecting safety have been adequately covered.

In the PSAR, at least the following items shall be accounted for: a description of the nuclear power plant's safety principles and other design criteria and their fulfillment, a detailed description of the plant and the site, a description of plant operation and behaviour in transient and accident conditions and the environmental impact of the plant's operation. Preliminary liaison with STUK on the contents of the safety analysis report is required. An example of the contents of the safety analysis report is given in Ref. 4.

In the PSAR, a reference shall be made to the topical reports which play an essential role in the assessment of the safety analysis report.

The purpose of topical reports is to give a detailed description of the kind of experimental research and theoretical analyses on which the plant's design is based. The reports may be related to the facility in question or to an other facility of a similar type designed by the same supplier.

Topical reports concerning i.a. the fuel, reactor, reactor pressure vessel, safety systems and containment shall be submitted. The reports shall present research results important to design and detailed descriptions of the calculational models employed for design and the codes employed for computer analysis.

Topical reports shall be forwarded to STUK for approval so that they can be reviewed not later than in conjunction with the review of the corresponding item in the safety analysis report.

The requirements for accident analyses are presented in Guide YVL 2.2.

Proposal for a Classification Document

The classification by their safety significance of structures, systems and components important to the nuclear power plant's safety shall be presented in the classification document.

Safety Class affects the requirements placed on design, manufacture, installation, testing and inspections. STUK's regulatory control as regards each item is determined on the basis of the Safety Class.

The safety classification requirements are presented in Guide YVL 2.1.

Quality assurance for construction

The systematic procedures followed in their quality-related activities by the organizations taking part in the nuclear power plant's design and construction shall be presented in quality assurance programmes.

In addition to the licence applicant's quality assurance programme, the quality assurance programmes of at least the facility's main supplier, the supplier of fuel and the most important components and equipment shall be submitted to STUK for review. STUK also requests for review, at its discretion, the quality assurance programmes of other organizations which play a significant role in the carrying out of the facility project.

The quality assurance requirements are presented in Guide YVL 1.4.

Plans for physical protection and emergency response arrangements

Physical protection aims at thwarting any unlawful activities against a nuclear power plant. A plan for physical protection during nuclear power plant construction and operation shall be presented in the preliminary security plan. The plan deals with plant protection by structural means and with administrative procedures.

Emergency response arrangements are intended to restrict nuclear damage at the nuclear power plant and on-site in the event of an accident. A plan for emergency response arrangements during nuclear power plant operation shall be presented in the preliminary emergency plan. The plan deals with the taking into account of emergency response arrangements in plant design, and with administrative procedures.

General regulations for physical protection and emergency response arrangements are presented in Ref. 2 and 3. Detailed requirements are presented in Guides YVL 6.11 and YVL 7.4.

Plan for the arrangement of the necessary control to prevent the proliferation of nuclear weapons

Safeguards control intends to ensure that nuclear materials will not be used for the fabrication of nuclear weapons or other nuclear explosives. The plant design data, which include basic information of plant layout and operation and a description of safeguards control at the plant, shall be presented in the plan for the arrangement of control.

The requirements concerning safeguards control and STUK's regulatory control measures are presented in Guide YVL 6.1.

Preliminary Probabilistic Safety Assessment (Mini-PSA)

Mini-PSA means a preliminary analysis at Level 1 of the Probabilistic Safety Assessment (PSA). Level 1 constitutes the first part of the safety assessment in which the probability of reactor core damage is analysed. The Mini-PSA is based on the design phase facility plan and examines the most important accident initiating events.

The requirements concerning Probabilistic Safety Assessment are presented in Guide YVL 2.8.

Measures to ensure regulatory control

In accordance with Section 35 of the Nuclear Energy Decree, the applicant for a licence shall describe the arrangements for the realization of the regulatory control by STUK both in Finland and abroad.

2.3 Operating licence

2.3.1 Licence application and its review

A nuclear power plant operating licence is applied for from the Council of State. The application for a licence and its review are addressed in Sections 16, 17, 20, 23, 24 and 25 of the Nuclear Energy Act and Sections 33, 34, 36, 37, 38, 39 and 40 of the Nuclear Energy Decree.

The licence application shall be supplemented with the documents listed in Section 34 of the Nuclear Energy Decree.

STUK issues a statement on the application for an operating licence to which a safety assessment is attached. When preparing the statement, STUK invites comments on the assessment from the Advisory Committee on Nuclear Safety and, where necessary, also from other expert organizations.

The prerequisites for granting the operating licence are presented in Section 20 of the Nuclear Energy Act. In its safety assessment STUK takes a stand on the fulfillment of statutory requirements as regards the issues to be reviewed by STUK.

2.3.2 Documents to be submitted to the Finnish Centre for Radiation and Nuclear Safety

When applying for an operating licence, the documents referred to in Section 36 of the Nuclear Energy Decree shall be submitted to STUK for approval. The requirements for these documents are presented below. STUK gives a statement of the application for an operating licence only after having approved of the essence of each of these documents by a separate decision.

Final Safety Analysis Report

The general requirements for the Preliminary Safety Analysis Report also apply to the Final Safety Analysis Report. The Safety Analysis Report together with its accident analyses and topical reports shall be based on actual nuclear

power plant systems, structures and components. As a rule, the Safety Analysis Report shall be made in Finnish. On application, STUK may give its approval for separately defined parts of the Safety Analysis Report to be written in some other language only.

In addition to the information on the nuclear power plant and the plant site, also descriptions of plant commissioning and operation shall be presented in the Final Safety Analysis Report.

Probabilistic Safety Assessment

A Probabilistic Safety Assessment (PSA) shall contain analyses at PSA Levels 1 and 2. Level 2 means an assessment of the likelihood and quantity of the releases of radioactive materials. The analyses shall be based on actual nuclear power plant systems, structures and components.

The requirements concerning Probabilistic Safety Assessment are presented in Guide YVL 2.8.

Quality assurance programme for operation

The systematic procedures which during nuclear power plant operation are applied to activities affecting quality shall be stated in the quality assurance programme for operation.

The requirements for the quality assurance programme are presented in Guide YVL 1.9.

Technical Specifications

The Technical Specifications shall determine the limit values for the process parameters most important to safety which are to be observed in the plant's various operational states as well as the limitations caused to plant operation by possible component failures. The Technical Specifications shall also state the requirements for the tests and inspections important to safety by which the operability of systems and components is periodically ensured. Furthermore, the Technical Specifications shall determine the minimum number of personnel required to be present during the various nuclear power plant operational states as well as the radioactive materials release limits.

Summary programme for inservice inspections

The inservice inspections of components and structures important to safety to be conducted periodically after commissioning, shall be laid down in the summary programme for inservice inspections. The programme contains the items scheduled for inspection and their scopes, methods and periods of inspection.

The inservice inspections requirements are presented in Guide YVL 3.8.

Physical protection and emergency response arrangements

Plant lay-out, systems and components as well as the structure and areas of responsibility of the plant's operating organization shall be taken into account in the security and emergency plans.

The requirements concerning the contents of the security plan are presented in Guide YVL 6.11.

The requirements for the contents of the emergency plan are presented in Guide YVL 7.4.

Arrangement of the necessary control to prevent the proliferation of nuclear weapons

The arrangement of control is presented in the manual for the nuclear materials accounting and control system.

The requirements concerning the accounting and control system are presented in Guide YVL 6.9.

Administrative rules

The duties, authority and responsibility of a nuclear facility's responsible manager, his deputy and the personnel directly required to operate the facility shall be specified in the administrative rules, as stipulated in Section 122 of the Nuclear Energy Decree.

Furthermore, the administrative rules shall state the competence requirements for the personnel.

The duties, authority and responsibility of the licensee's organizational units shall be more extensively presented in a separate organizational manual or some other corresponding document which shall be forwarded to STUK for information.

Environmental radiation monitoring

The systematic measures to monitor the occurrence in the nuclear power plant's vicinity of radioactive materials originating in the nuclear power plant shall be presented in the environmental radiation monitoring programme. Measures in accordance with the programme shall be initiated already prior to the plant's commissioning.

The requirements for the environmental radiation monitoring programme are presented in Guide YVL 7.7.

3 Regulatory control of construction and commissioning

According to Section 108 of the Nuclear Energy Decree, the various phases of nuclear facility construction may be started only after STUK is satisfied for each phase, on the basis of the documents referred to in point 2.2.2 and other detailed plans and documents required by the Centre, that factors affecting safety and safety regulations have been adequately taken into account.

According to Section 109 of the Nuclear Energy Decree, STUK exercises detailed control over the construction of the facility. This control aims to ensure that the conditions of the construction licence, the regulations which apply to pressure vessels and the approved plans referred to in point 2.2.2 are complied with and that the nuclear facility is built, also in other respects, in accordance with the regulations issued by virtue of the Nuclear Energy Act. During construction, control is focused on the working methods in particular to guarantee high quality.

According to Section 113 of the Nuclear Energy Decree, inspection and testing of nuclear facility systems, structures and components can be performed only by the licensee or, in his place, by an inspector or an inspection facility that has been specifically accepted by STUK for this purpose.

According to Section 123 of the Nuclear Energy Decree, the licensee shall appoint a responsible manager and his deputy for the construction of a nuclear facility who have approval from STUK for this job. The qualifications required of the responsible manager are presented in Section 125 of the Nuclear Energy Decree.

According to Section 129 of the Nuclear Energy Decree, the licensee shall also appoint persons who are responsible for emergency response arrangements, physical protection and safeguards. Those appointed to these duties must have an approval granted by STUK for their specific jobs.

3.1 Management of and quality assurance during construction

A high level safety culture and efficient quality assurance shall be observed during nuclear power plant construction. Apart from the licensee, this also applies to all the organizations participating in the project whose activities affect the safety of the nuclear power plant.

STUK oversees construction project management and quality assurance during construction by inspections carried out at its discretion. I.a. the following items are subject to inspections:

- organizational structure and conduct of management,
- competence and adequacy of personnel,
- review of issues relevant to safety,
- implementation of quality assurance, overall and in various sectors,
- control by the licensee over the implementation of his own quality assurance and that of the suppliers and subcontractors.

3.2 Concrete and steel structures

STUK controls erection of buildings and manufacture of concrete and steel structures important to safety. This control contains

- pre-inspection of structures,
- inspections at the construction site concerning readiness to start work,
- inspections concerning manufacture,
- construction inspections of steel structures and
- commissioning inspections.

Safety class of structures is taken into account when determining the scope of control and when setting the requirements. The requirements for and control of concrete and steel structures are presented in Guides YVL 4.1 and YVL 4.2.

Only organizations and individuals in their employ that have been granted approval by STUK are allowed to perform licenced inspection and expert duties relating to concrete and steel structures. Guides YVL 1.3 and YVL 4.1 present these duties and the procedures of granting approval.

3.3 Components

STUK controls the manufacture of pressure vessels and other meachanical components for nuclear power plants. This control contains

- pre-inspection of components,
- inspections concerning manufacture,
- construction inspections and
- commissioning inspections.

The safety class of components is taken into account when determining the scope of control and when setting the requirements. The requirements for and control of mechanical components are presented in YVL guides, categories 3 and 5.

Only organizations and individuals in their employ that have been granted approval by STUK are allowed to perform licensed inspection and expert duties relating to mechanical components. Guide YVL 1.3 presents these duties and the procedure of granting approval.

STUK controls also the design, manufacture and installation of electrical and instrumentation equipment for nuclear power plants. The scope of control contains

- pre-inspection of components,
- inspections concerning manufacture,
- inspections concerning installation and
- commissioning inspections.

Safety class is taken into account when determining the scope of control and when setting the requirements. The requirements for and control of electrical and instrumentation equipment are presented in Guide YVL 5.5.

3.4 Procurement of nuclear fuel

According to Sections 114 and 115 of the Nuclear Energy Decree, STUK controls that nuclear fuel is designed, manufactured, transported, stored, handled and used in conformity with valid regulations.

The nuclear fuel licencing procedure and STUK's regulatory control are presented in Guide YVL 6.1.

Guides YVL 6.2, YVL 6.3, YVL 6.4, YVL 6.5, YVL 6.7 and YVL 6.8 explain the requirements which apply to the design, manufacture, transport, handling, storage and use of nuclear fuel.

3.5 Preparations for operation: organization and training

Pursuant to Section 119 of the Nuclear Energy Decree, STUK controls that the organization operating the facility is adequate and appropriate and that the individuals participating in the use of nuclear energy meet the qualifications required and that proper training is arranged for them. Development and training of the organization for operation shall begin early enough during the construction of the nuclear power plant.

When reviewing the administrative rules and organizational manual referred to in point 2.3.2, STUK assesses the appropriateness and adequacy of the organization and the qualifications required.

According to Section 123 of the Nuclear Energy Decree, the licensee shall appoint a responsible manager and his deputy for the operation of a nuclear power plant who shall have approval from STUK for this job. Furthermore, pursuant to Section 129 of the Nuclear Energy Decree, the licensee shall appoint persons responsible for emergency response arrangements, physical protection and safeguards. Those appointed to the duties referred to above must have approval granted by STUK for their specific jobs. Pursuant to Section 128 of the Nuclear Energy Decree, the operator of the facility systems in the main control room of a nuclear facility must have STUK's approval for the job.

The plan for the hiring of personnel referred to in Guide YVL 1.7, the time of their hiring and initial training programmes, shall be submitted to STUK for information. STUK controls the implementation of the initial training programmes by inspections conducted at its discretion. Prior to the start of the operation of the nuclear power plant, STUK inspects that the qualifications required are fulfilled.

The requirements for the training of nuclear power plant personnel and operator licencing are presented in Guides YVL 1.6 and YVL 1.7.

3.6 Commissioning

A trial run is an essential part of a nuclear power plant's commissioning. It serves to demonstrate that the plant is built and operates according to design. The trial run is divided into the following main parts:

- systems tests,
- fuel loading and pre-criticality tests of reactor systems,
- reactor criticality and tests at low power, and
- tests at various power levels.

STUK controls nuclear power plant trial run by reviewing the overall trial run plans and programmes, by witnessing the tests conducted at the power plant and by inspecting the trial run result reports.

Nuclear power plant operation is considered to begin when the loading of nuclear fuel into the reactor is started. At this stage, to ensure that the plant conforms to the regulations which apply to it, STUK inspects, according to Section 20 of the Nuclear Energy Act, that

- documents concerning the operation of the plant are acceptable in every respect,
- operating procedures, the procedures for transients and emergencies included, are adequate,
- the organization operating the nuclear power plant is adequate and appropriate,
- persons taking part in the use of nuclear energy are qualified as required,
- persons who have approval from STUK have been appointed as the responsible manager for the operation of the plant and his deputy,
- there is a sufficient number of licenced operators at the plant,
- for the operation of the plant, persons responsible for the emergency response arrangements, physical protection and safeguards have been appointed, who have approval from STUK,
- commissioning inspections with acceptable results have been carried out for plant systems, components and structures,
- the results of systems tests are acceptable in so far as the trial run can be accomplished without the reactor,
- basic inspections of structures and components have been accomplished,
- physical protection and emergency response arrangements are sufficient,
- the necessary control to prevent the proliferation of nuclear weapons has been arranged appropriately, and
- the licencee has, as prescribed, arranged indemnification liability in case of nuclear damage.

Reactor loading may be started when STUK has approved the loading application and the reactor and fuel behaviour reports for the first fuel cycle. The reactor may be made critical and brought to a higher power level in conformity with STUK's decisions.

When the trial run has ended, the licensee and STUK will carry out an overall assessment of the results. Based on the results of the trial

run, also the Technical Specifications are reassessed. Based on the assessment, the licensee makes in the document the necessary changes approved by STUK.

The requirements for and control of the trial run are presented in Guide YVL 2.5.

4 Regulatory control of operation

Regulatory control of operating nuclear power plants contains reviews and inspections which can be divided into three categories as follows:

- periodic inspections are specified and registered by STUK in a plant-specific programme,
- inspections which the power company is obliged to request in connection with measures carried out at the plant or which STUK conducts at its discretion, and
- safety assessment based on operating experience and on safety research as well as other information obtained after the granting of the operating licence.

For the purposes of regulatory control, STUK requires the submission of both fixed-term and event-specific reports. The requirements for reporting are presented in Guide YVL 1.5. The reports are used, on the one hand, for preparation of inspections and, on the other, for evaluation of safety enhancing measures and overall monitoring of the safety level.

In addition to the regulatory control of nuclear power plant operation, STUK maintains its preparedness to act in plant emergencies. In an emergency, STUK is the authority controlling accident management and an expert body providing assistance to the authorities in charge of the rescue services.

4.1 Periodic inspection programme

Inspections contained in the periodic inspection programme are focused at the power company's activities important to safety. The control aims at ensuring compliance with the regulations and the plans and programmes approved by STUK and at assessing the appropriateness of the power company's activities. In preparation for the assessment, examples of the implementation and results of the activities in question are reviewed in connection with each inspection.

The periodic inspection programme is drawn up by STUK and its contents are reviewed annually. The programme and the procedures to be followed in its execution are set out in an internal guide of STUK. The guide in question and the necessary amendments thereto are forwarded to the nuclear power plants under control for information.

The inspection programme covers the following main areas which are further divided into several, specific inspections:

- operating organization, conduct of management and quality assurance,
- training of personnel,
- conduct of operations,
- maintenance,
- technical support functions,
- fire protection,
- radiation protection and chemistry,
- radiological safety of the environment,
- nuclear waste management,
- physical protection, and
- emergency response arrangements.

The inspection period for each item is defined in the periodic inspections programme. The inspection period usually is one year.

4.2 Special inspections

Special inspections are inspections which the power company is obliged to request in connection with the measures conducted at the plant, or which STUK conducts at its discretion.

Nuclear power plant operation includes activities which may be started only after STUK's approval of the activity has been granted. The execution of certain duties and the use of pressure retaining devices is tied to STUK's decisions. STUK's decisions are required also in connection with any changes to be made at the plants. An essential part of each decision is an inspection conducted prior to the making of the decision to justify it or

to ensure afterwards the realization of the proposed plans and of the decision's conditions. Requirements and obligations which apply to special inspections are presented in the YVL guides. Inspection procedures and reference to the relevant YVL guides are presented in an internal guide of STUK. The guide in question and the necessary amendments thereto are forwarded to the nuclear power plants under control for information.

Special inspections cover the following items:

- documents concerning operation,
- competence of personnel,
- inspections concerning operational events,
- outage planning and execution,
- refuelling of reactor,
- in-service inspections,
- in-service inspections as referred to in the Decree on pressure vessels,
- repairs, modifications and preventive maintenance,
- post-outage plant start-up,
- procurement of nuclear fuel,
- safeguards, and
- exemption of nuclear waste from regulatory control.

The requirements for and control of nuclear power plant refuelling outages and repairs, modifications and preventive maintenance are addressed in Guide YVL 1.8 and YVL 1.13.

4.3 Safety assessment

Assessment of nuclear power plant safety does not end in the granting of the operating licence but continues also during operation. This is necessary for the following reasons:

- Operational experience brings up issues to which adequate attention has not been paid.
- Safety research increases understanding of the effects of plant ageing and facilitates more accurate evaluation of transient and accident sequences.
- With the continuous development of nuclear power plant technology, it is appropriate to replace out-of-date components with new, improved ones.
- General views of the safety level to be sought after, and, accordingly, the safety requirements, change.

The need for and possibilities of improving safety are considered on the basis of a safety assessment made during operation.

4.3.1 Monitoring and analysis of operational events

Nuclear power plant operational events may be single transients or observations but also recurrent or common cause failures. On the basis of the reports submitted by the operating organization and STUK's own inspection findings, STUK sets up an investigation team to analyse an event, if necessary. It is the team's specific duty to disclose the event's root causes and to come forth with objectives for corrective measures.

4.3.2 Operating experience abroad

In addition to operational events at the domestic nuclear power plants, STUK follows events at plants abroad. Event reports are received from international organizations (IAEA, OECD) and direct from the regulatory authorities of various countries. The reports are reviewed systematically and it is separately assessed for each domestic facility whether safety enhancing measures should be taken based on the lessons learned. Furthermore, STUK follows the measures taken by the power companies to review and assess operational experiences abroad.

4.3.3 Re-assessment of issues reviewed for an operating licence

STUK annually draws up a plan for the reassessment of the issues reviewed for an operating licence. The plan is made to contain items whose improvement might be wellgrounded on the basis of new information yielded by safety researach, the advancement of technology in general or changed safety requirements.

Special safety assessments are annually made based on the plan. If necessary, the safety assessments are made known to the licensee for possible action. The safety assessments are utilized when making an overall safety assessment for the plant at a time considered suitable by STUK or, for instance, in connection with the renewal of an operating licence granted for a fixed period.

4.4 Amendments to plans and other documents approved by the Finnish Centre for Radiation and Nuclear Safety

If plant systems, components and structures covered by STUK's approval procedure are to be changed after plant commissioning, STUK's approval of the planned changes shall be obtained prior to their implementation. The effect of a change on the Technical Specifications shall be described in the documentation concerning the change. In the justification of the change, its effect on the results of the PSA as well as a technical description and analyses shall be given whose accuracy is consistent with at least the FSAR. Furthermore, the amendments needed to the documents approved in connection with the review of the operating licence application, shall be summarized.

The documents approved by STUK in connection with the review of an operating licence application shall be kept up-to-date. When updating the documents, STUK's approval of any changes shall be requested. In case significant amendments of principle are planned in the documents, the relevant plans shall be presented to STUK as early as during the preparation of the matter.

As a rule, the updated documents can be brought into use when they have been approved by the licensee and have been submitted to STUK for review. Any other time for their introduction shall be marked in each document separately. The Technical Specifications amendments whereto can be introduced only after STUK's approval has been obtained and changes which may weaken an earlier approved safety level are an exception to the above.

Amendments to the Final Safety Analysis Report may be collected and forwarded to STUK once a year.

The plant's operating instructions may be revised and updated based on the licensee's own approval procedure. The amended instructions shall be forwarded to STUK for information.

5 References

1. Decision of the Council of State on the general regulations for the safety of nuclear power plants (395/91), 14 February 1991

2. Decision of the Council of State on the general regulations for physical protection of nuclear power plants (396/91), 14 February 1991

3. Decision of the Council of State on the general regulations for emergency response arrangements at nuclear power plants (397/91)

4. Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants, Revision 3, U.S. Nuclear Regulatory Commission, 1978

YVL guides

General guides

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