Quality assurance during operation of nuclear power plants

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Authorization

By virtue of section 55, second paragraph, point 3 of the Nuclear Energy Act (990/87) and section 29 of the Council of State Decision (395/91) on the General Regulations for the Safety of Nuclear Power Plants, the Finnish Centre for Radiation and Nuclear Safety issues detailed regulations concerning the safety of nuclear power plants.

The YVL Guides are rules an individual licensee or any other organization concerned shall comply with, unless the Finnish Centre for Radiation and Nuclear Safety has been presented with some other acceptable procedure or solution by which the safety level laid down in YVL Guides is achieved.

1 General

Section 36 of the Nuclear Energy Decree (161/88) prescribes that when applying for an operating licence for a nuclear facility, the applicant shall submit to the Finnish Centre for Radiation and Nuclear Safety documents concerning the plant unit's operation and safety; the nuclear facility's quality assurance programme is one of these documents. According to section 112 of the Decree, the licensee shall regularly update the documents referred to in section 36 of the Decree.

General requirements applicable to the quality assurance of nuclear power plants are presented in the Council of State Decision (395/91) and in Guide YVL 1.4.

According to section 2 of the Council of State Decision (395/91), quality assurance means all systematic and planned actions which serve to ensure that a component, facility or activity fulfills the requirements made of it. The essential prerequisites for an effective quality assurance function are: clear delineation of authority and responsibility, employment of proven methods of management and work, good working conditions, the personnel's sense of responsibility and their familiarity with the duties they perform and also systematic reporting and maintenance of records.

The Finnish Centre for Radiation and Nuclear Safety (STUK) has been entrusted with the duty of regulating the safety of nuclear power plants. Regulatory control also covers quality assurance during operation of nuclear power plants. A quality assurance programme and amendments thereto are subject to approval by STUK. By conducting inspections related to various fields of quality assurance and plant operation STUK controls the execution of the quality assurance function. An overview of the regulatory control exercised by STUK over the operation of nuclear power plants is given in Guide YVL 1.1.

Quality assurance during operation of nuclear power plants applies to all activities and organizations with a bearing on the safe operation of nuclear power plants. Quality assurance requirements applicable during operation of nuclear power plants are presented in this Guide. This Guide also applies to quality assurance during operation of other nuclear facilities.

2 Management and organization of the quality assurance function

2.1 Quality assurance programme

High standards shall be maintained in the operation of nuclear power plants to ensure plant safety. To achieve this goal, an applicant for a licence/a licensee shall present in documents confirmed by the company management, the objectives of their quality assurance policy plus their commitment to high quality and safety culture. Training and guidance shall be employed to ensure that the concept of quality assurance is correctly understood and implemented.

A quality assurance programme shall be established for the operation of the nuclear power plant. Requirements and procedures facilitating achievement of high level safety and quality are presented in the programme.

The quality assurance programme can be appropriately presented in various documents such as the quality assurance manual, the organization manual, the administrative rules and the operating instructions. The quality assurance documents shall be straightforward in wording and they shall create good prerequisites for systematic execution of the quality assurance function at practical level.

The licensee shall systematically develop and maintain the quality assurance programme

and also supervise the programme's implementation. The whole programme's relevance and efficiency shall be assessed periodically and the programme shall be amended, where necessary.

2.2 Organization, areas of responsibility and authorities

2.2.1 Organization

An organization manual for operation of the nuclear power plant shall be drawn up in which the organization's structure and the duties, areas of responsibility and authorities of various units are presented.

The duties of organizational units shall be delineated in sufficient detail in the organization manual to facilitate identification of their duties, areas of responsibility and authorities by the units.

The quality assurance unit shall be given a self-dependent position in the organization; it shall be independent of other units and directly responsible to the management. Sufficient arrangements shall be made to facilitate efficient implementation of quality assurance at all levels of the organization. An example of an organization chart is given in Reference 2, Annex VII d.

2.2.2 Duties, responsibility and authority

The items addressed below are taken into account in specifying the areas of responsibility most important in terms of quality assurance during operation.

Responsible manager and other persons referred to in the Nuclear Energy Decree

In accordance with section 79 of the Nuclear Energy Act, a responsible manager approved by STUK shall be assigned for operation of a nuclear power plant. According to section 124 of the Nuclear Energy Decree, the responsible manager has a duty to see to it that the provisions of the Nuclear Energy Act prescribing for the safety of the use of nuclear energy, physical protection and emergency response arrangements, and the provisions of the Nuclear Energy Act concerning control as referred to in section 118 of the Decree, and also the rules and regulations issued by virtue of it, are observed.

In accordance with Section 129 of the Nuclear Energy Decree, persons who are responsible for the emergency planning, physical protection and nuclear material control of the nuclear facility shall be appointed. Only individuals approved by STUK may be assigned to these duties.

The quality assurance unit

The duties, responsibility and authority of the quality assurance unit shall be stated in the quality assurance programme. The quality assurance unit is responsible in particular for the programme's development and maintenance and also for the supervision of its implementation.

Individuals supervising the implementation of the quality assurance programme shall have sufficient authority to

- verify compliance with the quality assurance programme in all organizational units
- suggest and recommend procedures to correct any deficiencies detected
- ensure implementation of corrective actions
- develop the quality assurance function.

The same individuals shall not be responsible for the regulated activity.

Reports on the implementation and efficiency of the quality assurance function shall be submitted to a management of high enough level in the licensee organization which is obliged to and has sufficient authority entitling it to request for the implementation of the necessary corrective actions.

The unit responsible for operation

The duties, responsibility and authority of the unit responsible for plant operation shall be presented in the quality assurance programme. The duties, responsibility and authority of the manager responsible for plant operation and his deputy plus other individuals participating in the plant's operational management and in plant operation shall be given in writing.

Responsibilities shall be delineated clearly to ensure that measures to maintain a safe plant state or to bring the plant to a safe state are carried out correctly and without delay. Attention shall in particular be paid to

- compliance with regulations imposed by authorities, and with the administrative rules, the technical specifications and the operating instructions
- monitoring of the behaviour of safety-significant parameters
- the making of regular inspection rounds at the facility
- the follow-up of indications provided by the facility's instrumentation and safety-enhancing action thereupon
- the carrying out of periodic tests to ascertain operability of systems and components important to safety.

The procedure relating to the licencing of plant operators is presented in Guide YVL 1.6.

The unit responsible for maintenance

The duties, responsibility and authority of the plant's maintenance unit shall be presented in the quality assurance programme. The maintenance unit is responsible in particular for ensuring the integrity and reliability of systems, components and structures important to safety.

The maintenance unit's duties and responsibilities in preventive maintenance, component condition monitoring, fault analysis, utilization of operating experience, repairs and modifications and inservice inspection shall be specified unambiguously.

The unit responsible for radiation safety

The duties, responsibility and authority of the plant's radiation safety unit shall be presented in the quality assurance programme. The unit shall in particular see to it that the radiation exposure of nuclear power plant workers and the surrounding population is kept as low as reasonably achievable and that established dose limits and the limit values derived from them are not exceeded.

Technical support

The organization providing technical support for plant operation plus the organization's duties, responsibility and authority shall be presented in the quality assurance programme. Technical support includes i.a. follow-up and analysis of factors related to safety, quality and reliability; follow-up of operational and maintenance activities through assessment of the results of periodic tests and inservice inspections; analysis of operating experience plus presentation of the necessary modifications and suggestions for modifications, plus supply of expertise.

3 Requirements for the quality assurance programme

3.1 Training

3.1.1 Training of personnel

Requirements and procedures concerning training and a personnel training programme shall be described in the quality assurance programme.

The training programme serves to ensure that the personnel operating the plant and that supporting the plant's operation are qualified for the duties assigned to them.

The training programme shall cover the personnel's basic and further education, requalification training and practising in the job setting.

The requirements applicable to personnel training and qualification are presented in Guides YVL 1.6 and YVL 1.7.

3.1.2 Training of external workforce

Requirements and procedures applicable to the training of an external workforce shall be presented in the quality assurance programme.

Any external workforce temporarily employed at the plant shall be arranged the training and familiarization required for working at the plant.

3.2 Operation

Requirements and procedures applicable to operation shall be presented in the quality assurance programme.

The procedures described in the operating instructions shall be so planned that their correct execution is easily verified. Persons with a good understanding of the plant and its design bases shall review the operating instructions and modifications thereto.

The documents and instructions required by operators during plant operation shall be specified. These documents and instructions shall be continuously updated. Responsibility and procedures as regards the updating and review of these documents and instructions shall be specified.

The plant's operating records shall facilitate a detailed review afterwards of the plant's state at any time and also of the actions performed.

The requirements applicable to general documents relating to operation are presented in Guide YVL 1.1.

3.3 Maintenance

Requirements and procedures applicable to maintenance shall be presented in the quality assurance programme.

To ensure the integrity and reliability of systems, components and structures important to safety, appropriate preventive maintenance and periodic inspection programmes shall be established.

Requirements and procedures for the procurement of components, spare parts, materials and chemicals shall be presented in the quality assurance programme. It shall be evident from the described procedures how the validity of the utility's own and of procured services is assured.

There shall be instructions for the drawing up of procurement documents for spare parts and materials to ensure that all requirements necessary in terms of quality and reliability are contained in the documents.

There shall be written instructions for the receipt, storage, handling and introduction into service of spare parts and materials.

There shall be a sufficient number of approved spare parts at the plant for introduction into service when necessary.

Detailed requirements applicable to maintenance are given in Guide YVL 1.8.

3.4 Reactor core and fuel

Requirements and procedures applicable to activities affecting fuel quality and safety shall be presented in the quality assurance programme.

In accordance with Guide YVL 6.7 the quality assurance programme for fuel shall be written as a separate programme. The programme shall contain requirements applicable to quality assurance to assure i.a. that the fuel to be procured meets high quality standards and that the use, transport, handling and storage of fuel takes place safely.

Detailed requirements applicable to the procurement, transport, handling, storage and use of fuel are presented in Guides YVL 6.1 - 6.8.

3.5 Periodic tests

In the quality assurance programme, requirements and procedures applicable to periodic tests shall be presented which give assurance of the reliability of plant systems and components. For the performance of these tests, periodic testing programmes and instructions shall be drawn up which contain i.a.

- unambiguous and easily verified procedures to perform the tests
- acceptance criteria
- test schedules
- procedures for handling and filing the results.

The performance and results of periodic tests shall be approved by individuals other than those performing the tests.

The updating and adequacy of test programmes and instructions shall be assessed periodically. Individuals not responsible for the performance of the tests or for the implementation of the programme shall also take part in the assessment. The programmes and instructions shall be revised and complemented where necessary.

3.6 Inservice inspections

Requirements and procedures applicable to inservice inspections shall be presented in the quality assurance programme. To assure their integrity and reliability, components and structures important to safety shall be inspected periodically. The inspections shall be conducted according to inservice inspection programmes and instructions which have been determined beforehand.

The performance and results of inservice inspections shall be approved by individuals other than those conducting the inspections.

The updating and adequacy of the inspection programmes and instructions shall be assessed periodically. Individuals not responsible for the performance of the tests or for the implementation of the programme shall also take part in the assessment. The programmes and instructions shall be revised and complemented where necessary, taking into account the safety significance of different items, operating experience and previous inspection results.

Detailed requirements applicable to inservice inspections are presented in Guide YVL 3.8.

3.7 Repairs and modifications

Requirements and procedures applicable to the design, implementation, inspection and supervision of repairs and modifications, and which also apply to tests related to the repairs and modifications shall be presented in the quality assurance programme.

A repaired or modified item may be introduced into service only after it has acceptably passed all inspections related to design, work performance and introduction into service, and all tests to prove operability.

Detailed requirements applicable to the performance of repairs and modifications are presented in Guide YVL 1.8.

3.8 Refuelling and maintenance outages

Requirements and procedures applicable to refuelling and maintenance outages shall be

presented in the quality assurance programme. Provision shall be made for both planned and unplanned outages.

There shall be written instructions covering general arrangements during the outages and which also cover the design and implementation of preventive maintenance, repairs, modifications and inspections. The instructions shall describe the duties, authorities and responsibilities of various organizational units taking part in the outages.

There shall be written instructions for addressing any problems or deviations encountered during the outages.

Written instructions shall be complied with in plant startup. Also organizational units separately specified and which are independent of plant operation shall take part in ascertaining the plant's readiness for startup (e.g. the safety and quality assurance units). The individual responsible for the decision to start up the plant (usually the plant's responsible manager) shall be named.

3.9 Radiation safety

Requirements and procedures which apply to radiation safety shall be presented in the quality assurance programme. Attention shall in particular be paid to the fact that the limitation of radiation doses is always taken into account early enough in planning operation and maintenance.

Detailed requirements applicable to radiation safety are presented in Guides YVL 7.1 - 7.18.

3.10 The laboratory function

Requirements and procedures applicable to plant condition monitoring shall be presented in the quality assurance programme. There shall be written instructions covering condition monitoring which includes: process chemistry and systems contamination monitoring; chemicals employed for cleaning, inspections and maintenance; decontamination work and laboratory analyses.

3.11 Low and intermediate level waste

Requirements and procedures applicable to management of low and intermediate level waste shall be presented in the quality assurance programme.

Waste management procedures at the plant include

- collection, sorting, handling and packing
- activity and dose rate measurements and recording of the results
- granting exemptions from regulatory control
- transfers and transports
- storage onsite
- final disposal in bedrock onsite.

There shall be written instructions for the implementation of the waste management function.

Separate files for waste to be stored and for waste which has been placed in a repository shall be kept which contain all information about the waste.

Detailed requirements applicable to radioactive waste are presented in Guide YVL 8.3.

3.12 Fire protection

Requirements and procedures applicable to fire protection shall be presented in the quality assurance programme. The quality assurance programme shall cover all measures which aim to

- prevent a fire
- mitigate the impact of a fire
- prevent the spread of fire so that plant safety is not compromised should a fire occur
- extinguish a fire.

Attention shall in particular be paid to fire risks which may compromise plant safety or result in radioactive releases offsite.

Detailed requirements applicable to fire protection are presented in Guide YVL 4.3.

3.13 Physical protection

Requirements and procedures applicable to physical protection shall be presented in the quality assurance programme.

Provisions and requirements concerning physical protection are set out in the Council of State Decision (396/91) on the General Regulations for the Physical Protection of Nuclear Power Plants and in Guide YVL 6.11.

3.14 Emergency response arrangements

Requirements and procedures applicable to emergency response arrangements shall be presented in the quality assurance programme. Attention shall in particular be paid to procedures which serve to assure the development of emergency plans and the maintenance of the required emergency response readiness.

Provisions and requirements applicable to emergency response arrangements are presented in the Council of State Decision (397/91) on the General Regulations for Emergency Response Arrangements at Nuclear Power Plants and in Guide YVL 7.4.

3.15 Analysis of operational events

Requirements and procedures applicable to systematic analysis of operational events, clarification of root causes and carrying out of corrective actions shall be presented in the quality assurance programme. The programme shall also present requirements and procedures applicable to the assessment of operational events abroad and initiation of potential actions.

3.16 Industrial safety and the work environment

Requirements and procedures applicable to the enforcement and supervision of instructions issued by the labour protection authority shall be presented in the quality assurance programme.

3.17 Documents, computer codes and other documentation

Documents, computer codes and other records relating to safe operation and which shall be kept up-to-date shall be specified in the quality assurance programme. Updating means that the requirements are fulfilled and that documents are mutually consistent and in accordance with the state of affairs.

At least the below documents shall be kept up-to-date:

- technical specifications
- final safety analysis report
- probabilistic safety assessment
- classification documents
- computer codes related to maintenance and inspection
- nuclear material accounting and control manual
- security plan
- emergency plan
- administrative rules
- organization manual
- quality assurance manuals
- operating instructions.

The computer codes and other records to be updated shall be specified. Such records are i.a. radiographs, magnetic tapes and other records by which the condition of components or structures is determined or proven e.g. in connection with testing, inspections or maintenance.

An organizational unit responsible for the above documents and computer codes and which shall see to it that the documents, computer codes or other documentation are kept up-to-date shall be specified.

The updating of all documents and computer codes relating to operation and which are important to safety shall be checked periodically.

There shall be written instructions on the documents administration. Attention shall in particular be paid to instructions covering the drawing up, review, approval, issuing, distribution, changing and disposal when out-of-date of documents, computer codes and other documentation which are to be updated.

There shall be written instructions on the drawing up, review, approval and distribution of documents of non-renewable and of definite duration which have a bearing on plant safety.

The plant shall have a sufficient number of separately stored safety copies or paper copies of computer-maintained documents important to safety. The correctness of these documents shall be periodically checked.

Requirements applicable to documents to be submitted to STUK are presented in Guide YVL 1.2.

3.18 Corrective actions

Requirements and procedures concerned with deviations and deficiencies and which apply to corrective actions shall be presented in the quality assurance programme. The deviations and deficiencies referred to are as follows:

- a deficiency is detected in valid instructions
- an activity or procedure deviates from the course of action presented in the instructions or in the quality assurance programme
- a system, component or part thereof does not meet the requirements made of it
- the number or competence of staff does not meet the requirements
- the staff is not familiar with or does not understand the documents which are to be complied with in plant operation.

There shall be written instructions on the handling of deviations and deficiencies. Materials, components, parts, functions and services which do not meet the requirements shall be identified, marked and reported, and the necessary corrective actions shall be decided upon; also the use of defective parts or materials and inadequate functions or services shall be prevented.

Deviations and deficiencies shall be corrected without delay. There shall be written instructions on procedures concerning the temporary or permanent approval of a deviation or deficiency. The handling of a deviation or deficiency (finding out its cause, suggesting corrective action and approval) shall be based on documents.

4 Supervision of the quality assurance programme

4.1 Supervision of the implementation of the quality assurance programme

Requirements and procedures applicable to the system by which implementation of the quality assurance programme is monitored shall be presented in the quality assurance programme. It shall be ensured in particular that

- sufficient training is given on the contents of and the requirements set out in the quality assurance programme
- all organizational units comply with the procedures and requirements presented in the quality assurance programme

- operational measures and other activities relating to operation are in accordance with the operating instructions
- relevant instructions are complied with in the drawing up and review of documents.

Besides the quality assurance unit, experts in various fields shall participate in inspections relating to the implementation of the quality assurance programme; however, no individual is to inspect the work of their own organizational unit. There shall be written instructions on the handling of and reporting on any deficiencies ascertained during the inspections. Any observed deficiencies shall be dealt with at a level sufficiently high in the licensee organization.

4.2 Assessment of the viability and coverage of the quality assurance function

The viability and coverage of the quality assurance function shall be assessed periodically. Also experts independent of the organizational units responsible for operation and quality assurance shall be included in the assessment team. It is the team's duty to assess whether the quality assurance function is taken care of appropriately and whether compliance with the programme assures a high level of safety and quality. The assessment's results shall be directly reported to a management of high enough level in the licensee organization.

5 References

1 IAEA Safety Series No. 50-C-QA (Rev. 1), Safety Standards, Code on the safety of nuclear power plants: Quality Assurance, Vienna, 1988

2 IAEA Safety Series No. 50-SG-QA7, Safety Guide, Quality assurance organization for nuclear power plants, Vienna, 1983

3 IAEA Safety Series No. 50-SG-QA5 (Rev. 1), Safety Guide, Quality assurance during commissioning and operation of nuclear power plants, Vienna, 1986

4 IAEA Safety Series No. 50-SG-QA10, Safety Guide, Quality Assurance Auditing for Nuclear Power Plants, Vienna 1980

5 Operations Quality Assurance for Nuclear Power Plants, National Standard of Canada, CAN/CSA-N 286.5-M7, 1987

YVL guides

General guides

YVL 1.0 Safety criteria for design of nuclear power plants, 1 Dec. 1982

YVL 1.1 The Finnish Centre for Radiation and Nuclear Safety as the regulatory authority in control of the use of nuclear energy, 27 Jan. 1992

YVL 1.2 Documents to be submitted to the Finnish Centre for Radiation and Nuclear Safety concerning the regulation of nuclear facilities, 22 May 1991 (in Finnish)

YVL 1.3 Mechanical components and structures of nuclear power plants. Inspection licenses, 25 March 1983

YVL 1.4 Quality assurance of nuclear power plants, 20 Sep. 1991

YVL 1.5 Reporting nuclear power plant operation to the Finnish Centre for Radiation and Nuclear Safety, 18 Aug. 1989

YVL 1.6 Nuclear power plant operator licensing, 3 March 1989

YVL 1.7 Duties important to nuclear power plant safety, personnel qualifications and training, 28 Dec. 1992 (in Finnish)

YVL 1.8 Repairs, modifications and preventive maintenance at nuclear facilities, 2 Oct. 1986

YVL 1.9 Quality assurance during operation of nuclear power plant, 13 Nov. 1991

YVL 1.13 Regulatory inspections related to shutdowns at nuclear power plants, 9 May 1985

YVL 1.15 Mechanical components and structures in nuclear installations, Construction inspection, 16 April 1984

Systems

YVL 2.1 Safety classification of nuclear power plant systems, structures and components, 22 May 1992

YVL 2.2 Transient and accident analyses for justification of technical solutions at nuclear power plants, 7 Oct. 1987

YVL 2.3 Preinspection of nuclear power plant systems, 14 Aug. 1975

YVL 2.4 Over-pressure protection and pressure control during disturbances in the primary circuit and steam generators of a PWR plant, 19 Sept. 1984

YVL 2.5 Pre-operational and start-up testing of nuclear power plants, 8 Jan. 1991

YVL 2.6 Provision against earthquakes affecting nuclear facilities, 19 Dec. 1988

YVL 2.7 Failure criteria for the design of a light-water reactor, 6 April 1983

YVL 2.8 Probabilistic safety analyses (PSA) in the licensing and regulation of nuclear power plants, 18 Nov. 1987

Pressure vessels

YVL 3.0 Pressure vessels in nuclear facilities. General guidelines on regulation, 21 Jan. 1986

YVL 3.1 Nuclear power plant pressure vessels. Construction plan. Safety classes 1 and 2, 11 May 1981

YVL 3.2 Nuclear power plant pressure vessels. Construction plan. Safety class 3 and class EYT, 21 June 1982

YVL 3.3 Supervision of the piping of nuclear facilities, 21 May 1984

YVL 3.4 Nuclear power plant pressure vessels. Manufacturing license, 15 April 1981

YVL 3.7 Pressure vessels of nuclear facilities. Commissioning inspection, 12 Dec. 1991

YVL 3.8 Nuclear power plant pressure vessels. Inservice inspections, 3 Dec. 1993 (in Finnish)

YVL 3.9 Nuclear power plant pressure vessels. Construction and welding filler materials, 6 Nov. 1978

Buildings and structures

YVL 4.1 Nuclear power plant concrete structures, 22 May 1992 (in Finnish)

YVL 4.2 Steel structures for nuclear facilities, 19 Jan. 1987

YVL 4.3 Fire protection at nuclear facilities, 2 Feb. 1987

Other structures and components

YVL 5.3 Regulatory control of nuclear facility valves and their actuators, 7 Feb. 1991

YVL 5.4 Supervision of safety relief valves in nuclear facilities, 3 June 1985

YVL 5.5 Supervision of electric and instrumentation systems and components at nuclear facilities, 7 June 1985

YVL 5.6 Ventilation systems and equipment for nuclear power plants, 23 Nov. 1993 (in Finnish)

YVL 5.7 Pumps at nuclear facilities, 23 Nov. 1993 (in Finnish)

YVL 5.8 Hoisting appliances and fuel handling equipment at nuclear facilities, 5 Jan. 1987

Nuclear materials

YVL 6.1 Control of nuclear fuel and other nuclear materials required in the operation of nuclear power plants, 19 June 1991

YVL 6.2 Fuel design limits and general design criteria, 15 Feb. 1983

YVL 6.3 Supervision of fuel design and manufacture, 15 Sept. 1993 (in Finnish)

YVL 6.4 Supervision of nuclear fuel transport packages, 1 March 1984

YVl 6.5 Supervision of nuclear fuel transport, 1 March 1984

YVL 6.6 Surveillance of nuclear fuel performance, 5 Nov. 1990 (in Finnish)

YVL 6.7 Quality assurance of nuclear fuel, 23 Nov. 1993 (in Finnish)

YVL 6.8 Handling and storage of nuclear fuel, 13 Nov. 1991 (in Finnish)

YVL 6.9 The national system of accounting for and control of nuclear material, 23 Nov. 1993 (in Finnish)

YVL 6.10 Reports to be submitted on nuclear materials, 23 Nov. 1993 (in Finnish)

YVL 6.11 Physical protection of nuclear power plants, 13 July 1992 (in Finnish)

YVL 6.21 Physical protection of nuclear fuel transports, 15 Feb. 1988 (in Finnish)

Radiation protection

YVL 7.1 Limitation of public exposure in the environment of and limitation of radioactive releases from nuclear power plants, 14. Dec. 1992

YVL 7.2 Evaluation of population doses in the environment of nuclear power plants, 12 May 1983

YVL 7.3 Evaluating the dispersion of radioactive releases from nuclear power plants under operating and in accident conditions, 12 May 1983

YVL 7.4 Nuclear power plant emergency plans, 12 May 1983

YVL 7.5 Meteorological measurements of nuclear power plants, 28 Dec. 1990 (in Finnish)

YVL 7.6 Measuring radioactive releases from nuclear power plants, 13 July, 1992 (in Finnish)

YVL 7.7 Programmes for monitoring radioactivity in the environment of nuclear power plants, 21 May 1982

YVL 7.8 Reporting radiological control of the environs of nuclear power plants to the Institute on Radiation Protection, 21 May 1982

YVL 7.9 Radiation protection of nuclear power plant workers, 14 Dec. 1992 (in Finnish)

YVl 7.10 Individual monitoring and reporting of radiation doses, 1 March 1984

YVl 7.11 Radiation monitoring systems and equipment in nuclear power plants, 1 Feb. 1983

YVL 7.14 Action levels for protection of the public in nuclear power plant accidents, 26 May 1976

YVL 7.18 Radiation protection in design of nuclear power plants, 14 May 1981

Radioactive waste management

YVL 8.1 Disposal of reactor waste, 20 Sept. 1991

YVL 8.2 Exemption from regulatory control of nuclear wastes, 19 March 1992

YVL 8.3 Treatment and storage of radioactive waste at the nuclear power plants, 1 July 1985

The YVL-guides without any language marking are available both in English and Finnish.