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

LICENSING OF NUCLEAR FUEL AND OTHER NUCLEAR MATERIALS

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Appendix 1 Regulations for the control of nuclear fuel and other nuclear materials

1

GENERAL

The purpose of the supervision of nuclear fuel (later on fuel) and other nuclear material is to assure that

- the fuel is designed and manufactured so that the use of it may take place safely, and that the fuel and other nuclear materials are used, stored and transported safely (safety control),
- neither fuel nor other nuclear materials under Finnish control or of Finnish origin or produced in Finland, are used for the production of nuclear weapons or other nuclear explosives (safeguards control), and that
- adequate security systems exist for the use, storage and transportations of fuel and other nuclear materials against unauthorized handling, mischief, terrorism or other damaging action (security control).

The supervision is based on Atomic Energy Act, Act on Protection against Radiation and other legislation, on regulations based thereupon, on decisions made by the Ministry of Trade and Industry by virtue of the atomic energy legislation, and on the international agreements in the atomic energy field made by Finland. A list of these regulations and agreements is presented in Appendix 1 to this guide.

The safety, safeguards and security control measures outlined in this guide concern the fuel, structures and components of nuclear power plants as well as actions being necessary in obtaining the aforementioned targets and the nuclear subtances, other nuclear material and the nuclear information addressed in the first paragraph (1 §) of the Atomic Energy Degree (AED) given by virtue of the Atomic Energy Act (AEA).

The connection between the supervision of fuel and other nuclear materials and the other supervisory activities performed by the Institute of Radiation Protection is described in the Guide YVL 1.1.

2

LICENSING PROCEDURES

Special permits addressed in 2 § of the Atomic Energy Act and in 2 § of the Act on Protection against Radiation are necessary for the activities concerning fuel and other nuclear materials.

These permits are given by the Ministry of Trade and Industry based on a written application. The Ministry of Trade ans Industry asks the Atomic Energy Commission, the Consultative Commission for Radiological Protection, the Institute of Radiation Protection (IRP) and possibly other authorities for statement on these applications.

The activities for which a permit is required, are presented in 2 § of the Atomic Energy Act, and in 2 § of the Radiation Protection Act. Such activities are production, trade and other transfer, possession, transport, use, import and export of nuclear fuel and other nuclear material. Further, activities requiring a permit are i.a. certain actions concerning the nuclear information (AEA 2 §), and the export of certain substances, components and facilities associated with the atomic energy field (Decision 116/77 of the Ministry of Trade and Industry).

In connection with nuclear power plants the following permits are necessary:

- permits concerning the fuel to be used in nuclear reactors;

- permits concerning other nuclear substances, nuclear materials and nuclear information.

Conditions concerning safety, safeguards and security are included in the permits to be granted, taking also into account the obligations of the international agreements made by Finland. IRP supervises that the activities are in compliance with the permits and the conditions included therein (AED 4 §).

The Ministry of Trade and Industry and the Institute of Radiation Protection may, if necessary, in order to assure safety, or to fulfill the international agreement obligations of Finland, also give other instructions, which the licensee is obliged to follow (AED 7 §).

The general framework of the activities concerning fuel and other nuclear materials is defined in the above mentioned permits. The licensees are, however, not allowed to execute individual steps of their activities before separate decisions have been given by IRP (point 3 of this guide).

2.1 PERMITS CONCERNING FUEL

The permit addressed in 2 § of the Atomic Energy Act shall be applied according to 6 § of the Atomic Energy

Degree. The application for a permit shall be submitted to Ministry of Trade and Industry not later than one year prior to the planned importation of fuel.

A permit is applied for every specific fuel batch, which is the object of e.g. a purchase and/or a sales agreement.

In addition to the documents annexed to the permit application the applicant shall by virtue of 6 § of the Atomic Energy Degree submit to IRP

- in connection of the submit of the permit application copies of the agreement concerning the fuel activities,

- the reports and documents addressed in point 3 of this guide at dates presented in the point mentioned. When it is not necessary to submit saparate documents in connection of the permit application or prior to it, general principles for carrying out the activities in question shall be presented in the permit application. The documents submitted to IRP prior to the delivery of the permit application shall be referred to in the permit application.

As prerequisites for that IRP in its statement will recommend the granting of a permit concerning the import, transport, handling, storage, use and possible export of fuel are the following:

- The Institute of Radiation Protection is, on the basis of documents concerning the design and manufacture, transport, storage, handling and use of the fuel, and on the basis of its own inspections, assured of the safety and suitability of the fuel for the nuclear power plant in question, and of the competence and preparedness of the applicant to safely take care of the transport, storage, handling and use of fuel.

- The Institute of Radiation Protection is, on the basis of documents concerning the safeguards control and the security, and on the basis of its own inspections, assured of, that the competence and preparedness of the applicant are sufficient to arrange the safeguards control and the security systems in an acceptable way.

- The applicant has presented an acceptable plan for the spent fuel
  - to be finally and safely stored, or
  - to be exported or
  - to be temporarily stored, and in connection with reprocessing an acceptable plan to safely store the radioactive wastes to be possibly returned to Finland.

- The activity in question can be taken care of so that the obligations of the international agreements made by Finland can be fulfilled.

The safety permit meant in 2 § of the Act on Protection against Radiation is applied for at the Ministry of Trade and Industry according to 17 § of the Degree on Protection against Radiation. It is not necessary to restrict the application for a safety permit to a certain fuel batch, but it can more generally concern the fuel of a certain nuclear reactor. The safety permit and the permit meant in 2 § of the Atomic Energy Act may be applied for in the same application (AEA 22 §).

Before the import of the fuel is commenced, IRP will on the basis of a written application from the licensee carry out an inspection meant in 14 § of the Atomic Energy Degree and in 19 § of the Degree on Protection against Radiation. It shall be verified at the inspections that the fuel handling system is in an acceptable condition, and that the licensee possesses a sufficient readiness to receive, handle and store the fuel. Further, the licensee shall prior to the commencement of the import have for the activity in question a responsible leader and a deputy leader, who shall be approved by the Ministry of Trade and Industry for this task (Degree on Protection against Radiation 5 §).

Fuel may only be used in a nuclear reactor, for which an operating permits meant in 3 § of the Atomic Energy Act and in 2 § of the Act on Protection against Radiation is valid.

2.2

PERMITS CONCERNING OTHER NUCLEAR SUBSTANCES, MATERIALS AND INFORMATION

In addition to fuel permits, permits concerning other nuclear substances, material and information (AEA 2 §), shall also be applied for according to the 6 § of the Atomic Energy Degree.

When a safety permit meant in 2 § of the Act on Protection against Radiation in necessary, it may be

applied for in the same application as the permit meant in 2 § of the Atomic Energy Act.

In addition to what has been mentioned in the international agreements made by Finland, other nuclear material meant in clause 3 of 5 § of the Atomic Energy Degree, and for the export of which a permit is needeed, consists also of the substances, components and facilities mentioned in decision 116/77 of the Ministry of Trade and Industry.

3

SUPERVISORY ACTIVITIES

The supervisory activities of IRP concerning the fuel safety, safeguards and security control are discussed in the following. IRP will carry out the supervisory inspections on the request of the licensee (later on power company). Further, IRP will on its own initiativ carry out additional inspections, which are considered necessary.

3.1

FUEL SAFETY

3.1.1
Quality assurance programme of the power company for fuel

The quality assurance programme for fuel shall include purchase, design and manufacturing control, transport, handling, receipt, storage and use of the fuel.

The power company shall submit the quality assurance programme to IRP not later than one year prior to the commencement of fuel manufacturing. The manufacturing will be considered commenced, when parts of the fuel clusters are begun to be cut and/or worked to their final form and dimensions, or the fuel pellet manufacturing from powder is begun.

Prior to commencing the fuel manufacturing the power company shall possess an approval given by IRP concerning the quality assurance programme. IRP controls by inspections the fulfilment of the quality assurance programme.

The quality assurance programme requirements are made clear in separate guides.

3.1.2
Fuel design and manufacturing

The procedure for approval of the fuel design and manufacturing consists of the following:

a) A preinspection concerning the fuel design and manufacturing

The preinspection documents shall be submitted to IRP not later than one and a half year prior to the commencement of the fuel manufacturing. The power company shall possess prior to the commencement of the fuel manufacturing an approval given by IRP concerning the preinspection at least regarding the quality assurance, materials, manufacturing and drawings.

Prior to the commencement of the fuel manufacturing IRP will inspect at the manufacturing factory (or factories) that the activities at the manufacturing factory take place, or that the factory is ready to act, according to the preinspection documents.

The approval for the preinspection documents of the fuel generally concerns the initial loading only. For reloadings separate approvals shall be applied for at IRP not later than two months prior to the commencement of the manufacturing of the reloading batch in question. In the application all changes concerning the fuel design and manufacturing, and possible new information concerning the fuel behaviour, shall be presented.

b) The supervision of the quality assurance activities during the manufacturing and of the manufacturing itself

For carrying out the supervisory activities the manufacturing schedule shall be submitted to IRP by the power company well ahead of commencing the manufacturing.

c) The supervision of the receiving inspection at the nuclear power plant

For carrying out the supervisory activities the power company shall inform IRP the date of the receiving inspection well ahead of the inspection.

3.1.3
Transport packages for fresh and spent fuel

The design documents concerning a new package type shall be submitted to IRP for approval not later than three months prior to the tests to be made on the prototype or its miniature model. IRP supervises the performance of the tests. The test results shall be submitted to IRP for approval. After having accepted the design documents and the results of the tests IRP gives an approval certificate concerning the package type.

The supervision of the package, the type of which has been approved by the Institute of Radiation Protection, consists of the following:

a) The approval of the preinspection documents concerning the package; the evaluation time of the preinspection documents is approximately half a year in the first time

b) The supervision of the quality assurance activities during the manufacturing and of the manufacturing itself

c) Construction inspection

d) In-service inspections

The type of the transport package can also be approved by validation the approval certificate given by a competent foreign authority and concerning the package type in question. The certificate shall indicate, or it shall separately be made clear, the acceptance criteria used in the evaluation of the package type. Depending on the future use, ownership and supervision of the package, the above mentioned supervisory activities for the package will be applied.

The supervisory activities for the transport package are made clear in more detail in a separate guide.

3.1.4
Transport of fresh and spent fuel

The power company shall before each fuel shipment possess an approval given by IRP concerning the shipment. The approval application shall be compiled on a form available from IRP: General conditions for the approval are:

- the power company has a valid fuel permit;
- an insurance in accordance with the Atomic Liability Act or another special warranty exists;
- the transport plan has been approved by IRP;
- the package type has been approved by IRP;
- other possible permit conditions concerning the fuel transport are fulfilled.

During the shipment the Institute of Radiation Protection will supervise the shipment activities to the extent it considers necessary.

The supervisory activities of the transportations are described in more detail in a separate guide.

3.1.5
Fuel handling system

The procedure for approving the fuel handling system (storage, handling, transfer and inspection devices) consists of

a) preinspection of components and systems,

b) construction and start-up tests of devices,

c) the evaluation of test programmes and testing,

d) the inspection of the handling system (cf. Chapter 2.1).

Before transfering the fuel to the plant the fuel handling system shall be approved at least concerning the fresh fuel storage facilities and the handling devices needed. The whole handling system shall be approved before the fuel loading.

The fuel handling instructions shall be submitted to IRP for approval not later than two months prior to the intended fuel transfer.

The fuel handling system requirements are described in more detail in a separate guide.

3.1.6
Initial loading and reloading of fuel

The approval of the fuel loading plan is one condition for granting the loading permit. The loading plan shall be submitted to IRP not later than two months prior to the loading.

The Institute of Radiation Protection supervises the loading activities to the extent it considers necessary. After the loading IRP checks the fuel bundle numbers in the reactor core. Thereafter the cover of the reactor pressure vessel is closed and sealed.

Requirements concerning the loading plan are described in more detail in a separate guide.

3.1.7
Fuel performance

The supervision of the fuel performance is directed to the follow up of fuel power histories and the amount of fission products in the reactor primary circuit, to the fuel behaviour and integrity, and to the spent fuel investigations to be made.

The power company shall submit to IRP for approval a programme concerning the fuel supervision activities not later than one year before the start-up of the nuclear power plant unit in question.

The power company shall further submit to IRP for approval a report concerning the fuel behaviour during the subsequent period not later than two weeks before the reactor start-up after the reloading. The calculations presented in the report shall be based on real operating values of the fuel during preceding periods.

The reports concerning spent fuel investigations shall be submitted to IRP not later than two months after the fulfilment of each investigation. IRP shall however immediately be notified about unexpected phenomena observed in the investigations.

3.2
SAFEGUARDS

3.2.1
Nuclear material accounting and control

The power company shall prior to the import of the fuel possess an approval given by IRP concerning the nuclear material accounting and control system of

the nuclear power plant regarding the import and storage of the fuel, and regarding the whole system before the commencement of the loading. The manual for accounting and control shall be submitted to IRP not later than three months prior to the intended import of the fuel.

The Institute of Radiation Protection supervises the implementation of the system. IRP shall be furnished with documents, notices and reports relating to the supervision.

The requirements to be imposed on the nuclear material accounting and control system are made clear in more detail in a separate guide.

3.2.2
Design information on the facility and on the nuclear material accounting and control; subsidiary arrangements of the agreement between Finland and IAEA on safeguards

The design information concerning the facility shall be submitted to IRP for approval not later than one year prior to the intended transfer of the first nuclear material batch to the plant. The design information shall be submitted on forms available from IRP. When giving the design data the power company shall already be aware of the general principles for taking care of accounting and control activities.

After having accepted the design information IRP will submit it to IAEA. IAEA, the Ministry of Trade and Industry and IRP prepare on the basis of the design information a facility attachment presupposed by the agreement on safeguards. The facility attachment is an agreement concerning the communication, accounting and control between the Finnish authorities and IAEA, regarding a cartain facility, facilities or material balance area. IRP asks the power company for statement on this attachment. IRP will, after having accepted the facility attachment for its own part, deliver it to the Ministry of Trade and Industry, which will validate the attachment.

3.3

SECURITY SYSTEMS

A preliminary security plan describing the security systems of the nuclear power plant shall be submitted to IRP in advance to enable its evaluation prior to giving a statement concerning the construction permit application of the plant. The minimum evaluation time is two months.

The security requirements shall be taken into account in the general lay-out of the plant.

The final security plan shall be submitted to IRP to enable evaluation and approval prior to the import of the fuel to the plant. The minimum evaluatic time is six months.

The Institute of Radiation Protection supervises that the plans are implemented in accordance with the presented documents. IRP also supervises the start-up tests of the components and systems.

The security plans concerning the fuel transport are attached to the transport plans, and an approval is applied for them jointly.

Security systems of nuclear power plants and fuel transports are described in separate guides.

3.4

AMENDMENTS

Prior to modifying structures or systems already approved by IRP (cf. Chapter 3.1, 3.2 and 3.3), the power company shall have a corresponding approval for the modification in question. IRP supervises the amendments made to the components or structures of the system before the system or component can be taken into use again.

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LICENSING OF NUCLEAR FUEL AND OTHER NUCLEAR MATERIALS

1 INTERNAL FINNISH REGULATIONS

1.1 Atomic energy and radiation protection; the Institute of Radiation Protection

Atomic Energy Act (356/57) as amended by (7/73), (565/75) and (74/77)

Atomic Energy Degree (75/58) as amended by (735/70), (555/73) and (75/77)

Degree on Atomic Energy Commission (76/58)

Degree on the fees to be collected for the safety supervision of nuclear power plants (124/76)

Decision of the Ministry of Trade and Industry on the export of substances, components and plants relating to the Atomic Energy Act (116/77)

Act on Protection Against Radiation (174/57) as amended by (393/58), (1/65) and (144/73)

Degree on Protection Against Radiation (328/57) as amended by (197/58), (243/58) and (545/68)

Decision of the State Council on the carrying out the examination meant in 5 § of the Degree on Protection Against Radiation (243/58)

Decision of the Ministry of Social Affairs and Health on radiation protection (594/68)

Act on the Institute of Radiation Protection (536/74)

Degree on the Institute of Radiation Protection (103/75)

Degree on the right of the Institute of Radiation Protection to issue safety permits addressed in the Act on Protection Against Radiation (104/75)

Degree on the fees to be collected for the examinations meant in 5 § of the Degree on Protection Against Radiation (128/75)

Degree on the fees to be collected on the performances of the Institute of Radiation Protection (673/77)

1.2
Nuclear liability

Nuclear Liability Act (484/72) as amended by (128/77)

Degree on putting into effect the Paris Convention on Third Party Liability in the Field on Nuclear Energy (485/72)
Degree on the application of the Nuclear Liability Act (486/72) as amended by (130/77)

Order of the Council of Ministers on the application of certain provisions with regard to implementation of the Nuclear Liability Act (487/72)

Degree on putting into effect the Brussels Supplementary Convention on Third Party Liability in the Field of Nuclear Energy (129/77, SopS 4/77)

1.3
Transportations

Act on the transportation of dangerous materials on roads (510/74)

Degree on the transportation of dangerous materials on roads (861/74)

Degree on railway transportation (714/75)

Regulations of the State Railways on the transportations of dangerous materials (VAK), number 2696. A5.3000.1.69-5665, and amendments to it, numbers 2696.3000.1.71 and 2696.3000.7.73

Act on the acceptance of certain regulations of the international general agreements concerning the transportation of passengers and luggage by rail (CIV), and the transportation of goods by rail (CIM), (147/75)

Degree on the enforcement of the international general agreements concerning the transportation of passengers and luggage by rail (CIV), and the transportation of goods by rail (CIM), (148/75)

2
INTERNATIONAL AGREEMENTS

2.1
Prevention of the proliferation of nuclear weapons

The Treaty on the Non-Proliferation of Nuclear Weapons (SopS 11/70)

2.2
Agreement between Finland and the International Atomic Energy Agency

The agreement between the Republic of Finland and the International Atomic Energy Agency on safeguards (SopS 2/72) and subsidiary arrangements to it.

2.3
Bilateral agreements

Agreement between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the Republic of Finland for Co-operation in the Peaceful uses of Atomic Energy (16/68)

Agreement between the Government of Finland and the Government of Sweden for Co-operation in the Peaceful uses of Atomic Energy (SopS 41/68), and agreement made by exhange notes concerning it (SopS 17/72)

Agreement between the Government of the Republic of Finland and the Government of the Union of Sovjet Socialistic Republics for Co-operation in the Peaceful uses of Atomic Energy (SopS 39/69), and agreement made by exhange of notes concerning it (SopS 17/72)

Agreement for Co-operation between the Government of the United States of America and the Government of the Republic of Finland concerning civil uses of Atomic energy (SopS 33/70)

Agreement between the Government of the Republic of Finland and the Government of Canada concerning the Uses of Nuclear Material, Equipment, Facilities and Information transferred between Finland and Canada (SopS 43/76)