

## **Guide YVL D.1, Regulatory control of nuclear safeguards**

### **1 Introduction**

The following presents justifications for fulfilling the international obligations and facilitating international safeguards as well as maintaining and developing the national nuclear safeguards system.

#### **1.1 International obligations and international safeguards**

In principle, the peaceful use of nuclear energy provides the possibility to use nuclear material, nuclear technology and the related know-how to develop and produce nuclear weapons. There are several international agreements to prevent the proliferation of nuclear weapons, the most important of which is the Treaty on the Non-Proliferation of Nuclear Weapons, or the Non-Proliferation Treaty (Finnish Treaty Series 11/1970). According to Article III of the Non-Proliferation Treaty, each non-nuclear-weapon State Party to the Treaty shall conclude a separate Safeguards Agreement with the International Atomic Energy Agency (IAEA). It is the sole purpose of the Safeguards Agreement to verify that the use of nuclear energy does not lead to the development of nuclear weapons or other nuclear explosive devices. The non-nuclear-weapon Member States of the EU, the European Atomic Energy Community (Euratom) and the IAEA have had a similar agreement since 1973. When Finland joined the Union, its Safeguards Agreement was replaced by the Safeguards Agreement (Finnish Treaty Series 55/1995) made in 1995 on the implementation of Article III (1) and (4) of the Treaty on the Non-Proliferation of Nuclear Weapons between the countries not in possession of nuclear weapons within the European Union, the European Atomic Energy Community and the International Atomic Energy Agency. An Additional Protocol has been prepared for the Safeguards Agreement with the aim to improve international nuclear safeguards activities by creating a system to reveal any covert nuclear weapons programmes as early as possible.

In the European Union, nuclear safeguards are based on the Treaty establishing the European Atomic Energy Community (Euratom Treaty). Based on this Treaty, the European Commission (EC) has issued Regulation (Euratom) No 302/2005 on the application of Euratom safeguards. The Commission Regulation contains detailed provisions for the users of nuclear materials and producers of ores applicable to any person or undertaking setting up or operating a facility for the production, separation, reprocessing, storage or other use of nuclear materials.

The IAEA safeguards are based on the Non-Proliferation Treaty and the Safeguards Agreement issued thereunder, as well as the Additional Protocol to the Safeguards Agreement.

Euratom has its own intra-community nuclear material safeguards system based on the mandate specified in the Euratom Treaty. The safeguards apply to the use of nuclear material and ores containing uranium or thorium within the Euratom area. Detailed provisions are given in Commission Regulation No 302/2005 on the implementation of provisions concerning Euratom's nuclear safeguards. It sets out

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the duty of holders of nuclear material and ore producers to keep item accountancy records and submit to Euratom information concerning the material and any facility using or producing the material in question as specified in the regulation. In accordance with the Safeguards Agreement and the Additional Protocol to the Safeguards Agreement, Euratom submits part of the information further to the IAEA.

## 1.2 National safeguards

Finland shall for its part fulfil the requirements set forth in the international agreements. In Finland, the body overseeing the fulfilment of the requirements is STUK, the task of which it is to maintain and develop the national nuclear safeguards system (Nuclear Energy Decree 161/1988, Section 118). STUK sees to it that the operators have the necessary expertise and preparedness to arrange the supervision and that the operators for their own part implement the above-mentioned supervision in accordance with the pertinent regulations. When maintaining the safeguards system, STUK shall take account of the obligations of Commission Regulation No 302/2005. STUK's duties and supervisory rights are set out in the Nuclear Energy Act (990/1987, Sections 55 and 63).

The operators for their part have a role in how Finland fulfils its obligations. Obligations and requirements under nuclear safeguards (e.g. accountancy and reporting) apply to all operators regardless of the nature of the operations.

Guide YVL D.1 sets forth the requirements for the operators with regard to maintaining the national nuclear system and implementing nuclear safeguards in Finland. The requirements now cover all use of nuclear energy under the Nuclear Energy Act (Section 3) including nuclear fuel cycle-related research and development activities and the entire lifecycle of the nuclear energy use from the planning of the operations up to the implementation of the final disposal. By ensuring that the operators meet the requirements set forth in the guide, STUK can ascertain that Finland and Finnish operators fulfil the international contractual obligations and that the proliferation of nuclear weapons is prevented in an effective manner in Finland.

The guide is based on the national requirements detailed in the Nuclear Energy Act stipulating that the use of nuclear energy shall be in line with the overall good of society and ensure in particular that the use of nuclear energy is safe for man and the environment and does not promote the proliferation of nuclear weapons. The requirements have been set with the aim to fulfil the purpose of the Nuclear Energy Act and achieve as high a level of safety of nuclear energy use as practically possible. This is to ensure that also the commitments binding on Finland and in particular those under the Non-Proliferation Treaty can be met. Therefore, national requirements are not solely based on the existing IAEA or European Commission requirements. The guide also takes into account the requirement pursuant to the Nuclear Energy Act that stipulates that for the further development of safety, measures shall be implemented that can be considered justified considering operating experience and safety research and advances in science and technology.

STUK is responsible for maintaining the national nuclear material safeguards system and ensure that the operators possess the necessary expertise and preparedness to organise such control. The safeguards system maintained by STUK provides an

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efficient system for the national purposes of the implementation of nuclear safeguards that can also promote the safe use of nuclear energy and protection of the use of nuclear energy against unlawful action. The requirements set out in Guide YVL D.1 strengthen the current control practices. When considering the requirements and control practices, it has also been an aim to seek and utilise synergies of the following three essential regimes with regard to the use of nuclear energy:

1. nuclear safeguards and prevention of the proliferation of nuclear weapons
2. safe use of nuclear energy
3. protection of the use of nuclear energy against unlawful action.

## **2 Scope of application**

Guide YVL D.1 provides a description of the general principles and requirements related to nuclear safeguards activities in particular, which are applicable to all operators unless otherwise provided in the Guide. This Guide applies to all stages in the lifecycle of a nuclear facility and other use of nuclear energy from the commencement of operations until their termination. As regards the obligations imposed by the European Commission, the Euratom Treaty and Commission Regulation No 302/2005 issued thereunder shall be complied with. The requirements and procedures related to the transportation of nuclear materials and waste are set out in Guide YVL D.2 "Transport of nuclear materials and nuclear waste".

## **3 Justifications of the requirements**

The following presents brief chapter-specific justifications by subject area of the requirements set out in Guide YVL D.1. No special justifications have been prepared for such requirements that are based on the requirements set out in Commission Regulation No 302/2005 or directly on fulfilment of international contractual obligations.

To some extent, comparison to international requirements and internationally adopted industry practices have taken place, but the most important requirements for the operators, such as the Commission Regulation No 302/2005, already directly apply to the operators. In addition, the Commission has prepared unofficial instructions on how the requirements set out in Commission Regulation No 302/2005 shall be met. In this regard, it was not deemed necessary to replicate the requirements or instructions by the Commission other than in their most important parts. Where necessary, the justifications for the requirements also include separately indicated references to instructions prepared by the IAEA and the European Commission.

### **3.1 Chapter 1 Introduction**

The chapter states the general background for nuclear safeguards (including a brief history section if deemed necessary for clarification), goals and international agreements and obligations derived from them as well as organisations involved in nuclear safeguards activities, and their duties. The chapter also includes a summary clarifying which parts of the guide apply to which operations (the operator, however, is responsible for ensuring that the operation complies with the requirements prescribed by law, EU regulations and this guide).

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### 3.2 Chapter 2 Scope of application

Chapter 2 states that the guide provides a description of the general principles and requirements related to nuclear safeguards activities which are applicable to all operators (nuclear facilities, other facilities, other use of nuclear energy) unless otherwise provided in the guide. It is further stated that as regards the obligations imposed by the European Commission, the Euratom Treaty and Commission Regulation No 302/2005 issued thereunder shall be complied with. The starting point is that the obligations and requirements set by the European Commission and the Radiation and Nuclear Safety Authority shall be met. In the event of a conflict between the obligations or requirements in the YVL Guide and those set by the European Commission, those set by the Commission shall prevail.

### 3.3 Chapter 3: General principles

**301–359.** Chapter 3 presents requirements related to nuclear safeguards activities for the commencement of the use of nuclear energy and notification thereof, as well as for the operator's nuclear safeguards system.

#### 3.3.1 3.1 Licence requirement

**301–307.** This chapter describes the licencing procedures for nuclear use items and activities that are exempted from licence requirements. These are based on the Nuclear Energy Act and Decree. As a reminder, the chapter also includes a mention of the Act on the Control of Exports of Dual-Use Goods and the Council Dual-Use Regulation.

**301–301c.** In this revision round, the requirement has been divided in the interest of clarity. The requirement provides a description of the licencing practices in accordance with the Nuclear Energy Act and Decree principles.

**303.** The purpose of the receipts is to ensure that confidential information or other material subject to regulatory control does not fall into the wrong hands. The receipt shall include a general (or detailed, if necessary) description of the transferred/received material based on which the material can be identified. If necessary, the receipts shall be made available for inspection by STUK.

**307.** According to Section 20 of the Nuclear Energy Act, the use of a nuclear facility may only commence after STUK has ascertained that the nuclear facility meets the safety requirements set, that the physical protection and emergency planning are sufficient, that the necessary control to prevent the proliferation of nuclear weapons has been arranged appropriately, and that the licensee of the nuclear facility has, as provided, arranged indemnification regarding liability in case of nuclear damage. Other use of nuclear energy in accordance with Section 21 of the Nuclear Energy Act shall not be commenced on the basis of a licence (granted by STUK) until STUK has ascertained, when the operations so require, that the use of nuclear energy is in accordance with the requirements. If STUK considers that the operations require the aforementioned confirmation, this is stated in the operating licence.

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### 3.3.2 3.2 Basis for the planning and implementation of the use of nuclear energy

**308–312.** This chapter describes the general obligations based on the Nuclear Energy Decree. The requirements included in this chapter ensure that the operators plan the use of nuclear energy in accordance with Section 118 b of the Nuclear Energy Decree: *The use of nuclear energy shall be planned and executed such that the obligations on nuclear safeguards laid down in and issued by virtue of the Nuclear Energy Act and laid down in and issued by virtue of the European Atomic Energy Community (Euratom) Treaty are complied with. A nuclear facility or other place in which nuclear energy is used may contain no premises, materials or activities of significance to nuclear safeguards that are not included in the notified information. The licence holder or other user of nuclear energy shall have an accounting and reporting system for nuclear material and other nuclear commodities which ensures the correctness, scope and continuity of information in order to implement the safeguards necessary for the non-proliferation of nuclear weapons.*

**311.** The requirement is based on requirement 8 (Specific safety requirements, No SSR-2/1) of the IAEA Safety Standards “Safety of Nuclear Power Plants: Design”. Facilitation of international safeguards is a prerequisite for the use of nuclear energy. In this context, some Finnish nuclear facilities have implemented remote electronic transmission of control data from the monitoring equipment. Control data has been and shall be transmitted also with security arrangements in mind. This remote transmission of data will play a significant role especially as regards the disposal of spent fuel that otherwise would require continuous presence of inspectors at, for example, the spent fuel encapsulation plant. Furthermore, the Additional Protocol to the Safeguards Agreement (Article 14) requires the States to permit and protect free communications by the IAEA for official purposes between IAEA inspectors in that State and IAEA Headquarters (and/or Regional Offices), including attended and unattended transmission of information generated by IAEA containment and/or surveillance or measurement devices. The Government Proposal to give effect to the Additional Protocol (5/2000) states that *the IAEA shall have, in consultation with the State concerned, the right to make use of internationally established systems of direct communications, for example satellite systems. Finland has no objection to this. The IAEA may also use said method for transmission of information acquired by measurement devices or other devices of the inspected item, but it shall always take due account of the need to protect confidential or otherwise sensitive information. The IAEA is required to maintain a stringent regime to ensure effective protection against disclosure of commercial, technological and industrial secrets and other confidential information coming to its knowledge. The regime referred to above shall include provisions relating to the general principles and associated measures for the handling of confidential information, conditions of IAEA staff employment relating to the protection of confidential information and procedures in cases of breaches or alleged breaches of confidentiality. The regime shall be approved and periodically reviewed by the IAEA Board of Governors.*

### 3.3.3 3.3 Nuclear safeguards system and organisation

**313–328.** The requirements presented in this chapter are stricter than those in Commission Regulation No 302/2005 because it is only possible to ensure the fulfilment of the nuclear material obligations in the planning, construction and use of a

nuclear facility if the data pertaining to the facility is submitted in time. The State of Finland is committed to ensuring that the use of nuclear energy in Finland does not contribute to the proliferation of nuclear weapons. This goal is promoted by ensuring that the International Atomic Energy Agency (IAEA) (and the European Commission) can plan the safeguards at Finnish plants appropriately and without delay. Early submission of information is also likely to promote international acceptability of the use of nuclear energy. Chapter 3 also presents requirements for the operator's own nuclear safeguards system and general requirements for the protection of nuclear use items against unlawful action.

### **3.3.1 Operator's nuclear safeguards system**

**313–314.** The operator is responsible for the nuclear use items in its possession. The requirements for the operator's nuclear safeguards system are presented here. The purpose of the operator's nuclear safeguards system is to ensure the fulfilment of the nuclear use item accountancy and reporting obligations as well as nuclear safeguards under the operator's responsibility (incl. nuclear use item security arrangements).

### **3.3.2 Organisation involved in the operator's nuclear safeguards activities**

**315–321.** These requirements include the requirements for the organisation involved in the operator's nuclear safeguards activities. The requirements are based on nuclear energy legislation.

**317–318.** The requirements are based on Section 7 i of the Nuclear Energy Act according to which the licensee of a nuclear facility shall designate a person in charge of nuclear safeguards and a deputy for that person. Several persons in charge may be designated provided that the areas of responsibility are clearly specified (e.g. a person responsible for the nuclear safeguards activities pertaining to the facility and a person responsible for the nuclear safeguards activities pertaining to international transfers of nuclear materials). There may also be more than one deputy persons, but the responsibility for the implementation of nuclear safeguards always lies with one person (the person in charge of nuclear safeguards activities and, when this person is unable to carry out his or her responsibilities, his or her deputy). The purpose of the latter section of the requirement is to ensure that the person in charge of nuclear safeguards activities and person in charge of security arrangements have an effective opportunity to perform their duties.

**321.** Also in case of activities that do not require a manager in charge as defined in the Nuclear Energy Act, STUK requires that the operator ensures its obligations pertaining to the use of nuclear energy and has sufficient personnel to meet the obligations. Requirement 321 requires the operator to designate a person in charge of nuclear safeguards activities and his/her deputy and notify the names of these persons to STUK. Even though the operator is responsible for ensuring that the persons in charge have the opportunity to attend to the operator's accountancy, reporting and control obligations, the persons in charge do not necessarily in case of such activities have to be employed by the operator. Instead, the obligations can be attended to in a collective manner (for example, a licensee that is the principal holder of the nuclear information may attend to the nuclear safeguards obligations on behalf

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of its subcontractors and consults). This must, however, be agreed on with STUK separately, case-by-case.

### **3.3.3. Nuclear safeguards manual**

322–328. The licensee or some other user of nuclear energy is obliged to ensure that the requirements pertaining to nuclear safeguards are met. The licensee or some other user of nuclear energy shall designate persons responsible for attending to nuclear safeguards activities at the location where nuclear energy is being used. In case of nuclear facilities, the responsible person is the person in charge of nuclear safeguards activities; in case of other licensees and operators, the responsible manager or person in charge specifically designated for this position. The manner in which nuclear safeguards are attended to shall be described in the nuclear safeguards manual that shall be submitted to STUK for approval.

## **3.3.4 3.4 Nuclear security arrangements and information security**

### **3.4.1 Nuclear security arrangements**

**329–334.** The requirements are based on the criteria set out in IAEA Recommendation INFCIRC/225/Rev.5. Requirements for practical activities have been derived from the goals set out in the recommendations with the help of the design basis threat (DBT) prepared in cooperation with the Finnish Security Intelligence Service (SUPO). If necessary, the requirements set out in Guide YVL A.11 “Security of a nuclear facility” are also applied.

**331.** The requirement is based on Section 7 of the Nuclear Energy Act. Detailed requirements for nuclear security arrangements pertaining to nuclear facilities are specified in Guide YVL A.11. The description of nuclear security arrangements pertaining to other operators (section 829 describes how STUK inspects the description) shall include, for example:

- responsibilities and duties (e.g. who is responsible for the nuclear security arrangements);
- procedures for implementing the nuclear security arrangements (e.g. when handling and transporting nuclear use items) and data security procedures;
- practical implementation (e.g. guarding, access control, security systems incl. alarm systems and facilities and locations where nuclear use items are stored and handled).

The description shall be submitted as an annex to the nuclear safeguards manual. It must be taken into account that the obligation to observe secrecy referred to in Section 78 of the Nuclear Energy Act applies to the description of the nuclear security arrangements.

### **3.4.2 Information security**

**335–338.** The requirements in the chapter have been set out in Section 78 of the Nuclear Energy Act and Commission Regulation No 302/2005. This chapter contains a compilation of and references to the aforementioned requirements. If necessary,

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the requirements set out in Guide YVL A.12 "Information security management of a nuclear facility" are also applied.

### 3.3.5 3.5 Submission of preliminary design information, basic technical characteristics and programme of activities

#### 3.5.1 Preliminary design information and basic technical characteristics and 3.5.2 Programme of activities

**339–342** (3.5.1), **343–347** (3.5.2). These chapters present detailed requirements pertaining to the submission of the preliminary design information and basic technical characteristics as well as the programme of activities. The requirements are based on Commission Regulation No 302/2005, valid YVL guides and decisions of the IAEA Board of Governors.

Decisions of the IAEA Board of Governors on the submission of design information of a new facility:

- GOV/2554/Att.2/Rev.2, 1 April 1992: *Parties to comprehensive safeguards agreements will need to provide design information to the Agency at the time of the decision to construct, or to authorize the construction of, any nuclear facility (i.e. well before construction actually begins) in order to create confidence in the peaceful purpose of the facility and to provide adequate lead-time for safeguards preparations.*
- GOV/INF/819, 12 September 1997: *In February 1992 the Board, on the basis of Secretariat proposals (GOV/2554/Att.2/Rev.2), decided that a State's obligation under its Safeguards Agreement to provide design information on nuclear facilities included the requirement that preliminary information be provided as soon as a decision has been taken to construct a new facility or to modify an existing facility. In taking this decision, the Board requested the Secretariat to modify, where necessary, the Subsidiary Arrangements of the Safeguards Agreements... The information so provided has been included in the safeguards database for use in the Safeguards State Evaluations. The early provision of design information also contributes to the safeguards relevant information about States' nuclear programmes.*

Decision GOV/2554/Attachment 2/Rev.2 (section 2) of the IAEA Board of Governors also describes what the IAEA considers essential with regard to early submission of the design information:

- *to facilitate the incorporation into the facility design – including the design of the nuclear materials accountancy system – of features which will make it easier to implement safeguards at the facility (any proposed design modifications being consistent with the prudent management practices required for the economic and safe operation of the facility and such as to avoid hampering or delaying construction, commissioning or operation);*
- *to allow time for safeguards research and development work that may be necessary;*
- *to enable the Agency to do the budgetary planning necessary for the effective and efficient implementation of safeguards; and*

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- *to permit the identification and scheduling of actions which need to be taken jointly by the State, the facility operator and the Agency, including*
  - *the installation of safeguards equipment during construction of the facility;*
  - and*
  - *the verification of information on the design of the facility.*

**343.** A programme of activities for the design phase shall be submitted to provide a framework for the preliminary design information and the potential need for updating it. In other words, a programme of activities for the design phase includes a project roadmap essential for the project's nuclear safeguards, i.e. measures that will be used to attend to the nuclear safeguards obligations during plant design (in accordance with Section 118 b of the Nuclear Energy Act), construction and subsequent operation.

To allow STUK to ascertain that the IAEA receives the information it requires in time, the requirements set out in the guide are stricter than those set out in Commission Regulation No 302/2005. Since, based on the Safeguards Agreement, the European Commission is the party officially responsible for further submission of the information to the IAEA, the guide includes a requirement for the operator to submit the information also to the Commission.

**345.** Operators shall submit the nuclear facility's programme of activities by 15 November, unless otherwise provided in the particular safeguard provisions drawn up by the Commission. A reactor operating programme shall include, for example, known occurrences allowing for the opening of the reactor lid and any other deviations from the normal use of the reactor.

**346.** Operators with other nuclear use items than nuclear material in their possession or engaged in controlled operations shall also submit an annual programme of activities. The programme of activities shall be submitted annually by 31 January as an annex to the annual report required in section 451.

**347.** Operators shall communicate any changes to the information contained in the programme of activities to STUK and the Commission as soon as they become aware of the change. If the change may have an impact on the implementation of the IAEA safeguards (e.g. inspections carried out on short notice or the IAEA control tools), it shall also be notified "for information" to the IAEA. However, official reporting to the IAEA always takes place through STUK or the Commission.

### **3.5.3 Particular safeguard provisions and facility attachments**

**348–349.** The requirements are derived from Commission Regulation No 302/2005 and the Safeguards Agreement INFCIRC 193 and the Protocol thereof. In preparing the particular safeguard provisions, the Commission considers the basic technical characteristics submitted of the facility, in addition to which the particular safeguard provisions may be used to further specify the contents of the programme of activities and subsequent notifications as well as the schedule for the submission of information.

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### **3.3.6 3.6 Requirements related to nuclear safeguards activities pertaining to international transfers of nuclear materials**

**350–352.** Requirements related to nuclear safeguards activities pertaining to international transfers of nuclear materials are based on obligations imposed by the international agreements Finland has signed.

### **3.3.7 3.7 Specific requirements related to the disposal of spent nuclear fuel**

**353–359.** An underground emplacement room differs from traditional nuclear facilities in as much that it is not possible to verify spent fuel or ensure the location of spent fuel disposed of by means of direct observation. The data on nuclear material and the location thereof shall be verified and recorded in a reliable manner for the purpose of nuclear safeguards accountancy. Since the fuel is in an inaccessible location, the responsible party (and later the State) in particular shall be able to demonstrate that no undeclared activities of nuclear safeguards relevance take place in the disposal area and that fuel is not removed from the disposal area without notification.

**353.** The requirement emphasises the operator's obligation to ensure the coordination of the safety, security arrangements and nuclear safeguards through the entire spent fuel final disposal project at the final disposal facility with a service life of over 100 years and challenging control implementation (nuclear material is being placed in the final disposal facility at the same time as the facility is being constructed).

**357–359.** The IAEA's encapsulation plant model ISA "Model Integrated Safeguards Approach for a Spent Fuel Encapsulation Plant" [SG-PR-1305] requires each fuel item to be verified by means of non-destructive assays prior to being placed in the final disposal canister. After the verification, the fuel shall remain under dual containment/surveillance (Dual C/S). In the event of a C/S failure, the verification shall be carried out anew. It shall be possible to carry out the verification at the nuclear waste facility to ensure that any new verification of spent fuel, if necessary, can be carried out there. This also makes it possible to eliminate the need to transport the fuel back to the shipping facility for a new verification in the event of a C/S failure. This helps to minimise the safety risk due to spent fuel transports as low as practically possible.

## **3.4 Chapter 4: Nuclear use item accountancy and reporting**

Chapter 4 sets forth the requirements for the nuclear use item accountancy and reporting. As a rule, the operator's accountancy and reporting take place in accordance with Commission Regulation No 302/2005. Chapter 4 sets forth the requirements by which STUK ensures that operators for their part satisfy the requirements set out in the Commission Regulation and the accountancy and reporting requirements to maintain the national nuclear safeguards system by STUK and also to submit to STUK the additional information it requires to exercise regulatory control.

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### 3.4.1 4.1 General principles

**401–406.** The chapter provides a description of the general principles for the operator's accountancy and reporting system. The requirements are based on valid obligations imposed by Commission Regulation No 302/2005 and the international agreements Finland has signed.

### 3.4.2 4.2 Requirements pertaining to accountancy

**407–424.** The requirements presented in chapters 4.2.1–4.2.4 are based on valid obligations imposed by Commission Regulation No 302/2005 and the international agreements Finland has signed. The purpose of the requirements pertaining to the transfer and retaining of documents (411–412) is to ensure that, for example, the original information pertaining to a batch of nuclear material (source document or information in the source document) is transferred with the batch of nuclear material and that the information is preserved throughout the operation even if the operator should change. The objective is that each batch of nuclear use items is always transferred only against a signed receipt and that the consignor shall always retain a copy of the receipt. This is important especially with regard to batches of nuclear material and nuclear use items disposed of. When all the batches of nuclear use items recorded in the source documents have been disposed of, the source documents shall be provided in their entirety to the party responsible for the nuclear use items disposed of. In other times, it is sufficient that the consignee is provided with the information contained in the source documents (e.g. copies of the source documents or equivalent documents). Minimum retention period requirements shall also be set out for the operators. STUK may set longer retention periods for the documents if it is deemed necessary.

The conflict in the previous version (2013) of Guide YVL D.1 has been amended so that now also a copy of the source document is considered to be a source document of accountancy relevance. Thus, both the document provided to the consignee and the document retained by the consignor equally meet the requirements set out in this chapter.

#### 4.2.5 Inventory charts

**425–427.** The requirements provided in the chapter are set out such that the location of the batches of nuclear materials and other nuclear use items can be easily verified. According to Commission Regulation No 302/2005, nuclear material inventory charts shall be such that they can be verified to an accuracy of a material balance area or key measurement point. As regards other nuclear use items, inventory charts may also be of key measurement building accuracy, i.e. the inventory charts of these items normally refer to storage place information (NB! Storage places of other nuclear use items shall also fulfil the requirements for nuclear security arrangements).

#### 4.2.6 Other documents

**428–429.** The requirements provided in this chapter are based on the demand to document and include in the nuclear use item accountancy also other documents prepared for nuclear safeguards purposes. Operators shall document internal nuclear

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safeguards inspections in accordance with para. 428 and include the protocols in their nuclear use item accountancy. This document shall also be submitted to STUK as an annex to the annual report according to the requirements in chapter 4.3. The nuclear use item accountancy shall also include reports in accordance with para. 429.

### **3.4.3 4.3 Requirements pertaining to reporting and notifications**

#### **4.3.1 General requirements**

**430–433.** The chapter presents the general requirements for the reporting based on Commission Regulation No 302/2005. In para. 433, the requirement set out in the Commission Regulation on the submission in electronic format of reports and notifications that have been prepared electronically has been extended to apply also to other use of nuclear energy. The objective of the extension is to ensure equal treatment of operators.

#### **4.3.2 Advance notifications**

**434–435.** The requirements presented in the chapter provide criteria for occurrences requiring advance notification based on Commission Regulation No 302/2005 and Section 134 a of the Nuclear Energy Decree. Para. 434 includes a small amendment to clarify the interpretation and reduce the risk that a licensee should ignore the requirement in the Nuclear Energy Decree.

#### **4.3.3 Inventory change report, 4.3.4 Material balance report and 4.3.5 Physical inventory listing**

**436–447.** Chapters 4.3.3, 4.3.4 and 4.3.5 present the general requirements for the operators regarding the inventory change report, material balance report and physical inventory listing and their submission. The requirements are based on Commission Regulation No 302/2005 (detailed provisions are provided in the regulation).

**437.** It must be taken into account that the book inventory shall be notified always regardless of whether there are any inventory changes or not.

**442.** If there are no discrepancies between the notifications of the consignor and the consignee (item 4), there is no need to state this separately in the material balance report. Inspected ending book inventory shall be stated in the material balance report only if the operator carries out an extra physical inventory for its own purposes and the result of this inventory differs from the ending book inventory. If there are discrepancies between the consignor's and consignee's statements or if the operator has carried out an extra physical inventory the result of which differs from the ending book inventory, a special nuclear safeguards report referred to in chapter 4.3.8. shall also be submitted to STUK as an annex to the material balance area. Inventory changes (item 2) shall be presented as occurrence-specific sums by inventory change types in accordance with Commission Regulation No 302/2005.

**444.** The balance report submitted to STUK shall be enclosed with balances by country of origin. There are no requirements on the form of this report. The report shall be submitted only in the event that any nuclear material subject to a particular

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safeguards obligation is present in the material balance area. The requirement is based on bilateral agreements concluded by Finland.

#### **4.3.6 Notifications of operations**

**448.** The requirement is applied to ensure that should the information stated in the advance notification change, the operator shall notify the changed information so that STUK has up-to-date information on occurrences of nuclear safeguards activities relevance (Section 118 of the Nuclear Energy Decree).

#### **4.3.7 Annual report**

**449–452.** The chapter presents requirements for the operators' annual reports. Para. 451 is based on requirements set out in Commission Regulation No 302/2005, and para. 452 is a supplement by which STUK ensures that also other operators (other than those referred to in paras. 449–451) implement supervision in accordance with the pertinent regulations (Section 118 of the Nuclear Energy Decree). Para. 450 apply to operators who possess licensed nuclear information purported by nuclear energy legislation. Nuclear information is not subject to any advance notification requirements regarding write-off from accountancy, but any disposal of nuclear information and its write-off from accountancy shall be indicated in the annual report.

#### **4.3.8 Special nuclear safeguards reports**

**453–454.** The chapter presents requirements for the special nuclear safeguards reports. Para. 454 is based on Commission Regulation No 302/2005 and only applies to nuclear material. Para. 453 includes also special report requirements for other nuclear use items. Para. 453 has been re-phrased to eliminate the conflict in the previous version (2013) of Guide YVL D.1. Para. 453 is applied to ensure that STUK has up-to-date information on all unusual events in safeguards-related activities.

### **3.4.4 4.4 Accountancy, notifications and reports of international transfers of nuclear materials**

**455–458.** The chapter presents requirements for the accountancy and reporting of nuclear material owned by a Finnish operator and intended to be imported to Finland. As for accountancy, it is required with regard to nay nuclear use items intended to be imported to Finland. Accountancy of nuclear use items intended to be imported to Finland shall also cover the receiving and transferring of nuclear use items considered to be subject to any particular safeguards obligation based on a bilateral nuclear safeguards agreement or agreement in the form of exchange of letters concluded between Finland and another State (nuclear use items shall be originally intended to be imported to Finland even if not yet designated to be imported in Finland). However, it is recommended to keep accountancy records of all nuclear use items in possession of the operator even if the items should not yet be accounted in the international transfers of nuclear use item accountancy. As regards reporting, the obligatory burden of the operators has been reduced insofar that a separate confirmation is no longer required if the operations are as stated in the advance notification.

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**3.4.5 4.5 Notifications and reports on the write-off and disposal of nuclear use items**

**459–463.** STUK and the operators have both expressed that there is a need for instructing the activities. The guide presents requirements on how the nuclear use item accountancy and reporting of nuclear use items being disposed of shall be carried out and under which prerequisites can items be written-off from the accountancy or, if items (spent nuclear fuel) cannot fully be written-off from the accountancy, which documents shall be further maintained. The basis for the requirements is that it is not possible to re-verify by means of conventional methods nuclear use items that are, as a rule, disposed of. Activities in accordance with the requirements protect use of nuclear energy against unlawful actions and ensure that the items cannot in any case be used for advancing the proliferation of nuclear weapons.

As regards spent fuel, items disposed of may, in theory, be reintroduced into the sphere of safeguards and re-verified. Subsequently, the accountancy thereof shall be retained, in practice, in perpetuity. However, it is unlikely that spent nuclear fuel should be reintroduced (to the fuel cycle), so the relevant procedures set out for its final disposal in the guide are in line with other procedures for final disposal of other nuclear use items.

**459.** Source documents (original source documents or copies of the original source documents) and history files (original history file or a copy of the original history file that has been maintained starting from the import of the batch of nuclear material and contains entries indicating all occurrences and changes applicable to the batch of nuclear material) shall indicate all information relevant to nuclear safeguards, and they shall be submitted further to the party responsible for the spent fuel or nuclear material intended to be disposed or already disposed of at any given time. A separate requirement also stipulates that the location of the disposed nuclear fuel in the nuclear waste facility shall be indicated in the history file for possible reintroduction.

**460.** A general ledger shall be kept of nuclear fuel intended to be disposed of or already disposed of so that it can be ensured through accountancy that the disposed of material actually is the material that was intended to be disposed of.

**461.** There is not yet an inventory change code for the disposal of spent nuclear fuel as required by the Commission Regulation. This requirement allows STUK to ensure that, prior a batch of nuclear material can be reported as disposed of, there are no parties (IAEA, Commission, STUK, operators) with any open questions related to the batch of nuclear material being disposed of.

**462.** The accountancy (source documents, history file, general ledger and operating records as well as inventory change reports especially as regards to fuel item encapsulation and disposal) of nuclear material being disposed of shall be retained "in perpetuity", meaning that when the operator's waste management obligation expires, the accountancy obligation shall be transferred to the State. This is to ensure that if the nuclear material is to be reintroduced (to the fuel cycle) at a later point in time, the necessary information on the nuclear material to be reintroduced will be available.

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**463.** As regards not nuclear materials (“other nuclear use items”, with the exception of nuclear information), account-keeping can be stopped when said materials are no longer operable or usable and cannot be restored for operation or use through repair. With the requirement, STUK reserves the necessary time (2 weeks) to ensure that the materials are no longer operable or usable. As regards nuclear information, disposal and write-off from the accountancy shall be notified in the annual report in accordance with para. 450.

### 3.5

#### **Chapter 5: Declarations required under the Additional Protocol to the Safeguards Agreement**

**501–521.** As regards Finland, the implementation of the Additional Protocol to the Safeguards Agreement is the responsibility of the Radiation and Nuclear Safety Authority (Government Proposal 5/2000). Chapter 5 sets forth the requirements for the information (Article 2 of the Additional Protocol) and deadlines to submit the information to STUK in order to meet the obligations for which the State of Finland is responsible under the Additional Protocol to the Safeguards Agreement (Article 3 of the Additional Protocol). The requirements are based on the Additional Protocol to the Safeguards Agreement and IAEA instructions “Guidelines and Format for Preparation and Submission of Declarations Pursuant to Articles 2 and 3 of the Model Protocol Additional to Safeguards Agreements, Service Series 11” that provides recommendations on the contents and format of the notifications. Guidelines to meet the obligations for which the European Commission is responsible for (submission of information and submission deadline) are provided in Commission Regulation No 302/2005.

Government Proposal 5/2000 (on amending the nuclear energy legislation) states about Article 3 of the Additional Protocol to the Safeguards Agreement as follows:

*Article 3. The Article states when the information referred to in Article 2 shall be submitted. In case of operations that fall within the scope of the Nuclear Energy Act, the Radiation and Nuclear Safety Authority may, under Section 63 of the Nuclear Energy Act, oblige the operators to provide certain reports and notifications and also in this connection set such deadlines that it itself will be able to submit the information further to the IAEA in time.*

The Additional Protocol to the Safeguards Agreement and Commission Regulation No 302/2005 provides deadlines by which the information required by the Additional Protocol shall be submitted to the IAEA or Commission (to be submitted further to the IAEA). This chapter sets operator deadlines to ensure that STUK will be able to submit the information further to the IAEA/Commission in time. With the exception of exports to be reported quarterly (deadlines 2 weeks for export-related transfer and 2 weeks of STUK’s request as regards import) the deadline set for the notifications is 1 February or the last day of February. This is to ensure that STUK will have sufficient time to check the correctness and completeness of the information and to prepare based on the information the necessary notifications to the IAEA/Commission within the deadlines provided in the Additional Protocol to the Safeguards Agreement and Commission Regulation No 302/2005.

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**501–504.** The requirements provide deadlines for submission of information in accordance with the Additional Protocol to the Safeguards Agreement (deviations are provided separately in subsequent requirements) and specifications for the format and submission method of the notifications.

### **3.5.1 5.1 Nuclear fuel cycle-related research and development activities**

**505–508.** Research and development activities related to the nuclear fuel cycle fall within the scope of the Nuclear Energy Act (Section 2(1)(6)). The activities do not require a license, but an annual notification to the Radiation and Nuclear Safety Authority (Section 8 of the Nuclear Energy Act) is required. The definitions (Section 130 a of the Nuclear Energy Decree) concerning the notification and paras. 505–508 of the guide are based on Article 18a of the Additional Protocol. The notification shall be made annually by the end of February (para. 505). STUK shall review the notified information and submit the notification to the Commission and the IAEA annually by 15 May. To clarify the activities and improve communication, para. 507 includes new requirements on the format.

### **3.5.2 5.2 Description of the site pursuant to the Additional Protocol to the Safeguards Agreement**

**509–513.** In Finland, the Radiation and Nuclear Safety Authority is responsible for collecting and submitting the information pursuant to the Additional Protocol to the Safeguards Agreement to the IAEA and the Commission. The Ministry of Economic Affairs and Employment (MEAE) has appointed STUK as the party responsible for the site collecting and submitting information related to the site pursuant to the Additional Protocol to the Safeguards Agreement in accordance with Commission Regulation No 302/2005. However, the correctness of the information shall be the responsibility of the operator to which this chapter sets forth the requirements concerning, for example, the preparation, review (more detailed in chapter 6.4) and submission of a general site description to STUK. STUK shall review the notified information and submit the notification to the Commission annually by 1 April.

### **3.5.3 5.3 Manufacture of nuclear equipment**

**514–516.** A State shall notify manufacture of nuclear equipment in accordance with the Additional Protocol. The guide specifies that STUK shall be notified before commencing the activity and that any equipment manufactured shall be notified annually by the end of February. STUK shall review the notified information and submit the notification to the IAEA annually by 15 May.

### **3.5.4 5.4 Location or reprocessing of intermediate or high-level waste**

**517.** Location or reprocessing of intermediate or high-level waste shall be notified to STUK and the Commission. STUK shall review the notified information and submit the notification to the IAEA annually by 1 April. The official notification, however, is submitted to the IAEA by the Commission.

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### **3.5.5 5.5 Import and export of specified equipment and materials listed in Annex II to the Additional Protocol to the Safeguards Agreement**

**518–520.** Export of specified equipment and materials listed in Annex II to the Additional Protocol to the Safeguards Agreement is always subject to a license issued by the Ministry for Foreign Affairs (MFA). A transfer report related to the export shall be submitted to STUK (Section 21 of the Nuclear Energy Act). Here are presented the requirements for the operator notification's content, based on which STUK submits the notifications pursuant to the Additional Protocol to the IAEA. Exports shall be notified only upon separate request by the IAEA. The contents of the notification are similar to that in the case of imports. STUK shall review the notified information and submit the notification to the IAEA quarterly within 60 days of the end of the quarter concerned.

### **3.5.6 5.6 General plan for the nuclear fuel cycle**

**521.** General plans related to the nuclear fuel cycle shall be notified pursuant to the Additional Protocol. The requirement obliges the operators to notify their plans to STUK annually by 1 February. STUK shall review the notified information and submit the notification to the IAEA annually by 15 May.

### **3.5.7 5.7 Other declarations related to activities pursuant to the Additional Protocol to the Safeguards Agreement**

**522.** The requirement recalls that an operator shall also submit copies of other notifications pursuant to the Additional Protocol (the responsibility to submit of which lies with the Commission) to STUK.

## **3.6 Chapter 6: Internal inspections by the operator**

**601–612.** Chapter 6 presents requirements on what the operator shall inspect itself, and how. The requirements are based on Section 118 b of the Nuclear Energy Decree. The operator shall ensure the effectiveness of its safeguard system by internal inspections pursuant to para. 601. This helps to ensure that the licensee has the necessary expertise and preparedness to arrange the supervision and that the licensee for its own part implements the above-mentioned supervision in accordance with the pertinent regulations.

### **3.6.1 6.1 Physical inventory taking**

**602–605.** The requirements are based on Commission Regulation No 302/2005. In addition to what is stipulated in the Commission Regulation, STUK requires that the operator shall take physical inventory also by particular safeguards obligations and Euratom's safeguards obligations to disclose the quantity of material pursuant to the obligations.

### **3.6.2 6.2 Inventory of other nuclear use items**

**606–607.** The procedures are necessary to facilitate the implementation of the regulatory control exercised by STUK.

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### 3.6.3 6.3 Inspections of the nuclear safeguards system

**608–610.** Para. 608 further specifies what an inspection of the nuclear safeguards system shall, at minimum, include to cover the requirements set forth in Section 118 b of the Nuclear Energy Decree and allow STUK, for its part, to verify that the operator possesses the necessary expertise and preparedness to implement the control in accordance with the pertinent regulations.

### 3.6.4 6.4 Review of the description of the site pursuant to the Additional Protocol to the Safeguards Agreement

**611.** One of the main tasks included in the operator's own safeguards activities is to update and review the information provided in the description of the site (the contents of the description are described in chapter 6.2). According to Article 3 of Commission Regulation No 302/2005: *While the site representative carries the responsibility for the timely collection of the relevant information and the submission of the general description of the site to the Commission, the responsibility for the correctness and the completeness of the declarations remains with the persons or the undertakings setting up or operating the installation, and (...) with the Member State concerned.* The purpose of this requirement is to ensure that the notification submitted by the operator to STUK (appointed as the party responsible for the site pursuant to the Regulation) is realistic. The requirement specifies further that the operator, not the author or supplier of the description, is responsible for the drawing up and reviewing of the description of the site. STUK shall review the information provided by the operator regularly (816).

### 3.6.5 6.5 Review of the information pertaining to spent nuclear fuel before encapsulation for final disposal

**612.** The operator and STUK must know which fuel items are going to final disposal and that the nuclear material data of the fuel items disposed of are accurate. The requirement is based on Section 118 b of the Nuclear Energy Decree. The operator may carry out (or have another party carry out) the identification and inspection (e.g. inspection of the nuclear material data and usage history, including measurements, if applicable) in the intermediate storage facility or encapsulation plant or, if necessary, both, depending on its own needs.

STUK will verify the reviewed information declared by the operator before the fuel items are encapsulated for final disposal (chapter 8).

## 3.7 Chapter 7: Obligations related to regulatory inspections

**701–709.** Chapter 7 includes requirements stipulating that the operator shall ensure that regulatory inspections can be conducted appropriately and without any undue delay. The requirements are based on obligations under international agreements and the Nuclear Energy Act and Decree.

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**701–705.** The requirements are based on the Safeguards Agreement and Additional Protocol to the Safeguards Agreement.

**706.** The requirement is based on Section 63 and what is referred to in the Nuclear Energy Act. STUK, IAEA and EC also carry out non-destructive assays (NDA) to ensure, among other things, the correctness of the nuclear material data. NDA measurements can be carried out in any stage of the fuel cycle and by the IAEA and the EC within the scope of their supervisory rights.

The IAEA's encapsulation plant model ISA "Model Integrated Safeguards Approach for a Spent Fuel Encapsulation Plant" [SG-PR-1305] requires each fuel item to be verified by means of non-destructive assays prior to being placed in the final disposal canister. According to the IAEA, the measuring shall be accurate enough to detect the so-called *partial defect*. If this cannot be achieved, the best possible approved method shall be used. *Partial defect* means that part of the fuel has been removed. The removed part can be expressed as a percentage value. Without a percentage value, experts normally understand *partial defect* meaning that half of the nuclear material in the fuel assembly has been removed.

One of the most suited methods available is FORK. The measurement, that can be carried out airborne or in water, requires approximately one-square-meter of radiation-proofed space and takes approximately one minute at the measuring position. However, there are circumstances when FORK cannot detect whether half of the fuel has been removed, and it does not meet the *partial defect* requirement.

Of the NDA methods, Passive Gamma Emission Tomography (PGET) is able to detect a single rod missing from the fuel assembly. The measurement, that can be carried out airborne or in water, requires approximately one-square-meter of radiation-proofed space and takes approximately 5 minutes at the measuring position. The operator shall make provisions for commissioning the PGET measurement method. It is also possible to integrate a neutron measurement equipment to a PGET device in order to verify the declared history and burn-up of the fuel assembly and get direct evidence of nuclear material presence based on neutron multiplication.

During the inspections and nuclear material measurements, it is also possible to obtain operating experience and, for example, valuable information on the properties of the nuclear fuel that can be used as a basis for developing measures to further the safety and security arrangements. Therefore, measurement activities (just like other nuclear safeguards inspections) in their part support the objective to maintain the safety of nuclear energy use at as a high level as practically possible.

The basic premise of the regulatory control exercised by STUK is also to ensure sufficient security measures to prevent unauthorised use and removal of nuclear materials while considering nuclear safety in the implementation thereof. The most stringent security measures shall be applied to materials subject to safeguards; IAEA Specific Safety Guide "Geological Disposal Facilities for Radioactive Waste", No SSG-14. In other words, ensuring, for example, that no fuel rods have been removed from the fuel item without authorisation fulfils the national requirements and

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obligations to prevent the proliferation of nuclear weapons, providing at the same time the information required by the IAEA for the purpose of nuclear safeguards. Also on this basis, STUK shall verify the nuclear material data of the fuel items and other batches of nuclear material using the best methods available.

The measurement results may also be made available to the operator, or the operator may at least utilise the measurement results in order to fulfil the requirements and obligations applied to it.

In comparison, the US NRC requirement (NRC Regulation: Part 74 – Material Control and Accounting of Special Nuclear Material) for an operator in possession of spent nuclear fuel states as follows:

*(5) The licensee shall establish, document, and maintain an item control program that:*

*(i) Provides current knowledge of SNM items with respect to identity, element and isotope content, and stored location; and*

*(ii) Assures that SNM items are stored and handled, or subsequently measured, in a manner such that unauthorized removal of 200 grams or more of plutonium or uranium-233 or 300 grams or more of uranium-235, as one or more whole items and/or as SNM removed from containers, will be detected.*

With respect to spent nuclear fuel in a Finnish nuclear power plant, 200 grams of plutonium equals approximately one-eighth of the plutonium in an item, or approximately 12 fuel rods on average. Presently, only accepted verification method able to reliably detect this kind of defect from a spent fuel assembly is Passive Gammaemission Tomography (PGET)

**707.** The requirement is applied to ensure that it is possible to verify the integrity of a fuel item and continuity of the information verified by inspections between the last inspection and encapsulation of the fuel item so that the fuel item does not need to be taken for a new verification. The responsibility of the facilitation of this lies with the operator implementing the disposal of nuclear fuel also in the case that the fuel item verification should take place elsewhere.

**708.** The requirement is applied to ensure that the operator (or a person authorised by the operator) confirms during inspection the information entered in the inspection protocol, any further appropriate actions (the operator shall be heard with regard to the set deadlines and a jointly agreed on deadline shall be entered in the protocol) and that the operator or the person has received the protocol. The protocol shall also be signed by the IAEA and the European Commission inspectors with regard to whom the result entered in the protocol is “preliminary”.

**709.** The operator shall also have procedures for addressing any flaws and non-conformances detected in activities (during inspection). These instructions can be included in the nuclear safeguards manual or more generally in quality guidelines. The procedures shall be presented to STUK upon request.

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### **3.8 Chapter 8: Regulatory oversight by the Radiation and Nuclear Safety Authority**

**801–845.** Chapter 8 provides a description of the oversight implemented by STUK to ensure that operators fulfil the requirements and obligations provided by law and set forth in STUK's guides and regulations, thereby enabling Finland to comply with international contractual obligations. The main tasks and role related to nuclear safeguards by STUK are described in Section 55 of the Nuclear Energy Act and Section 118 of the Nuclear Energy Decree, with the supervisory rights described in Section 63 of the Nuclear Energy Act. In addition, STUK shall take part in all inspections by the IAEA and the European Commission pursuant to Section 63 of the Nuclear Energy Act and ensure that the aforementioned can carry out their oversight in Finland pursuant to Section 63 of the Nuclear Energy Act. Therefore, the chapter also considers the IAEA and the European Commission's oversight, oversight methods and oversight equipment as well as their use in particularly insofar these have an impact on STUK's oversight and oversight practices.

Paras. 801–804 describe the basic premises for STUK's nuclear safeguards.

#### **3.8.1 8.1 Review of documents and other inspections**

**805–816.** The requirements describe the inspection by STUK of the documents and other information (licences, manuals, reports and notifications, declarations required under the Additional Protocol to the Safeguards Agreement) required from the operators as well as the central accountancy system for nuclear use items, the maintaining of which is the responsibility of STUK. The chapter includes sections of particular interest to STUK.

#### **3.8.2 8.2 On-site inspections**

**817–839.** The requirements describe STUK's on-site inspection activities, i.e. inspections carried out where nuclear energy is used and initiated by STUK itself or the IAEA or European Commission. Notifications and inspection rights with regard to the inspections by the IAEA are stipulated in, for example, the Safeguards Agreement and Additional Protocol to the Safeguards Agreement. Inspections and inspection rights with regard to the European Commission are stipulated in the Euratom Treaty. Supervisory rights of the IAEA and the European Commission are also stated in Section 63 of the Nuclear Energy Act. Paras. 821–831 describe inspections and inspection activities carried out by STUK alone. Paras. 832–839 describe STUK's inspections and inspection activities in case of an inspection initiated by the IAEA or European Commission as well as how STUK shall attempt to ensure that the international inspectors shall receive answers and clarifications to all of their questions.

The following presents detailed justifications for the activities by STUK described in paras. 818 and 830.

**818.** STUK shall, by 31 January each year, provide the nuclear facility with a plan for the measurements to be carried out during the current year to verify the information declared by the operator. The operator shall agree on the exact dates and times of the inspections with STUK within two weeks of receipt of the plan. The operator shall

promptly advise of any changes affecting the agreed dates and times of the inspections or their implementation.

**829.** STUK will inspect the appropriateness of the nuclear security arrangements implemented by all operators regarding nuclear use items. Pertaining to nuclear facilities, the aforementioned is addressed in Guide YVL A.11. The “description of the nuclear security arrangements” (operators that are not nuclear facilities) added in this section, for example, is presented in para. 331, and the content of the description is explained in this explanatory memorandum.

After receiving the description of the nuclear security arrangements presented in para. 331 from the operator, STUK assesses the adequacy of the security arrangements in accordance with the risk-based approach (operator’s nuclear use items; the quantity and quality thereof). During the processing of the analysis, STUK assesses the need for possible inspection with regard to the security arrangements, issues a request for further clarification if necessary and takes a decision on the matter. The decision also includes any requirements to improve security arrangements.

**830.** Where necessary, STUK will verify the correctness of the nuclear material data and information declared by the operator by means of measurements. STUK may also verify by means of measurements whether, for example, the material is nuclear material or not.

Paras. 818 and 830 (for STUK) are presented such that national obligations and international commitments and requirements can be met. Fulfilment of the Non-Proliferation Treaty requirements shall be demonstrated by means of measurements and, furthermore, provisions shall be made for any doubts raised with respect to either the operators or, ultimately, the State of Finland in future. The measurements also provide information, for example, on the correctness of the information related to the usage history of the fuel. At the same time, it is possible to verify that the information and certainty required for the IAEA safeguards can be secured. The measurements carried out can also help in ensuring that the safety requirements are met. By providing the nuclear facility with a plan for the measurements to be carried out during the current year, and by agreeing on specific measurement dates with the operator, it is possible to ensure that the measurements are carried out appropriately and with consideration to the conduct of operations at the nuclear power plant.

### **3.8.3 8.3 Methods of oversight (employed by STUK, the European Commission and the IAEA)**

**840–844.** The requirements describe the control equipment and methods normally used by STUK, the IAEA and the European Commission in carrying out the control.

### **3.8.4 8.4 Annual report on nuclear safeguards**

**845.** The requirement presents that STUK will issue a report in English on the results and findings made in the course of its regulatory control of nuclear safeguards on an annual basis (e.g. for the IAEA). Key findings and results from the regulatory control of nuclear safeguards will be presented also in Finnish in a report (“MEAE report”)

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submitted to the Ministry of Economic Affairs and Employment pursuant to Section 121 of the Nuclear Energy Decree.

### 3.9 Definitions

Definitions provide descriptions of some key terms used in the guide, like “Operator”. The definitions are provided at the end of the guide and also in the STUK’s definition collection. Other key terms with regard to the nuclear safeguards are defined in Commission Regulation No 302/2005 and the Nuclear Energy Act and Decree. The IAEA Safeguards Glossary (available, for example, on the IAEA’s website), that also presents nuclear safeguards terms and definitions in English, may be useful for operators when planning and implementing the safeguards.

### 3.10 Annexes

Annexes A–D to the guide include summaries “What is meant by nuclear use item” (Annex A), “Categorisation of nuclear materials and nuclear waste” (Annex B), “Notifications and reports (nuclear use items)” (Annex C) and “Summary of the submission deadlines for the information pursuant to the Additional Protocol to the Safeguards Agreement”. The purpose of the annexes is to make the reading of the guide and fulfilling of the requirements thereof easier. Annex B is common to Guides YVL A.11 and YVL D.2.

#### 3.10.1 Annex B

Annex B to the guide presents a categorisation of nuclear materials based on a table found in the Convention on the Physical Protection of Nuclear Material and Nuclear Facilities (Finnish Treaty Series 72/1989). The same table is also included in IAEA Recommendation NSS 13. The table presents nuclide-specific limits for nuclear materials based on which the materials are divided into different categories. Nuclide-specific limits refer to the amount of the nuclide (fissile isotope) in question, not to the total amount of nuclear material. In case of, for example, uranium low-enriched in U-235 (uranium with more than 0.71% but less than 10% of the isotope U-235), an amount of nuclear material with 10 kg or more of the nuclide U-235 belongs to category 3.

If the material is a mixture of nuclides mentioned in the table, the category shall be determined by the so-called sum formulas, i.e. by calculating the total sum of the actual amounts of the various nuclides in the mixture divided by the nuclide limit values and compared to figure one. Example:  $(\text{amount of nuclide A}/\text{limit value of nuclide A}) + (\text{amount of nuclide B}/\text{limit value of nuclide B}) \dots < 1$ . If the total sum remains below figure one, the material does not belong to the category with the limit value against which it is being compared. A detailed description of the background and justifications of Annex B can be found in the explanatory memorandum of Guide YVL D.2.

## 4 International provisions concerning the scope of the guide

The following international agreements form the key basis for the guide: the Non-Proliferation Treaty and the Euratom Treaty. The Safeguards Agreement (INFCIRC

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193), to which the IAEA, European Atomic Energy Community (EURATOM) and non-nuclear-weapon States of the European Union are parties, and the Additional Protocol to the Safeguards Agreement (INFCIRC 193a8) have been drawn on the basis of the Non-Proliferation Treaty. The Euratom Treaty has been the basis on which the European Commission has drawn its own nuclear safeguards regulations described in Commission Regulation No 302/2005. As regards the control of exports of dual-use items, the EU has prepared Council Regulation (EC) No 428/2009.

Commission regulations provide the requirement basis for the Finnish users of nuclear materials. Guide YVL D.1 takes into account the requirements by the Commission and also the information that STUK requires in addition to the Commission requirements in order to maintain national nuclear safeguards system pursuant to Section 118 of the Nuclear Energy Decree. The purpose of the additional requirements specified for the operators is, thus, to ensure in part that the operators fulfil the requirements set for them in the Commission Regulation.

The security arrangements requirements are based on the criteria set forth in IAEA Recommendation INFCIRC/225/Rev.5 and what has been laid down in Guide YVL A.11.

Annexes to Guide YVL D.1 include the treaties and regulations that specify the requirements and obligations the fulfilment of which the guide sets out to ensure. The annexes also include EU recommendations concerning the operators.

The preparation of the guide has also considered matters and recommendations set forth in the following documents:

The IAEA:

- ISA Model Integrated Safeguards Approach for a Spent Fuel Encapsulation Plant [SG-PR-1305]
- ISA Model Integrated Safeguards Approach for a Geological Repository [SG-PR-1306]
- Guidelines and Format for Preparation and Submission of Declarations Pursuant to Articles 2 and 3 of the Model Protocol Additional to Safeguards Agreements

IAEA Board of Governors:

- GOV/2554/Att.2/Rev.2, 1 April 1992
- GOV/INF/819, 12 September 1997

## **5 Impacts of the Tepco Fukushima Dai-ichi accident**

The Fukushima accident has not had any immediate impact on the contents of the guide.

## **6 Needs for changes taken into account in the update**

The needs for changes due to changes made to international and national laws/regulations and the change proposals made in connection with the preparation of the YVL Guide implementation decisions (SYLVI) together with others recorded in STUK's change proposal database have been considered when updating the

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requirements. In addition, the possibilities to reduce the so-called administrative burden have been considered.

The update includes changes to almost a hundred items of the requirement or description type. Typically, the changes made are minor clarifications, corrections of typing errors or changes to regulation references. Some requirements have been divided and others re-grouped. Changed regulatory control practices and digitalisation have affected the guide somewhat.

There are no significant possibilities to reduce the administrative burden with regards the requirements set forth in the guide because they are based on international agreements concluded by Finland and the legislation. Clarifying the guide, however, makes it easier to apply and understand. In addition, changed practices, like electronic services, facilitate the practical implementation of nuclear safeguards.