

GUIDE YVL D.2

TRANSPORT OF NUCLEAR MATERIALS AND NUCLEAR WASTE

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Definitions

Authorisation

According to Section 7 r of the Nuclear Energy Act (990/1987), *the Radiation and Nuclear Safety Authority (STUK) shall specify detailed safety requirements for the implementation of the safety level in accordance with the Nuclear Energy Act.*

Rules for application

The publication of a YVL Guide shall not, as such, alter any previous decisions made by STUK. After having heard the parties concerned STUK will issue a separate decision as to how a new or revised YVL Guide is to be applied to operating nuclear facilities or those under construction, and to licensees' operational activities. The Guide shall apply as it stands to new nuclear facilities.

When considering how the new safety requirements presented in the YVL Guides shall be applied to the operating nuclear facilities, or to those under construction, STUK will take due account of the principles laid down in Section 7 a of the Nuclear Energy Act (990/1987): *The safety of nuclear energy use shall be maintained at as high a level as practically possible. For the further development of safety, measures shall be implemented that can be considered justified considering operating experience, safety research and advances in science and technology.*

According to Section 7 r(3) of the Nuclear Energy Act, *the safety requirements of the Radiation and Nuclear Safety Authority (STUK) are binding on the licensee, while preserving the licensee's right to propose an alternative procedure or solution to that provided for in the regulations. If the licensee can convincingly demonstrate that the proposed procedure or solution will implement safety standards in accordance with this Act, the Radiation and Nuclear Safety Authority (STUK) may approve a procedure or solution by which the safety level set forth is achieved.*

With regard to new nuclear facilities, this Guide shall apply as of 1 June 2019 until further notice. With regard to operating nuclear facilities and those under construction, this Guide shall be enforced through a separate decision to be taken by STUK. This Guide replaces Guide YVL D.2 (15.11.2013).

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1 Introduction

101. Nuclear materials and nuclear waste are radioactive materials. The fundamental safety principle in the transport of radioactive materials is to protect people, property, and the environment from the effects of radiation during the transport of radioactive materials. The transport of nuclear materials and nuclear waste is considered to be use of nuclear energy as referred to in the Nuclear Energy Act (990/1987, Section 3) and is therefore subject to the safety principles stated in nuclear energy legislation (990/1987, Section 7 a) and to a licence (990/1987, Section 8; 161/1988, Section 17), and transport operations shall be covered by sufficient security arrangements for protection against unlawful action (990/1987, Section 7). According to Section 115 of the Nuclear Energy Decree (161/1988), the transport cannot be commenced until STUK has ascertained that the transport arrangements, security and emergency arrangements meet the requirements set for them. Therefore, the plans concerning certain types of transport are subject to STUK's approval. [2013-11-15]

102. In the regulations for the transport of dangerous goods, radioactive materials are classified in category 7. The Act on the Transport of Dangerous Goods (719/1994) as well as the decrees issued by virtue of it (in road transport e.g. 194/2002 and TRAFICOM/82133/03.04.03.00/2019, in sea transport e.g. 666/1998, in rail transport e.g. 195/2002 and TRAFICOM/82134/03.04.02.00/2019, in air transport e.g. 210/1997 and OPS M1-18 / TRAFI/1359/03.04.00.00/2015) and other transport regulations (in sea transport of spent nuclear fuel e.g. the INF regulations) set detailed requirements for the transport of radioactive materials, which are valid as such in the transport of nuclear material and nuclear waste and are not repeated in this guide. Under the Convention on the Physical Protection of Nuclear Material and Nuclear Facilities (SopS 72/1989) and its Amendment (513/2008), security arrangements shall be based on a graded (risk-informed) approach, taking into account the current threat assessment, the nature of the nuclear materials, and the potential consequences of unlawful action directed against the nuclear materials. The Nuclear Liability Act (484/1972) applies to the transport of nuclear materials and nuclear waste. Nuclear liability is addressed in the STUK Guide YVL A.1 "Regulatory oversight of safety in the use of nuclear energy". [2019-05-15]

103. The transport regulations for dangerous goods require that the packaging designs for fissile material be approved by a competent authority in the countries of departure, transit and destination. STUK is the competent authority for packaging design approval in Finland. Approval may be granted for a new packaging design or a packaging design approved by a

foreign authority, in which case STUK validates the approval certificate issued by the foreign authority. The packaging design requirements are given in the regulations covering the various modes of transport (TRAFICOM/82133/03.04.03.00/2019, Appendix A;

TRAFICOM/82134/03.04.02.00/2019, Appendix A; the IMDG Code, ICAO-TI). [2019-05-15]

104. The operator shall be responsible for the safety of a nuclear material transport as well as the nuclear security and emergency preparedness arrangements. Section 9 of the Nuclear Energy Act defines licensee responsibility and the Act on the Transport of Dangerous Goods (719/1994, Section 3) and the decrees issued under it define the responsibility of other operators. [2013-11-15]

105. The Radiation and Nuclear Safety Authority (STUK) is responsible for the regulatory control of safe use of nuclear energy and security arrangements in the use of nuclear energy, and for the necessary regulatory control of the use of nuclear energy to prevent the proliferation of nuclear weapons (990/1987, Section 55). The transport of dangerous goods by road and the related temporary storage are controlled by the police. The road transports of dangerous goods leaving Finland and arriving in Finland and the related temporary storage are also controlled by the Customs and the Border Guard, each within their field of activity. In matters relating to radioactive material transports and their temporary storage, STUK acts as an overseer in co-operation with the Police, the Customs, the Border Guard and the Defence Forces (194/2002, Section 30). The transport of dangerous goods in packaged form by sea is controlled by the Transport Safety Agency, the Police, the Customs and the Border Guard (666/1998, Section 14). The police, at their discretion, contribute to the security arrangements of nuclear material and nuclear waste transports. [2019-05-15]

106. Security arrangements aim to protect the transport against unlawful action. A central aim is to prepare for preventing the threat of larceny or sabotage. The sectors of protection include prevention, detection, and delay of unlawful action as well as response to it. Response comprises stopping the unlawful action and bringing the situation under control as well as preventing and mitigating the consequences. Security arrangements comprise administrative arrangements (organisation, management system, safety culture), technical arrangements (structural barriers, security monitoring and alarm system, other equipment), operational arrangements (guarding by a security organisation, response to threats, operator arrangements for authority response) and information security. [2019-05-15]

2 Scope of application

201. This Guide sets forth the requirements and oversight procedures for the transport of nuclear materials and nuclear waste as well as for the nuclear security and emergency arrangements pertaining to them. The guide is to be applied in accordance with the graded, risk-informed approach referred to in para. 102. The classification of nuclear materials and nuclear waste is given in Annex A. [2013-11-15]

202. The requirements and procedures of this Guide apply to nuclear material and nuclear waste transports in the Finnish territory as well as to vessels registered in Finland and transporting nuclear material or nuclear waste to or from Finland once they enter international waters / airspace. In international transports, the regulations valid in the countries of departure, transit, and destination apply. [2013-11-15]

3 Transport requirements

3.1 General principles

301. The operator shall ensure that the requirements presented in this Guide and in the other transport regulations referred to in para. 102 are implemented. [2013-11-15]

302. The safety of nuclear energy use shall be maintained at as high a level as practically possible (990/1987, Section 7 a). The requirements of this Guide shall be implemented in accordance with this principle. [2013-11-15]

303. The transport arrangements, nuclear security and emergency arrangements of the transport, and the actions presupposed by nuclear non-proliferation shall be coordinated and complementary to one another, where possible. [2013-11-15]

304. The Design Basis Threat (DBT), risk analyses of the operations to be secured, and the protection needs identified based on them (STUK Y/3/2016 3 §) shall be used as a basis for the planning of security arrangements. [2019-05-15]

305. The sectors of protection and their interdependencies given in para. 106 shall be taken into account in designing security arrangements. Response time shall be taken into account when planning detection and delay measures, for example. [2013-11-15]

305a. The operator shall maintain a good safety culture. [2019-05-15]

3.2 General requirements for transportation of all nuclear materials and nuclear waste

306. The requirements of this Chapter apply to all transports of nuclear materials and nuclear waste. [2013-11-15]

307. For a transport not subject to a transport licence (990/1987, Section 8; 161/1988, Section 17), a notification in accordance with Section 134 a of the Nuclear Energy Decree shall be drawn up and submitted to STUK for information. [2013-11-15]

308. In transport and during temporary transport-related storage, the administrative, technical, and operational security arrangements shall be based on risk analysis and DBT. [2019-05-15]

308a. If any deficiencies are identified in security arrangements, the operator shall undertake the necessary corrective or compensating actions. [2019-05-15]

308b. In addition to external threats, "insiders" shall be taken into account when planning and implementing security arrangements. "Insider" refers to a person who has authorised access to a nuclear facility or transport of nuclear materials or nuclear waste, or any information thereof. [2019-05-15]

309. The information security of a transport shall be assured. Transport security-related information, the disclosure of which to a third party could compromise the implementation of security arrangements, is subject to confidentiality and protection obligations as laid down in Section 78 of the Nuclear Energy Act In communicating transport information, the consignee's need for information shall be assessed and secure communication procedures used, as appropriate. The operator shall ensure that transport-specific information security procedures are in place in the organisations participating in the transport. [2019-05-15]

310. The consignor shall, in good time, provide the consignee with the necessary transport information: mode and date of transport and any other essential matters for the consignee to plan its necessary actions. The consignor shall request the consignee's confirmation of the arrival of the transport. [2013-11-15]

311. Prior to engaging in international transports, the consignor shall ensure that the transport and security arrangements comply with the legislation of the destination country and those of the transit countries. [2013-11-15]

312. The transport mode, routes, and dates shall be chosen so as to take into account natural phenomena and to weigh the threats and risks associated with the various modes, routes, and schedules of transport. [2013-11-15]

313. The total time of transport for nuclear material or nuclear waste shall be the shortest possible taking into account the choices made in accordance with para. 312. [2013-11-15]

314. The number of transfers of nuclear material or nuclear waste between conveyances and temporary storage shall be kept to a minimum and they shall be of the shortest possible duration. [2013-11-15]

315. There shall be a sufficient number of qualified, trustworthy personnel suitable for their tasks in the arrangement of a transport. [2013-11-15]

316. Nuclear material or nuclear waste shall, as a rule, be transported in a closed conveyance. [2019-05-15]

317. The packages shall be controlled for the entire duration of the transport. The condition of the packages shall be monitored. STUK and the consignor shall be informed of any damage to

the packages discovered during transport and of any deviations from approved packaging design. [2013-11-15]

318. Transport-related special situations shall be reported to the rescue services and/or the police upon detection and to STUK without delay. Unless restricted by authorities, the consignor shall be notified of any information relating to such special situations that the consignor needs to know to fulfil its responsibilities. [2013-11-15]

3.3 Small amount of special fissionable material

319. The transports of nuclear material and nuclear waste where the amount of material or waste exceeds the allowable transportation limit in an excepted package are, in addition to Chapter 3.2, subject to the requirements of this Chapter. [2019-05-15]

320. Persons shall be assigned to transport-related tasks and they shall be reliably identifiable. [2013-11-15]

321. The conveyances, cargo spaces, containers, and/or packages shall be locked and/or sealed. [2013-11-15]

322. The integrity of locks and seals and/or the packages shall be verified on dispatch and receipt of the transport and where necessary, e.g. during transfers of responsibility for the transport. [2019-05-15]

323. A security check shall be performed on conveyances and transport packages and/or containers. [2013-11-15]

324. For persons taking part in the transport, the necessary instructions shall be drawn up for transport, nuclear security and emergency preparedness arrangements. [2013-11-15]

325. The persons contributing to the transport shall be given training in the properties of the transported material and the transport, nuclear security, and emergency preparedness arrangements, which also covers the procedure in special situations. [2019-05-15]

325a. Actions under special situations shall be practised. The form, content, organisation and frequency of the exercises shall be planned in a risk-informed manner. [2019-05-15]

325b. The effectiveness of the transport, nuclear security, and emergency arrangements and their implementation in accordance with the plans shall be regularly assessed, and the arrangements shall be updated, where necessary. [2019-05-15]

3.4 Source material: natural uranium or thorium

326. In addition to Chapter 3.3, the transport of source material (161/1988, Section 3) is subject to the requirements of this Chapter if the source material is suitable, by composition and purity, for nuclear fuel fabrication or for being isotopically enriched and if the amount of uranium or thorium transported at a time exceeds 10,000 kg. [2019-05-15]

327. The notification referred to in para. 307 shall, in addition to paragraphs 1 to 4 of Section 134 a(1) of the Nuclear Energy Decree, provide the information referred to in para. 424 (161/1988, Section 134(a)(1)(5)). [2013-11-15]

328. The operator shall, in co-operation with the police, prepare the plans on security arrangements and measures to prepare for threats (STUK Y/3/2016 15 §). [2019-05-15]

329. The consignor, carrier, and consignee shall agree in advance upon the responsibilities relating to the transport and of the date, place, and procedure for their transfer. [2013-11-15]

330. In sea transports in the Finnish territory, the harbour nearest to the place of departure and destination of the transport shall be used if practicable and if favourable for safety on the basis of risk assessment. [2013-11-15]

331. An alternative transport route/routes shall be planned for the transport. [2013-11-15]

332. A sufficient number of Finnish or Swedish speakers shall accompany the transport in order to ensure fluent communication during special situations. [2013-11-15]

333. The transport shall have communication and tracking arrangements for the operator to track the location of the transport in the territory of Finland and in order to facilitate an effective response to special situations. [2013-11-15]

334. The working condition of the equipment used during the transport shall be ensured before the transport. [2013-11-15]

335. STUK shall be notified, within the scope appropriate for the transport operations in question, of a transport's departure from and arrival in Finland as well as of the transport's arrival in and departure from the territory of Finland. [2013-11-15]

336. The consignee shall promptly notify the consignor of the arrival of the transport. The consignee shall notify the consignor within a reasonable time if the transport has not arrived by the time communicated by the consignor. [2013-11-15]

337. If so presupposed by the results of risk analysis, special situation, or natural phenomena, the following shall be implemented, where necessary:

- changing the transport date and time
- changing the planned transport route
- updating the situation assessment
- enhancement of the transport's other security arrangements.

[2019-05-15]

338. Provision shall be made for special situations. In a special situation, immediate measures shall be taken to stop unlawful action, gain control of the special situation, and to mitigate and minimise the consequences. The operator shall assist the authorities in the event of special situations especially in matters relating to radiation safety. A record shall be kept of special situations and deviations, which are to be reported to STUK. The operator shall assist the authorities in the event of special situations, especially in mitigating and minimising radiation consequences and regaining control of stolen nuclear material or nuclear waste. [2019-05-15]

339. The authorities in question shall be reserved the opportunity of participating in the training and excersices as referred to in paras. 325 and 325a. [2019-05-15]

340. Moved to para. 325b. [2019-05-15]

3.5 Fresh nuclear fuel

341. In addition to Chapter 3.4, the requirements of this Chapter apply to fresh nuclear fuel transports. Category 2 fresh nuclear fuel is subject to the requirements of Chapter 3.6 and Category 1 fresh nuclear fuel is subject to the requirements of Chapter 3.7. [2019-05-15]

342. A transport plan and a transport security plan shall be drawn up for a transport subject to a transport licence (990/1987, Section 8; 161/1988, Section 17) and these shall be submitted to STUK for approval. A transport may only be undertaken after STUK's approval of the plans. These plans replace the notification referred to in para. 307. [2013-11-15]

343. As a basis for the planning and assessment of security arrangements the operator shall use a DBT (STUK Y/3/2016 3 §) applicable to its transport operations. [2019-05-15]

344. Prior to the transport, the consignor shall obtain confirmation of the consignee's readiness to receive the transport. [2013-11-15]

345. The licensee shall assign a responsible manager and his or her deputy (990/1987, Section 7 k) for transports subject to a transport licence (990/1987, Section 8; 161/1988, Section 17). [2013-11-15]

346. The operator shall identify the persons who have a significant role in transport operations and of whom a personal security clearance performed by an authority is requested in accordance with the Security Clearance Act (177/2002). [2013-11-15]

347. There shall be security staff for securing the transport of nuclear material or nuclear waste relating to the operation of a nuclear facility (990/1987, Section 7 l). [2013-11-15]

348. The equipment for use of force of security staff, their carrying and use, qualification for use, and training shall be described in the security standing order of the nuclear facility responsible for the security arrangements of the transports, and the security standing order is subject to approval by STUK (990/1987, Section 7 n). [2013-11-15]

349. In place of security staff, security guards shall be used to ensure the nuclear security of a transport not relating to the operation of a nuclear facility. [2013-11-15]

350. Security guards' equipment for use of force, their carrying and use, qualification for use, and training shall be presented in the transport security plan. [2013-11-15]

351. Conveyance security checks as well as the loading, unloading, and temporary storage of nuclear material or nuclear waste shall be carried out in an area bordered off from its surroundings and subject to access control. [2013-11-15]

352. A communication system that enables quick, effective and secure communication between the parties concerned shall be used in transports. The communication system shall have a back-up system. [2019-05-15]

353. A communication centre shall be set up for the transport in order to facilitate tracking of the transport, communication, notifications, and alarms. [2013-11-15]

353a. The person involved in the transport shall regularly notify the communication centre of the progress of the transport and report any special situations immediately. [2019-05-15]

354. The conveyance and any movement in its vicinity shall be monitored during stops. [2019-05-15]

3.6 Spent nuclear fuel

355. In addition to Chapter 3.5, the requirements of this Chapter apply to spent nuclear fuel transports. Category 1 spent nuclear fuel is subject to the requirements of Chapter 3.7.

[2019-05-15]

356. An emergency plan, accompanied by a report justifying the measures presented in the emergency plan, shall be drawn up for a transport where the activity of the material transported exceeds 1,000 TBq. [2013-11-15]

357. Removed. [2019-05-15]

358. Transport by road, rail, or sea shall be carried out in exclusive use and transport by air by a freightliner. [2013-11-15]

359. In the design and equipment of conveyances, the implementation of technical security arrangements shall be taken into account. [2019-05-15]

359a. The transport vehicle shall be equipped with a technical protection system against unauthorised use during the transport event. [2019-05-15]

360. The communication centre shall be secured so as to enable operation in the event of a threat. [2013-11-15]

361. The transport shall include a gamma and neutron dose rate meter suitable for the measurement of external radiation. [2013-11-15]

362. Temporary storage related to the transport shall take place in closed and controlled quarters. [2013-11-15]

3.7 Category 1

363. In addition to the requirements of Chapter 3.6, the transport of Category 1 nuclear material or nuclear waste is subject to para 364 and 365. [2019-05-15]

364. STUK shall be informed in writing about a transport 72 hours prior to the transport's planned starting. If presupposed by a current threat scenario, STUK may prohibit the transport completely or at the planned date and time, or set conditions for the transport. [2013-11-15]

365. During its transport, nuclear material or nuclear waste shall be the sole cargo of the conveyance. [2013-11-15]

366. Moved to para. 359a. [2019-05-15]

3.8 Other nuclear materials or nuclear waste

367. The requirements of Chapter 3.5 apply to the transport of Category 3 nuclear material or nuclear waste. [2013-11-15]

368. The requirements of Chapter 3.6 apply to the transport of Category 2 nuclear material or nuclear waste. [2013-11-15]

4 Transport-related licence applications, plans, notifications, and reports

4.1 Application for approval of transport packaging design

401. For approval of new packaging design, the operator shall submit to STUK the design and testing documentation of transport packaging as well as an analysis of the criticality safety of the packaging. The application and the related documents shall be submitted to STUK not later than six months before the before packaging in accordance with the packaging design in question is taken into use in Finland. [2019-05-15]

402. If practical tests are carried out for approval of new packaging design, the test design documentation and a description of the testing methods to be used shall be submitted to STUK no later than six months before the planned date of testing. The applicant shall inform STUK of the testing date and STUK shall supervise the tests within the scope it deems necessary. If the tests are to be replaced by theoretical calculations, reliable and conservative methods shall be employed. [2013-11-15]

403. For the approval of a packaging design approved by a foreign authority, the operator shall submit to STUK the transport packaging's design and testing documentation, an analysis of its criticality safety, and a copy of the approval certificate issued by the foreign authority. The application and the related documents shall be submitted to STUK no later than three months before packaging in accordance with the packaging design in question is taken into use in Finland. [2013-11-15]

4.2 Transport licence application

404. With the exception of the cases referred to in Section 17 of the Nuclear Energy Decree, the Nuclear Energy Act requires a licence for the transport of nuclear materials and nuclear waste. The requirements pertaining to the licence and how to apply for a licence are provided in Sections 56-60 of the Nuclear Energy Decree; STUK is the authority granting the licences. During the review of a licence application, the applicant's reliability and expertise in the transport of the materials referred to in the application are assessed, the transport arrangements as well as the nuclear security arrangements and emergency preparedness arrangements of the transport are reviewed in outline as well as the arrangements of liability for nuclear damage. A licence may be issued for a single transport or as a fixed-period licence for transport operations. The transport licence application shall be submitted to STUK no later than three months before the planned day of starting the transports. [2013-11-15]

4.3 Transport plan

405. The transport plan shall describe the transport arrangements. In accordance with the requirements of transport regulations, the transport plan shall contain the following information:

- name and address of consignor and consignee
- material to be transported, its total amount (mass and number/quantity), amount of material in one package, and quality of material (chemical form, state, physical form, isotopic enrichment) as well as potential identification data such as the number of the nuclear fuel batch
- average burn-up, residual heat, and date of removal from the reactor of the spent nuclear fuel to be transported
- general information of the packaging, the number and issuer of the approval certificate, description of the packaging and contents, and the allowable number of packages
- placement of packages in the transport unit or container and information concerning the transport unit or container
- equipment and accessories used in the transport
- total activity of transport, activity of material in one package, estimated dose rate on the outer surfaces of package and conveyance and at one meter's distance from the surfaces, and the estimated transport index, criticality safety index, and category of package or overpack
- general information about the transport, such as the mode of transport, conveyance, estimated schedule, alternative routes, the carrier, and potential stops and temporary storages
- persons involved in design, loading, transport, and unloading, their tasks and responsibilities, and the maintenance of their qualifications
- transfer of transport-related responsibilities
- a description of nuclear liability insurance
- reference to a separately approved transport security plan and, where necessary, to an emergency plan
- safety instructions in writing
- radiation protection programme as referred to in the regulations for the transport of dangerous goods
- a description of dose rate and contamination measurements before and during the transport

- a description of package handling and use of equipment
- a list of documents to be kept with the transport
- any special safety measures (speed limits, restrictions on other traffic, special equipment)
- information on potential exclusive use of conveyance
- procedures during potential temporary storage during the transport
- a description of potential special arrangements (or reference to a separate approval certificate relating to them)
- any other matters presented in the licence conditions.

[2013-11-15]

406. A transport plan shall, as a rule, be drawn up for an individual transport. In case of similar recurrent transports, a transport plan may be drawn up for transport operations instead of individual transports. The transport plan for transport operations shall be kept up-to-date. It shall be submitted to STUK for approval after every significant change and for information after every change. [2013-11-15]

407. The transport plan shall be submitted to STUK for approval no later than three months before the planned date of transport/transports. [2013-11-15]

408. A detailed schedule as well as the names and contact information of the responsible manager, his or her deputy, and the applicant's transport contact person shall be submitted to STUK before undertaking the transport. The requirement of submission shall also apply to information that changes from transport to transport if the transport plan is drawn up for transport operations. [2013-11-15]

4.4 Transport security plan

409. The transport security plan shall describe how the security arrangement requirements of this Guide are implemented in the extent presupposed by the requirements. The transport security plan shall contain:

- a. reference to transportation plan
- b. desing bases for the security arrangements
- c. evaluation, update and development of transport arrangements and transport security plan
- d. risk analysis (reference)
- e. responsibilities of the security arrangements and transfer of the security arrangement responsibilities
- f. organization

- persons participating in to the security arrangements
- tasks, number and location of persons
- management relations in normal and special situations

g. planning and agreed arrangements with the police

h. transportation routes

i. technical arrangements

- structural barriers
- lockings and sealings
- security monitoring and alarm
- communication and tracking arrangements
- equipment and means of those implementing security arrangements
- other accessories

j. operation in normal situation

- monitoring and checks by the security organisation
- communication
- testing and maintenance of systems and equipment

k. operation in special situation

- actions to stop the unlawful action, to bring the situation under control and to prevent and mitigate the consequences.
- help to the authorities
- communication

l. implementation of instructions, training, and qualifications

m. training/exercise plan

n. information management

- management of the saved information
- information security management

o. reliability and security clearance

p. reporting

q. any other matters presented in the licence conditions

[2019-05-15]

409a. Issues presented in para. 409 can be described in other documents as well, such as the exercise plan and security standing order of a nuclear facility. References can be made to these

documents in the actual transport security plan. [2019-05-15]

410. In case of similar, recurrent transports, it is advisable to draw up a security plan for transport operations instead of individual transports. [2019-05-15]

411. The transport security plan shall be submitted to STUK for approval no later than three months before the planned date of transports. [2013-11-15]

412. The transport security plan shall be kept up-to-date. It shall be submitted to STUK for approval after every significant change and for information after every change. [2013-11-15]

413. The names and contact information of the key security personnel assigned to the transport as well as other security arrangement information that changes from transport to transport shall be submitted to STUK before beginning the transport in accordance with a STUK-approved transport security plan. [2013-11-15]

4.5 Transport emergency plan

414. The emergency plan, which shall comply with para. 356, shall describe the procedure in case of a transport emergency. As far as other nuclear materials and nuclear waste are concerned, STUK makes case-specific decisions on the scope necessary for the advance planning of emergency preparedness. [2019-05-15]

415. The operator shall draw up a report presenting justification for the actions described in the emergency plan. The report shall assess the possibility of accidents and the types of accident during which radioactive materials could be released into the environment as well as the doses to the transport personnel and to an individual in the population during special situations. The report shall be submitted to STUK for approval no later than three months before the planned date of the transports. [2013-11-15]

416. The emergency plan shall include

- potential accidents related to the transport and a reference to the report specified in para. 415
- the emergency preparedness organisation and the chain of command in an emergency
- the alarm and communication arrangements
- notification of an emergency (first communication) to authorities
- assessment of consequences of an emergency
- assessment of the radiation situation and isolation of the site of emergency
- warning those at the site of emergency

- actions for mitigating the consequences of the emergency
- procedure during an emergency
- communicating the situation assessment to authorities and to the operator's emergency preparedness organisation
- arranging public communication
- a description of the emergency equipment and supplies
- implementation of instructions, training, and qualifications.

[2013-11-15]

417. In case of similar, recurrent transports, it is advisable to draw up an emergency plan for transport operations instead of individual transports. [2013-11-15]

418. The emergency plan shall be submitted to STUK for approval no later than three months before the planned date of transports. [2013-11-15]

419. The emergency plan shall be kept up-to-date. It shall be submitted to STUK for approval after every significant change and for information after every change. The emergency plan may also be presented as part of the transport plan. [2013-11-15]

420. The names and contact information of those essential for the emergency preparedness arrangements as well as other information changing from transport to transport shall be submitted to STUK before undertaking the transport. [2013-11-15]

421. The operator's emergency preparedness arrangements shall be consistent with the rescue and emergency plans of the authorities. The operator shall submit the STUK-approved emergency plan for information to the Ministry of the Interior as well as the Regional State Administrative Agencies and rescue departments along the transport route. [2013-11-15]

4.6 Information to be submitted in connection with an application for a nuclear facility's construction licence and operating licence

422. The licence-applicant shall, in applying for a nuclear facility construction licence, submit to STUK a preliminary description of the transport arrangements and, in applying first time for an operating licence, a description of the transport arrangements (Section 35(2) and Section 36(3) of 161/1988, any other descriptions deemed necessary by STUK). These descriptions shall be drawn up in a way that makes possible assessing the feasibility of the planned transport arrangements against the requirements of this Guide based on the descriptions. [2019-05-15]

423. The licence-applicant shall, in applying for a nuclear facility construction licence, submit to STUK a preliminary plan for security arrangements and, in applying for an operating licence, a plan for security arrangements (Section 35(1) and Section 36(1) of 161/1988). These descriptions shall address also nuclear material and nuclear waste transports in a way making it possible on their basis to assess the feasibility of the security arrangements planned for the transport against the requirements of this Guide. [2013-11-15]

4.7 Notification to be given of a transport exempt from a transport licence

424. Sections 134 a and 136 a of the Nuclear Energy Decree set forth the requirements for the content and submission period of a notification to be submitted instead of a licence application. In accordance with Section 134(a)(1)(5) of the Nuclear Energy Decree, a notification concerning a nuclear material transport, as referred to in para. 327, shall include:

- name and contact information of the transport contact person
- transfer of transport-related responsibilities
- material to be transported, its total amount (mass and number/quantity), amount of material in one package, and quality of material (chemical form, state, physical form, isotopic enrichment)
- general information of the packaging, description of the packaging and contents, and the allowable number of packages
- placement of packages in the transport unit or container and information concerning the transport unit or container
- equipment and accessories used in the transport
- total activity of transport, activity of material in one package, estimated dose rate on the outer surfaces of package and conveyance and at one meter's distance from the surfaces, and the estimated transport index and category of package or overpack
- general information about the transport, such as the mode of transport, conveyance, estimated schedule, route and alternative routes, the carrier, and potential stops and temporary storages
- safety instructions in writing
- radiation protection programme as referred to in the regulations for the transport of dangerous goods
- a list of documents to be kept with the transport
- arrangements agreed upon with the police
- technical arrangements: structural barriers, security monitoring and alarm system,

communication and tracking arrangements

- operational arrangements: monitoring and checks as well as procedures in a special situation
- implementation of instructions, training, and qualifications.

[2019-05-15]

425. Any changes to the contents of the notification shall be submitted to STUK. [2013-11-15]

4.8 Deviations from the plans

426. Deviations from approved plans during the transport are only allowed for unanticipated and compelling reasons. STUK and other authorities to whom the deviations apply shall be notified of any deviations without delay. [2013-11-15]

4.9 Summary of notifications and reports to be submitted to the authorities

427. Below is a summary of notifications and reports pertaining to transports which are to be submitted to STUK and other authorities. For each of them, reference is made to the requirement in this Guide that specifies the notification or report. [2013-11-15]

428. For a transport not subject to a transport licence (990/1987, Section 8; 161/1988, Section 17), a notification in accordance with Section 134 a of the Nuclear Energy Decree shall be drawn up and submitted to STUK for information (307, 327, 424, 425). [2013-11-15]

429. The operator shall inform STUK and the authorities concerned about training to be given on transports (325, 339). [2013-11-15]

430. STUK shall be notified in writing 72 hours prior to the planned starting of the transport of Category 1 nuclear material or nuclear waste (364). [2013-11-15]

431. If practical tests are carried out for approval of new packaging design, the applicant shall inform STUK of the testing date (402). [2013-11-15]

432. A detailed schedule as well as the names and contact information of the responsible manager, his or her deputy, and the applicant's transport contact person shall be submitted to STUK before undertaking the transport. The requirement of submission shall also apply to information that changes from transport to transport if the transport plan is drawn up for transport operations (408). [2019-05-15]

433. The names and contact information of the key security personnel assigned to the transport as well as other security arrangement information that changes from transport to transport shall

be submitted to STUK before undertaking the transport in accordance with a STUK-approved transport security plan (413). [2013-11-15]

434. The names and contact information of those essential for the emergency preparedness arrangements as well as other information changing from transport to transport shall be submitted to STUK before undertaking the transport (420). [2013-11-15]

435. STUK shall be notified, within the scope appropriate for the transport operations in question, of a transport's departure from and arrival in Finland as well as of the transport's arrival in and departure from the territory of Finland (335). [2013-11-15]

436. STUK shall be informed of any damage to the packages discovered during transport and of any deviations from approved packaging design (317). [2013-11-15]

437. STUK and the other authorities to whom the deviations apply shall be notified of any deviations from the transport plans without delay (426). [2013-11-15]

438. Transport-related special situations shall be reported to the rescue services and/or the police immediately upon detection of the special situations and to STUK without delay (318). [2013-11-15]

439. The operator shall report to STUK in writing about any special situations within two weeks of the event. The report shall include a description of the event and its consequences as well as the necessary corrective actions the operator has taken/will take in order to prevent the recurrence of such events in the future (338). [2019-05-15]

5 Regulatory oversight by the Radiation and Nuclear Safety Authority

501. STUK oversees that the operator carries out the transports and implements their nuclear security arrangements and emergency preparedness arrangements in accordance with the requirements set forth in legislation, the licence conditions, and this Guide. [2013-11-15]

502. STUK reviews the transport-related applications (application for approval of transport packaging design, transport licence application) and plans (transport plan, transport security plan, transport emergency plan) as well as the nuclear facility's security standing order (that includes preparedness by the nuclear facility's security organisation for the prevention of unlawful action also in transports relating to the facility's operations). [2013-11-15]

503. STUK oversees, within the scope it deems necessary, any testing that is conducted for the approval of transport packaging designs. [2013-11-15]

504. STUK reviews, where necessary, the operator's transport-related instructions and notifications and oversees by inspections, where it deems necessary, that the transport arrangements and the nuclear security and emergency preparedness arrangements of the transports are implemented in accordance with the approved plans and legislative requirements applicable to transports. [2013-11-15]

505. In overseeing transports, STUK is in contact with the authorities concerned. [2013-11-15]

6 ANNEX A Nuclear material and nuclear waste categories

Nuclear material and nuclear waste categories. All materials referred to in Section 3 of the Nuclear Energy Act (990/1987) and Sections 3 and 5 of the Nuclear Energy Decree (161/1987) are considered nuclear material or nuclear waste. The categorisation is based on the Convention on the Physical Protection of Nuclear Material and Nuclear Facilities (SopS 72/1989) and the IAEA's Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (NSS 13, INFCIRC/225/Rev.5). Of the categories, Category 1 is the most severe and Category 3 the least severe.

Material r = enrichment level (atom-%)	Category 1 m = mass (kg)	Category 2 m = mass (kg) A = activity (Bq)	Category 3 m = mass (kg) A = activity (Bq)	Source material
Plutonium-239	$m \geq 2$	$0.5 < m < 2$	$0.015 < m \leq 0.5$	natural uranium (uranium containing a mixture of the U-235-isotope occurring in nature), depleted uranium and thorium
Uranium-233	$m \geq 2$	$0.5 < m < 2$	$0.015 < m \leq 0.5$	
Uranium-235	$r \geq 20$	$1 < m < 5$	$0.015 < m \leq 1$	
	$10 \leq r < 20$	$m \geq 10$	$1 < m < 10$	
			$m \geq 10$	
Nuclear waste		spent nuclear fuel ¹ nuclear waste not containing nuclear material in which $A > 1 \times 10^{15}$	nuclear waste not containing nuclear material in which $1 \times 10^{12} < A \leq 1 \times 10^{15}$	

¹ Spent nuclear fuel may belong to Category 1 based on the amount of nuclear material it contains, provided that the radiation level at 1 metre's distance from the fuel does not exceed 1 Gy/h. [2019-05-15]

7 References

1. Nuclear Energy Act (990/1987). [2013-11-15]
2. Nuclear Energy Decree (161/1988). [2013-11-15]
3. Nuclear Liability Act (484/1972). [2013-11-15]
4. Government Decree on the Security in the Use of Nuclear Energy (STUK Y/3/2016). [2019-05-15]
5. The Convention on the Physical Protection of Nuclear Material and Nuclear Facilities (SopS 72/1989). [2013-11-15]
6. Act on implementing the regulations under the Amendment to the Convention on the Physical Protection of Nuclear Material (513/2008). [2013-11-15]
7. Act on the Transport of Dangerous Goods (719/1994). [2013-11-15]
8. Government Decree on the Conformity Assessment of Packaging, Tanks and Freight Containers used for the Transport of Dangerous Goods and on related Inspection organizations (124/2015). [2019-05-15]
9. Government Decree on the Transport of Dangerous Goods by Road (194/2002). [2013-11-15]
10. Government Decree on the Transport of Dangerous Goods by Rail (195/2002). [2013-11-15]
11. Decree on the Transport of Dangerous Goods in Packaged Form by Sea (666/1998). [2013-11-15]
12. Government Decree on the Reporting Obligation on Sea Transports of Dangerous Goods or Marine Pollutants (346/2014). [2019-05-15]
13. Government Decree on the Transport of Dangerous Goods by Air (210/1997). [2013-11-15]
14. Decree of the Ministry of Transport and Communications on the Transport of Dangerous Goods by Road (TRAFICOM/82133/03.04.03.00/2019). [2019-05-15]
15. Decree of the Ministry of Transport and Communications on the Transport of Dangerous Goods by Rail (TRAFICOM/82134/03.04.02.00/2019). [2019-05-15]
16. Government Decree on the Transport and Temporary Storage of Dangerous Goods in a Port Area (251/2005). [2013-11-15]

17. Private Security Services Act (1085/2015). [2019-05-15]
18. Security Clearance Act (726/2014). [2019-05-15]
19. European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) (SopS 23/1979). [2013-11-15]
20. Convention concerning International Carriage by Rail (COTIF), Appendix C, RID regulations (SopS 52/2006). [2013-11-15]
21. IMDG Code (International Maritime Dangerous Goods Code) defined by the regulations of the International Convention for the Safety of Life at Sea (SOLAS), Appendix VII, Chapter A, Part 1, and the valid decision by the Finnish Transport Safety Agency (TRAFICOM). [2019-05-15]
22. INF Code (International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on Board Ships) defined by the regulations of the International Convention for the Safety of Life at Sea (SOLAS), Appendix VII, Chapter D, Part 14,. [2013-11-15]
23. ICAO-TI (Technical Instructions for the Safe Transport of Dangerous Goods by Air), the technical regulations published by the International Civil Aviation Organisation (ICAO) and the aviation regulation OPS M1-18 / TRAFI/1359/03.04.00.00/2015, 21.12.2015. [2019-05-15]
24. Design basis threat in the use of nuclear energy and radiation. [2013-11-15]
25. Regulations for the Safe Transport of Radioactive Material, 2012 Edition, Specific Safety Requirements (No. SSR-6), IAEA (2012). [2013-11-15]
26. Code of Conduct on the Safety and Security of Radioactive Sources, IAEA (2004). [2013-11-15]
27. Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev.5), NSS No. 13, IAEA, 2011. [2013-11-15]
28. Nuclear Security Recommendations on Radioactive Materials and Associated Facilities, NSS No. 14, IAEA, 2011. [2013-11-15]
29. Nuclear Security Recommendations on Nuclear and other Radioactive Material outside Regulatory Control, NSS No. 15, IAEA, 2011. [2013-11-15]
30. Security in the Transport of Radioactive Material, NSS No. 9, IAEA (2008). [2013-11-15]
24. Security of Nuclear Material in Transport, NSS 26-G, IAEA (2015). [2019-05-15]

Definitions

Special fissionable material

Special fissionable material shall refer to plutonium-239, uranium-233, uranium enriched in isotopes 235 and 233, and materials that which contain one or more of the above-mentioned materials (161/1988, Section 3).

Special arrangements

Special arrangements shall refer to STUK-approved measures enabling the transport of consignments that do not fully meet the requirements for radioactive materials set forth in the transport regulations for dangerous goods.

Special situation

Special situation shall refer to an exceptional situation such as an accident, deterioration of nuclear security arrangements, a disturbance or a threat situation.

Fissile material

Fissile material shall, in accordance with the regulations for the transport of dangerous goods (such as 369/2011, Appendix A, Chapter 2.2.7.1.3), refer to fissile nuclides, including uranium-233, uranium-235, plutonium-239, plutonium-241 and all materials that contain one of these. However, unirradiated natural uranium, depleted uranium, or natural uranium only irradiated in a thermal reactor shall not be considered fissile material under the transport regulations.

Package

Package, in connection with radioactive materials, shall refer to packaging and its radioactive contents in the form it has been submitted for transport.

Criticality safety index

Criticality safety index shall refer to a figure related to the design of a fissile material package that limits the number of packages in one transport unit.

Transport

Transport shall refer to an event specified in Section 3(1)(2) and Sections 3(1)(4)–(7) of the Act on the Transport of Dangerous Goods (719/1994) concerning nuclear material or nuclear waste.

Transport index

Transport index shall refer to a figure marked on the warning labels and transport documents of

a package indicating the dose rate of radiation emitted from the package.

Unlawful action

Unlawful action shall refer to an activity or measure that is aimed at directly or indirectly endangering the nuclear safety or radiation safety of a nuclear facility, nuclear material or nuclear waste. Deliberate or negligent activity that is punishable by law towards a nuclear facility, nuclear material or nuclear waste, or towards the persons working at a nuclear facility is considered unlawful action. (STUK Y/3/2016)

Graded approach

Graded approach related to nuclear security shall refer to a principle according to which, the specification, planning and implementation of nuclear security takes into account the applicable threat assessment, the properties of nuclear materials, and the potential consequences of unlawful action directed at nuclear materials.

Source material

Source material shall refer uranium that contains the mixture of isotopes in amounts occurring in nature, or uranium in which the relative quantity of isotope 235 has been reduced, thorium, and any of the materials specified above in the form of metal, alloy, chemical compound or concentrate. (161/1988, Section 3)

Packaging

Packaging shall refer to parts necessary to completely enclose the radioactive contents. Packaging may include one or several containers, absorbent material, equipment for maintaining the safety distance, a radiation shield, filling and emptying devices, cooling devices, shock dampers, handling and fastening equipment, and so on.

Excepted package

Excepted package shall refer to a package that may contain limited amounts of radioactive materials, instruments, or articles. These limited amounts are defined in the transport regulations for dangerous goods; such as with regard to road transport in Decree 369/2011, Annex A, Table 2.2.7.2.4.1.2.

Radioactive material

Radioactive material in the regulations for the transport of dangerous goods shall refer to a material (including fissile materials, other nuclear materials, or nuclear waste) the activity concentration and total activity of which in the consignment exceed the radionuclide-specific limits defined in the transport regulations.

Risk analysis

Risk analysis shall refer to examinations performed by using systematic measures in order to identify threats, problems, and vulnerabilities, surveying the causes and consequences thereof, and assess the related risks. (STUK Y/3/2016)

Design basis threat

Design basis threat shall refer to a threat of unlawful action used as the basis for the planning and assessment of the nuclear security arrangements for which the licensee is responsible. (161/1988)

Operator

Operator shall, depending on the context, refer to a licensee, licence applicant or some other user of nuclear energy (Section 2 of the Nuclear Energy Act) who is engaged in, or is planning to engage in, operations falling within the area of application of the Nuclear Energy Act. In the transport of nuclear material or nuclear waste, the user of nuclear energy specified above shall be the consignor, carrier, or consignee as per prior agreement concerning the division and transfer of responsibilities between the consignor, carrier, and consignee and considering the responsibilities for different parties under the transport regulations for dangerous goods.

Security personnel

Security personnel shall refer to persons trained and authorised to plan and implement nuclear security as laid down in Section 7 I of the Nuclear Energy Act.

Security arrangements

Security arrangements shall refer to the measures needed to protect the use of nuclear energy against illegal activities in the nuclear facility, its precincts, other places or vehicles where nuclear energy is used. (Nuclear Energy Act 990/1987)

Threat

Threat shall refer to a situation in which unlawful action against a nuclear facility, nuclear material, or nuclear waste is ascertained, or there is reason to suspect this. (STUK Y/3/2016)

Security guard

Security guard shall refer to a person employed by a guarding services supplier and certified under Section 24 of the Private Security Services Act (282/2002), who has completed basic guard training or a corresponding qualification and meets the general requirements for the guard certification.

Responsible manager

Responsible manager shall refer to the person specified in Section 7 k of the Nuclear Energy

Act.

Nuclear material

Nuclear material shall refer to special fissionable materials or source materials, such as uranium, thorium and plutonium, suited for obtaining nuclear energy. (Nuclear Energy Act 990/1987)

Nuclear waste

Nuclear waste shall refer to a) radioactive waste in the form of spent nuclear fuel or in some other form generated during or as a result of the use of nuclear energy and b) materials, objects and structures which, having become radioactive during or as a result of the use of nuclear energy and having been removed from use, require special measures owing to the danger posed by their radioactivity. (Nuclear Energy Act 990/1987)

Nuclear liability

Nuclear liability shall refer to the liability of an operator of a nuclear facility for damage incurred to a third party.

Exclusive use

Exclusive use shall mean the sole use, by a single consignor, of a conveyance or of a large freight container, in respect of which all initial, intermediate and final loading and unloading and shipment are carried out in accordance with the directions of the consignor or consignee.