



REPUBLIC OF ESTONIA
ENVIRONMENTAL BOARD

**4th Estonian National Report on Compliance with the
Obligations of the Convention on Nuclear Safety**

as referred to in Article 5 of the Convention

Seventh Review Meeting

Environmental Board

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of the Convention on Nuclear Safety**

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Chapter 1 Introduction

Estonia is a state in the Baltic region of Northern Europe with a population of 1.31 million. The territory of Estonia covers 45,227 km². There are no nuclear power plants or facilities operating with nuclear fuel cycle in Estonia, neither are any activities related to nuclear fuel cycle performed.

Estonia is a Member State of the IAEA since 1992. The Convention on Nuclear Safety came into force for Estonia on 4 May 2006. The present report is the 4th Estonian National Report to the 7th Review Meeting of the Convention on Nuclear Safety. This report gives an overview of the national policy, State institutional framework and general legislation governing nuclear matters in Estonia. It also sets out measures adopted by Estonia to implement the relevant obligations of the Convention.

In 2009, Estonian parliament approved the “National Development Plan of the Energy Sector until 2020” (NDPES), which, in principle, gave a green light for peaceful use of nuclear energy in Estonia. In 2011, the possibility of participation in Lithuanian Visaginas nuclear power plant project was under discussion but in 2015 it was announced that internal investments in energy sector are our main focus at the moment and the plan was dropped. After the Fukushima accident and due to the changed economic situation in the Baltic region the NDPES was reviewed and there are no implications to nuclear energy in the new “National Development Plan of the Energy Sector until 2030”. Adoption of the new “National Development Plan of the Energy Sector until 2030” is planned by the end of 2016.

Although Estonia has no operating nuclear power reactors, there are foreign nuclear power plants close to its borders: Loviisa NPP in Finland (103 km), Leningrad NPP in Russia (79 km) and Ignalina NPP in Lithuania (215 km, under decommissioning since 2009). Therefore, Estonia is, according to Article 16, obliged to “take the appropriate steps for the preparation and testing of emergency plans for their territory that cover the activities to be carried out in the event of such an emergency”. As nuclear emergency preparedness is a direct obligation for Estonia in relation to the Convention, this item is dealt with in greater detail in the report.

Estonia has also adopted the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention). Handling of radioactive waste shall be reported to that Convention accordingly. Estonia does not have a policy for spent fuel management, as there is no nuclear fuel in Estonia. There is, however, the former nuclear submarine training centre together with two reactor compartments in Paldiski site (*hereinafter Paldiski site*), but spent fuel was removed from the reactors and taken back to Russia already in 1995. Consequently, reporting about the Paldiski site and its developments will be presented in the reports to the Joint Convention and not to the Nuclear Safety Convention. Annex A of the report gives a brief overview of the shut-down nuclear submarine reactors in the Paldiski site and the legal regime controlling this activity.

At present, interest of Estonia in nuclear safety is primarily related to the safety of nuclear installations in the neighboring countries and to the implications that accidents at such installations, should they occur, may have on the health of the population and on the environment.

Estonia is a member state of the European Union from 1st of May 2004. Thus, EU regulations in the field have been transposed to national legal and administrative framework in Estonia. When necessary, Estonian legislation is amended and modified to take into account the new EU regulations and their amendments. In 2011 the requirements of the European Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations were brought into Estonian legislation by amending the Radiation Act.

Based on discussion with the European Commission, the Paldiski site and radioactive waste storage located on the same site do not directly fall within the scope of Directive 2009/71/Euratom. Therefore, Estonia must implement the requirements of this directive at general level. The Radiation Act was amended with relevant definitions, requirements of passing a principle decision by the Riigikogu (Parliament) on establishment of a nuclear installation, obligations of the license holder of nuclear installations and quality assurance requirements to ensure radiation safety. However, if Estonia decides to use nuclear energy, relevant nuclear legislation is required. In 2013 the Council Directive 2011/70/Euratom establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste was transposed into Estonian legislation and in 2015 National Programme for Radioactive Waste Management was adopted.

The present report to the 7th Review Meeting of the Convention on Nuclear Safety presents a description of the Estonian legal regime and the implemented administrative and technical measures related to nuclear safety and emergency preparedness. The main developments in the field since the 3rd National Report in 2013 described in the present Report are the following: adoption of the new Radiation Act (enters into force on 1 November 2016) and upgrade of the legal framework and technical capabilities for emergency preparedness and response.

The report is prepared by the Environmental Board under the Ministry of the Environment in cooperation with the Ministry of the Environment, the Environmental Inspectorate and the Estonian radioactive waste management agency A.L.A.R.A. Ltd. In summary, the main conclusions of the Report are the following:

- Estonian nuclear and radiation regulations fulfil the obligations of the Convention;
- Estonian regulatory infrastructure is in compliance with the Convention obligations;
- regulatory and licensee practices comply with the Convention obligations;
- Estonian Nuclear Emergency Preparedness system has a high standard and complies fully with the Convention.

Chapter 2 Article-by-article review

Article 4. Implementing measures

Each Contracting Party shall take, within the framework of its national law, the legislative, regulatory and administrative measures and other steps necessary for implementing its obligations under this Convention.

The principles of radiation and nuclear safety as well as the responsibilities of the licensees are provided by the Radiation Act (issued by the Riigikogu on 24 March 2004, amended on 18 January 2016). Article 2 of the Act specifies that no radiation practice should be started without a radiation practice license. Due to the fact that at present there are no nuclear installations under the Convention definition in Estonia, the issues related to nuclear safety are not included in the Act in a great detail. The Environmental Impact Assessment and Environmental Management System Act (issued by the Riigikogu on 22 February 2005, amended on 18 January 2016) states that environmental impact shall be assessed upon applying for development consent or for amending development consent whereby the proposed activity which is the reason for applying for or amending the development consent potentially results in significant environmental impact. Activities with significant environmental impact include also:

- construction, dismantling or decommissioning of a nuclear power station or other nuclear reactors, except research installations for the production and conversion of fissionable and fertile materials, whose maximum power does not exceed 1 kilowatt continuous thermal load;
- production or enrichment of nuclear fuel, processing or handling or final disposal of used nuclear fuel or disposal of used nuclear fuel for over ten years on a site other than the place of generation thereof;
- handling high-activity radioactive waste, final disposal of merely radioactive waste or disposal thereof for over ten years on a site other than the place of generation.

Article 5. Reporting

Each Contracting Party shall submit for review, prior to each meeting referred to in Article 20, a report on the measures it has taken to implement each of the obligations of this Convention.

The response to the obligation, see the present Report.

Article 6. Existing nuclear installations

Each Contracting Party shall take the appropriate steps to ensure that the safety of nuclear installations existing at the time the Convention enters into force for that Contracting Party is reviewed as soon as possible. When necessary in the context of this Convention, the Contracting Party shall ensure that all reasonably practicable improvements are made as a matter of urgency to upgrade the safety of the nuclear installation. If such upgrading cannot be achieved, plans should be implemented to shut down the nuclear installation as soon as practically possible. The timing of the shut-down may take into account the whole energy context and possible alternatives as well as the social, environmental and economic impact.

According to the convention “nuclear installation” means any land-based civil nuclear power plant under its jurisdiction including such storage, handling and treatment facilities for

radioactive materials as are on the same site and are directly related to the operation of the nuclear power plant. Such a plant ceases to be a nuclear installation when all nuclear fuel elements have been removed permanently from the reactor core and have been stored safely in accordance with approved procedures, and a decommissioning program has been agreed to by the regulatory body.

According to this definition there are no nuclear facilities in Estonia. Annex A of the Report gives an overview of the shutdown nuclear submarine reactors in the Paldiski site and the legal regime controlling this activity. The site is under decommissioning and consequently any information about these installations are and will be included in the reports to the Joint Convention.

Article 7. Legislative and regulatory framework

1. Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of nuclear installations.

2. The legislative and regulatory framework shall provide for:

i. the establishment of applicable national safety requirements and regulations;

ii. a system of licensing with regard to nuclear installations and the prohibition of the operation of a nuclear installation without a license;

iii. a system of regulatory inspection and assessment of nuclear installations to ascertain compliance with applicable regulations and the terms of licenses;

iv. the enforcement of applicable regulations and of the terms of licenses, including suspension, modification or revocation.

National legislative and regulatory framework

The parliament of the Republic of Estonia (the Riigikogu) is responsible for establishing regulatory requirements. The coordinator of legislative drafting is the Ministry of Justice, who stands for the systematic development of law and supports the formation of quality legislative drafting. In accordance with Section 6 of the Regulation of the Government No 186 of 10.12.2009 “Statute of the Ministry of Environment” (as amended on 7 March 2015), area of government of the Ministry of Environment includes ensuring radiation protection, compiling related strategic documents and draft legislation. The Ministry of Environment through the Environmental Board and Environmental Inspectorate manages radiation protection related actions according to the Subsection 4 (1) of the Radiation Act.

Based on Clause 5 (2) 3) of the Statutes of the Environmental Board, the Environmental Board participates, where necessary and within its mandate, in the drafting of environmental legislation, also in the development of environment-related strategies, programs and plans, and is responsible for their implementation to the extent set forth in legislation; based on Clause 44, the Environmental Board tables proposals to the Ministry of the Environment to supplement legislation.

Based on Clause 7 11) of the Statutes of the Environmental Inspectorate, the Environmental Inspectorate analyses the effect of legislation in its area of activity and tables proposals for their improvement, participates in the preparation and coordination of new draft legislation.

Radiation safety requirements are developed mainly in the cooperation between the Ministry of the Environment (including subdivisions Environmental Board, Environmental Inspectorate), Ministry of Social Affairs (Health Board, hospitals), Ministry of Interior (Police and Border Guard Board, Rescue Board, Security Police Board), Ministry of Finance (Tax and Customs Board), Ministry of Economic Affairs and Communications (radioactive waste management company AS A.L.A.R.A.).

The Estonian legislative and regulatory system implements all legislative requirements with regard to the Treaty Establishing the European Atomic Energy Community (Euratom). Radiation safety and protection requirements have been transposed to the Radiation Act from the Council directive 96/29/Euratom laying down basic safety standards for the protection of the health of workers and the public against the dangers arising from ionizing radiation.

By 6 February 2018, Estonia as a European Union Member State needs to transpose requirements from the Council directive 2013/59/Euratom that lays down basic safety norms for protection against hazards from ionising radiation. Therefore, the requirements for radiation safety and protection will be reviewed within the national legislation.

In Estonia, the legislation for radiation protection framework was established in 1997, when the first Radiation Act entered into force. In 2004, Estonia joined the European Union. The process required preparation of several amendments to the Radiation Act, which were necessary to comply with the relevant European Atomic Energy Community (EURATOM) Directives. Therefore, a new version of the Radiation Act entered into force in 2004. The Radiation Act and its 15 sub-acts, as in force on 15 August 2016, is given in Annex B. The Emergency Act and its implementing regulations deal with emergency preparedness. Environmental Impact Assessment and Environmental Management System Act and its implementing regulations state conditions of environmental impact assessment. These are the main documents used by the Government and the Ministry of the Environment as a reference.

The most significant amendment was enforced in 2009, when the majority of functions of the regulatory authority were transferred from the Ministry of the Environment to the new governmental body within the area of government of the Ministry of the Environment, the Environmental Board (in Estonian: Keskkonnaamet). Substantial amendments were made also in 2011 during the transposition of the Directive 2009/71/EURATOM establishing a Community framework for the nuclear safety of nuclear installations. Amendments involved emergency preparedness and responsibilities, radioactive waste management and supervision.

The Radiation Act provides two measures to assess the national radiation protection system: preparation of the national radiation safety development plan and state audit of radiation safety. The Ministry of the Environment issued the “National Radiation Safety Development Plan 2008 – 2017” (NRSDP), which was approved by the Government of the Republic on 17 April 2008. The NRSDP is a ten-year program for developing and enhancing radiation safety in Estonia. Its objectives are to minimize radioactive waste, improve emergency preparedness, optimize the use of radiation in medicine and raise public awareness. Pursuant to Subsection 4 (4) of the Radiation Act, the Ministry of the Environment organizes at least after each ten years the state audit of radiation safety. In addition to that, Estonia had its first international audit in July 2005 (IAEA RaSSIA mission) and the second international audit is going to take place in September 2016 (IAEA IRRS mission). The reports are listed in the Annex C to this Report.

In August 2015, the Minister of the Environment approved the National Action Plan for Radioactive Waste Management. The plan describes the institutions, technical and financial resources, and research and development activities for safe radioactive waste management. The action plan provides sub-objectives, measures, and expected results of the field until 2050. The

need for the preparation of a national action plan for radioactive waste management arises from both the NRSDP and the European Union Directive 2011/70/Euratom establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste.

After joining the European Union it became evident that environmental law needs a more consistent approach in Estonia. The codification process of environmental law started in 2011 and the new Radiation Act was drafted. The content of the new draft Radiation Act remains largely unchanged compared to the current version. However, a number of changes specifying the content and the structure have been made. In the new Radiation Act, processes related to the proceeding of applications of radiation practice license are clarified to minimize administrative burden to applicants and administrative authorities. The new Radiation Act enters into force on 1 November 2016.

In the international context, Estonia has signed, ratified/approved several treaties, agreements and conventions, the listing of which is given in Annex D to this Report.

The main legal document in the field of radiation protection and safety is the Radiation Act and its implementing regulations. The Radiation Act provides:

- 1) general safety requirements for the purpose of protecting human health and the environment from the damage caused by ionizing radiation;
- 2) the rights, obligations and liability of persons using ionizing radiation and the requirements on radiation practice;
- 3) the procedure of state supervision over compliance with the requirements provided in the Radiation Act;
- 4) liability for compliance with the requirements provided in the Radiation Act.

According to the Section 36 of the Radiation Act, the Environmental Board issues guidance materials for holders of radiation practice license to assure the implementation of legal requirements in accordance with good practices. Guides are not legally binding. The need to issue guidance materials for different types of radiation sources is decided based on the number of users. Guidance materials have been published on the website of the Environmental Board.

System of licensing

The licensing system for practices is prescribed in Chapter 3 of the Radiation Act. The use of radiation source requires a radiation practice license, which is granted by the Environmental Board upon application.

According to the definition given in Section 2 of the Radiation Act, radiation practice is any activity that increases or may increase the radiation of a person from artificial sources or natural sources (where natural radionuclides are processed due to their properties of radioactivity; nuclear fission or nuclear fusion). Such activities are, *inter alia*:

- 1) production, processing, use, ownership, storage, transport, import and export as well as temporary storage or disposal of radioactive substances;
- 2) use of an electrical appliance emitting ionizing radiation and operating at a potential difference higher than 5 kV;
- 3) the operation of nuclear installations.

The Section 16 of the Radiation Act sets forth the activities for which a radiation practice license is obligatory:

- 1) the operation, closure and decommissioning of any facility involved in the nuclear fuel cycle;
- 2) the deliberate addition of radioactive substances in the production and manufacture of medical products and the import or export of such goods;
- 3) the deliberate addition of radioactive substances in the production and manufacture of consumer goods and the import or export of goods with a radioactive substance content;
- 4) for using a radiation source and administering a radioactive substance to a human and animal for the purpose of assessing their health condition, diagnostics, treatment and scientific research;
- 5) for using an x-ray device or radioactive substance in industrial radiography and roentgenography, processing products, scientific research and using accelerators, except for using electron microscopes;
- 6) activity related to increased natural exposure, in the case of which the radiation caused by natural radionuclides is important from the point of view of radiation safety;
- 7) managing of radioactive waste.

The Subsection 34 (2) of the Radiation Act states, that a radiation source may be installed, repaired and maintained by a person holding a radiation practice license.

The Section 35 of the Radiation Act describes the conditions for transport of radioactive substance and a device containing radioactive substance. Radioactive substance and a device containing radioactive substance, which the activity or specific activity of which is greater than the exemption level, is transported by highway, railway, air and waterway according to the procedure established by legislation concerning hazardous loads. Transport across the state border takes place in accordance with international agreements in force in respect of the Republic of Estonia and based on Estonian legislation.

The Section 49 of the Radiation Act describes activities, which involve increased natural radiation. Operations, in the case of which natural radiation sources may cause a significant increase of the exposure of workers and inhabitants, are following:

- 1) work at mineral springs, in caves, mines or underground constructions;
- 2) work with substances which contain radioactive substances occurring in nature;
- 3) work of aircraft crews in high-altitude flights.

If, during performing work, which involve increased natural radiation, a worker receives or may receive an effective dose that is higher than the upper annual limit of the effective dose of public exposure established under the Radiation Act, such activities are deemed to be radiation practice and a radiation practice license needs to be applied for.

In addition, the cases are identified in the Section 17 of the Radiation Act, when a license is not required, e.g. when law exempts the use of radiation or a device.

The Subsection 18 (1) of the Radiation Act describes the scope of the application. In order to obtain a radiation practice license, an applicant shall submit an application to the Environmental Board with the following information and documents:

- 1) applicant's business name or name, registry or personal identification code and contact details;
- 2) purpose of radiation practice, location plan of the location and installation and data about the technology and devices used;
- 3) justification and description of radiation practice;
- 4) data characterizing the radiation source;
- 5) data about the radioactive waste or emissions generated in the course of radiation practice and about the radioactive waste storage room and waste acceptance criteria;

- 6) radiation source safe inclusion plan after terminating use of the radiation source, which in the case of radiation practice of moderate and great risk has been approved by a qualified radiation expert;
- 7) when applying for a license for radioactive waste management data about the manners of final closure of the management site;
- 8) radiation monitoring plan and data about the devices used for radiation monitoring;
- 9) radiation safety assessment and measures for ensuring radiation safety;
- 10) in case of a high risk radiation practice the plan for operating in an accidental exposure situation, which is based on the potential exposure assessment;
- 11) description of the radiation safety quality system;
- 12) data about exposed workers and their professional training;
- 13) radiation work rules.

The application of the radiation practice license, application to amend radiation practice license and other necessary documents can be presented in paper or digital format. The application has to be signed in writing or digitally, accordingly, and by the legal person of the applicant. According to the Subsection 5 (6) of the Administrative Procedure Act, in administrative procedure, electronic operations shall be equal to written operations. In determining the terms of the license, and in amending or revoking of the license, the Environmental Board proceeds from the specific radiation practice, based on the main principles of radiation safety. The terms of the license shall be weighted and justified based on the Radiation Act and the Administrative Procedure Act.

The data and documents to be submitted when applying for the radiation practice license are specified in Regulation No. 41 of 29.04.2004 of the Minister of the Environment, "Time limits of the procedure for the grant, amendment and repeal of radiation practice licenses, and specified requirements and forms for radiation practice license applications and radiation practice license forms". The Regulation No 41 of the Minister of the Environment describes formal requirements:

- 1) for entry and proceeding of the radiation practice license application;
- 2) for notification of initiating open proceedings for granting or amending a radiation practice license;
- 3) for granting of the radiation practice license;
- 4) for proposals and objections presented during the open proceedings of the radiation practice license;
- 5) for refusal of granting the radiation practice license;
- 6) for amending the radiation practice license and notification of the need for applying for a new license;
- 7) for repealing the radiation practice license.
- 8) for documents of application of radiation practice license and the forms of application of radiation practice license;
- 9) for forms of a radiation practice license.

The granting of a radiation practice license can be subject to additional conditions needed to ensure safety. Pursuant to the Regulation No. 41 of the Minister of the Environment, the issuer of a license reviews the data and documents submitted by the applicant and, if needed, checks their conformance to the actual situation. If the issuer of the license imposes a deadline for the applicant to remedy deficiencies or submit specifying data on the materials of the application, the deadline for the processing the application will be extended by the time of remedying the deficiencies or submitting specifying data. If the applicant fails to do so by the term given, the issuer of the license will return the application without review within 5 days after the deadline.

According to the Subsection 19 (1) of the Radiation Act, the radiation practice license shall set out the following:

- 1) radiation practice license number and issue date;
- 2) business name and registry code or name and personal identification code and address of the holder of a radiation practice license;
- 3) radiation practice name;
- 4) radiation practice license term of validity;
- 5) description of radiation sources;
- 6) place of radiation practice taking place description of installations and rooms;
- 7) ways of management, limits and management facilities of radioactive waste;
- 8) limits of radioactive waste and methods of discharging into the environment;
- 9) radiation safety and radiation monitoring requirements arising from radiation practice and its special character;
- 10) radiation practice risk level.

According to the Subsection 18 (3) of the Radiation Act, radiation practices are divided into the following risk categories depending on the risk presented by the radiation practice or the radiation source:

- 1) low risk radiation practice, in the course of which the exposed worker receives or may receive an effective dose of up to one millisievert per annum;
- 2) moderate risk radiation practice, in the course of which the exposed worker receives or may receive an effective dose of one to six millisieverts per annum;
- 3) high risk radiation practice, in the course of which the exposed worker receives or may receive a higher effective dose than six millisieverts per annum.

In addition to the Subsection 18 (3), a radiation practice is of high risk if the radiation practice license is applied for:

- 1) activities related with high activity radioactive sources;
- 2) the operation, closure and decommissioning of any facility involved in the nuclear fuel cycle;
- 3) managing of radioactive waste.

The holder of the radiation practice license has to notify the Environmental Board when the holder plans to:

- 1) introduce a new or additional radiation source into use;
- 2) discontinue the use of the radiation source specified on the radiation practice license;
- 3) transfer the radiation source to another person or store as radioactive waste;
- 4) change the radiation practice license defined in the radiation practice license, methods of managing the generated radioactive waste, its limits or management facility;
- 5) change the location, facilities or premises of the radiation practice;
- 6) recruit a new radiation safety specialist;
- 7) change in any other way substantially the radiation practice described in the license.

Upon receiving an application to change the radiation practice license, the Environmental Board reviews the data and documents submitted by the applicant and, if needed, checks their conformance to the actual situation (pursuant to Section 2 of Regulation No. 41 of Minister of the Environment). Where a change is critical from the perspective of radiation safety, the Environmental Board may require that the license holder submits an application for a new radiation practice license. The specialists of the Environmental Board have access to all premises during the licensing process.

A radiation practice license remains valid for up to 5 years. Since the Radiation Act does not provide for the extension of the radiation practice license, a new license needs to be applied for the continue radiation practice.

The provisions of open procedure are applied to the procedure of granting and amending radiation practice licenses (pursuant to Section 20 of the Radiation Act) if a radiation practice license is applied for the following activities:

- 1) the operation, closure and decommissioning of any facility involved in the nuclear fuel cycle;
- 2) activity related to increased natural exposure, in the case of which the radiation caused by natural radionuclides is important from the point of view of radiation safety;
- 3) managing of radioactive waste.

The Environmental Impact Assessment and Environmental Management System Act states, that environmental impact shall be assessed upon applying for development consent or for amending development consent whereby the proposed activity which is the reason for applying for or amending the development consent potentially results in significant environmental impact. Activities with significant environmental impact include also:

- 1) construction, dismantling or decommissioning of a nuclear power station or other nuclear reactors, except research installations for the production and conversion of fissionable and fertile materials, whose maximum power does not exceed 1 kilowatt continuous thermal load;
- 2) production or enrichment of nuclear fuel, processing or handling or final disposal of used nuclear fuel or disposal of used nuclear fuel for over ten years on a site other than the place of generation thereof;
- 3) handling high-activity radioactive waste, final disposal of merely radioactive waste or disposal thereof for over ten years on a site other than the place of generation.

According to the Section 21 of the Radiation Act, the time and place of the public display of the application of the radiation practice license and draft of the radiation practice license shall be made known at least two weeks before the beginning of the public display in the official publication *Ametlikud Teadaanded* (Official Announcements¹), at least one national daily newspaper and the website of the Environmental Board.

Under the Radiation Act nuclear installations are subject to the authorization by the Environmental Board. According to the amendment in 2011 to the Radiation Act (based on Council Directive 2009/71/Euratom), it is clearly stated that the license to operate a nuclear installation can be applied only after the Estonian Parliament has made the decision to take a nuclear installation into use.

¹ <https://www.ametlikudteadaanded.ee/> (accessed on 15 August 2016)

The Official Announcements is an electronic journal that publishes all notices, invitations and announcements prescribed by the legislation. The Official Announcements is administrated by the Estonian Centre of Registers and Information Systems (RIK). The website of the Official Announcements is freely accessible to everyone and new announcements are published there on every business day, as they are issued. Since 1 July 2003, the Official Announcements is published only electronically. Announcements can be issued: 1) Electronically via the website; 2) From other information systems via the X-road system. Both private persons and agencies can issue official announcements. The person issuing the announcement is liable for its contents. Announcements can be read and issued only in Estonian.

System of the inspection and enforcement

The Environmental Inspectorate as stated in Section 68 of the Radiation Act carries out state supervision of radiation safety. Supervision of radiation practice licenses is organized in collaboration with the Radiation Safety Department of the Environmental Board.

The radiation safety inspections of the Environmental Inspectorate are carried out either based on the work plan, in the course of control raids, or as a response to complaints. The Environmental Inspectorate, which is granted a right to withdraw licenses and suspend operations in unsafe situations, has direct access to all premises, buildings, etc., for inspection purposes.

Radiation supervision takes place on the basis of an annual work plan. It is prepared collaboratively with the Environmental Board and approved by the Director General of the Environmental Inspectorate. High-risk radiation sites are checked annually (currently, there are nine holders of the radiation practice license of this kind in Estonia). The inspection of moderate and low-risk radiation sites is risk-based (taking into account the previous monitoring results and potential risks). However, inspections are performed not less often than every three years for a moderate risk radiation practice and every five 5 years for a low risk radiation practice.

The work plan is prepared and the sites are selected based on the area, region and the validity of the radiation practice license. Data from the register of radiation practice licenses is taken into account. It contains the following information about the holder of the radiation practice license: validity of the license, terms and conditions of the license, secondary terms and conditions, monitoring data performed under the license, inventory data for radiation sources.

The aim of control raids is to check the situation unannounced, i.e., whether or not radiation practice occurs at the site. Check-ups are made on the complaint basis and information received from the Environmental Board. Additional check-up of other areas of environmental inspections include scrap metal dealers, manufacturing plants etc. Likewise, environment-related complaints and notifications received by the inspectorate are checked.

For scheduled inspections, the time of inspection is agreed upon, for control raids and complaints the inspection visits are unannounced.

During inspections, the Environmental Inspectorate is entitled to examine the entire documentation on radiation practice (including technology, application, various monitoring data, calibration documents etc.).

Inspections are carried out on the basis of:

- 1) general legal requirements, including the Radiation Act, recommendations of the International Atomic Energy Agency (IAEA) and EU directives;
- 2) the terms and conditions laid down in the radiation practice license;
- 3) check-lists, which have been developed for various sectors on radiation practices and are used for quality control and harmonization purposes.

Check-ups of the businesses having high and moderate risk of radiation are generally performed with the radiation specialists of the Environmental Board.

The following in-house documents have been composed to aid the inspection process: guidelines for drafting the work plan; guidelines for conducting inspections, including radiation practice inspection; check-lists for the inspection of various types of radiation practices. Basic features of an inspection of the holder of the radiation practice license include verification of the data and conditions specified in the radiation practice license. In particular, the following features are checked:

- 1) is all the equipment in use covered by the radiation practice license, has the equipment been installed correctly and does it have an appropriate location in the premises;
- 2) are the radiation source(s) and the premises appropriately marked and labelled;
- 3) are personal dosimeters used;
- 4) personnel training records;
- 5) existence of the personal protection equipment (visual check-up);
- 6) workplace radiation monitoring and radiation safety quality system;
- 7) existence of radiation safety instructions and an emergency response plan.

Where relevant, the data submitted in the application for radiation practice license is checked stated in the Subsection 18 (1) of the Radiation Act.

According to the Statutes of the Environmental Inspectorate, in the cases provided in law, the Environmental Inspectorate is an extra-judicial body that conducts misdemeanor proceedings and pre-trial proceeding of crimes.

The Environmental Inspectorate has the right to suspend unlawful activities damaging or dangerous to the environment, as well as lawful activities related to the use of natural resources if such activities endanger the life, health or property of people. Regarding radiation safety, the responsibility of Environmental Inspectorate is to implement measures provided by law for the prevention of illegal activities and implementation of mandatory environmental protection measures. Upon identification of practice not compliant with the Radiation Act, the Environmental Inspectorate initiates administrative or misdemeanor proceedings according to the procedure set forth in the Administrative Procedure Act (Sections 2, 8) and the Misdemeanor Act (Sections 1, 8, 9, 10).

Pursuant to Section 7 of the Law Enforcement Act, in the performance of state supervision a law enforcement agency shall adhere to the following proportionality principles:

- 1) out of several suitable and necessary state supervision measures a law enforcement agency shall apply the one which will presumably harm a person as well as the public the least;
- 2) applies only such a state supervision measure that is proportional, taken into account the goal pursued by the measure and the situation requiring urgent implementation, and
- 3) applies a state supervision measure only as long as its goal has been achieved or can no longer be achieved.

Pursuant to Section 8 of the Law Enforcement Act, in the performance of state supervision a law enforcement agency shall act purposefully and efficiently, and within the limits of lawful discretion shall apply state supervision measures flexibly.

Inspectors of the Environmental Inspectorate have the right to apply enforcement measures (conduct proceedings in environmental violations, precepts, suspension or termination of illegal activities, penalty payment, substitutive enforcement etc.) if violation is found.

Penalties are imposed on the basis of the rates set forth in Sections 64–67 of the Radiation Act and the Code of Misdemeanor Procedure (Subsection 55 (2)). Liability and the rates of fines arise out of the Radiation Act.

There are no specific instructions which measures and rates of fine to apply to which non-conformances. Environmental protection inspectors are independent in their activities and make decisions on a case-by-case basis.

In practice and as a rule, misdemeanor proceedings are initiated:

- 1) for unauthorized radiation practice where the license is mandatory;

- 2) for violation of the requirements of the radiation practice license (for instance, no monitoring or approval tests have been carried out);
- 3) for violation of other obligations of the holder of the radiation practice license (modification of radiation practice premises, replacement of radiation source equipment);
- 4) when the non-conformances identified in a company are recurrent and the company does not comply with deadlines to remedy shortcomings.

The Environmental Inspectorate limits itself with recording shortcomings and pointing out non-conformances if they do not cause disturbances in radiation practice and there is no threat to workers and members of the public. For instance, failure to submit inventory or monitoring in time, monitoring delays, delays in revising radiation practice rules (if the obligations are done by the time of inspection).

In recent years, violations of conditions of radiation practice licenses have been discovered in 30-35% of the controlled objects (mostly low risk radiation objects), see Table 1.

Table 1. Number of radiation safety inspections and violations in 2013–2015.

Year	Number of inspections	Number of violations
2013	35	8
2014	71	26
2015	46	21

Article 8. Regulatory body

1. Each Contracting Party shall establish or designate a regulatory body entrusted with the implementation of the legislative and regulatory framework referred to in Article 7, and provided with adequate authority, competence and financial and human resources to fulfil its assigned responsibilities.

2. Each Contracting Party shall take the appropriate steps to ensure an effective separation between the functions of the regulatory body and those of any other body or organization concerned with the promotion or utilization of nuclear energy.

According to the amendment of the Radiation Act in 2009, the Environmental Board is authorized to fulfil the obligations of the Regulatory Authority in the country. The other body, the Environmental Inspectorate, is provided to carry out regular inspections of the licensed practices. The Section 4 of the Radiation Act states: The performance of activities related to the field of radiation safety shall be managed by the Ministry of the Environment within the limits of its competence through the Environmental Inspectorate and the Environmental Board. The status, areas of activity and tasks as well as the management of the organizations are set forth in the Statutes of the Environmental Board (Minister of the Environment Regulation No. 13, adopted 20.05.2014, date of enforcement of the wording 01.07.2014) and the Statutes of the Environmental Inspectorate (Minister of the Environment Regulation No. 12, adopted 31.03.2008, date of enforcement of the wording 14.07.2014). Both the Environmental Board and the Environmental Inspectorate have their own budget based on the annual national Fiscal Act.

The Environmental Board and the Environmental Inspectorate fall under the area of administration of the Ministry of Environment, which coordinates and executes supervisory control of the activities of both organizations.

The Environmental Board and the Environmental Inspectorate are required to prepare an annual activity report on its development plan, which is submitted to the Ministry of the Environment. The activity report of the Ministry of the Environment, in turn, is forwarded to the Ministry of Finance that coordinates the reporting of the development plans of all ministries.

The State Audit Office in their sectoral audits in turn, inspects the activities of the Environmental Board and the Environmental Inspectorate.

In Estonia, policy shaping (Ministry of the Environment), implementation of policies (Environmental Board) and environmental supervision (Environmental Inspectorate) are separate from each other. This contributes to independence from pressures from various sectors. From the perspective of the Radiation Safety Department, independence is also furthered by the fact that radiation safety issues are within the mandate of the Environmental Board, not subordinated to the Ministry of Social Affairs or the Ministry of Economic Affairs and Communications, which would implicate a more robust economic pressure on decision-making in the field of radiation safety.

The Radiation Act and its administration belong to the responsibility of the Ministry of the Environment, which, as such, is independent of the Ministry of Economic Affairs and Communications. The latter elaborates, manages and implements the state's economic policy and economic development plans in a number of fields, including energy.

There is no advisory body in Estonia in the domain of radiation protection, as because of its smallness, the State cannot afford it.

The Environmental Board

The Environmental Board was established in 2009. The mission, vision, core values and management system of the Environmental Board proceed from the tasks vested in the Environmental Board by legislation. The area of activity of the Environmental Board is set forth in the Subsection 5 (1) of the Statutes of the Environmental Board: “The area of activity of the board is national environmental and nature conservation protection and use as well as the implementation of radiation safety policies, programs and action plans.” According to its statutes, the Environmental Board has the following duties in the field of radiation safety:

- 1) to participate in the development and implementation of the radiation protection policy, development plans and programs;
- 2) to advise the regulatory authorities in radiation protection;
- 3) to perform licensing of radiation practices;
- 4) to evaluate the radiation safety of existing and applied radiation practices;
- 5) to organise the assessment of population doses and doses to critical groups arising from radiation practices;
- 6) to maintain the registries related to radiation safety (state registry of the doses of radiation workers; registries of the radioactive sources, nuclear material and radioactive waste);
- 7) in cooperation with the Environmental Inspectorate to execute regulatory supervision of the radiation practice licenses;
- 8) to organize the monitoring of radionuclides in air, soil, water and food, radioactivity in the environment and to analyze the results;
- 9) to perform laboratory analyses related to radiation safety;

- 10) to perform assessment of public exposures;
- 11) to secure functioning of the early-warning system pursuant to the provisions of legal acts and to the conditions established by international conventions and treaties and timely warning in the case of a radiation emergency;
- 12) to serve as a contact point for EURATOM and IAEA;
- 13) to serve as a national data centre (NDC) in the exchange of information in the framework of the CTBT agreement;
- 14) to participate in international cooperation, to prepare and to participate in international projects in the field of radiation safety;
- 15) to participate in the preparation of emergency situation management plans, in the testing of these plans and in the management of possible emergency cases.

Organizational structure of the Environmental Board is given in Figure 1. The tasks and management of each structural unit of the Environmental Board, including the Radiation Safety Department, are defined in the statutes of each structural unit, approved by the General Director of the Environmental Board. By August 1st 2016 there were 367.5 positions in the Environmental Board, 16 of them working in the Radiation Safety Department. The number of employees in the Radiation Safety Department has decreased by one over the last three years due to the state reform. The Radiation Safety Department is divided into two bureaus: the radiation protection bureau and the radiation monitoring bureau (see Figure 2 for the structure).

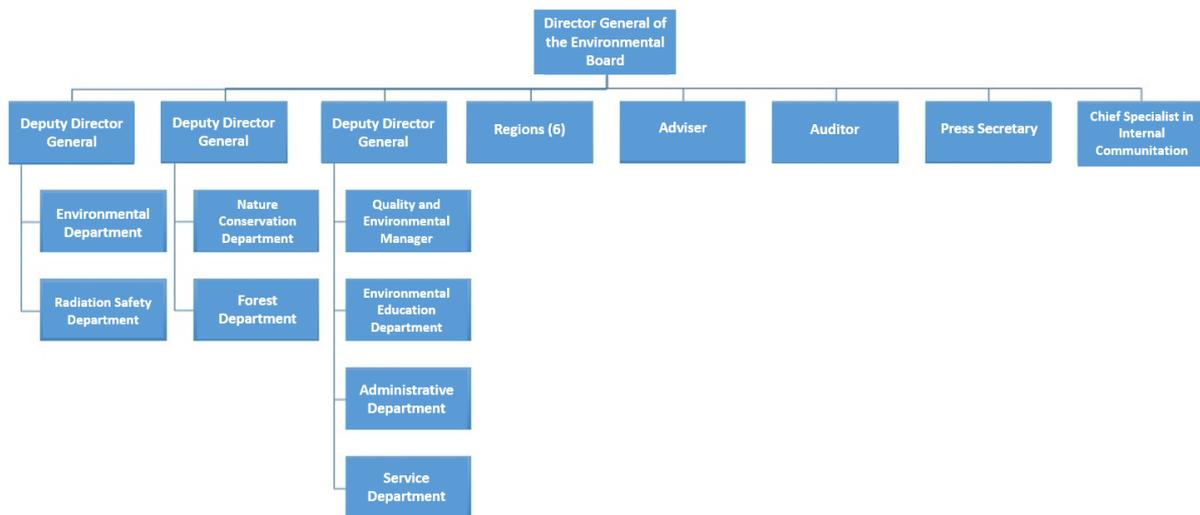


Figure 1. Organizational structure of the Environmental Board.

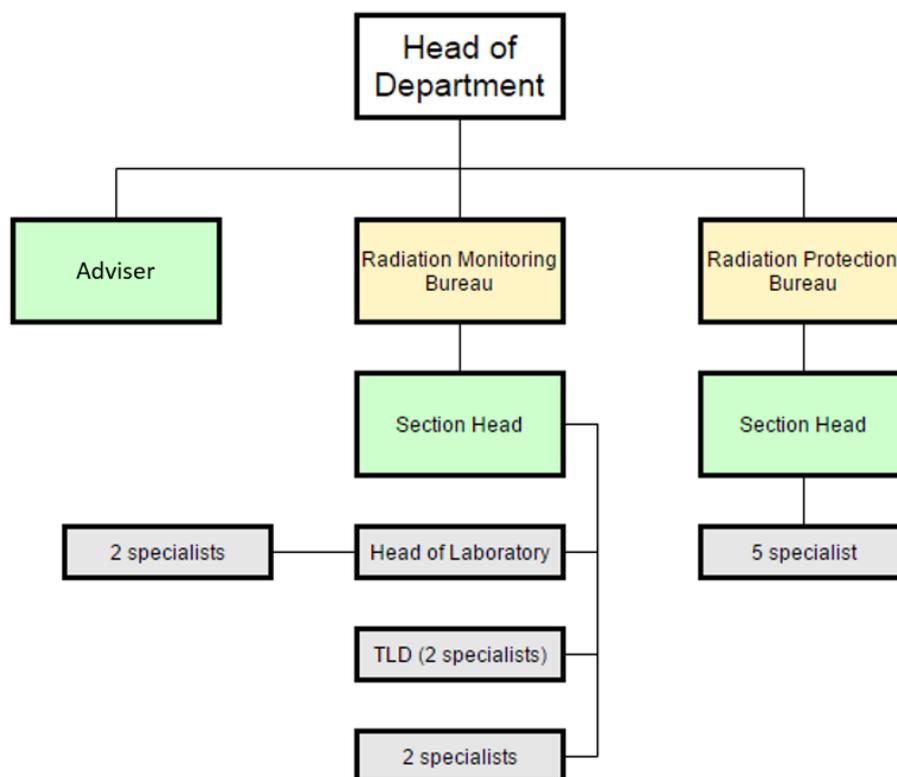


Figure 2. Structure of the Radiation Safety Department of the Environmental Board.

A variety of measures is applied to develop and maintain competence of employees. The performance of employees and their various competences are evaluated during annual performance review. As a result of the performance review interviews, training needs are identified which the human resource manager consolidates in the training plan of the Environmental Board. Performance reviews are conducted and competences are evaluated by direct supervisors. The results of performance reviews (incl. competence evaluation) are integrated in the information system for work plans. The management approves the annual training plan and allocates funds for this from the budget.

During a performance review the following aspects are covered:

- 1) evaluation of competences (incl. a discussion between the employee and the employer to clarify development needs);
- 2) evaluation of task fulfilment;
- 3) setting of goals for the next period (tasks and training courses in the next period).

Based on the performance reviews, an individual work and training plan is compiled for each employee every year.

The Ministry of the Environment gives to the organizations within its scope of administration, including the Environmental Board, the absolute budgetary amount. It is in the competence of the Environmental Board to allocate the budget within the organization. The budget is prepared through the activities planned in work plans (both the anticipated working time of employees and costs of work equipment are taken into account). Over the past three years the budget of the Radiation Safety Department has remained unchanged. The budget is sufficient to fulfill the obligations of the regulatory body.

The Environmental Board applies a process management model in its management system: processes cover all the important activities of the organization; their continuous development is one of the principles of process management. The management system of the Environmental Board is adequately documented, although it is not described in a single document. All the critical activities of the Environmental Board have been described in 72 process maps. Additionally, the Environmental Board has adopted an environmental management system EMAS (the Eco-Management and Audit Scheme) that was introduced in 2011.

Opinions of and feedback from customers and various stakeholders are an important part of the management system of the Environmental Board. Regular meetings with major partners, e.g. Estonian Council of Environmental NGOs, advisory council of customers, other public authorities, local municipality governments, and sectoral unions (Estonian Waste Management Association, Estonian Water Works Association) associations are organized to consolidate discussions and opinions. A customer feedback system in the form of an e-mail survey has been introduced. Results are analyzed and reports are available to the entire organization in the Intranet.

The Environmental Board has set up an advisory council of customers comprised of representatives of entrepreneurs from different sectors who deal with the services of the Environmental Board on a day-to-day basis. This is an advisory body that discusses problems associated with the services of the Environmental Board and shapes joint standpoints regarding the development of services. Information about the advisory council and its minutes are available on the public web page².

The Environmental Inspectorate

Pursuant to the Environmental Supervision Act, environmental supervision in Estonia at the state level is executed by the Environmental Inspectorate. Environmental Inspectorate coordinates and executes supervision of all areas of environmental protection and the use of natural resources, as well as conducts proceedings in environmental violations.

Areas of supervision include: fisheries, forest protection, hunting requirements, protection of shores, classic nature protection, CITES (Washington Convention or Convention on International Trade in Endangered Species of Wild Fauna and Flora), extraction of mineral resources, waste management, protection of ambient air and ozone layer, protection of water, hazardous substances and chemical safety, radiation issues, integrated pollution control, maintenance and excavation works.

The main legal acts regulating environmental supervision are the Environmental Supervision Act, Law Enforcement Act, Code of Misdemeanor Procedure, Radiation Act and Statutes of the Environmental Inspectorate.

The structure of the Environmental Inspectorate is presented in Figure 3. As of January 1st 2016, the Inspectorate has a total of 215 employees, 140 of them inspectors. At the local office level, there are 15 inspectors involved in radiation supervision (planned inspections, resolving complaints, misdemeanors). They also oversee adherence to the requirements of legislation for environmental protection in other fields.

² <http://goo.gl/Qw2g7t> (accessed on 15 August 2016)

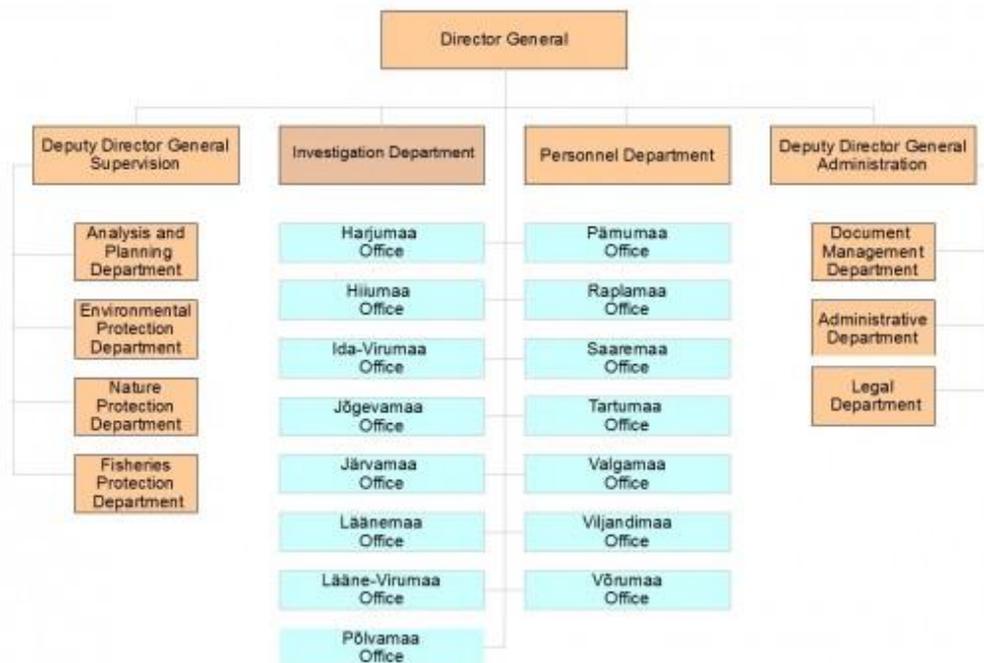


Figure 3. Organizational structure of the Environmental Inspectorate.

The Environmental Inspectorate does not have inspectors who are involved solely in the radiation supervision (no radiation specialists). The environmental protection department has a chief inspector who deals with the coordination of the supervision activities, trainings, risk evaluation and quality management.

The competence of inspectors is developed through training. Internal trainings take place on a regular basis (1-2 times a year) and are organized in cooperation with the Department of Radiation of the Environmental Board.

There have not been any changes in numbers of inspectors of radiation supervision in the last three years. As the Environmental Inspectorate executes supervision in all areas of environmental protection, there are no separate financial resources planned for radiation protection. The Environmental Inspectorate does not have special resources to carry out radiation surveillance. If necessary, external technical support is gained from the Radiation Safety Department of the Environmental Board.

Supervision results are publicly available. They are published in press releases, briefings and in the yearbooks of the Environmental Inspectorate. Information about the work schedule and supervision results can also be obtained upon request by contacting the Environmental Inspectorate.

Article 9. Responsibility of the license holder

Each Contracting Party shall ensure that prime responsibility for the safety of a nuclear installation rests with the holder of the relevant license and shall take the appropriate steps to ensure that each such license holder meets its responsibility.

Estonia has no nuclear installations according to the definition of the Convention. As stated in the Introduction of this report, the requirements of the European Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations have been brought into the Estonian legislation in a general level. The following text describes the responsibilities of holder of radiation practice license in general. The few special requirements for nuclear installations, which exist in the Radiation Act, are also given.

Chapter 3 of the Radiation Act sets forth the obligations of the holder of a radiation practice license. According to the Section 30 of the Radiation Act, the holder of a radiation practice license is obligated to:

- 1) be responsible for radiation safety and ensure the physical protection of radiation sources in its possession, thereat check at least once per annum, whether the radiation source or device containing it is in the place of use or storage and is externally in good condition;
- 2) prepare the rules necessary for carrying out radiation works and instructing exposed workers;
- 3) organize the processing and conditioning of radioactive waste, if it is necessary for changing the characteristics of radioactive waste before discharge into the environment and temporary or final storage;
- 4) keep account of all radiation sources under their responsibility, their location and delivery, do a radiation sources inventory once a year and submit the results of the inventory to the Environmental Board by March 1 of the year following the accounting year. If it has not been noted otherwise in the conditions of the radiation practice license, the records must contain data about the radiation source, which are required when applying for a radiation practice license pursuant to this Act;
- 5) ensure the exposed workers with the training and radiation safety-related instructing taking into account the nature of their work and workplace conditions;
- 6) organize the medical examination of exposed workers;
- 7) ascertain before delivery of the radiation source, whether the recipient has the relevant radiation practice license;
- 8) immediately notify the Environmental Board and the Alarm Centre of the loss, theft or unauthorized use of the radiation source and an incident or accident that has taken place in the course of radiation practice, as a result of which an employee or inhabitant has unintentionally been exposed to radiation, also check the integrity of the radiation source after each incident, which may have damaged the radiation source, and if necessary notify the Environmental Board of such events and the measures taken;
- 9) remedy the consequences of an accidental exposure situation;
- 10) ensure the regular checking and calibrating of the measuring instruments used and be responsible for their fitness for use and professional use;
- 11) ensure the observation of the doses of radiation workers and the submission of this data into the dose register;
- 12) ensure that in the case of a high risk radiation practice a radiation expert qualified in radiation safety matters would have reviewed the installation project in advance and recognized taking the new radiation source into use;

- 13) make the radiation source safe after terminating use according to the safe inclusion plan submitted in the license application;
- 14) evidence the lawfulness of owning the radioactive substance or radiation device containing a radioactive substance on the request of competent authorities;
- 15) prepare an accidental exposure situation resolution plan in case of a high-risk radiation practice and test it in accordance with the requirements and with the frequency established with legislation;
- 16) improve the technologies, devices and work practices used;
- 17) develop and implement a radiation safety quality system.

The Section 30¹ of the Radiation Act lays down the obligations of the holder of a radiation practice license in case of a high-activity radiation source. In addition to the provisions of the Section 30 of the Radiation Act, in case of radiation practice related to high-activity radiation source the holder of a radiation practice license must:

- 1) ensure that the necessary information comes with the radiation source, which evidences that the radiation source is identified with a unique number. The information involves photographs of the radiation source, radiation source container, transport package and if necessary the equipment and devices;
- 2) ensure that the appropriate tests have been done with the frequency designated by the issuer of the license for checking and maintaining the integrity of the radiation;
- 3) return each radiation source returned from use immediately after terminating its use to the manufacturer, delivering to another person holding a radiation practice license or radioactive waste manager;
- 4) when procuring a radiation source prefer a manufacturer that agrees to add a term into the sale contract for returning the radiation source to the manufacturer at least 15 years after the import of the radiation source, if the activity of the radiation source ten years after its import into the country is greater than 10 MBq.

The Section 30² of the Radiation Act determines the obligations of the holder of a radiation practice license when operating a nuclear installation. In addition to the provisions of the Section 30 of the Radiation Act in case of radiation practice related to a nuclear plant the holder of a radiation practice license must:

- 1) ensure the implementation of nuclear safety measures and compliance with the relevant requirements;
- 2) ensure that the workers and subcontractors of the nuclear installation comply with the nuclear safety culture and radiation safety quality system implemented in the nuclear installation on the basis of their duties;
- 3) assess the nuclear safety in the nuclear installation at least as often as it is provided in the radiation practice license conditions.”

To enhance radiation safety, the Radiation Act authorizes a possibility to establish additional requirements to a radiation practice license. The 2011 amendment of the Radiation Act gives to the regulatory body the right to demand financial guarantee from the applicant to ensure that the funds necessary for safe disposal of the radioactive source or waste are immediately available. Pursuant to the Section 18¹ of the Radiation Act:

- 1) The issuer of a radiation practice license may require a financial security (hereinafter the security) for the safe inclusion of a radioactive substance, device containing it and radioactive waste.
- 2) The issuer of a radiation practice license shall decide over the need for the security within 20 days from registration of the radiation practice license or its amendment

application. The important of ensuring the safe inclusion of a radioactive substance, device containing it and radioactive waste from the position of radiation safety is taken into account when making the decision.

- 3) The security must be intended only for the safe inclusion of a radioactive substance, device containing it and radioactive waste and immediately usable if necessary.
- 4) The size of the security is the presumed cost of the safe inclusion of a radioactive substance, device containing it, radioactive waste pursuant to the data submitted in the application of the applicant for the radiation practice license, and the issuer of the radiation practice license determines it.
- 5) Existence of the security is evidenced with the guarantee of an Estonian or international credit or financing institution accepted by the issuer of the radiation practice license. The issuer of the radiation practice license has the right not to accept the guarantor, if there are grounds to doubt the trustworthiness of the security given by it based on the guarantor's current activity, economic situation or reputation.
- 6) The security must apply until the end of the safe inclusion of a radioactive substance, device containing it and radioactive waste.
- 7) If the issuer of the radiation practice license ascertains in the course of processing a repeated radiation practice license application or radiation practice license amendment application, that the size of the existing security of the applicant no longer covers the costs of the safe inclusion of a radioactive substance, device containing it and radioactive waste, then it has the right to require increasing the security.

It is the responsibility of the Environmental Board to verify that the licensee fulfils the regulations. The holders of the radiation practice license are subject to inspections by the Environmental Inspectorate and their practices may be suspended for a period until the requested corrective measures are implemented.

The verification of safety is carried out in the form of safety reviews and safety assessments as well as in the implementation of inspection programs carried out by the Environmental Inspectorate (in cooperation with the Environmental Board). Ultimately, any violation of the requirements of the Radiation Act and/or its provisions determined by a radiation practice license is punishable by fines. As a precondition for granting a radiation practice license, the Radiation Act requires that the applicant shall present a valid proof on the safe management of any radioactive waste, which may be generated. The Radiation Act provides that the responsible party shall manage the practice so that it meets all radiation safety requirements prescribed in the Act and it shall take all measures needed to render radioactive waste arising from its operation harmless. The Radiation Act also provides for the responsibility of decontamination of the environment, if the radioactive material is released in such an extent that the resulting health or environmental hazard requires action. According to the Act, in utilization of natural resources containing radioactive materials, the responsible party shall ensure that radioactive waste do not pose any health or environmental hazard during the operations, including the final stages.

The Section 22 of the Radiation Act states the conditions of refusal. The Environmental Board shall refuse to issue a radiation practice license, if:

- 1) a risk to national or international security arises or may arise with the activity for which a radiation practice license is applied;
- 2) the activity for which a radiation practice license is applied does not comply with the requirements established with legislation;
- 3) false data has been submitted in the radiation practice license application;
- 4) the applicant for a radiation practice license does not have exposed workers with the

- required professional preparation;
- 5) the location of radiation practice or other conditions do not enable compliance with the radiation safety requirements;
 - 6) the applicant for a radiation practice license does not evidence the existence of the security established in Subsection 18¹ (1) of the Radiation Act in the amount and on the conditions determined by the issuer of the radiation practice license

The legislative, regulatory and administrative measures in the Estonian regulatory system are adequate for the situation in Estonia and in compliance with the obligations of the Convention as discussed in this report.

Article 10. Priority to safety

Each Contracting Party shall take the appropriate steps to ensure that all organizations engaged in activities directly related to nuclear installations shall establish policies that give due priority to nuclear safety.

According to the Radiation Act, in the licensing procedure the applicant shall present to the Environmental Board the radiation safety assessment and the description of measures guaranteeing radiation safety.

Article 11. Financial and human resources

1. Each Contracting Party shall take the appropriate steps to ensure that adequate financial resources are available to support the safety of each nuclear installation throughout its life.

2. Each Contracting Party shall take the appropriate steps to ensure that sufficient numbers of qualified staff with appropriate education, training and retraining are available for all safety-related activities in or for each nuclear installation, throughout its life.

The Section 3 of the Radiation Act prescribes that the responsible party is required to ensure that the adequate expertise in safety related matters is available, taking into account the nature and the risks arising in the practice. The responsible party may appoint a special radiation safety officer to deal with these issues. If more than ten exposed workers are employed, specifying a radiation safety specialist is mandatory. In the application of the radiation practice license, the applicant shall provide the information on the competence of persons working with radiation.

Requirements on qualifications of and educational programs for staff-members involved with safety issues are included in the radiation practice license.

All exposed workers instructed before starting work. Reinstruction has to be done at least once a year; it is an obligation of the holder of the radiation practice license to organize it. Additionally exposed workers involved in the radiation activities with moderate or high risk, have to be trained before starting work. Retraining has to take place every five years.

Requirements for the radiation safety training of exposed workers are set down by Ministry of Environment Regulation No. 86 of 8 July 2004 "Requirements for the Radiation Safety Training of Exposed Workers".

Article 12. Human factors

Each Contracting party shall take the appropriate steps to ensure that the capabilities and limitations of human performance are taken into account throughout the life of a nuclear installation.

Not applicable, as there are no nuclear installations in Estonia. The Paldiski site is covered by the Joint Convention.

Article 13. Quality assurance

Each Contracting Party shall take the appropriate steps to ensure that quality assurance programs are established and implemented with a view to providing confidence that specified requirements for all activities important to nuclear safety are satisfied throughout the life of a nuclear installation.

Principal obligations of holders of radiation practice license include being responsible for radiation safety and guarantee the physical protection of the radiation sources in the holder's possession, also developing and implementing a radiation safety quality system. Article 18 of the Radiation Act prescribes that an application for a practice license shall include the description of the radiation safety quality system, the performance of which is assessed by the Environmental Board in the licensing process. The Subsections 32(2) and 32 (3) of the Radiation Act provide that the quality system of radiation safety shall include the following:

The radiation safety quality system must contain:

- 1) planned and systematic activity, the purpose of which is ensuring radiation safety;
- 2) an analysis of the duties of workers and the requirements for the skills needed to operate the radiation source
- 3) a system for controlling compliance with the radiation safety requirements;
- 4) descriptions of procedures for procuring and using materials; procedures for supervision of radiation safety and controlling the functioning of safety systems.

The radiation safety quality system of the nuclear installation contains in addition to the abovementioned:

- 1) description of operations ensuring nuclear safety;
- 2) description of the control system for compliance with operations ensuring nuclear safety;
- 3) analysis of the duties of employees;
- 4) requirements imposed for employees;
- 5) plans for training and instructing workers;
- 6) description of the procedure for procuring devices and materials, use and removal from use.

During inspections of the licensed practices, the Environmental Inspectorate checks the practical application of the quality systems.

In order to assure the quality of radioactivity analyses performed by the Environmental Board, the most important analysis procedures (gamma spectrometry, personal dosimetry) have been accredited according to ISO standard 17025 "General requirements for the competence of testing and calibration laboratories". Quality assurance is described in detail the Quality Manual for the Laboratory of Radiation Safety Department of the Environmental Board.

Article 14. Assessment and verification of safety

Each Contracting Party shall take the appropriate steps to ensure that:

- i. comprehensive and systematic safety assessments are carried out before the construction and commissioning of a nuclear installation and throughout its life. Such assessments shall be well documented, subsequently updated in the light of operating experience and significant new safety information, and reviewed under the authority of the regulatory body;*
- ii. verification by analysis, surveillance, testing and inspection is carried out to ensure that the physical state and the operation of a nuclear installation continue to be in accordance with its design, applicable national safety requirements, and operational limits and conditions.*

Safety of all radiation practices is continuously supervised by the Environmental Inspectorate in cooperation with the Environmental Board according to the annual inspection plan. Results of these inspections and of the performed safety assessments are documented and reviewed by the regulatory bodies. The Radiation Act stipulates that the radiation practice license is valid for maximum 5 years.

Article 15. Radiation protection

Each contracting Party shall take the appropriate steps to ensure that in all operational states the radiation exposure to the workers and the public caused by a nuclear installation shall be kept as low as reasonably achievable and that no individual shall be exposed to radiation doses which exceed prescribed national dose limits.

Fundamental principles of radiation safety that shall be adhered to by all licensees including possible operators of nuclear installations in the future are provided in the Section 3 of the Radiation Act:

- 1) All new radiation practices must be justified in advance by their economic, social or other benefits in relation to the health detriment they may cause. Such justification shall be reviewed whenever new or important evidence about the efficacy or consequences of existing classes or types of radiation practices is acquired.
- 2) It shall be ensured that, in the context of optimization, all exposures shall be kept as low as reasonably achievable, economic and social factors being taken into account.
- 3) The sum of doses from all relevant practices shall not exceed the dose limits laid down based on this Act for exposed workers and members of the public. This principle does not apply to medical exposure.

Regulation of the Government No 193 of 17 May 2004 “Effective Dose and Equivalent Dose Limits for the Lens of the Eye, Skin and Extremities for Exposed Workers and Members of the Public” sets the following dose limits:

- 1) effective dose for exposed worker 100 mSv in 5 years, but no more than 50 mSv in 1 year;
- 2) effective dose for 16-18 years old intern working with radioactive sources 6 mSv in 1 year;
- 3) effective dose for a member of the public 1 mSv in 1 year;
- 4) equivalent doses for exposed worker: 150 mSv for the lens of the eye, 500 mSv/cm² for skin and 500 mSv for extremities in 1 year;
- 5) equivalent doses for 16-18 years old intern: 50 mSv for the lens of the eye, 150 mSv/cm² for skin and 150 mSv for extremities in 1 year;

- 6) equivalent doses for a member of the public: 15 mSv for the lens of the eye and 50 mSv/cm² for skin.

The Section 58 of the Radiation Act lays down the basic principles of managing radioactive waste and emissions. The holder of a radiation practice license ensures the safe management of radioactive waste and emissions generated in the course of radiation practice and ensures that:

- 1) radioactive waste is managed in a manner, the forecast adverse impact of which to future generations would not be greater than permitted with this Act or legislation issued pursuant to it;
- 2) the activity and amounts of the generated radioactive waste and emissions are as small as possible;
- 3) biological, chemical and other risks and the mutual impact of the various stages of the generation of radioactive waste and its management are taken into account;

Based on the Subsection 17 (7) of the Radiation Act, the Regulation No 10 of the Minister of the Environment “Clearance Levels for Radioactive Substances and Materials Contaminated with Radioactive Substances Resulting from Radiation Practices, and the Requirements for Their Clearance, Recycling and Reuse” sets the clearance levels for radioactive substances resulting from radiation practices and conditions under which the said substances or contaminated materials can be released or discharged to the environment. The Regulation No 10 of the Minister of the Environment establishes the principles on which the clearance levels are derived (the dose constraint principle):

- 1) Effective dose to a member of the public resulting from the cleared material or discharged substance shall be less than 0.01 mSv per year.
- 2) Collective effective dose resulting from cleared material or discharged substance shall be less than 1 manSv per year.
- 3) In case of cleared NORM material or release of an area contaminated with NORM material, the effective dose to a member of the public shall be less than 0.3 mSv per year.

Annex 5 of the Regulation No 10 of the Minister of the Environment sets annual activity limits of radionuclides for discharges, both in gaseous or liquid form, from an authorized radiation practice facility.

The procedure for clearance, according to the Regulation No 10 of the Minister of the Environment is as follows:

- 1) For clearance of materials contaminated with radioactive substances or for discharges of radioactive substances to the environment the licensee must submit an application to the regulatory body, the Environmental Board (exception for medical institutions, for excreta of patients, exists – no limit is set for discharge of excreta to the sewer system).
- 2) The Environmental Board, based on the assessment of licensed qualified radiation expert, confirms that the release of radioactive substances or contaminated materials or discharge thereof is an optimal course of action.

The Subsection 18 (1) of the Radiation Act requires that the applicant of the radiation practice license shall submit the data about the radioactive waste or emissions generated in the course of radiation practice (if applicable) upon application. This includes data on emissions to the environment and pathways of dispersion to the environment (the requirements are specified in the Regulation No 41 of the Minister of the Environment, the Subsection 13 (8)).

The Subsection 19 (1) of the Radiation Act states that the limits of discharges of radioactive substances to the environment and the methods of discharge shall be described in the radiation practice license (if applicable).

The Subsection of 18 (1) the Radiation Act requires that the applicant of the radiation practice license submits a radiation monitoring program and information of the equipment used for monitoring with its application. Further details are specified by the Section 16 of the Regulation No 41 of the Minister of the Environment: the necessary details about the monitoring program, monitoring methods and the characteristics of the used radiation monitoring equipment; which areas shall be monitored, the frequency of monitoring, what data shall be submitted and how the monitoring data shall be stored.

The Subsection 19 (1) of the Radiation Act states that the requirements on radiation monitoring shall be described in the radiation practice license. The frequency of submitting monitoring data to the Environmental Board is also established in the license.

Safety of all radiation practices is continuously supervised by the Environmental Inspectorate in cooperation with the Environmental Board according to the annual inspection plan. Results of these inspections and of the performed safety assessments are documented and reviewed by the regulatory bodies.

Article 16. Emergency preparedness

1. Each Contracting Party shall take the appropriate steps to ensure that there are on-site and off-site emergency plans that are routinely tested for nuclear installations and cover the activities to be carried out in the event of an emergency. For any new nuclear installation, such plans shall be prepared and tested before it commences operation above a low power level agreed by the regulatory body.

2. Each Contracting Party shall take the appropriate steps to ensure that, insofar as they are likely to be affected by a radiological emergency, its own population and the competent authorities of the States in the vicinity of the nuclear installation are provided with appropriate information for emergency planning and response.

3. Contracting Parties which do not have a nuclear installation on their territory, insofar as they are likely to be affected in the event of a radiological emergency at a nuclear installation in the vicinity, shall take the appropriate steps for the preparation and testing of emergency plans for their territory that cover the activities to be carried out in the event of such an emergency.

The national legal framework for emergency preparedness, including nuclear and radiological emergency, is based on the Emergency Act (passed on 15 June 2009, last amended on 25 November 2015). A number of regulations specifying important requirements of the Act have been passed by the Government and by the Minister of the Interior.

An overview of the Emergency Act is presented below.

The Act provides the legal basis for crisis management, including preparing for emergencies and responding to emergencies as well as ensuring the continuous operation of vital services. This Act also regulates the declaration of, the response to and the termination of emergency situations and the use of the Defense Forces and the National Defense League in responding to emergencies, performing rescue operations and ensuring security.

Chapter 1 of the Act provides that the Government forms a permanent crisis management committee and nominates the Minister of the Interior as its chairman.

Crisis management committees are also formed in the regions and in the local governments (Sections 4 and 5).

Organisation of preparation for emergencies (Chapter 2) shall include risk assessments of possible emergencies, preparation of emergency response plans and crisis management exercises conducted at least once in four years. The detailed procedures and requirements are prescribed.

Chapter 3 specifies the response to the emergencies: informing the public and media, basis and conditions and procedure of declaring an emergency situation. Procedures for changing the conditions and the termination of emergency situation as well as direction and financing of the emergency situation response and emergency situation work are provided. For the purposes of this Act, extensive chemical, biological or radioactive contamination of the environment, extensive fire or explosion, etc., is defined as a catastrophe – a large-scale accident.

Subdivision 3 provides measures implemented during emergency situations, including obligation to work, expropriation of movables, duty of grant use of things, procedure for expropriation or taking things into duty of grant use, entry into property, prohibition of stay and other restrictions of freedom of movement, restrictions on holding public meetings and public events, isolation and treatment of people with infectious diseases during emergency situations, infectious animal disease control and responsibilities of the Police in ensuring these measures.

Division 3 of the Act details the use of the Defense Forces or the Defense League in responding to emergencies, in rescue work and ensuring security.

Chapter 4 provides the obligations of ministries, local governments, agencies and persons in securing vital services, in continuous operation thereof and organizing of their continuous operation.

The Ministry of the Interior shall (Section 36):

- 1) coordinate the fulfilment of the responsibilities established in this Act by the agencies organising the continuous operation of vital services;
- 2) develop the policy of ensuring the continuous operation of vital services;
- 3) provide advice to agencies in organising the continuous operation of vital services;
- 4) present an overview of the status of the organisation of the continuous operation of vital services to the Government of the Republic and the crisis management committee of the Government of the Republic once in every two years.

The Minister of the Interior shall also establish the guidelines for preparing the risk assessment of continuous operation of vital services (Section 38) and the continuous operation plan of vital services (Section 39). The authority or person that has prepared a risk assessment of continuous operation shall assess at least once in every two years the up-to-date value of the risk assessment and make amendments as necessary.

Detailed procedure for the information transfer in the case of emergency is specified by the regulation of the Minister of the Interior (Regulation No. 57 of 6 May 2010).

The Section 34 of the Emergency Act stipulates that the Ministry of the Environment shall, among other tasks, organize the continuous operation of the system of early warning of the radiation risk.

Chapter 5 provides conditions of compensating damages incurred during emergency situations to persons.

Provisions of supervisory control over compliance with this Act and legal acts issued on the basis thereof are specified in Chapter 6 and the liabilities in the case of violations of the requirements and obligations are presented in Chapter 7 of the Act.

In summary, the Estonian emergency preparedness system is coordinated by and under the responsibility of the Minister of the Interior.

The Radiation Act provides more specific provisions of intervention needed in the case of a radiological emergency or an existing exposure situation.

Fundamental safety principles are provided in the Section 52 of the Radiation Act: the implementation of intervention shall be justified so that the reduction in detriment caused by radiation outweighs the harm and costs of the intervention and also shall be optimized in form, scale and duration.

Intervention levels and action levels, and limits for emergency exposure, which constitute the basis for preparation of the national crisis management plan for responding to a radiological emergency and implementation of measures for protecting the public are provided by the Regulation No. 93 of 14 July 2004 of the Minister of the Environment. Responsibility of licensees specified by the Radiation Act also includes preventing or reducing the release of radioactive material and exposure of workers and the public. According to the Radiation Act (Section 57) Environmental Board shall ensure the operation of the radiation risk early warning system. In emergency situation, Environmental Board acts as an adviser of the government and the response organizations on the matters concerning radiological and nuclear safety.

Primarily the Rescue Board does the operative organisation of response to a radiological emergency.

Based on the Emergency Act, the Emergency Response Plan was approved in 2011. The radiological emergency response plan stipulates the organisation of the emergency response in a radiological emergency and consist of chapters as follows:

- 1) organisation of response to radiological emergency;
- 2) management structure of response to emergency;
- 3) duties of institutions and persons participating in response to radiological emergency;
- 4) organisation of exchange of information;
- 5) organisation of notification of public;
- 6) organisation of international cooperation upon responding to radiological emergency;
- 7) organisation of compensation of expenses;
- 8) organisation of evacuation.

The authority that lead the preparation of an emergency response plan shall assess at least once a year the up-to-date value of the emergency response plan and make a proposal to the Government of the Republic to amend the plan, if needed. Despite there are no nuclear installations in Estonia, due consideration is given to the main provisions of Vienna Declaration in assessment process of the emergency response plan.

Early warning in case of a radiological emergency in Estonia or at a nuclear facility in the vicinity of Estonia is based on the international agreements on exchange of information and on the bilateral agreements, which Estonia has entered together with a number of neighboring states, e.g. Finland, Latvia, and Sweden. Estonia is a Contracting Party to the International Convention on Early Notification of a Nuclear Accident and to the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency. Furthermore, as a member state of the European Union, the Commission Directives concerning the emergency situations apply

in Estonia. Radiation monitoring data from neighboring countries is also received automatically in Estonia based on an agreement of the Council of Baltic Sea States.

As a supplement to the early warning agreements, Estonian on-line system for automatic monitoring of radioactivity is in service 24 hours a day. The system consists of gamma monitoring stations placed strategically in the country (Figure 4). The early warning system was renewed in 2013-2014 in the framework of the project “Upgrading of Radiation Monitoring in Estonia” carried out under the co-operation program “Enhancing Public Environmental Monitoring Capacities” between the Republic of Estonia and Swiss Confederation. The number of monitoring stations was increased from 10 to 15 during the upgrade. All the monitoring stations have a Geiger-Müller type detector for gamma dose rate monitoring and a NaI gamma detector for spectrometric measurements.



Figure 4. On-line automatic gamma dose-rate monitoring stations for early warning in Estonia.

The Environmental Board collects automatically the data from the stations. Any increase in the gamma radiation dose-rate level attributed to causes other than a natural increase of the radon content in air, initiates an alarm by the computer server and a notification of the officer of the Environmental Board on a 24/7 duty. The data from all the monitoring stations (dose rates averaged over 10-minute and one hour periods) are stored in the server installed in the Information Technology Centre of the Ministry of the Environment.

The Decision Support System ARGOS has been in use in Estonia since 2005. The Danish Emergency Management Agency (DEMA) in association with the Prolog Development Centre Inc. originally developed ARGOS. An international consortium now manages the ongoing development and maintenance of the ARGOS system where the Environmental Board is a member. The system is regularly updated, so that any lesson learned from exercises or from uses in emergency can be incorporated into operational systems. ARGOS calculates and presents doses in the affected areas and includes a prognostic model based on actual meteorological data. The data with analyses and simulations are used for decision-making and management support in nuclear emergency situations. The ARGOS system allows viewing prognostic, measured radiation, agricultural and meteorological data overlaid in a geographic information system. Results of ARGOS simulations of possible accidents in NPPs of neighboring countries, in addition to analysis of the practices of other countries, have been

taken into account in decision-making on strategic aspects of preparedness, for example on the need of State reserve of iodine tablets (our current decision is not to have the State reserve).

In addition to gamma monitoring stations, three high-volume air samplers with aerosol filters are continuously operating in Narva-Jõesuu, Tallinn-Harku and Tartu-Tõravere. In 2013-2016 all three stations were renewed. The weekly filters with deposited radioactivity from these stations are analyzed by the laboratory of the Environmental Board to determine the radionuclide content in the out-door air.

National Radiation Safety Development Plan 2008-2017 includes the requirement to conduct joint emergency exercises at least once per year that involves several agencies and, if possible, radiation practice license holders.

Estonian authorities regularly participate in the international exercises, such as those coordinated by the IAEA. On the regional scale, the Council of Baltic Sea States has its own agreements about the information exchange in the case of emergency and the regular testing of communication systems is performed.

Estonian Ministry of the Interior with the contribution of the Civil Protection Financial Instrument of the European Union organised a Full Scale chemical and radiological emergency management exercise in 2011 (EU CREMEX 2011; acronym from EU Chemical and Radiological Emergency Management Exercise 2011). It included a Field Exercise and a Command Post part. In order to fully test the whole crisis management system implemented in Estonia, the exercise was conducted in two different locations in Estonia with a very complicated CBRN scenario involving all relevant authorities who have their role in responding to chemical and radiological incidents in Estonia.

On March 14, 2013 Estonia took part in NB8 Joint Nordic-Baltic exercise hosted by Finland. The purpose was to test co-operation, communication and coordination of actions among NB8 countries. The exercise scenario was an accident in Loviisa Nuclear Power Plant in Finland.

On April 12-13, 2016 an international ARGOS user group meeting took place in Tallinn, Estonia. An exercise was held on using ARGOS during an imaginary nuclear accident in Leningrad NPP.

26 September – 5 October 2011, IAEA carried out an Emergency Preparedness Review EPREV mission in Estonia, to conduct, in accordance with article III of the IAEA Statute, a peer review of correspondence of Estonia's emergency preparedness and response arrangements to the relevant IAEA standards. The review focused on the ability of the relevant Estonian organizations to respond to a radiological incident or emergency, and was based on an assessment of existing response provisions and capabilities. In summary, the review team was in an opinion that Estonia has established an operational emergency preparedness and response capability based on an integrated all hazard approach including radiological emergencies.

Detailed measures to keep the public informed about a nuclear or a radiological emergency are provided in the Radiation Act, in the Emergency Act and in the Regulation of the Government No. 92 of 1 July 2010 "Procedure of Informing of the Public about the Immediate Danger for Arising of the Emergency Situation, about the Emergency Situation and about the Management of the Emergency Situation and the Requirements to the Forwarded Information". Arrangements are in place to inform the public about the emergency, its consequences and any countermeasures that are to be implemented to reduce doses to the population. The Regulation specifies the requirements to the forwarded information. The Environmental Board shall notify the public of an impending risk of the occurrence of a radiological emergency and a rescue institution shall notify the public of the ongoing response to a radiological emergency.

Early notification of a nuclear accident occurring abroad is received in Estonia via the ECURIE system of the European Council or the IAEA USIE notification system or both. The Environmental Board is the National Warning Point and the National Competent Authority in Estonia for any situation, which might result in an actual or potential deterioration of radiation safety of the population, environment or society. In order to immediately notify, advise and/or consult the local and governmental authorities on the needed emergency response actions, an expert of the Environmental Board is on duty for 24 hours a day. The communication systems and the arrangements for transfer of early notifications are tested regularly. The Environmental Board participates actively in the communication exercises organized by the IAEA IEC.

The emergency risk assessments are revised biannually or whenever there is new information available based on lessons learned from previous accidents worldwide.

European Council Directive 2013/59/Euratom has a number of implications on emergency preparedness and response. A working group of parties that have a role in emergency preparedness and response in Estonia was established and commenced its work in May 2016 by the initiative of the Ministry of the Environment in order to determine necessary changes in Estonian legislation. The requirements of the Directive shall be adopted into Estonian legislation by February 2018.

Article 17. Siting

Each Contracting Party shall take the appropriate steps to ensure that appropriate procedures are established and implemented:

- i. for evaluating all relevant site-related factors likely to affect the safety of a nuclear installation for its projected lifetime;*
- ii. for evaluating the likely safety impact of a proposed nuclear installation on individuals, society and the environment;*
- iii. for re-evaluating as necessary all relevant factors referred to in sub-paragraphs (i) and (ii) so as to ensure the continued safety acceptability of the nuclear installation; for consulting Contracting Parties in the vicinity of a proposed nuclear installation, insofar as they are likely to be affected by that installation and, upon request providing the necessary information to such Contracting Parties, in order to enable them to evaluate and make their own assessment of the likely safety impact on their own territory of the nuclear installation.*

The Environmental Impact Assessment and Environmental Management Act provides that the environmental impact shall be assessed upon application for or application for amendment of a development consent, if the proposed activity, which is the basis for application for or amendment of the development consent, potentially results in a significant environmental impact. The list of activities with significant environmental impact includes the following activities:

- 1) construction, dismantling or decommissioning of a nuclear power station or other nuclear reactors, except research installations for the production and conversion of fissionable and fertile materials, whose maximum power does not exceed 1 kilowatt continuous thermal load;
- 2) production or enrichment of nuclear fuel, processing or handling or final disposal of used nuclear fuel or disposal of used nuclear fuel for over ten years on a site other than the place of generation thereof;

- 3) handling high-activity radioactive waste, final disposal of merely radioactive waste or disposal thereof for over ten years on a site other than the place of generation.

Siting of a facility, including a nuclear facility, is provided as one of the important topics of the environmental impact assessment procedure. At present no specific regulation detailing such a report relevant to a nuclear facility is passed as Estonia has no nuclear facilities.

Article 18. Design and construction

Each Contracting Party shall take the appropriate steps to ensure that:

i. the design and construction of a nuclear installation provides for several reliable levels and methods of protection (defense in depth) against the release of radioactive materials, with a view to preventing the occurrence of accidents and to mitigating their radiological consequences should they occur;

ii. the technologies incorporated in the design and construction of a nuclear installation are proven by experience or qualified by testing or analysis;

iii. the design of a nuclear installation allows for reliable, stable and easily manageable operation, with specific consideration of human factors and the man-machine interface.

Not applicable. The construction of a nuclear facility is not yet decided.

Article 19. Operation

Each Contracting Party shall take the appropriate steps to ensure that:

- i. the initial authorization to operate a nuclear installation is based upon an appropriate safety analysis and a commissioning program demonstrating that the installation, as constructed, is consistent with design and safety requirements;*
- ii. operational limits and conditions derived from the safety analysis, tests and operational experience are defined and revised as necessary for identifying safe boundaries for operation;*
- iii. operation, maintenance, inspection and testing of a nuclear installation are conducted in accordance with approved procedures;*
- iv. procedures are established for responding to anticipated operational occurrences and to accidents;*
- v. necessary engineering and technical support in all safety-related fields is available throughout the lifetime of a nuclear installation;*
- vi. incidents significant to safety are reported in a timely manner by the holder of the relevant license to the regulatory body;*
- vii. programs to collect and analyse operating experience are established, the results obtained and the conclusions drawn are acted upon and that existing mechanisms are used to share important experience with international bodies and with other operating organizations and regulatory bodies;*
- viii. the generation of radioactive waste resulting from the operation of a nuclear installation is kept to the minimum practicable for the process concerned both in activity and in volume, and any necessary treatment and storage of spent fuel and waste directly related to the operation and on the same site as that of the nuclear installation take into consideration conditioning and disposal.*

Not applicable, as there are no nuclear facilities in Estonia.

Chapter 3 Summary

In the above, the implementation of the obligations of the Convention, Articles 4 and 6 to 19, is evaluated. Based on the evaluation it can be concluded that the relevant Estonian regulations and practices continue to be in compliance with the obligations of the Convention.

The main developments since the 3rd National Report in 2013 are the adoption of the new Radiation Act (entering into force in November 1st, 2016) and upgrade of the legal framework and technical capabilities for emergency preparedness and response. The most significant changes introduced by the new Radiation Act are the following:

- 1) An opportunity is created to issue radiation practice licenses for an unspecified term for low risk radiation practices (e.g., the use of dental X-ray devices). Until now all the radiation practice licenses had a validity of up to 5 years. About 550 radiation practice licenses have been issued in Estonia, 70% of them being low risk radiation practices. The change will significantly reduce the administrative burden and leave more resources for dealing with the applications of medium and high risk radiation practices.
- 2) The requirements concerning the field of Naturally Occurring Radioactive Material (NORM) are clarified. Besides the existing term “NORM waste” a new term “NORM residues” is introduced to comply with the internationally used terminology. Requirement on the timespan when NORM waste has to be delivered to a radioactive waste management site is specified.
- 3) The role of different authorities in accidental and existing exposure situations are specified. The Environmental Board shall be responsible for the assessment of the distribution of the radioactive substance and related doses; conducting of measurements and monitoring; as well as documentation.

Planned measures in 2013 and their status by 2016

Issues which were identified in the previous National Report, the 3rd National Report in 2013, are listed below. Corresponding updates and developments during 2013-2016 are given.

- 1) Implementation of a university level master study curriculum on Nuclear Energetics was intended – The plan was cancelled for several reasons. First, the parliament has postponed decisions on implementing nuclear power in Estonia. Secondly, the system of financing higher education has been reformed significantly since 2013. It is highly unlikely for a university in Estonia to find a sufficient number of students and to be able to maintain a sustainable curriculum on nuclear energetics in the current situation.
- 2) Continue to improve emergency preparedness and response to a nuclear and radiological emergency – One of the biggest achievements since the last report to the Convention has been the upgrading of the Estonian on-line system for early warning and automatic radioactivity monitoring. Additionally, all the three high-volume air-sampling stations were renewed in 2013-2016. Thanks to these investments, the reliability of monitoring devices (and therefore the monitoring data) have advanced significantly resulting in better means for ensuring security.
- 3) Suppression of hazards associated with radioactive waste management – In August 2015, the Minister of the Environment approved the National Action Plan for Radioactive Waste Management. The plan describes the institutions, technical and financial resources, and research and development activities for safe radioactive waste management. The action plan provides sub-objectives, measures, and expected results of the field until 2050. In addition, according to current legislation NORM waste

producers did not have the obligation to deliver the NORM waste into the radioactive waste management site not later than within five years from their generation. The new Radiation Act, which enters into force on November 1st, 2016 will lose this exemption enabling better control over NORM waste generated in Estonian industry.

- 4) Optimizing protection in medical practice – The regulation no 29 of 15.05.2014 of the Minister of Social Affairs “Radiation safety requirements for medical radiology procedures and requirements for the protection of persons undergoing medical radiation” entered into force on 1 July 2014. The regulation establish requirements for referrals to medical radiology procedures, for medical radiology procedures, for the use of medical radiation devices, for data collection for the optimization of the patient dose, and for quality manual and clinical audit. The new Radiation Act will provide more clarification for radiation safety of a patient.
- 5) Improving awareness of sources of elevated natural radiation – The Ministry of the Environment and the Environmental Board have sections devoted to radon and naturally occurring radioactivity on their public webpage to improve the awareness of the general public. In order to improve the capability of radon determination in Estonia, the Ministry of the Environment organized a two-day training course on measurement of the activity concentration of radon in May 2016. The course was targeted at Estonian enterprises working in the field of radon measurements.

Challenges in 2013 and their status by 2016

Training of the staff remains a challenge – This can still be pointed out as a challenge for Estonia.

Suggestions in 2013 and their status by 2016

To use international peer review to strengthen competences and transparency of the Regulatory Body – This suggestion has been fully implemented. On September 4-14, 2016 an IAEA IRRS (Integrated Regulatory Review Service) mission will be hosted in Estonia.

Planned activities to improve safety

As Estonia has no nuclear installations according to the Convention of Nuclear Safety, the main issue is to improve of emergency preparedness. As for the last National Report in 2013, the National Radiation Safety Development Plan 2008-2017, is the basis for future planning in the field of radiation protection and nuclear safety.

The general objective of the Development Plan is ensuring high level of radiation safety. Strategic objectives listed and detailed in the Development Plan, which overlap with the objectives of the Convention, are the following:

- 1) suppression of hazards associated with radioactive waste and its management;
- 2) ensuring preparedness for response to radiation emergencies;
- 3) improvement of the awareness of sources of elevated natural radiation;
- 4) creation of the optimised radiation safety ensuring system in the country.

The findings of the IAEA IRRS mission will provide information in areas needing improvement. The results of the mission will be revised and an action plan for implementation of findings will be prepared by the 2017 under the lead of the Ministry of the Environment. Follow-up mission is planned to take place in 2018.

By 6 February 2018, Estonia as an European Union Member State needs to transpose requirements of the Council directive 2013/59/Euratom that lays down basic safety norms for

protection against hazards from ionising radiation. The transposition of the requirements of the directive into national legislation is ongoing. The working groups are established for the following topics: basic principles of radiation safety and regulatory infrastructure; NORM-materials and building materials; medical, public and occupational exposure; radon; emergency preparedness and response. The working groups are composed of representatives from the Ministry of the Environment, the Environmental Board, the Environmental Inspectorate, the Ministry of Social Affairs, the Ministry of Economic Affairs and Communications, the Ministry of the Internal Affairs, the Health Board, the Rescue Board, the radioactive waste management company, Estonian Geological Survey and the University of Tartu. In addition, the transposition of requirements of Council Directive 2014/87/Euratom into national legislation is ongoing.

The new Radiation Act enters into force on 1 November 2016. In relation to this current regulations are reviewed and new secondary legislation will be established. The drafting of the secondary legislation is ongoing.

Chapter 4 Annexes

Annex A. Nuclear Facilities Under Decommissioning

The site of the former USSR nuclear submarine training centre is located in Paldiski, North Estonia. It is currently in the process of decommissioning. The nuclear facility in Paldiski was established in the early 1960' for training the USSR navy personnel for the operation of submarine nuclear reactor systems. Two full-sized PWR type reactors were installed in the submarine mock-ups in a large building. The reactors were close analogues of those operated on real nuclear submarines of the Echo and Delta classes. Operating nuclear propulsion systems with the complete power transmission to propeller shafts and the corresponding hydraulic brake systems have been used as the training stands. The first-generation 70 MWth reactor was commissioned in 1968. The reactor was in operation during about 20,000 h until January 1989. In 1983 the 90 MWth PWR reactor was commissioned. This reactor was in operation for about 5,300 h until December 1989. Table A1 presents main available data of the reactors.

Table 1. Characteristics of the submarine nuclear reactors in Paldiski.

Description	Unit 1	Unit 2
Reactor type	PWR/BM-A	PWR/BM-4
Thermal power	70 MW	90 MW
Fuel enrichment	20%	20%
First criticality	April 1968	February 1983
Last criticality	January 1989	December 1989
Refuelling and maintenance	1980 - 1981	never
Operating time	~ 20,000 h	~ 5,300 h
Encasement (submarine hull segment)		
- diameter	7.5 m	9.5 m
- length	~ 50 m	~ 50 m

In 1994 the reactors were defuelled and the spent nuclear fuel was shipped to Russia. Non-radioactive components of the training stands were dismantled, hull sections housing reactor vessels with their primary circuits, auxiliary equipment and some additional waste were partly grouted, seal-welded and enclosed into concrete sarcophagi. In 1995 the ownership and control of the site were officially transferred to Estonia. Since then the work on monitoring, dismantling, decommissioning, decontamination and dismantling of the Paldiski facilities is in progress. Site is under administration of the Estonian Radioactive Waste Management Agency A.L.A.R.A. Ltd. In 1997 A.L.A.R.A. Ltd established at the site a centralized interim storage for both D&D and institutional radioactive waste.

During the period 1995-2011, a number of activities have been undertaken on the site to guarantee the safe storage of the reactor compartments until 2040. By that time, Estonia should have radioactive waste disposal facilities available, which could accommodate waste arising from decommissioning of the reactor compartments.

Related to the decommissioning of reactor compartments feasibility studies has been carried out in 2014-2015³. Preferable option for decommissioning is full dismantling (without cutting of reactor vessel) with cutting into small pieces and fitting waste in standard concrete containers. Arising waste volume will be up to 600 m³ low and intermediate level waste.

³ <http://alara.ee/paldiski20142015.php> (accessed 15 August 2016)

Annex B. Estonian Legislation – Radiation and Nuclear Safety

Estonian legislation on radiation and nuclear safety is listed below, as in force on 15 August 2016. The legislative acts are available through an electronic database “Riigi Teataja” – The State Gazette: www.riigiteataja.ee (mostly Estonian, some also in English).

Acts:

Radiation Act, passed on 1 May 2004, as amended on 22 February 2005, 10 May 2006, 7 December 2006, 24 January 2007, 18 December 2008, 15 June 2009, 16 September 2009, 22 April 2010, 27 October 2011, 19 February 2014, 19 March 2014, 9 December 2015.

Emergency Act, passed on 15 June 2009, as amended on 26 November 2009, 22 April 2010, 5 May 2010, 21 October 2010, 27 January 2011, 8 December 2011, 13 June 2012, 17 October 2012, 13 February 2014, 19 February 2014, 7 May 2014, 19 June 2014, 19 November 2014, 3 December 2014, 11 February 2015, 18 February 2015, 11 June 2015, 25 November 2015.

Environmental Impact Assessment and Environmental Management System Act, passed on 22 February 2005, as amended on 7 December 2006, 21 February 2007, 19 June 2008, 18 December 2008, 27 January 2010, 22 April 2010, 26 October 2010, 6 December 2011, 19 February 2014, 19 June 2014, 18 February 2015, 19 February 2015, 11 June 2015, 29 October 2015, 9 December 2015.

Regulations of the Government:

Regulation No. 163 of 30 April 2004, as amended on 11 February 2010: The Bases for Calculation of Exemption Values, and the Exemption Values for Radionuclides

Regulation No. 193 of 17 May 2004: Effective Dose and Equivalent Dose Limits for the Lens of the Eyes, Skin and Extremities for Exposed Workers and Members of the Public

Regulation No. 243 of 8 July 2004, as amended on 15 January 2009, 10 December 2009 and 23 May 2013: Procedure Specifications for Processing Documents of Import, Export and Transit of Radioactive Waste Based on Country of Origin and Destination

Regulation No. 244 of 8 July 2004, as amended on 15 January 2009 and 1 August 2011: Statutes for the Maintenance of the State Dose Register of Exposed Workers

Regulation No. 92 of 1 July 2010, as amended on 22 December 2011 and 6 June 2013: Procedure of Informing of the Public about the Immediate Danger for Arising of the Emergency Situation, about the Emergency Situation and about the Management of the Emergency Situation and the Requirements to the Forwarded Information

Regulation No. 57 of 6 May 2010, as amended on 22 December 2011, 6 June 2013 and 30 July 2015: Procedure of Notification of the Ministry of the Interior of An Emergency or of the Impending Risk of the Occurrence of An Emergency

Regulations of the Minister of the Environment:

Regulation No. 41 of 29 April 2004, as amended on 31 May 2006, 21 January 2009 and 4 March 2014: Time Limits for Proceedings to Issue, Amend or Revoke the Radiation Practice Licenses, the Specific Requirements for and Format of Applications for Radiation Practice Licenses, and the Format of Radiation Practice Licenses

Regulation No. 86 of 8 July 2004, as amended on 21 January 2009: Requirements for the Radiation Safety Training of Exposed Workers

Regulation No. 93 of 14 July 2004: Intervention and Action Levels, and Emergency Exposure Guidance in a Radiological Emergency

Regulation No. 110 of 27 August 2004, as amended on 21 January 2009: The Requirements for the Results of Individual Monitoring of Outside Workers, and for Formalising Such Results, and for the Standard Format for the Dose Chart of Outside Workers

Regulation No. 113 of 7 September 2004, as amended on 31 May 2006: Activity levels of radionuclides, requirements established for rooms where a radiation source is located, and requirements established for labelling the radiation source

Regulation No. 127 of 12 October 2004, as amended on 21 January 2009: The Format of Activity Licenses of Qualified Experts and Applications Therefore and the Procedure for the Issue, Extension, Suspension and Revocation of Activity Licenses

Regulation No. 8 of 9 February 2005, as amended on 21 January 2009: The Classification of Radioactive Waste, the Requirements for Registration, Management and Delivery of Radioactive Waste and the Acceptance Criteria for Radioactive Waste

Regulation No. 10 of 15 February 2005, as amended on 21 January 2009: Clearance Levels for Radioactive Substances and Materials Contaminated with Radioactive Substances Resulting from Radiation Practices, and the Requirements for Their Clearance, Recycling and Reuse

Regulation No. 45 of 26 May 2005, as amended on 21 January 2009: The Procedure for Monitoring and Estimation of Effective Doses Incurred by Exposed Workers and Members of the Public, and the Coefficients for Calculating Radionuclide Ingestion and Inhalation Doses

Regulation No. 13 of 20 May 2014: Statute of the Environmental Board

Regulation No. 50 of 30 July 2002, as amended on 21 August 2003, 15 May 2008, 26 March 2010 and 23 May 2013: Establishment of National Environmental Monitoring Stations and Areas

Regulation No. 11 of 13 March 2012, as amended on 9 May 2012: The List of Paid Services and Rates of Fee of the Environmental Board.

Regulations of the Minister of the Interior:

Regulation No. 15 of 8 June 2010: The Guidelines for Preparing An Emergency Response Plan

Regulation No. 5 of 18 February 2010, as amended on 13 April 2010 and 9 November 2010: The Guidelines for Preparing an Emergency Risk Assessment

Regulations of the Minister of the Social Affairs:

Regulation No. 29 of 15 May 2014, as amended on 18 April 2016: Radiation safety requirements for medical radiology procedures and requirements for the protection of persons undergoing medical radiation

Annex C. National Reports and Other Documents

National Reports

Convention on Nuclear Safety. 3rd Estonian National Report on Compliance with the Obligations of the Convention on Nuclear Safety as referred to in Article 5 of the Convention. Sixth Review Meeting, August 2013. Environmental Board, Radiation Safety Department, Estonia.

http://www.keskkonnaamet.ee/public/ajutine/test/Convention_Nuclear_Safety_ESTONIA_2013.pdf

Convention on Nuclear Safety. Estonian National Report on lessons learned and actions taken in response to the Fukushima Daiichi nuclear accident. Second Extraordinary Meeting, August 2012, Environmental Board, Radiation Safety Department, Estonia.

http://www.keskkonnaamet.ee/public/kiirgus/National_Report_2nd_Extraordinary_Meeting_CNS.pdf

Convention on Nuclear Safety. 2nd Estonian National Report on Compliance with the Obligations of the Convention on Nuclear Safety as referred to in Article 5 of the Convention. Fifth Review Meeting, August 2010, Environmental Board, Radiation Safety Department, Estonia.

http://www.keskkonnaamet.ee/public/kiirgus/EST_CNSreport_5thRM_2010.pdf

Convention on Nuclear Safety. 1st Estonian National Report on Compliance with the Obligations of the Convention on Nuclear Safety as referred to in Article 5 of the Convention. Fourth Review Meeting, April 2007, Estonian Radiation Protection Centre, Estonia.

http://www.keskkonnaamet.ee/public/kiirgus/Estonian_report_2007.pdf

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. Estonian National Report. Fifth Review Meeting, October 2014. Environmental Board, Radiation Safety Department, Estonia.

http://www.keskkonnaamet.ee/public/kiirgus/5th_RW_JCReport_Estonia_2014.pdf

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. 3rd Estonian National Report on Compliance with the Obligations of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management as referred to in Article 32 of the Convention. Fourth Review Meeting, October 2011, Environmental Board, Radiation Safety Department, Estonia.

http://www.keskkonnaamet.ee/public/kiirgus/3rd_JCReport_Estonia.pdf

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. National Report from Estonia. Third Review Meeting, May 2009, Radiation Protection Centre, Estonia.

http://www.keskkonnaamet.ee/public/kiirgus/JC_viimane2009.pdf

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. National Report from Estonia. Second Review Meeting, May 2006, Estonian Radiation Protection Centre, Estonia.

http://www.keskkonnaamet.ee/public/kiirgus/JC_Estonia.pdf

Other

National Radiation Safety Development Plan 2008-2017, Tallinn, 2008.
<http://www.envir.ee/sites/default/files/korakik.pdf>

National Development Plan of the Energy Sector until 2020, Tallinn, 2009.
<http://ee.vlex.com/vid/development-plan-energy-sector-until-73464689> (In English).

International Atomic Energy Agency. Infrastructure Appraisal for Estonia of Radiation Safety and the Security of Radioactive Sources. 25-29 July 2005, Tallinn, Estonia.
<http://www.keskkonnaamet.ee/public/kiirgus/Rassia.pdf>

International Atomic Energy Agency. EPREV Report. Peer Appraisal of the Arrangements in the Republic of Estonia regarding the Preparedness for Responding to a Radiation Emergency. 26 September – 5 October 2011, Tallinn, Estonia.
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Annex D. Compilation of Treaties signed by Estonia

Multilateral Agreements

No.	Title	In Force	Status
1.	Agreement on the Privileges and Immunities of the IAEA	1992-02-12	acceptance: 1992-02-12
2.	Treaty on the Non-Proliferation of Nuclear Weapons	1992-01-07	Accession: 1992-01-07
3.	Comprehensive Nuclear-Test-Ban Treaty	Not yet	Signature: 1996-11-20 Ratification: 1999-08-13
4.	Convention on Environmental Impact Assessment in a Transboundary Context	2001-07-24	Ratification: 2001-04-25
5.	Amendment to the Convention on Environmental Impact Assessment in a Transboundary Context	2014-08-26	Ratification: 2010-04-12
6.	Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context	2010-07-11	Ratification: 2010-04-12
7.	Amendment to the Convention on Environmental Impact Assessment in a Transboundary Context	Not yet	Ratification: 2010-04-12
8.	Convention on the Physical Protection of Nuclear Material	1994-06-08	accession: 1994-05-09
9.	Vienna Convention on Civil Liability for Nuclear Damage	1994-08-09	accession: 1994-05-09
10.	Convention on Early Notification of a Nuclear Accident	1994-06-09	accession: 1994-05-09
11.	Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	1994-06-09	accession: 1994-05-09
12.	Convention on Nuclear Safety	2006-05-04	accession: 2006-02-03
13.	Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention	1994-08-09	accession: 1994-05-09
14.	Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2006-05-04	Signature: 2001-01-05 ratification: 2006-02-03
15.	Revised Supplementary Agreement Concerning the Provision of Technical Assistance by the IAEA (RSA)	2001-07-17	Signature: 2001-07-17
16.	Amendment to the Convention on the Physical Protection of Nuclear Material	2016-05-08	ratification: 2009-02-24

Safeguards Agreements

Reg.No	Title	In Force	Status
1240	Application of safeguards in implementation of Article III (1) and (4) of the Treaty on the Non-Proliferation of Nuclear Weapons (with Protocol)	2005-12-01	accession: 2005-07-28
1696	Agreement between the Government of the Republic of Estonia and the IAEA for the Application of Safeguards in connection with the Treaty of the Non-Proliferation of Nuclear Weapons	1997-11-24	Signature: 1997-11-24
1769	Prot.Add. to Agreement between the Rep. Austria, the Kingdom of Belgium, the Kingdom of Denmark, the Rep. of Finland, the Federal Rep. of Germany, the Hellenic Rep., Ireland, the Italian Rep., the Grand Duchy of Luxembourg, the Kingdom of the Netherlands, the Portuguese Rep., the Kingdom of Spain, the Kingdom of Sweden, the European Atomic Energy Community and the IAEA in Implementation of Article III, (1) and (4) of the Treaty on the Non-Proliferation of Nuclear Weapons	2005-12-01	accession: 2005-07-28