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 Convention on 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

Radiation Safety Department, Environmental Board, Estonia
Tallinn
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Contents

Section A. Introduction

This Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management was adopted on 29 September 1997 in Vienna diplomatic Conference. Estonia signed the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management on 5 January 2001. Estonian Parliament ratified the convention on 19 October 2005. Estonia deposited the instrument of accession to the joint Convention on 03 February 2006. The convention entered into force on 04 May 2006.

In Estonia radioactive wastes are arising from the use of radioactive sources in industry, medicine and to a small extent from the use in education and research as well as from decommissioning of facilities used for radiation practice. Estonia has 2 shut-down nuclear submarine reactors of the former Soviet Union in long term storage stage in Paldiski. Spent fuel was sent back to Russia. There is also a facility for interim storage for the low and intermediate radioactive waste in Paldiski. Radioactive waste management facility, which was used during Soviet time is situated in Tammiku and is currently under decommissioning. The uranium mining and milling facility in Sillamäe was operational in late 1940`s – early 1980`s. Sillamäe tailing pond remediation project was finished by the end of 2008.

The Radiation Act provides that the benefits arising from the use of radiation and practices involving exposure to radiation shall exceed the detriment it causes; that the practice shall be organized in such a way that the resulting exposure to radiation hazardous to health is kept as low as reasonably achievable and that no person`s exposure shall exceed the maximum values prescribed in the Radiation Act. These general safety principles, included in the Radiation Act, apply to the management of radioactive waste, including those arising from decommissioning of a nuclear facility.

In June 2009 the Estonian Parliament (Riigikogu) approved the National Development Plan for Energy 2020 and the Electricity Development Plan 2008–2018, which define important development directions of the field of energy and propose the measures contributing to the achievement of the government's goals in the field of energy. These plans include the preparation of Nuclear Law. Nevertheless, the planned specific activities have not started or have been delayed.

Estonia is a member state of the European Union from 1st May 2004. Thus, the regulations of the Union are in force in Estonia. When necessary, the Estonian regulations have been modified to take into account the EU regulations.

The present report is the third Estonian National Report and is presented for the Fourth Review Meeting to the Convention, which takes place 14-23 May 2012 at the Headquarters of the IAEA in Vienna, Austria.

The report is structured in conformity with the "Guidelines regarding the form and structure of national reports" issued by the IAEA on 19 July 2006 (INFCIRC/604/Rev.1) adopted at the Preparatory Meeting of the Contracting Parties to the Joint Convention held from 10 to 12 December 2001, which were modified at the Second Review Meeting of the Contracting Parties

held from 15 to 24 May 2006. The section concerning the safety of spent fuel management covering articles 4-10 of the Joint Convention is not applicable to Estonia.

The situation with regard to the obligations of the Convention has practically not changed since the last Review Meeting and for that reason repetitions from the previous report could not be fully avoided. The comments, questions and remarks given to Estonia's last national report and Estonia's presentation given at the Third Review Meeting have been incorporated in this report[1]. However, the current report will also present the developments – both in waste management policies and in practices.

The report is prepared by the Environmental Board under the Ministry of the Environment, in co-operation with the radioactive waste management agency A.L.A.R.A. Ltd and the Ministry of the Environment.

Based on the evaluation, it is the understanding of the Estonian authorities that:

- the Estonian radiation and waste safety legislation fulfils the obligations of the Convention;
- the Estonian regulatory infrastructure is in compliance with the Convention obligations;
- the regulatory and licensing policies and the practical implementation of radioactive waste management comply with the Convention obligations;
- future challenges are foreseen to enhance safety, notably in the area of working out the policies; these are discussed in the report.

It is concluded in the report that Estonia meets all obligations of the Convention.

1 http://www.kiirguskeskus.ee/image/JC_viimane2009.pdf

Section B. Policies and Practices

ARTICLE 32. REPORTING

1. In accordance with the provisions of Article 30, each Contracting Party shall submit a national report to each review meeting of Contracting Parties. This report shall address the measures taken to implement each of the obligations of the Convention. For each Contracting Party the report shall also address its:

i. spent fuel management policy;
ii. spent fuel management practices;
iii. radioactive waste management policy;
iv. radioactive waste management practices;
v. criteria used to define and categorize radioactive waste.

Radioactive waste is regulated in the framework of the Radiation Act. According to the definitions given in the article 3 of the Radiation Act radioactive waste is any material or object which contains or is contaminated by radionuclides, the activity or specific activity of which exceeds the established clearance levels and for which no future use is foreseen. The definition includes also equipment, goods and materials that are contaminated by radioactive materials. Radioactive materials and radiation appliances containing radioactive material whose owner can not be found shall also be regarded as radioactive waste.

According to the Radiation Act, the organization engaged in radiation practice is required to take any measures to render harmless radioactive wastes arising from its operation. Rendering radioactive waste harmless means any measure needed to treat, isolate or dispose of the waste, or to restrict its use so that it does not endanger human health or the environment. The state has the secondary responsibility in case when a producer of radioactive waste is incapable of fulfilling its management obligation. There are two options for the management of such radioactive waste - either to return the sealed source to the supplier/manufacturer or to deliver it to the waste management agency paying a waste management fee. In Estonia, majority of waste generated by practices involving the use of unsealed sources have too low activity concentrations or amounts to justify their storage in the same way that is implemented, e.g., for the spent sealed sources. A common practice is that radionuclide laboratories store their short-lived radioactive waste at their premises until their activity/activity concentration decays below the approved discharge limit.

Estonia has completed the National Development Plan for Radiation Protection 2008-2017 (Development plan), which was approved by the government in April 2008. This plan sets out the measures designed to guarantee radiation safety and ensure that the state is able to cope with emergency situations involving radiation. The plan is divided into 5 sections, which cover infrastructure of radiation protection, radioactive waste management, medical exposure, emergency preparedness and natural radiation. Most of the principles to follow in the radioactive waste management are given in the existing legislation. The section of the Development plan covering radioactive waste management sets the general strategy. The Development plan concludes that a specific action plan should be drawn up in order to reduce the risks associated with the treatment of radioactive waste and that there should be better communication about potential threats with residents living around the radioactive waste sites.

Section C. Scope of Application

ARTICLE 3. SCOPE OF APPLICATION

1. *This Convention shall apply to the safety of spent fuel management when the spent fuel results from the operation of civilian nuclear reactors. Spent fuel held at reprocessing facilities as part of a reprocessing activity is not covered in the scope of this Convention unless the Contracting Party declares reprocessing to be part of spent fuel management.*
2. *This Convention shall also apply to the safety of radioactive waste management when the radioactive waste results from civilian applications. However, this Convention shall not apply to waste that contains only naturally occurring radioactive materials and that does not originate from the nuclear fuel cycle, unless it constitutes a disused sealed source or it is declared as radioactive waste for the purposes of this Convention by the Contracting Party.*
3. *This Convention shall not apply to the safety of management of spent fuel or radioactive waste within military or defence programmes, unless declared as spent fuel or radioactive waste for the purposes of this Convention by the Contracting Party. However, this Convention shall apply to the safety of management of spent fuel and radioactive waste from military or defence programmes if and when such materials are transferred permanently to and managed within exclusively civilian programmes.*
4. *This Convention shall also apply to discharges as provided for in Articles 4, 7, 11, 14, 24 and 26.*

As Contracting Party to the Joint Convention Estonia declares that airborne and liquid discharges from radioactive waste management facilities are included in the scope of this Convention. There is no production of radioactive wastes from military of defence programmes in Estonia nowadays. Waste containing only naturally occurring materials (NORM-waste), except sealed radium sources, is not declared as radioactive waste for the purposes of the Convention.

Section D. Inventories and Lists

ARTICLE 32. REPORTING

2. This report shall also include:

i. a list of the spent fuel management facilities subject to this Convention, their location, main purpose and essential features;

ii. an inventory of spent fuel that is subject to this Convention and that is being held in storage and of that which has been disposed of. This inventory shall contain a description of the material and, if available, give information on its mass and its total activity;

iii. a list of the radioactive waste management facilities subject to this Convention, their location, main purpose and essential features;

iv. an inventory of radioactive waste that is subject to this Convention that:

(a) is being held in storage at radioactive waste management and nuclear fuel cycle facilities;

(b) has been disposed of; or has resulted from past practices.

This inventory shall contain a description of the material and other appropriate information available, such as volume or mass, activity and specific radionuclides;

i. a list of nuclear facilities in the process of being decommissioned and the status of decommissioning activities at those facilities.

There are no nuclear power plants, research reactors and facilities for radioactive material production in Estonia. However, there are radioactively contaminated facilities and considerable amounts of radioactive waste at few sites in Estonia resulting from the former USSR military and non-military nuclear activities up to 1991. These are: Paldiski, Sillamäe and Tammiku (Figure 1).

Figure 1. Location of radioactive wastes in Estonia

The licensing database maintained by the Radiation Safety Department of the Environmental Board includes source-specific information on all sources in licence holders' possession. This information is updated continuously according to licence holders' notification and observations made during the licensing process and inspections.

Table 1 shows the overall information about radioactive waste sites in Estonia and an inventory of radioactive waste that is subject to this Convention.

Table 1. Information about radioactive waste sites in Estonia

Owner	Ministry of Economic Affairs and Communications
Location	**Paldiski, 50 km West of Tallinn**
Purpose	Interim radioactive waste storage facility
Inventory	Ca 1000 TBq, mainly spent sealed sources of Sr-90, Cs-137, Co-60 and Pu- Be neutron sources. The volume of about 1000 m^3 , 1240 tons
Essential Features	Operational
Remarks	The interim storage is situated in the territory of the former U.S.S.R. Paldiski nuclear training center (listed as a nuclear facility in this report). It was commissioned and in operation since the year 1997 and is intended to use for both decommissioning and institutional waste.

Owner	Ministry of Economic Affairs and Communications
Location	**Tammiku, 12 km South of Tallinn**
Purpose	Radioactive waste storage facility
Inventory	Before starting waste retrieval in 2008, the overall activity of waste was ca 76 TBq, consisting mainly of spent sealed sources of Sr-90 and Cs-137. The estimated volume of waste was ca 110 m3, with the weight of ca 97 tons
Essential Features	Under decommissioning. All radioactive waste was removed from the site by September 2011.

Owner	Silmet Group
Location	**Sillamäe, 184 km East of Tallinn**
Purpose	Former uranium mining and milling facility
Inventory	1830 tons of U, 850 tons of Th and up to 3000-4000 TBq their daughter products, including 226Ra
Essential Features	The tailing pond is remediated

Radioactive waste management facilities

There are two radioactive waste management facilities subject to the Convention in Estonia: the Paldiski interim radioactive waste storage and the Tammiku radioactive waste storage facility, which are both under administration of the state-owned A.L.A.R.A. Ltd., responsible for radioactive waste management. A.L.A.R.A. Ltd. reports to the Ministry of Economic Affairs and Communications.

Tammiku was a RADON-type storage facility for institutional waste, commissioned in 1963. In 1996 it was temporarily closed and the storage vaults were covered with concrete slabs and soil layer. In 2008 A.L.A.R.A. Ltd started the decommissioning process, after approval of the Environmental Impact Assessment Report (EIA) by the Minister of the Environment in 2007. After analysis of several possible options the following option was chosen: to retrieve all radioactive waste from Tammiku, to transport it to the Paldiski facility, to condition and to store it in the interim radioactive waste storage. Practice is divided into two stages – the first one including retrieval and transportation of the waste, and the second, the decommissioning and dismantling of the facility. For the first stage the company obtained the corresponding radiation practice licence, which is valid until the end of 2011. By the end of September 2011 all waste has been retrieved and transferred to Paldiski.

The next step will be the radiological survey of the facility, the planning of decontamination and demolishing of concrete structures of the facility. All cavities have to be filled, so they will be even with the surface. In the next stages the area will be converted into a green field area. Company has applied for the radiation practice licence in order to continue with the second stage. The site should remain under environmental surveillance according to the Estonian legislation.

Nuclear facilities under decommissioning

The former USSR nuclear submarine training centre, with 2 PWR reactor compartments (see table 2 for characteristics) at the Paldiski site is in the process of deferred decommissioning. In 1994, based on the Agreement between the Republic of Estonia and the Russian Federation, before the site was taken over by the Estonian authorities, the reactors were defuelled and the spent nuclear fuel was shipped to Russia. Currently the site is administrated by A.L.A.R.A. Ltd.

During the period 2005-2007 a number of activities have been undertaken on the site under the EU Phare project 632.03.01 “Safe long-term storage of Paldiski sarcophagi and related dismantling activities”. The main objective of the project has been to guarantee the safe storage of the reactor compartments for a period of at least 50 years. By that time Estonia should have a specific radioactive waste disposal facility, which could accommodate waste arising from decommissioning of the reactor compartments (depending from the decommissioning strategy, it is estimated to be approximately 720 to 2070 m^3).

Table 2. Characteristics of the 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 – length	 7.5 m ~ 50 m	 9,5 m ~ 50 m

Section E. Legislative and Regulatory System

ARTICLE 18. 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 main legal instrument is the Radiation Act. The principles of radiation and nuclear safety as well as the responsibilities of the licence holder are provided by the Radiation Act. Article 2 of the Act specifies that no radiation practice should be started without a radiation practice licence. The Environmental Impact Assessment and Auditing Act states that the environmental impact shall be assessed upon application for or application for amendment and for development consent if the proposed activity which is the basis for application for or amendment of the development consent potentially results in significant environmental impact.

According to the Article 14 of the Radiation Act, all radiation practices shall be performed only by licence holders. Article 18 (1) lists the documents, which the applicant for a radiation practice licence shall present, while Article 18 defines the practices of low, moderate and high risk. All practices involving radioactive waste management and nuclear fuel cycle and the corresponding facilities, as well as practices using high-activity radiation sources, are considered as practices of high radiation risk (Article 18 (3^1)). Article 19 establishes generic data and conditions common for all radiation practice licences and the additional ones, including public involvement (Article 20 and 21) in case of radioactive waste management and nuclear fuel cycle related activities as well as work activities within which the presence of natural radiation sources leads to a significant increase in the exposure which cannot be disregarded from the radiation protection point of view.

Article 6 of the Environmental Impact Assessment and Environmental Management System Act as amended in 2011 provides that practices concerning radioactive waste management and nuclear fuel cycle and the corresponding facilities are activities with 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 of irradiated nuclear fuels or handling of irradiated nuclear fuels or radioactive waste;
- construction of installations for temporary storage or final disposal of irradiated nuclear fuels or radioactive waste.

The current regulations apply to the possession, sale, transit, transport, import, export, use for commercial, industrial, medical, scientific or other purposes, recycling and re-use of equipment or substances capable of emitting ionizing radiation. They also apply to the treatment, handling, storage, elimination and disposal of radioactive substances or waste and to any other activity involving a risk arising from ionizing radiation.

Estonian legislation has determined only the general requirements concerning nuclear facilities.

A list of relevant Acts and Regulations in force by 1 October 2011 is given in Annex A.

ARTICLE 19. LEGISLATIVE AND REGULATORY FRAMEWORK

1. Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of spent fuel and radioactive waste management.

2. This legislative and regulatory framework shall provide for:

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

ii. a system of licensing of spent fuel and radioactive waste management activities;

iii. a system of prohibition of the operation of a spent fuel or radioactive waste management facility without a licence;

iv. a system of appropriate institutional control, regulatory inspection and documentation and reporting;

v. the enforcement of applicable regulations and of the terms of the licences;

vi. a clear allocation of responsibilities of the bodies involved in the different steps of spent fuel and of radioactive waste management.

3. When considering whether to regulate radioactive materials as radioactive waste, Contracting Parties shall take due account of the objectives of this Convention.

In Estonia, the legislation for radiation protection framework was established in 1997, when the Radiation Act entered into force. Since then, a new version of the Radiation Act came into force in 2004, to which several amendments and new regulations have been issued. The most significant amendments were enforced in 2009, when the functions like issuing of a radiation practice licence and licence for qualified radiation expert were transferred from the Ministry of the Environment to the new governmental body, the Environmental Board (est., Keskkonnaamet), within the area of government of the Ministry of the Environment. The Estonian legislation for radioactive waste management is part of the overall Estonian legislation on radiation protection.

The licensing system for practices is described in Chapters 3-4 of the Act. The use of radiation including radioactive waste management, requires a radiation practice licence, which can be granted by the Environmental Board upon application. A licence can be subject to extra conditions needed to ensure safety. In addition, the cases when a licence is not needed are identified, e.g. when the use of radiation is exempted.

General requirements for managing of radioactive waste and radioactive emissions are described in Chapter 7 of the Act.

The relevant general regulation beside the Radiation Act is the Regulation of Minister of the Environment No 10 of 15 February 2005 (as amended in 2009) for the radioactive waste management, which is called „The Classification of Radioactive waste, the Requirements for Registration, Management and Delivery of Radioactive Waste and the Acceptance Criteria for Radioactive Waste“ (see Annex A). It specifies the requirements for radioactive waste management and sets the following:

- Definitions
- Radioactive waste classification

- Requirements for radioactive waste pretreatment and storage
- Requirements for radioactive waste treatment and conditioning
- Requirements for radioactive waste treatment storage in producer premises
- Requirements for interim storage facility of radioactive waste
- Requirements for safety assessment of interim storage facility and final disposal of radioactive waste
- Activities and events covered in radiation safety assessment
- Physical protection of radioactive waste
- Requirements for radioactive waste package
- Acceptance criteria for waste package
- Delivery of radioactive waste
- Registration, accountancy and reporting of radioactive waste

Radioactive waste will be categorized by activity or specific activity, by half-life, by type of radiation and by heat generation as a result of radioactive decay. In conditioning and storing of radioactive waste their producer has to take into account, beside their type, also physical, chemical and biological properties of radioactive waste. Radioactive waste categorization is the following:

- exempt waste – includes radioactive waste arising from radiation practice the activity, specific activity or surface-specific activity of which are below the exemption levels, (established by the Regulation No 10 of 15 February 2005, see annex A);
- NORM waste – includes radioactive waste arising from processing of natural radionuclides the specific activity of which is higher than exemption levels;
- short-lived waste – includes radioactive waste, which contains radionuclides with half-life less than 100 days and which decay within less than 5 years below exemption level;
- low and intermediate activity short-lived waste – includes radioactive waste, which contains β- and γ-sources with half-life less than 30 years and a limited number of long-lived α- sources (no more than 4000 Bq/g for one waste package and no more than 400 Bq/g averaged for total waste package amount);
- low and medium activity long-lived waste – includes radioactive waste, which contains radionuclides with half-life higher than 30 years with the activity concentration higher than that for low and intermediate activity short-lived waste and which will generate less than 2 kW/m3 heat energy during radioactive decay;
- high level waste – includes radioactive waste, which generates more than 2 kW/m3 heat energy during radioactive decay.

Under the Radiation Act radioactive waste management is subject to the authorization by the Environmental Board and the inspection of these practices and facilities is carried out by the Environmental Inspectorate (est., Keskkonnainspektsioon).

ARTICLE 20. 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 19, and provided with adequate authority, competence and financial and human resources to fulfill its assigned responsibilities.*
2. *Each Contracting Party, in accordance with its legislative and regulatory framework, shall take the appropriate steps to ensure the effective independence of the regulatory functions from other functions where organizations are involved in both spent fuel or radioactive waste management and in their regulation.*

In 2009 in the course of reorganization, the Estonian Radiation Protection Centre was merged as a department, Radiation Safety Department, with the Environmental Board (est., Keskkonnaamet). Article 15 of the amended version of the Radiation Act 2009 authorizes the latter to function as a regulatory authority.

The other body, the Environmental Inspectorate, is provided to carry out regular inspections of the licenced practices. Article 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. Both the Environmental Board and the Environmental Inspectorate have their own budget on the annual Fiscal Act.

The Environmental Board has the following duties in the field of radiation safety:

- to issue radiation practice licences as well as other environmental licences;
- to participate in the development and implementation of the radiation protection policy, development plans and programs;
- to perform administrative proceedings within the limits of its competence
- to prepare the radiation safety assessments for existing and applied radiation practices;
- to organize the assessment of population doses and doses for critical groups arising from radiation practices;
- to maintain the registries related to radiation safety;
- in cooperation with the Environmental Inspectorate to exercise regulatory supervision over the radiation practice licences;
- to organize the monitoring of radionuclides in the air, soil, water and food, radioactivity in the environment and to analyse the results;
- to perform laboratory analysis related to radiation safety;
- 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;
- to serve as a contact point for EURATOM and IAEA;
- to serve as a national data centre (NDC) in the exchange of information in the framework of the CTBT agreement;
- to participate in international cooperation, to prepare and to participate in international projects in the field of radiation safety;
- to participate in the preparation of emergency situation management plans, in the testing of these plans and in the management of possible emergency cases;

The specialists of the Environmental Board have access to all premises during the licensing process. The Environmental Inspectorate, which is granted a right to withdraw licences and suspend operations in case of unsafe situations, has the same direct access to all premises, buildings, etc., for inspection purposes.

The Environmental Board and the Environmental Inspectorate are within the area of government 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 economic policy in a number of fields, including radioactive waste management.

Section F. Other General Safety Provisions

ARTICLE 21. RESPONSIBILITY OF THE LICENCE HOLDER

1. *Each Contracting Party shall ensure that prime responsibility for the safety of spent fuel or radioactive waste management rests with the holder of the relevant licence and shall take the appropriate steps to ensure that each such licence holder meets its responsibility.*
2. *If there is no such licence holder or other responsible party, the responsibility rests with the Contracting Party which has jurisdiction over the spent fuel or over the radioactive waste.*

According to the Article 30 of the Radiation Act the holder of a radiation practice licence has the obligation to:

- be responsible for radiation safety and to guarantee the physical protection of radiation sources in the licence holder's possession;
- prepare the rules necessary for performing radiation practices and instructing exposed workers;
- organize the treatment and conditioning of radioactive waste if such activity is necessary for modifying the properties of the radioactive waste prior to its release into the environment, and to arrange the interim or final disposal of the radioactive waste;
- take an annual inventory of the radiation sources and submit the results of the inventory to the Environmental Board by 1 March of the following year;
- provide training and radiation safety instruction for exposed workers commensurate with the nature of their work and workplace conditions;
- organize the medical examination of exposed workers;
- upon a change of ownership of a radiation source, provide the new owner with comprehensive information to ensure radiation safety;
- immediately inform the Environmental Board and the Alarm Centre of accidents which take place in the course of radiation practices and of exposure events involving doses exceeding the dose limits;
- alleviate the consequences of emergencies;
- ensure the regular control and calibration of measuring instruments used and be responsible for their fitness for use and appropriate use;
- ensure the monitoring of doses incurred by exposed workers and submission of the obtained information to the dose registry;

- guarantee that all building design documentation concerning facilities is reviewed, and that new radiation sources to be used are approved beforehand by a qualified expert;
- render a radiation source harmless after its use is terminated pursuant to the plan for rendering the radiation source harmless submitted in the application for the licence;
- provide certification, at the request of competent authorities, of the legality of the possession of radioactive substances or radiation apparatuses containing radioactive substances;
- prepare an emergency plan if the person engages in high risk radiation practices and test the plan pursuant to the requirements and with the frequency established by legislation;
- improve the technologies, equipment and techniques used;
- develop and implement a quality system of radiation safety.

To enhance radiation safety, the Act authorizes the Environmental Board to establish additional requirements to a radiation practice licence.

It is the responsibility of the Environmental Board to verify that the licence holder fulfils the regulations. The licence holders are subjected to inspections by the Environmental Inspectorate and their practices may be suspended for a period until the requested corrective measures are applied.

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 Act and/or its provisions determined by a radiation practice licence is punishable by fines. As a precondition for granting a radiation practice licence, the Radiation Act requires that the applicant shall present a valid proof on the safe management of any radioactive waste, which may be generated. 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 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 Radiation Act states that the Environmental Board shall refuse to issue a radiation practice licence, if:

- the activity, for which the radiation practice licence is applied, involves or is likely to involve a risk to national or international security;
- the activity, for which the radiation practice licence is applied, does not conform to the requirements provided by legislation;
- false information is submitted in the application for the radiation practice licence;
- the applicant for the radiation practice licence does not employ with requisite professional training;
- the location of the radiation practice set out in the application or other conditions do not allow for compliance with radiation safety requirements.

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 22. HUMAN AND FINANCIAL RESOURCES

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

i. *qualified staff are available as needed for safety-related activities during the operating lifetime of a spent fuel and a radioactive waste management facility;*
ii. *adequate financial resources are available to support the safety of facilities for spent fuel and radioactive waste management during their operating lifetime and for decommissioning;*
iii. *financial provision is made which will enable the appropriate institutional controls and monitoring arrangements to be continued for the period deemed necessary following the closure of a disposal facility.*

During proceeding of licence application copy of qualification certificate, copy of document certifying in-service training in radiation safety is requested as well as requirements on qualifications of and educational programs for staff members working with radiation sources. Chapter 4 of the Radiation Act prescribes that the responsible party is required to ensure that in safety related matters of radiation practices the expertise is available, taking into account the nature and the risks characteristic to the practice.

The financial arrangements are adequate for ensuring the long-term safety of the Paldiski and Tammiku facilities as these are state properties, and as such, the financial situation is and will be secure also in the future until all the facilities are fully decommissioned.

ARTICLE 23. QUALITY ASSURANCE

Each Contracting Party shall take the necessary steps to ensure that appropriate quality assurance programmes concerning the safety of spent fuel and radioactive waste management are established and implemented.

According to article 32 of the Radiation Act the holder of radiation practice licence shall prepare a radiation safety quality system to ensure compliance with the requirements provided for in this Act and legislation established on the basis thereof and with the conditions set by the radiation practice licence. The radiation quality system shall set out the following: planned and systematic activity aimed at ensuring radiation safety, an analysis of the duties of workers and the requirements for the skills needed to operate the radiation sources, a system for controlling the compliance with the radiation safety requirements and a description of the procedures for the supply and use of materials and of the procedures for supervision over radiation safety and controlling the functioning of safety systems.

The radiation quality system should be submitted for review and assessment by the regulatory body. This programme should describe the ways of assuring that all quality related activities will be performed in the properly controlled conditions, i.e. by properly qualified personnel using appropriate tools, equipment, methods and technological processes and under suitable environmental conditions, so that the required quality is attained and may be verified by inspection or test. Review and assessment of the relevant radiation quality system is carried out by the

regulatory body at all stages of the licensing process, i.e. prior to and during the construction, operation, closure and decommissioning of radioactive waste storages and repositories. If necessary, suitable conditions and requirements will be included in the licence. The regulatory body, through the requirements concerning the preparation and implementation of the radiation quality system, obliges the applicant/licence holder to plan, perform, verify and document all their activities in an organized and systematic way. An effective radiation quality system, established and implemented by the licence holder, allows the regulatory body to obtain satisfactory confidence in the quality of facility's equipment and in the quality of all performed activities. The regulatory body confirms that the licence holder has established and implemented and effective radiation quality system by audits, document reviews and inspections of work.

The quality assurance at Paldiski is guaranteed by implementing the set of regulations covering radiological protection of workers, physical safety, waste acceptance criteria, environmental monitoring and written work procedures. The quality management system of A.L.A.R.A Ltd. was adopted in 2010 and it is planned to start ISO 9000/ISO 14000 certification process in 2011.

ARTICLE 24. OPERATIONAL RADIATION PROTECTION

1. Each Contracting Party shall take the appropriate steps to ensure that during the operating lifetime of a spent fuel or radioactive waste management facility:

- *i. the radiation exposure of the workers and the public caused by the facility shall be kept as low as reasonably achievable, economic and social factors being taken into account;*
- *ii. no individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection; and*
- *iii. measures are taken to prevent unplanned and uncontrolled releases of radioactive materials into the environment*

2. Each Contracting Party shall take appropriate steps to ensure that discharges shall be limited:

- *i. to keep exposure to radiation as low as reasonably achievable, economic and social factors being taken into account; and*
- *ii. so that no individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection.*

iii. 3. Each Contracting Party shall take appropriate steps to ensure that during the operating lifetime of a regulated nuclear facility, in the event that an unplanned or uncontrolled release of radioactive materials into the environment occurs, appropriate corrective measures are implemented control the release and mitigate its effects.

During the operating lifetime all radioactive waste management practices and the management facility itself shall implement the requirements of the Radiation Act and the regulations issued on its basis. The requirements of the Article 24 on the ALARA principle and on the dose limitation are explicitly included in the Radiation Act.

The licensing procedure is provided in Chapter 3 and Radiation practice licence in Chapter 7 of Radiation Act. Applicant shall present the estimation of radioactive waste and discharges, as well as emergency plan and actions/measures to prevent unplanned and uncontrolled releases of radioactive materials into the environment. In the event that an unplanned or uncontrolled release of radioactive materials into the environment occurs, the basic responsibilities of the licence owner and the implementation procedure of corrective measures are established in Chapter 4 Responsibilities of

licence holder and in Chapter 6 Intervention. In addition, adequate responsibilities for corrective measures are provided in the Emergency Act.

The reported levels of environmental monitoring from radioactive waste management sites from period 2009 to 2011 are the following.

The Environmental Board has carried out monitoring around radioactive waste management facilities. It covers fish, seaweed and seawater. Sampling is generally conducted on an annual basis. The results are published in annual environmental radiation monitoring reports. For the period from 2009 to 2011 the activity concentrations of Cs-137 vary: in the seawater from 27 Bq/m^3 to 30 Bq/m^3, for fish from 4.5 to 4.7 Bq/kg, for seaweed up to 17.7 Bq/kg and for berries and mushrooms from 1 Bq/kg to 119 Bq/kg. There have been no measurements for bottom sea sediments. Due to the fact that the decontamination and decommissioning can cause the discharges to the environment and the most probabilistic pathways include water, the water samples from wells (both the Tammiku and the Paldiski site) are sampled on a quarterly basis. At the Tammiku site the maximum result for tritium was 243 Bq/l in 2009. All other measurement results were under 10 Bq/l.

A.L.A.R.A. Ltd carries out on-site environmental monitoring which includes monitoring of upper groundwater aquifer (borehole) on a quarterly basis, grass on a semi-annual basis and soil on an annual basis. The reported activity concentrations for the period from 2009 to 2011 for the Paldiski site are following:

- upper groundwater aquifer: tritium from 3 to 6,1 Bq/l, Sr-90 from 0.012 to 0.11 Bq/l, Cs-137 as well as for Co-60 less than 0.2 Bq/l;
- grass: Cs-137 from 1 to 5 Bq/kg, Sr-90 up to 1.4 Bq/kg;
- soil: Cs-137 from 0.8 to 15.1 Bq/kg, Sr-90 less than 2.2 Bq/kg;

The monitoring programme also includes quarterly sampling of off-site sewage water at coastal outfall. Activity concentrations are stabilized, for Cs- 137 it is under 0.3 Bq/l, for H-3 under 3 Bq/l and for Sr-90 it is less than 0.02 Bq/l.

The reported activity concentrations for the period from 2009 to 2011 for the Tammiku site are following:

- upper groundwater aquifer: maximum result for tritium was 181 Bq/l in 2009, all other results were less than 3.4 Bq/l, Sr-90 less than 0.0024 Bq/l, Cs-137 as well as Co-60 less than 0.2 Bq/l;
- grass: Cs-137 from 2.1 to 14.8 Bq/kg, Sr-90 from 1.9 to 5.4 Bq/kg;
- soil: Cs-137 from 1.9 to 11.2 Bq/kg, Sr-90 less than 0.9 Bq/kg;

Tammiku site does not have sewage system.

ARTICLE 25. EMERGENCY PREPAREDNESS

1. *Each Contracting Party shall ensure that before and during operation of a spent fuel or radioactive waste management facility there are appropriate on-site and, if necessary, off-site emergency plans. Such emergency plans should be tested at an appropriate frequency.*
2. *Each Contracting Party shall take the appropriate steps for the preparation and testing of emergency plans for its territory insofar as it is likely to be affected in the event of a radiological emergency at a spent fuel or radioactive waste management facility in the vicinity of its territory.*

The national legal framework for emergency preparedness, including nuclear and radiological emergency, is based on the Emergency Act passed 15 June 2009. The Act provides the legal bases 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 Defence Forces and the National Defence League in responding to emergencies, performing rescue operations and ensuring security. A number of regulations specifying important requirements of the Act have been passed by the Government and by the Minister of the Interior. In Estonia emergency preparedness system is coordinated by and under the responsibility of the Minister of Interior.

Obligation to keep the public informed about the emergency and a pending risk of an emergency is provided by the Radiation Act and the Emergency Act. Details about the quality and contents of the information is provided in the corresponding regulation. Arrangements are in place to inform the public of the accident, its consequences and of any countermeasures that are to be implemented to reduce doses to the population. National Development Plan for Radiation Protection 2008-2017 includes also the requirement to conduct joint emergency exercises at least once per year. Emergency Act requires to prepare several emergency plans, including plan to response a radiological emergency and elaborates on the content of these plans. Emergency Act also sees to conduct complex crisis management exercises at least once in four years to test these plans.

In response to a request from Estonian authorities, the IAEA implemented an Emergency Preparedness Review (EPREV) mission to Estonia (26.09-05.10.2011), to conduct a peer review of Estonian's emergency preparedness and response arrangements *vis-à-vis* the relevant IAEA standards.

A.L.A.R.A. Ltd has the emergency preparedness plan, which describes actions in the case of a radiation emergency situation in the radioactive waste management facility. Radioactive waste management practice is defined according to the legislation as a high-risk radiation practice. Conditions for testing and updating of emergency response plan are set in radiation practice licence of A.L.A.R.A. Ltd, issued in 2011. The company shall test the plan once per year and update it regularly.

ARTICLE 26. DECOMMISSIONING

Each Contracting Party shall take the appropriate steps to ensure the safety of decommissioning of a nuclear facility. Such steps shall ensure that:

i. *qualified staff and adequate financial resources are available;*
ii. *the provisions of Article 24 with respect to operational radiation protection, discharges and unplanned and uncontrolled releases are applied;*
iii. *the provisions of Article 25 with respect to emergency preparedness are applied; and*
iv. *records of information important to decommissioning are kept.*

A.L.A.R.A. Ltd., operator of both facilities under decommissioning (Tammiku Radioactive Waste Storage and Paldiski Former Nuclear Submarine Training Centre) is state owned and operates under Ministry of Economic Affairs and Communications. The staff and financial arrangements of the A.L.A.R.A. Ltd. are adequate for the long-term safe storage of the reactor compartments at Paldiski, decommissioning of Tammiku and partly of Paldiski facility.

The site operator A.L.A.R.A. Ltd. has a radiation practice licence issued pursuant to the Radiation Act and fulfils the requirements. Current licence for Paldiski site is valid until March 2016. For Tammiku site licence covers removal and transportation of radioactive waste and is valid until December 2011. The operator has applied for a licence for a second stage of the actions (clean up and dismantling process of Tammiku site).

The Radiation Act establishes the provisions of Article 24 of the Joint Convention with respect to operational radiation protection, discharges and unplanned and uncontrolled releases as well as the provisions of Article 25 with respect to emergency.

Sites under decommissioning are state properties, and as such, the financial situation is and will be secure also in the future until all the installations are fully decommissioned.

Section G. Safety of Spent Fuel Management

ARTICLE 4. GENERAL SAFETY REQUIREMENTS

Each Contracting Party shall take the appropriate steps to ensure that at all stages of spent fuel management, individuals, society and the environment are adequately protected against radiological hazards.
In so doing, each Contracting Party shall take the appropriate steps to:

- *i. ensure that criticality and removal of residual heat generated during spent fuel management are adequately addressed;*
- *ii. ensure that the generation of radioactive waste associated with spent fuel management is kept to the minimum practicable, consistent with the type of fuel cycle policy adopted;*
- *iii. take into account interdependencies among the different steps in spent fuel management;*
- *iv. provide for effective protection of individuals, society and the environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation which has due regard to internationally endorsed criteria and standards;*
- *v. take into account the biological, chemical and other hazards that may be associated with spent fuel management;*
- *vi. strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;*
- *vii. aim to avoid imposing undue burdens on future generations.*

ARTICLE 5. EXISTING FACILITIES

Each Contracting Party shall take the appropriate steps to review the safety of any spent fuel management facility existing at the time the Convention enters into force for that Contracting Party and to ensure that, if necessary, all reasonably practicable improvements are made to upgrade the safety of such a facility.

ARTICLE 6. SITING OF PROPOSED FACILITIES

1. *Each Contracting Party shall take the appropriate steps to ensure that procedures are established and implemented for a proposed spent fuel management facility:*
   - *i. to evaluate all relevant site-related factors likely to affect the safety of such a facility during its operating lifetime;*
   - *ii. to evaluate the likely safety impact of such a facility on individuals, society and the environment;*
   - *iii. to make information on the safety of such a facility available to members of the public*
   - *iv. to consult Contracting Parties in the vicinity of such a facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.*
2. *In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 4.*

ARTICLE 7. DESIGN AND CONSTRUCTION OF FACILITIES

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

- *i. the design and construction of a spent fuel management facility provide for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases;*
- *ii. at the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a spent fuel management facility are taken into account;*

iii. the technologies incorporated in the design and construction of a spent fuel management facility are supported by experience, testing or analysis.

ARTICLE 8. ASSESSMENT OF SAFETY OF FACILITIES

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

i. before construction of a spent fuel management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;

ii. before the operation of a spent fuel management facility, updated and detailed versions of the safety assessment and of the environmental assessment shall be prepared when deemed necessary to complement the assessments referred to in paragraph (i).

ARTICLE 9. OPERATION OF FACILITIES

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

i. the licence to operate a spent fuel management facility is based upon appropriate assessments as specified in Article 8 and is conditional on the completion of a commissioning programme demonstrating that the facility, as constructed, is consistent with design and safety requirements;

ii. operational limits and conditions derived from tests, operational experience and the assessments, as specified in Article 8, are defined and revised as necessary;

iii. operation, maintenance, monitoring, inspection and testing of a spent fuel management facility are conducted in accordance with established procedures;

iv. engineering and technical support in all safety-related fields are available throughout the operating lifetime of a spent fuel management facility;

v. incidents significant to safety are reported in a timely manner by the holder of the licence to the regulatory body;

vi. programmes to collect and analyse relevant operating experience are established and that the results are acted upon, where appropriate;

vii. decommissioning plans for a spent fuel management facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body.

ARTICLE 10. DISPOSAL OF SPENT FUEL

If, pursuant to its own legislative and regulatory framework, a Contracting Party has designated spent fuel for disposal, the disposal of such spent fuel shall be in accordance with the obligations of Chapter 3 relating to the disposal of radioactive waste.

There is no overall policy for the spent fuel management in Estonia, as spent fuel from the former U.S.S.R Paldiski Nuclear Submarine Training facility was under the Russian jurisdiction and according to the Estonian-Russian agreement was transported to Russia in 1994.

Section H. Safety of Radioactive Waste Management

ARTICLE 11. GENERAL SAFETY REQUIREMENTS

Each Contracting Party shall take the appropriate steps to ensure that at all stages of radioactive waste management individuals, society and the environment are adequately protected against radiological and other hazards.
In so doing, each Contracting Party shall take the appropriate steps to:

i. *ensure that criticality and removal of residual heat generated during radioactive waste management are adequately addressed;*
ii. *ensure that the generation of radioactive waste is kept to the minimum practicable;*
iii. *take into account interdependencies among the different steps in radioactive waste management;*
iv. *provide for effective protection of individuals, society and the environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation which has due regard to internationally endorsed criteria and standards;*
v. *take into account the biological, chemical and other hazards that may be associated with radioactive waste management;*
vi. *strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;*
vii. *aim to avoid imposing undue burdens on future generations.*

Estonian legislation together with the Development plan (especially the section, which covers radioactive waste management) provide the policy, principles and also strategy for radioactive waste management.

Requirements on Operational Limits and Conditions for handling, storing and transport of radioactive material during radioactive waste management are adequately addressed. The Act and regulations under the Act also refer to working methods for waste minimization. The licence holder must have clear working procedures in order to avoid unnecessary transfer of objects and materials in the controlled areas. Radioactive waste management is covered also by the requirements of the Environmental Impact Assessment Act. This means that all possible hazards are considered in the EIA report.

ARTICLE 12. EXISTING FACILITIES AND PAST PRACTICES

Each Contracting Party shall in due course take the appropriate steps to review:

i. *the safety of any radioactive waste management facility existing at the time the Convention enters into force for that Contracting Party and to ensure that, if necessary, all reasonably practicable improvements are made to upgrade the safety of such a facility;*
ii. *the results of past practices in order to determine whether any intervention is needed for reasons of radiation protection bearing in mind that the reduction in detriment resulting from the reduction in dose should be sufficient to justify the harm and the costs, including the social costs, of the intervention.*

No changes since 2008. Radioactive waste sites in Paldiski and Tammiku are covered by the radiation practice licence and they are subject to regular inspections by the regulatory authority.

ARTICLE 13. SITING OF PROPOSED FACILITIES

1. Each Contracting Party shall take the appropriate steps to ensure that procedures are established and implemented for a proposed radioactive waste management facility:

- *i. to evaluate all relevant site-related factors likely to affect the safety of such a facility during its operating lifetime as well as that of a disposal facility after closure;*
- *ii. to evaluate the likely safety impact of such a facility on individuals, society and the environment, taking into account possible evolution of the site conditions of disposal facilities after closure;*
- *iii. to make information on the safety of such a facility available to members of the public;*
- *iv. to consult Contracting Parties in the vicinity of such a facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.*
- *v. In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 11.*

ARTICLE 14. DESIGN AND CONSTRUCTION OF FACILITIES

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

- *i. the design and construction of a radioactive waste management facility provide for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases;*
- *ii. at the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a radioactive waste management facility other than a disposal facility are taken into account;*
- *iii. at the design stage, technical provisions for the closure of a disposal facility are prepared;*
- *iv. the technologies incorporated in the design and construction of a radioactive waste management facility are supported by experience, testing or analysis.*

ARTICLE 15. ASSESSMENT OF SAFETY OF FACILITIES

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

- *i. before construction of a radioactive waste management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;*
- *ii. in addition, before construction of a disposal facility, a systematic safety assessment and an environmental assessment for the period following closure shall be carried out and the results evaluated against the criteria established by the regulatory body;*
- *iii. before the operation of a radioactive waste management facility, updated and detailed versions of the safety assessment and of the environmental assessment shall be prepared when deemed necessary to complement the assessments referred to in paragraph (i).*

ARTICLE 16. OPERATION OF FACILITIES

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

- *i. the licence to operate a radioactive waste management facility is based upon appropriate assessments as specified in Article 15 and is conditional on the completion of a commissioning programme demonstrating that the facility, as constructed, is consistent with design and safety requirements;*
- *ii. operational limits and conditions, derived from tests, operational experience and the assessments as specified in Article 15 are defined and revised as necessary;*
- *iii. operation, maintenance, monitoring, inspection and testing of a radioactive waste management facility are conducted in accordance with established procedures. For a disposal facility the results thus obtained shall*

be used to verify and to review the validity of assumptions made and to update the assessments as specified in Article 15 for the period after closure;

iv. *engineering and technical support in all safety-related fields are available throughout the operating lifetime of a radioactive waste management facility;*

v. *procedures for characterization and segregation of radioactive waste are applied;*

vi. *incidents significant to safety are reported in a timely manner by the holder of the licence to the regulatory body;*

vii. *programmes to collect and analyse relevant operating experience are established and that the results are acted upon, where appropriate;*

viii. *decommissioning plans for a radioactive waste management facility other than a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body;*

ix. *plans for the closure of a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility and are reviewed by the regulatory body.*

The waste management facilities at Paldiski/Tammiku existed before the Radiation Act was put into force in 1997. Consequently this law did not regulate the original design of the installations and the initial constructions. However, both sites are licenced and safety assessments have been performed. The licence for radioactive waste management in Paldiski have been updated during the period between 2 review meetings. The licence application for the Tammiku site is currently under review by the Environmental Board.

ARTICLE 17. INSTITUTIONAL MEASURES AFTER CLOSURE

Each Contracting Party shall take the appropriate steps to ensure that after closure of a disposal facility:

i. *records of the location, design and inventory of that facility required by the regulatory body are preserved;*

ii. *active or passive institutional controls such as monitoring or access restrictions are carried out, if required; and*

iii. *if, during any period of active institutional control, an unplanned release of radioactive materials into the environment is detected, intervention measures are implemented, if necessary.*

As stated in section B the Ministry of the Environment prepared the Development Plan, which was approved by the government on April 2008. The Development Plan has been prepared based on the Radiation Act and its implementing legislation. The Development Plan specifies priorities of radiation protection development until the year 2017 and the measures and guidance documents required for achievement of the established objectives.

Based on the Development Plan preparation of the technical documentation based on the chosen radioactive waste management strategies is started. This will be a starting point for the process preparing a basis for decisions concerning an Estonian disposal facility.

The Development plan concludes that action plan should be drawn up in order to reduce the risks associated with the treatment of radioactive waste. Development Plan specifies that the Ministry of the Environment as the responsible Ministry shall prepare the action plan. In order to prepare the action plan for radioactive waste management it is necessary to have an overview on possible waste streams which includes studies for decommissioning of facilities related to radiation practice as well as inventory data of radioactive waste and radioactive sources. In 2009 the Ministry initiated process to work out the methodology for evaluation of radioactive waste streams. It concluded with

the assessment of radioactive waste streams in 2010. The main outcomes were the following:

- there are two main waste streams in Estonia: institutional waste arising from radiation practice and decommissioning waste;
- non-characterized waste, mainly decommissioning waste, forms up to 81% of total waste volume;
- identified radionuclide composition: Sr-90 (65%), Cs-137 (18%) and Co-60 (16%);
- the total activity of short-lived radionuclides (half-life is equal or less than 30 years) decreases with 80 years about 90%;
- activity of long-lived radionuclides is about 1% of the total activity;
- waste amount arising from radiation practices will decrease in the future, while the amount of decommissioning waste will arise;
- uncertainties related to the volumes and activities of radioactive waste (both radioactive sources and decommissioning waste)

Additional outcomes of the assessment have been suggestions for future activities to establish waste clearance procedures, to work out measurement methods for characterization of decommissioning waste and to strengthen the legislative framework to control waste arising from future activities. With the information gained, in 2011 the Ministry of the Environment has started the preparation of the action plan for future activities in the field of radioactive waste management.

This initial process will make sure that all necessary steps are taken to implement fundamental principles and requirements for a disposal facility in compliance with national and international obligations and recommendations. Prior to siting, construction and commissioning of the Estonian disposal facility, the project should be subject to the environmental impact assessment according to the Estonian legislation which implements the European Council Directive 85/337/EEC and 97/11/EC. In addition, prior to the commissioning of a disposal facility the European Commission will be provided with general data relating to the disposal project making it possible for the Commission to assess whether the implementation of the project is liable to result in a radioactive contamination of the water, soil or airspace of another Member State as called for under the Article 37 of the Euratom Treaty.

Section I. Transboundary movement

ARTICLE 27.TRANSBOUNDARY MOVEMENT

1. Each Contracting Party involved in transboundary movement shall take the appropriate steps to ensure that such movement is undertaken in a manner consistent with the provisions of this Convention and relevant binding international instruments.

In so doing:

i. a Contracting Party which is a State of origin shall take the appropriate steps to ensure that transboundary movement is authorized and takes place only with the prior notification and consent of the State of destination;

ii. transboundary movement through States of transit shall be subject to those international obligations which are relevant to the particular modes of transport utilized;

iii. a Contracting Party which is a State of destination shall consent to a transboundary movement only if it has the administrative and technical capacity, as well as the regulatory structure, needed to manage the spent fuel or the radioactive waste in a manner consistent with this Convention;

iv. a Contracting Party which is a State of origin shall authorize a transboundary movement only if it can satisfy itself in accordance with the consent of the State of destination that the requirements of subparagraph (iii) are met prior to transboundary movement;

v. a Contracting Party which is a State of origin shall take the appropriate steps to permit re-entry into its territory, if a transboundary movement is not or cannot be completed in conformity with this Article, unless an alternative safe arrangement can be made.

2. A Contracting Party shall not licence the shipment of its spent fuel or radioactive waste to a destination south of latitude 60 degrees South for storage or disposal.

3. Nothing in this Convention prejudices or affects:

i. the exercise, by ships and aircraft of all States, of maritime, river and air navigation rights and freedoms, as provided for in international law;

ii. rights of a Contracting Party to which radioactive waste is exported for processing to return, or provide for the return of, the radioactive waste and other products after treatment to the State of origin;

iii. the right of a Contracting Party to export its spent fuel for reprocessing;

iv. rights of a Contracting Party to which spent fuel is exported for reprocessing to return, or provide for the return of, radioactive waste and other products resulting from reprocessing operations to the State of origin.

The Government has issued the Regulation No. 243 of 8 July 2004 (as amended in 2009) on international transfer of radioactive waste. This Regulation implements all obligations under Article 27 (Transboundary movement) of the Convention. The regulation is the Estonian implementation of Council Directive 92/3/EURATOM of 3 February 1992 on the supervision and control of shipments of radioactive waste between Member States and into and out of the Community.

Neither the Ministry of the Environment nor the Environmental Board has until now never received an application and consequently has never issued any licence for a transboundary movement of radioactive waste with Estonia as the country of origin or with Estonia as the country of destination. Since issuance of the above-mentioned Regulation there has also been no authorisation for transboundary movement of radioactive waste between EU-countries with Estonia as a country of transit.

Section J. Disused sealed Sources

ARTICLE 28. DISUSED SEALED SOURCES

1. Each Contracting Party shall, in the framework of its national law, take the appropriate steps to ensure that the possession, remanufacturing or disposal of disused sealed sources takes place in a safe manner.

2. A Contracting Party shall allow for reentry into its territory of disused sealed sources if, in the framework of its national law, it has accepted that they be returned to a manufacturer qualified to receive and possess the disused sealed sources.

The use of sealed radioactive sources in industry, hospitals and laboratories is covered by the Radiation Act and several regulations. These legal documents implement all obligations under Article 28 of the Convention ensuring that the possession and storage of disused sealed sources take place in a safe manner. The Radiation Act requires that there is prior authorization for holding the source for all practices involving the use of radioactive sources. This licence is given upon a written application. General conditions are laid down in the Radiation Act and regulations. All premises where radioactive sources are employed are inspected regularly at least once in 5 years by the Environmental Inspectorate or by the Radiation Safety Department of the Environmental Board. For high-risk radiation practices the inspection is conducted once a year. For sealed sources, which are not high-activity radiation sources, the inspection frequency is normally once in 3 years. The main objective of an inspection is to validate that radioactive sources are used and stored safely and other conditions set in the radiation practice licence are followed. Any changes must be notified to the licence provider. Licensing and source information is stored in a database maintained by the Radiation Safety Department of the Environmental Board and every year the licence holder has the requirement to provide the data about the inventory of the sources to the Radiation Safety Department of the Environmental Board. When new sources are authorized for use, it is required according to the Radiation Act that the applicant has also to present a plan on measures to be taken when it becomes a disused source. As stated in section F it is the responsibility of the licence holder to ensure that disused sealed sources are handled in a safe manner and finally either returned to the manufacturer or sent to the A.L.A.R.A. Ltd at Paldiski. The first option is preferred. In Estonia neither manufacturing nor re-manufacturing of sealed sources takes place.

If the origin of waste is unknown, like in case of orphan sources, the State has the obligation to render the radioactive waste harmless. In such case, the licence holder – if identified later – shall compensate the State for the costs incurred in such action.

Fixed monitors for vehicles and railway traffic have been installed to all major crossing points at the Estonian-Russian border and at the Tallinn Airport. In all crossing points the custom officers are equipped with portable monitors. Biggest scrap metal companies have installed fixed monitors at the gates of their installations. In exceptional cases the Radiation Safety Department of the Environmental Board should be notified.

Section K. Planned Activities to Improve Safety

Estonia as a EU Member State shall bring into force the laws, regulations and administrative provisions for transposition of the Council directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installation. As Estonia has no specific nuclear safety law and regulatory infrastructure, the Ministry of the Environment has decided to prepare an amendment of the Radiation Act to enforce the necessary provisions as far as reasonably achievable. In Estonia, the provisions of the Directive apply directly to the Paldiski site with its closed nuclear reactors and the temporary storage facility for legacy radioactive waste on the same site.

The corresponding draft amendment has been prepared and it is currently in the procedure of the Riigikogu (Parliament). The amendment includes the following:

- The terms ’nuclear safety’ and ’nuclear facility’ are added to the Article 6 of the Act.
- The commitments of the practice licence holder on commissioning of the nuclear facility are listed in the Article 30^{2}. The licence holders are required to ensure the implementation of nuclear safety measures and to follow the corresponding provisions. Specifically is stressed the commitment of the licence holders to establish the systems of nuclear and radiation safety culture and quality assurance, as well as the system for periodical self-assessment of safety of their facilities.
- Subsection 3 is added to Article 32, which specifies the requirements to the quality assurance system of radiation safety in the nuclear facility. E.g., requirements on the description of activities and the corresponding control systems to ensure nuclear safety, on the analysis of working duties, qualification and training of exposed workers, as well as on procurement, use and clearance of equipment and materials.
- A new article (Article 18^{1}) is added to amend the Radiation Act, which sets out the requirements for financial guarantees to render radioactive substances, an apparatus containing radioactive substance and radioactive waste harmless.

Radiation Act as it will amended 2011 will entry into force by the end of year 2011.

In addition, a review of implementation of the Development Plan has begun to specify new activities for the next four years (2012-2015) like preparing action plan for radioactive waste management, activities to improve radiological emergency preparedness planning and response.

Annex A. Estonian Legislation – Spent Fuel and Radioactive Waste

The Estonian legislation listed below is in force per 1 October 2011. The legislation is available in Estonian (and partly in English) at the web site of the Radiation Safety Department of the Environmental Board: www.kiirguskeskus.ee; the Ministry of Justice http://www.just.ee/23295, the electronic database of the "Elektrooniline Riigi Teataja" www.riigiteataja.ee (in Estonian), etc.

Acts:

- Radiation Act, entered into force in 1 May 2004, as amended in 22 February 2005, 10 May 2006, 7 December 2006, 24 January 2007, 18 December 2008 and 15 June 2009, 16 September 2009
- Emergency Act, enforced in 15 June 2009, as amended in 26 November 2009, 5 May 2010 and 21 October 2010
- Environmental Impact Assessment and Environmental Management System Act, passed 22 February 2005, as amended in 7 December 2006, 21 February 2007, 19 June 2008, 18 December 2008, 27 January 2010 and 26 October 2010

Regulations of the Government:

- Regulation No. 163 of 30 April 2004, as amended in 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 in 15 January 2009 and 10 December 2009: 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 in 15 January 2009 and 01 August 2011: Statutes for the Maintenance of the State Dose Register of Exposed Workers
- Regulation No. 92 of 1 July 2010: Order 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: 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 in 31 May 2006 and 21 January 2009: Time Limits for Proceedings to Issue, Amend or Revoke the Radiation Practice Licences, the Specific Requirements for and Format of Applications for Radiation Practice Licences, and the Format of Radiation Practice Licences
- Regulation No. 86 of 8 July 2004, as amended in 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 in 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 in 31 May 2006: Requirements for the Rooms Where the Radiation Sources Are Situated and for Labeling Thereof and for the Working Rules for the Performance of Radiation Practices
- Regulation No. 127 of 12 October 2004, as amended in 21 January 2009: The Format of Activity Licences of Qualified Experts and Applications Therefore and the Procedure for the Issue, Extension, Suspension and Revocation of Activity Licences
- Regulation No. 8 of 9 February 2005, as amended in 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 in 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 in 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. 5 of 19 January 2009. as amended in 1 October 2010, 1 August 2011: Statute of the Environmental Board
- Regulation No. 53 of 17 September 2010, as amended in 30 June 2011: Structure and Personnel of the Environmental Board
- Regulation No. 50 of 30 July 2002, as amended in 21 August 2003, 15 May 2008 and 26 March 2010: Establishment of National Environmental Monitoring Stations and Areas

Regulations of the Minister of the Interior:

- Regulation No 15 of 8 June 2010: The Guidelines for Preparing An Emergency Plan
- Regulation No 5 of 18 February 2010, as amended in 13 April 2010 and 09 November 2010: The Guidelines for Preparing An Emergency Risk Assessment

Annex B. National Reports and Other Documents

National Reports

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

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Other

- National Radiation Safety Development Plan 2008-2017, Tallinn, 2008.

http://www.envir.ee/381029

- National Development Plan of the Energy Sector until 2020, Tallinn, 2009. http://www.legaltext.ee (In English)