

# **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

Environmental Board, Radiation Safety Department, Estonia  
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## 1. Foreword

The Convention on Nuclear Safety came into force for Estonia on 4 May 2006. The present report is the Estonian National Report to the Sixth Review Meeting of the Convention. This report gives an outline 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.

Estonia is a state with foreign nuclear power plants close to its borders. 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". Because 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). The handling of radioactive waste shall be reported to that Convention accordingly. 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. Consequently the reporting about the Paldiski facility and its developments will be presented in the reports to the Joint Convention and not to the Nuclear Safety Convention.

At present the interest of Estonia in nuclear safety is primarily related to the safety of nuclear installations in the neighbouring 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. The National Development Plan of the Energy Sector until 2020 (endorsed by the Riigikogu in June 2009, Annex C) foresees the development of legal framework for use of nuclear energy. Nevertheless, the planned specific activities in the field have not started or have been delayed.

Estonia is a member state of the European Union from 1st May 2004. Thus, the EU regulations in the field have been transposed to the national legal and administrative framework in Estonia. When necessary the Estonian acts and regulations are 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, the Radiation Act. Based on discussion with European Commission the directive applies to the Paldiski facility and radioactive waste storage that is on the same site. The Radiation Act was amended with relevant definitions, decision on principle, obligations of the licence holder of the nuclear installations and quality assurance requirements to ensure radiation safety. However, if the Estonia decides to use nuclear energy, the relevant nuclear legislation is required.

The present report to the Sixth Review Meeting of the Nuclear Safety Convention 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 1<sup>st</sup> National Report 2007 and described in the present Report are the following: the reorganisation of the regulatory authority and the major upgrade of the legal framework for emergency response.

The report is prepared by the Environmental Board under the Ministry of the Environment.

In summary, the main conclusions of the Report are the following:

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

## 2. General Provisions

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.

There are no nuclear facilities according to the definition given in the Convention in Estonia. However, Estonia is surrounded by nuclear power plants in the neighbouring countries: Loviisa NPP in Finland, Leningrad NPP in Russia and Ignalina NPP in Lithuania (in 2009 the latter was shut down for decommissioning). This means that Estonia has a necessity to prepare and to test plans for response in the case of possible emergency situations with transboundary impact. Estonia has found it important to join the principles laid down in the Nuclear Safety Convention in order to protect the local population and the environment.

Although Estonia is not a nuclear state in the terms of the Convention, the Annex A of the Report gives a brief overview on the shut-down nuclear submarine reactors in the Paldiski site and on the legal regime controlling this activity. As spent nuclear fuel was transported to Russia and the site is under decommissioning, any further information about these nuclear installations will be included in the report to the Joint Convention.

## 3. Compliance with Articles 4 to 19 – 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. 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 Auditing Act states that 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 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.

### **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.*

There are no nuclear facilities according to the definition given in the Convention 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 licence;*
- iii. a system of regulatory inspection and assessment of nuclear installations to ascertain compliance with applicable regulations and the terms of licences;*
- iv. the enforcement of applicable regulations and of the terms of licences, including suspension, modification or revocation.*

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 amendment was enforced in 2009, when the majority of functions of the regulatory authority from the Ministry of the Environment were transferred to the new governmental body within the area of government of the Ministry of the Environment, the Environmental Board (est., Keskkonnaamet). The list of Acts, Regulations, etc., in force on 12 August 2013 is given in Annex B.

The Estonian legislative and regulatory system also implements all legislative requirements with regard to the Treaty Establishing the European Atomic Energy Community (Euratom).

The main legal document in the field of radiation safety is the Radiation Act (as last amended in November 2011). The licensing system for practices is prescribed in Sections 3 of the Act. The use of radiation requires a radiation practice licence, which is granted by the Environmental Board upon application. The granting of a radiation practice licence can be subject to additional conditions needed to ensure safety. In addition, the cases are identified, when a licence is not required, e.g. when the use of radiation or a device is exempted by law.

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 licence to operate a nuclear installation can be applied only after the Estonian Parliament has made the decision to take a nuclear installation into use.

### **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.*

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.

According to the amendment in 2009 to the Radiation Act, the Environmental Board (est., Keskkonnaamet) 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. E.g., 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.

According to the regulation of the Ministry of the Environment, the Environmental Board has the following duties in the field of radiation safety:

- to participate in the development and implementation of the radiation protection policy, development plans and programs;
- to advise the regulatory authorities in radiation protection;
- to perform licensing of radiation practices;
- to evaluate the radiation safety of 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 (state registry of the the doses of radiation workers; registries of the radioactive sources, nuclear material and radioactive waste);
- 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 analyses related to radiation safety;
- to perform assessment of public exposures;
- 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.

Both the Environmental Board and the Environmental Inspectorate have their own budget based on the annual national Fiscal Act.

### **Article 9. Responsibility of the licence holder**

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

The Radiation Act provides the following principal obligations of a licence holder to:

- (1) be responsible for radiation safety and to guarantee the physical protection of radiation sources in the holder's possession;
- (2) prepare the rules necessary for performing radiation practices and instructing exposed workers;
- (3) 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;
- (4) 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;

- (5) provide training and radiation safety instruction for exposed workers commensurate with the nature of their work and workplace conditions;
- (6) organize the medical examination of exposed workers;
- (7) upon a change of ownership of a radiation source, provide the new owner with comprehensive information to ensure radiation safety;
- (8) 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;
- (9) alleviate the consequences of emergencies;
- (10) ensure the regular control and calibration of measuring instruments used and be responsible for their fitness for use and appropriate use;
- (11) ensure the monitoring of doses incurred by exposed workers and submission of the obtained information to the dose registry;
- (12) 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;
- (13) 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;
- (14) provide certification, at the request of competent authorities, of the legality of the possession of radioactive substances or radiation apparatuses containing radioactive substances;
- (15) 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;
- (16) improve the technologies, equipment and techniques used;
- (17) develop and implement a quality system of radiation safety.

According to the amendment in 2011 to the Radiation Act (based on Council Directive 2009/71/Euratom), in addition, the licence holder of the nuclear installation has to:

- (18) ensure implementation of nuclear safety measures and compliance with relevant requirements;
- (19) ensure that the employees of the nuclear installation and sub-contractors follow the nuclear safety culture and the quality assurance system of radiation safety on their jobs;
- (20) assess nuclear safety of the nuclear installation at least as often as it is set out in the conditions of the radiation practice licence;

To enhance radiation safety, the Act authorizes a possibility to establish additional requirements to a radiation practice licence. The 2011 amendment to 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.

It is the responsibility of the Environmental Board to verify that the licensee fulfils the regulations. The license holders are subjected 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 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:

- (1) the activity, for which the radiation practice licence is applied, involves or is likely to involve a risk to national or international security;
- (2) the activity, for which the radiation practice licence is applied, does not conform to the requirements provided by legislation;
- (3) false information is submitted in the application for the radiation practice licence;
- (4) the applicant for the radiation practice licence does not employ exposed workers with requisite professional training;
- (5) the location of the radiation practice set out in the application or other conditions do not allow for compliance with radiation safety requirements;
- (6) the applicant for the radiation practice licence does not present the financial guarantee in required amount and conditions.

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.*

Requirements on qualifications of and educational programs for staff-members involved with safety issues are included in the radiation practice licence. 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. In a licence application the applicant shall provide the information on the competence of persons working with radiation.

### **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 licences 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 licence shall include the description of the radiation safety quality system, the performance of which is assessed by the Environmental Board in the licensing process. Article 32 provides that the quality system of radiation safety shall include the following:

- (1) planned and systematic activity aimed at 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) a description of procedures for the supply and use of materials, and of procedures for supervision over radiation safety and controlling the functioning of safety systems.

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

The majority of radioactivity analysis activities are accredited and the Quality Manual for the Laboratory of Radiation Safety Department of the Environmental Board is approved by the Estonian Accreditation Centre.

#### **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 licence 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 are provided in the Radiation Act:

- (1) All new radiation practices shall 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 and 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 optimisation, 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 for exposed workers and members of the public. This principle does not apply to the medical exposure.

Limits of the effective dose are the following:

- (1) for exposed workers 100 mSv in 5 years, but no more than 50 mSv in one year;
- (2) members of the public 1 mSv in 1 year.

## **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, bases on the Emergency Act passed 15 June 2009 (last amended in October 2012). 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 Defence Forces and the National Defence 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 (Articles 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, organisation of psychological defence, basis and conditions and procedure of declaring a 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 also 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 Defence Forces or the Defence 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 organising of their continuous operation.

The Ministry of the Interior shall (Article 36):

- (1) co-ordinate 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 (Article 38) and the continuous operation plan of vital services (Article 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).

Article 34 of the Emergency Act stipulates that the Ministry of the Environment shall, among other tasks, organise 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 Article 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 optimised 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 (Article 57)

Environmental Board shall ensure the work of the system of early warning of the radiation risk. In emergency situation, Environmental Board acts as an adviser to the government and to the response organizations on the matters concerning radiological and nuclear safety.

The operative organisation in the case of a radiological emergency is based primarily on the Rescue Board.

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 sections as follows:

- organisation of response to radiological emergency;
- management structure of response to emergency;
- duties of institutions and persons participating in response to radiological emergency;
- organisation of exchange of information;
- organisation of notification of public;
- organisation of international cooperation upon responding to radiological emergency;
- organisation of compensation of expenses;
- 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.

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 neighbouring states, e.g. Finland, Latvia, 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 neighbouring countries is also received automatically in Estonia based on an agreement among the Council of Baltic Sea States.

As a supplement to the early warning agreements, an Estonian on-line system for automatic monitoring of radioactivity is in service 24 hours a day. The system consists of 10 gamma monitoring stations placed strategically in the country (Figure 1).

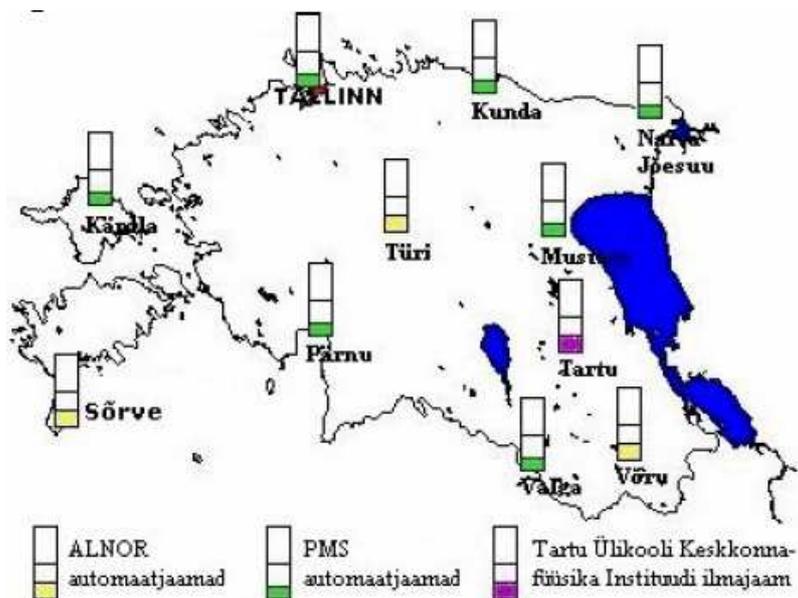


Figure 1. On-line automatic gamma dose-rate monitoring stations for early warning in Estonia.

The data from the stations is collected automatically at the Environmental Board. 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 one hour) are stored in the ARGOS computer system installed in the Radiation Safety Department of the Environmental Board. 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. ARGOS was originally developed by the Danish Emergency Management Agency (DEMA) in association with the Prolog Development Centre Inc. The ongoing development and maintenance of the ARGOS system is now managed by an international consortium. The system is regularly updated, so that any lesson learned from exercises or from uses in emergency can be incorporated into operational systems.

Under the co-operation programme „Enhancing Public Environmental Monitoring Capacities” between the Republic of Estonia and Swiss Confederation the Environmental Board is carrying out the project „Upgrading of Radiation Monitoring in Estonia“. Environmental Board's purpose is to acquire at least 15 spectrometric monitoring stations. According to the timetable the project will end and new stations will be at work by the end of 2013. The main purpose of the project is to upgrade the existing radiation monitoring system (early warning system) in Estonia, replacing old monitoring stations that are reaching their end of reliable service period and the central data collection unit with modern reliable components and communication system.

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. The weekly filters

with deposited radioactivity from these stations are analysed by the laboratory of the Environmental Board to determine the radionuclide content in the out-door air.

Early notification of a nuclear accident occurring abroad is received in Estonia via the ECURIE system of the European Community or via the IAEA USIE notification system or via 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.

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 2010. Arrangements are in place to inform the public of the emergency, its consequences and of 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 response to a radiological emergency. National Radiation Safety Development Plan 2008-2017 includes also the requirement to conduct joint emergency exercises at least once per year which at least involves several agencies and, if possible, radiation practice licence 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 including in addition to the Field Exercise also a Command Post part (EU CREMEX 2011; acronym from EU Chemical and Radiological Emergency Management Exercise 2011). In order to fully test the whole crisis management system implemented in Estonia, the exercise was conducted in two different places in Estonia with a very complicated CBRN scenario involving all relevant authorities who have their role in Estonia in responding to Chemical and Radiological incidents.

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 the accident in Loviisa Nuclear Power Plant in Finland. 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 opinion that Estonia has established an operational emergency preparedness and response capability based on an integrated all hazard approach including radiological emergencies. However mission team gave a list of recommendations for further developments.

### **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 also following:

- 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 of 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 fuel or radioactive waste.

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.

### **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 (defence 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 licence 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, there are no nuclear facilities in Estonia.

## **4. Concluding summary on the fulfilment of the obligations**

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.

## **5. 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. The National Radiation Safety Development Plan 2008-2017 (see Annex C), which has been endorsed by the government after multiple delays due to active discussions in 2008, 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 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) ensuring optimised use of radiation in medicine;
- (5) creation of the optimised radiation safety ensuring system in the country.

One part of this document is dedicated to emergency preparedness. Several technical and organizational upgrades are planned to establish a modern fully functioning radiological emergency response system. The upgrading and improvement of the existing Estonian on-line system for early warning and for automatic radioactivity monitoring is currently in progress and according to the schedule should be finalized by the end of 2013.

## Annexes

- A. Nuclear Facilities Under Decommissioning
- B. Estonian Legislation – Radiological and Nuclear Safety
- C. National Reports and Other Documents

### **Annex A. Nuclear Facilities Under Decommissioning**

Near Paldiski, North Estonia, is the site of the former USSR nuclear submarine training centre, which presently is 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 MW<sub>th</sub> reactor was commissioned in 1968. The reactor was in operation during about 20,000 h until January 1989. In 1983 the 90 MW<sub>th</sub> PWR reactor was commissioned. This reactor was in operation for about 5,300 h until December 1989. Table 1 presents main available data of the reactors.

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 1995 the work on monitoring, dismantling, decommissioning, decontamination and dismantling of the Paldiski facilities is in progress. Site is under administration of the Radioactive Waste Management Agency A.L.A.R.A. Ltd

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

## ***Annex B. Estonian Legislation – Radiological and Nuclear Safety***

- The Estonian legislation listed below, in force as of 12 August 2013. Texts of the legislative acts are available on the following web sites:the Environmental Board:
- [www.keskkonnaamet.ee](http://www.keskkonnaamet.ee) (in Estonian and partly in English);the Ministry of Justice: <http://www.just.ee/23295>:
- electronic database of the “Riigi Teataja” - The State Gazette: [www.riigiteataja.ee](http://www.riigiteataja.ee) (in Estonian), etc.

### Acts:

- Radiation Act, entered into force 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 and 27 October 2011
- Emergency Act, enforced 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 and 17 October 2012
- Environmental Impact Assessment and Environmental Management System Act, passed 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 and 6 December 2011

### 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 and 6 June 2013: 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 and 21 January 2009: 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: 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 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. 5 of 19 January 2009, as amended on 17 September 2010, 30 June 2011, 30 November 2012 and 22 May 2013: 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

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

## **Annex C. 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.  
[http://www.keskkonnaamet.ee/public/kiirgus/JC\\_viimane2009.pdf](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. 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, Radiation Safety Department, Environmental Board, Estonia  
[http://www.keskkonnaamet.ee/public/kiirgus/3rd\\_JCReport\\_Estonia.pdf](http://www.keskkonnaamet.ee/public/kiirgus/3rd_JCReport_Estonia.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. Forth Review Meeting, April 2007, Estonian Radiation Protection Centre.  
[http://www.keskkonnaamet.ee/public/kiirgus/Estonian\\_report\\_2007.pdf](http://www.keskkonnaamet.ee/public/kiirgus/Estonian_report_2007.pdf)
- Convention on Nuclear Safety. 2<sup>nd</sup> 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](http://www.keskkonnaamet.ee/public/kiirgus/EST_CNSreport_5thRM_2010.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](http://www.keskkonnaamet.ee/public/kiirgus/National_Report_2nd_Extraordinary_Meeting_CNS.pdf)

### Other

- National Radiation Safety Development Plan 2008-2017, Tallinn, 2008.  
<http://www.envir.ee/1171547>
- National Development Plan of the Energy Sector until 2020, Tallinn, 2009.  
<http://www.legaltext.ee> (In English).
- 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.  
[http://www.keskkonnaamet.ee/public/Final\\_EPREV\\_Report\\_1.pdf](http://www.keskkonnaamet.ee/public/Final_EPREV_Report_1.pdf)