

# **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*

Estonian Radiation Protection Centre  
Forth Review Meeting  
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## 1. Foreword

The Convention on Nuclear Safety came into force for Estonia on 4<sup>th</sup> May 2006. The present report is the Estonian National Report for the Fourth Review Meeting to 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. Estonia is therefore, 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 2 shut down nuclear submarine reactors in long term storage stage in Paldiski. Spent fuel was sent back to Russia. 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. Consequently the reporting about Paldiski installation will be directed to the Joint Convention instead of the Nuclear Safety Convention.

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

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 report is prepared by the Estonian Radiation Protection Centre under the Ministry of the Environment.

The present report to the Fourth Review Meeting of the Nuclear Safety Convention provides a description of the Estonian legal regime and the implemented administrative and technical measures related to nuclear safety and emergency preparedness. It is concluded that:

- the Estonian nuclear and radiation regulations fulfill 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 neighboring countries: Loviisa NPP in Finland, Leningrad NPP in Russia and Ignalina NPP in Lithuania. This means that Estonia has the need to prepare and test plans for the emergency situations. Estonia found it important to join the principles put down in the nuclear safety convention in order to protect population and environment.

Although Estonia is not a nuclear state in the terms of the Convention, the report annex gives overview of the shot down nuclear submarine reactors in Paldiski site and the legal regime controlling this activity. The spent nuclear fuel was sent back to Russia and the site is under decommissioning and consequently any further information about the nuclear installations will be included in the reporting to the Joint Convention.

### 3. Compliance with Articles 4 and 6 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, also the responsibilities of the licensees are written down in the Radiation Act. The second paragraph of the Radiation Act states that no radiation practice should not be started with out having a license. Due to the fact that there are no nuclear installations under the convention definition present in Estonia and there are no plans for building own of them, the questions related to nuclear safety are not written down in the Act in a great detail. The Environmental Impact Assessment and Auditing Act states that Environmental impact shall be assessed in 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 this obligation is 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. the report annex gives overview of the shot down nuclear submarine reactors in Paldiski site and the legal regime controlling this activity. The site is under decommissioning and consequently any further information about the nuclear installations will be included in the reporting 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 was established in 1997. Since then, a new Radiation Act came into force in 2004 and several amendments and new regulations have been issued. Acts, Regulations etc. in force (1 September 2007) 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 instrument is the Radiation Act. The licensing system for practices is described in Sections 3 of the Act. The use of radiation requires a safety licence, which can be granted by the Ministry of the Environment upon application. A safety licence can be subject to extra conditions needed to ensure safety. In addition, the cases where a licence is not needed are identified, e.g. when the use of radiation or a device is exempted.

Under the Radiation Act (2004) nuclear installations are subject to authorization by the Minister of the Environment and installations are subject to inspection by the Environmental Inspectorate.

#### *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 fulfill 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.*

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

The Nuclear Regulatory Authorities according to the Radiation Act is the Ministry of the Environment. In the act it is also stated: The performance of activities related to radiation protection shall be organized by the Ministry of the Environment within the limits of its competence through the Environmental Inspectorate and the Estonian Radiation Protection Centre (ERPC).

According to the regulation of the Ministry of the Environment, ERPC has the following duties:

- participation in the preparation and organization of the radiation protection policy, development and financial plans;
- advising the regulatory authorities in radiation protection;
- checking the applications and analyzing the safety assessments for the radiation practices and preparation of proposals to issue or refuse the licence;
- keeping the archive of the documents concerning the radiation practice licenses;
- keeping the registry of the radiation practice licenses on the paper and also electronically;
- participation in the preparation of the legislation concerning the radiation protection;
- keeping the state registry of the the doses of radiation workers;
- keeping the registry of the radioactive sources, nuclear material and radioactive waste;
- assessment to the import-, export and transit applications, making proposals for issuing or refusing the licenses and gives if required information to the international organizations;
- giving out the materials to consult the licensees in order to increase the safety of the activities according to good practices;
- checking during the license granting process that the presented documentations is in accordance with the real situation on site and in the case of non accordance informs the Environmental Inspectorate about the case;
- preparing the reports according to international agreements and EU legislation;
- contact point for EURATOM and IAEA;
- co-operating with other national and international organizations in radiation protection questions ;
- organizing the monitoring of the radionuclides in the air, soil, water and food; analyzes these results;

- organizing the assessments of the doses from radiation activities for the population;
- laboratory analyzes for the radionuclides;
- participation in preparation of the emergency plan for the radiation emergency, in the testing of that plan and also participates in the real emergency case;
- participation in the training of radiation protection officers;
- responsible for the early warning system;
- publication of the results of the monitoring and providing information about the dangers of radiation and protection measures;
- organizing the radiation protection trainings and prepares the training materials;
- according to CTBT agreement fulfills the NDC responsibilities;
- answering to all requests/proposals made in the field of radiation protection.

Estonian Radiation Protection Centre has access to all premises during the licensing process and Environmental Inspectorate has direct access to all premises, buildings etc. for inspection purposes and to withdraw licensees and stop operations in case of unsecured situations.

*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 states the principal obligations of the licence holder:

- 1) be responsible for radiation safety and guarantee the physical protection of the 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 Estonian Radiation Protection Centre 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 Estonian Radiation Protection Centre and the Alarm Centre of the Rescue Board of accidents which take place in the course of radiation practices and of events of exposure in 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 the 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 radiation safety quality system.

The Radiation Act gives the possibility to write additional requirements into radiation practice licence.

It is the responsibility of the Estonian Radiation Protection Centre to verify that the licensees fulfill the regulations. The license holders are subjected inspections by the Environmental Inspectorate and their license can be redrawn for a period until the corrective measures requested are fulfilled. The verification is carried out through safety reviews and assessments as well as inspection programs (carried out together with Environmental Inspectorate). Ultimately the punishment for violations of this Act and/or provisions is penalties. As a precondition for granting a radiation activity licence for the use of radiation the Radiation Act requires that the applicant presents a valid proof on safe management of any radioactive waste, which may be generated. Radiation Act provides that the responsible party shall organize the practice so that it meets all radiation safety requirements prescribed in the Act and 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 resulting health or environmental hazards requires action. According to the Act, in utilization of natural resources containing radioactive materials, the responsible party shall ensure that radioactive wastes do not pose any health or environmental hazards during the operations, including the final stages.

The Radiation Act states that the Ministry of the Environment 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.

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. No additional steps are required in Estonia for implementation of the obligations under this Convention.

#### *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 provide to the Ministry of the Environment radiation safety assessment and measures for 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 working with safety issues are included in Operational Licence. Section 3 of the Radiation Act prescribes that the responsible party is required to ensure that in safety related matters of the operations the expertise is available, taking into account the nature and the risks posed by the operation. The responsible party can appoint a special radiation safety officer. In a licence application the applicant shall

provide information on the competence of the persons working with radiation.

Both Estonian Radiation Protection Centre and Environmental Inspectorate have their own budget based on the annual Fiscal Act.

#### **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. Paldiski site is covered by 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. A radiation safety quality system shall set out 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 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.

ERPC own Quality Manual is under preparation. Part of the measurement activities are accredited and Quality Manual for laboratory is approved.

#### **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.*

All practices are continuously monitored, as Estonian Radiation Protection Centre and Environmental Inspectorate work out together the inspection plan for every year. Due to the requirements of the Radiation Act, the 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 given in Radiation Act and are following:

- (1) All new radiation practices must be justified in advance by their economic, social or other benefits in relation to the health detriment they may cause. Such justification shall be reviewed whenever new 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 the 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 medical exposure. Limits of the effective dose are following:

for exposed workers	100 mSv in 5 years, but no more than 50 mSv in one year
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.*

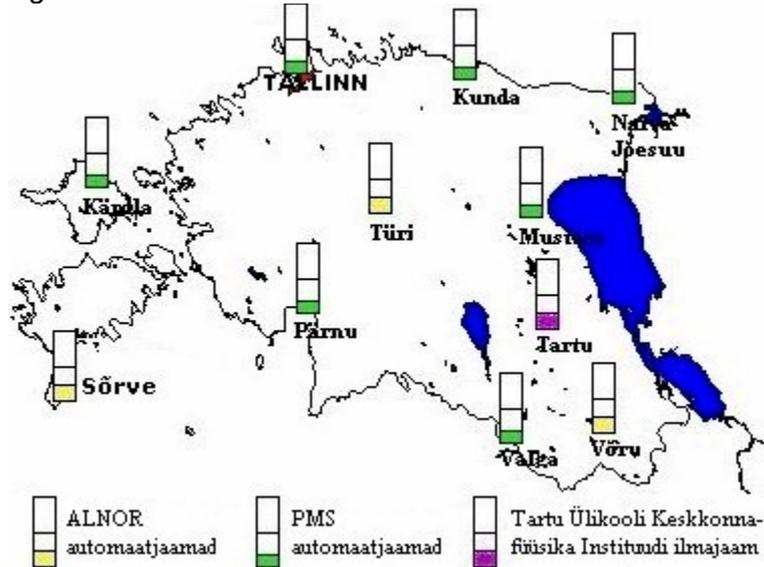
*3. Contracting Parties which do not have a nuclear installation on their territory, insofar as they are likely to be affected in the event of a radiological emergency at a nuclear installation in the vicinity, shall take the appropriate steps for the preparation and testing of emergency plans for their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

The Estonian Emergency Preparedness System for Nuclear Accidents is under the responsibility of The Minister of Interior. The operative organisation is based primarily on the Rescue Board. The Emergency Preparedness Act (2000) defines the need for the National Crisis Management Plan (NCMP, 2002; revised 2007) which was followed by the detailed implementation procedures including the development of information channels. Each ministry has to have its own crisis management plan, which are integrated into the NCMP developed by the Ministry of Internal Affairs. The Ministry of the Environment has crisis management plan which covers emergencies in its government area. The ERPC acts as an adviser to the government and response organizations. Responsibility of licensees also include preventing or reducing the release of radioactive material and exposure of workers and the public.

National Crisis Management Plan has special precautions for nuclear installations close to Estonian territory and is going through the revision process. Early warning in case of a radiological emergency in Estonia or at a facility in the vicinity of Estonia is based on international agreements on exchange of information and on bilateral agreements, which Estonia has entered with a number of neighbouring states (Finland, Latvia, Sweden). Estonia is Contracting Party to the International Convention on Early Notification of a Nuclear Accident and 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 accident situations apply in Estonia. Radiation monitoring data from neighbouring states is also received automatically every day based on an agreement among Council of Baltic Sea States.

As a supplement to the early warning agreements an on-line system for automatic monitoring of radioactivity is in service 24 hours a day (Figure 1). The system provides monitoring data from 10 stations placed strategically in the country. The data is collected automatically at the Estonian Radiation Protection Centre, where a computer will give a signal to the officer on 24 hours duty if any increase in gamma radiation could be attributed to causes other than natural increase of the radon content in the air. The data from all the monitoring systems are stored in the ARGOS computer system for decision-making and management support in nuclear emergency situations, which calculates and presents doses in the affected areas. ARGOS also includes a prognostic model based on actual meteorological data. ARGOS was originally developed by the Danish Emergency Management Agency (DEMA) in association with Prolog Development Centre Inc. Ongoing development and maintenance of the system is now managed by an international consortium. The ARGOS system allows prognostic, measurement, agricultural and meteorological data to be viewed and overlaid in a geographic information system. The system is updated regularly so that any lessons learned from exercises or emergency use can quickly be incorporated into operational systems.

Figure 1. Early warning stations in Estonia



Early notification of a nuclear accident abroad would be received in Estonia through European Community (ECURIE) or IAEA (EMERCON) or from both. ERPC is the National Warning Point and the National Competent Authority in Estonia for any kind of situation which might result in actual or potential deterioration of radiation safety of the population, environment or society. ERPC has an expert on duty for 24 hours a day, in order to be able to immediately give advice to local and governmental authorities on needed emergency response actions.

Communication systems and arrangements for exchange of early notifications are tested regularly. A detailed program of testing for the ECURIE arrangements is coordinated by the European Commission. Equivalent arrangements are in place to test the EMERCON notification system coordinated by the IAEA. It is recognised that international cooperation on exercises is essential. Estonian authorities regularly participate in international exercises such as those in the INEX and those coordinated by the IAEA. On the more regional scale Council of Baltic Sea States has its own agreements about the information exchange in the case of emergency and testing of the communication systems is done regularly.

Measures to keep the public informed about a nuclear accident or emergency are addressed in the Radiation Act. 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. The information booklet about emergency planning arrangements was published in 2004 in Estonian and Russian. The booklet was distributed and is also available on the website of ERPC.

Radiation Protection Action Plan (under preparation) includes also the requirement that joint emergency exercises should be conducted at least once per year.

#### 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 Auditing Act states that Environmental impact shall be assessed in 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.

Siting will be one of the topics of the assessment.

#### **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. Construction of nuclear facilities is not planned in the foreseeable future.

#### **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 as there are no nuclear installations 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 Estonian regulations and practices continue to be in compliance with the obligations of the Convention.

#### **5. Planned activities to improve safety**

As Estonia does not have nuclear installations according to the Convention of Nuclear Safety, for us the main question is emergency planning. There is in the preparation the radiation protection action plan for next 10 years, which will be base for the future planning in radiation protection and nuclear safety. One part this document is dedicated to the emergency planning. Several technical and organizational upgrades are planned to provide functioning emergency response system. The action plan approval has been delayed due to the active discussions, however it should be approved by the government in the near future.

## Annexes

- Nuclear facilities under decommissioning
- Estonian Legislation – Nuclear Safety

### **Annex A. Nuclear facilities under decommissioning**

In Paldiski is the former USSR nuclear submarine training centre, which is in the process of being decommissioned. The nuclear facility Paldiski was established in the early 1960' for training the USSR navy personnel for the operation of submarine nuclear reactor's systems. Two full-sized PWR type reactors were installed. The reactors were close analogues of those operated on real nuclear submarines of the Echo and Delta classes. The operating nuclear propulsion system with their complete power transmission to propeller shafts and the corresponding hydraulic brake systems has been used as training stands. The first-generation 70 MW<sub>th</sub> reactor was commissioned in 1968. In all this 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 in all for about 5,300 h until December 1989. 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 both seal-welded, reactor vessels with their primary circuits, auxiliary equipment and some additional waste were partly grouted, seal-welded and enclosed into concrete sarcophagi. Table 1 shows some main data of the reactors. 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 Radioactive Waste Management Agency A.L.A.R.A. Ltd

Table 1. 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	7.5 m	9.5 m
● length	~ 50 m	~ 50 m

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

The Estonian legislation listed below is in force (1 September 2007). The legislation is available in Estonian (and partly in English) at the web site of the Estonian Radiation Protection Centre: [www.kiiruskeskus.ee](http://www.kiiruskeskus.ee).

### Act:

Radiation Act (entered into force 1 May 2004)

### Regulations of the Government:

- Regulation No. 163 of 30 April 2004: 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: 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: Statutes for Maintenance of the State Dose Register of Exposed Workers

### Regulations of the Minister of the Environment

- Regulation No. 41 of 29 April 2004: The Time Limits for Proceedings to Issue, Amend or Revoke 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: Requirements for Exposed Workers Radiation Safety Training
- 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: 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: Requirements for the Rooms Where the Radiation Sources Are Situated and for Labelling Thereof and for the Working Rules for the Performance of Radiation Practices
- Regulation No. 127 of 12 October 2004: 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: 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: The 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: 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