

**Joint Convention on the  
Safety of Spent Fuel Management and on the  
Safety of Radioactive Waste Management**

**National Report from Estonia**

Estonian Radiation Protection Centre  
Third Review Meeting  
May 2009

## **Contents**

<u>Section A. Introduction.....</u>	<u>3</u>
<u>Section B. Policies and Practices.....</u>	<u>5</u>
<u>Section C. Scope of Application.....</u>	<u>5</u>
<u>Section D. Inventories and Lists.....</u>	<u>6</u>
<u>Section E. Legislative and Regulatory System.....</u>	<u>9</u>
<u>Section F. Other General Safety Provisions.....</u>	<u>10</u>
<u>Section G. Safety of Spent Fuel Management.....</u>	<u>13</u>
<u>Section H. Safety of Radioactive Waste Management.....</u>	<u>14</u>
<u>Section I. Transboundary movement.....</u>	<u>17</u>
<u>Section J. Disused sealed Sources.....</u>	<u>18</u>
<u>Section K. Planned Activities to Improve Safety.....</u>	<u>19</u>
<u>Annex A. Estonian Legislation – Spent Fuel and Radioactive Waste.....</u>	<u>20</u>

## **Section A. Introduction**

This Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management was adopted on 29 September 1997 in Vienna diplomatic Conference. Estonia signed the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management 05 January 2001. Estonian Parliament ratified the convention 19 October 2005. Estonia deposited the instrument of accession to the joint Convention on 03 February 2006. The convention entered into force 04 May 2006.

Most of the radioactive waste that needs further management measures is caused by the past activities during the Soviet time and the major generator of radioactive waste in Estonia is the decommissioning Paldiski Nuclear Submarine Training Facility. The plans for decommissioning of nuclear facilities are discussed shortly as well. Small amounts of radioactive wastes arise from a number of facilities using radioactive sources in medical, research and industrial application. Furthermore, the development in waste management policies and practices during the reporting period is described. There is also facility for interim storage for the radioactive waste in Paldiski.

Radioactive waste management facility, which was used during Soviet time is situated in Tammiku and is currently under decommissioning. The results from environmental impact assessment process are reviewed in the report.

The uranium mining and milling facility in Sillamäe was operational in late 1940`s – early 1980`s. Sillamäe tailing pond remediation project is in the final stage, the final layer of the covering will be finished by the end of 2010.

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

Estonia is a member state of the European Union from 1<sup>st</sup> 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 EC Directives relate e.g. to radiation protection and transboundary movements of radioactive waste, whereas there are so far no regulations pertaining directly to safe management of spent fuel and radioactive waste.

The present report is the second Estonian National Report and is presented for the Third Review Meeting to the Convention, which takes place 11-22 May 2009 at the Headquarters of the IAEA in Vienna, Austria.

The report is prepared in accordance with the Guidelines regarding the Form and Structure of National Reports (INFCIRC/604/Rev. 1, 19 July 2006) adopted at the Preparatory Meeting of the Contracting Parties to the Joint Convention held from 10 to 12 December 2001, which were

modified at the Second Review Meeting of the Contracting Parties held from 15 to 24 May 2006.

The situation with regard to the obligations of the Convention has practically not changed since the last Review Meeting and for that reason duplications from the previous report could not be fully avoided. However it is recommended to look for additional information from the previous report<sup>1</sup>. The comments, questions and remarks given to Estonia's first national report and Estonia's presentation given at the second review meeting have been incorporated into this report.

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

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

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

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

---

1 [http://www.envir.ee/kiirgus/image/JC\\_Estonia.pdf](http://www.envir.ee/kiirgus/image/JC_Estonia.pdf)

## **Section B. Policies and Practices**

### ***ARTICLE 32. REPORTING***

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

- 1. spent fuel management policy;*
- 2. spent fuel management practices;*
- 3. radioactive waste management policy;*
- 4. radioactive waste management practices;*
- 5. criteria used to define and categorize radioactive waste.*

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

According to Radiation Act the organization engaged in radiation practice is required to take any measures to render harmless radioactive wastes arising from its operation. Rendering radioactive waste harmless means any measure needed to treat, isolate or dispose of the waste, or to restrict its use so that it does not endanger human health or the environment. The state has the secondary responsibility in case that a producer of radioactive waste is incapable of fulfilling its management obligation. There are two options for the management of such radioactive waste - either return to the supplier/manufacturer of the sealed source or delivery to waste management agency against a waste management fee. In practice, most of waste from the use of unsealed sources in Estonia arise in such low activity concentrations or amounts that it is not necessary to arrange the storage of generated waste in the same way as e.g. for the sealed sources. A common practice is that radionuclide laboratories store their short lived radioactive wastes at their premises until they have decayed below the limits set for discharges.

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

## **Section C. Scope of Application**

### ***ARTICLE 3. SCOPE OF APPLICATION***

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

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

## **Section D. Inventories and Lists**

### ***ARTICLE 32. REPORTING***

- 2. This report shall also include:*
  - i. a list of the spent fuel management facilities subject to this Convention, their location, main purpose and essential features;*
  - ii. an inventory of spent fuel that is subject to this Convention and that is being held in storage and of that which has been disposed of. This inventory shall contain a description of the material and, if available, give information on its mass and its total activity;*
  - iii. a list of the radioactive waste management facilities subject to this Convention, their location, main purpose and essential features;*
  - iv. an inventory of radioactive waste that is subject to this Convention that:*
    - 1. is being held in storage at radioactive waste management and nuclear fuel cycle facilities;*
    - 2. has been disposed of; or has resulted from past practices.*
  - v. This inventory shall contain a description of the material and other appropriate information available, such as volume or mass, activity and specific radionuclides;*
  - vi. a list of nuclear facilities in the process of being decommissioned and the status of decommissioning activities at those facilities.*

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

Figure 1. Location of radioactive wastes in Estonia



The licensing database maintained by Estonian Radiation Protection Centre, includes source-specific information on each source in licensees` possession. This information is updated continuously according to licensees` notification and observations made during the licensing process and inspections.

Table 1 shows the overall information about radioactive waste sites in Estonia and an inventory of radioactive waste that is subject to this Convention. More information about sites can be found in the first national report.

Table 1. Information about radioactive waste sites in Estonia

Owner	Ministry of Economy and Communication
Location	<b>Paldiski</b>
Purpose	Former Nuclear Submarine Training Centre
Inventory	The total activity enclosed in two nuclear reactors and their auxiliary system is ca 230 TBq and it comprises mainly of the activation products such as Fe-55, Co-60, Ni-63, Eu-152 and Eu-154. Some sealed sources with total activity of 5 TBq has also been poured into concrete there.
Essential Features	Under decommissioning
Owner	Ministry of Economy and Communication
Location	<b>Paldiski, 50 km west from Tallinn</b>

Purpose	Interim Storage
Inventory	Ca 1000 TBq, mainly spent sealed sources of Sr-90, Cs-137, Co-60 and Pu-Be neutron sources.
Essential Features	Operational

Owner	Ministry of Economy and Communication
Location	<b>Tammiku, 15 km south of Tallinn</b>
Purpose	Radioactive waste depository
Inventory	Ca 76 TBq, mainly spent sealed sources of Sr-90 and Cs-137
Essential Features	Under decommissioning

Owner	Silmet Group
Location	<b>Sillamäe</b>
Purpose	Former uranium and milling facility
Inventory	1830 tons of U, 850 tons of Th and up to 3000-4000 TBq their daughter products, including Ra
Essential Features	Tailing pond is under remediation

### Radioactive waste management facilities

There are two radioactive waste management facilities subject to the Convention in Estonia: Paldiski interim radioactive waste storage and Tammiku radioactive waste storage facility, which are both under administration of the Waste Management agency A.L.A.R.A Ltd.

Tammiku radioactive waste storage is under decommissioning. The facility was closed temporarily in 1996 and the storage vaults were closed and covered with soil layer. In 2005 A.L.A.R.A Ltd started an Environmental Impact Assessment (EIA) process in order to start decommissioning process.

The total volume of the waste stored on the site is about 110 m<sup>3</sup>, with a rough total weight of about 97 ton. Most of the waste is rather low active but in one partition there are 2 containers with spent sealed sources and dose rates up to 1,2 Sv/h has been measured on the top of the containers.

EIA was approved by the Ministry of the Environment in 2007 and from the possible options it was chosen to retrieve all radioactive waste from Tammiku, transport it to Paldiski facility, condition and store it there in the interim radioactive waste storage. After retrieving radioactive waste, the concrete structures of the facility will be decontaminated and demolished. All cavities have to be filled, so they will be even with the surface. The fence and all reminding installations will be demolished and there will be a green field area. The decommissioning should be completed by end of 2013.

## **Nuclear facilities under decommissioning**

Paldiski is the former USSR nuclear submarine training centre, with 2 PWR reactor compartments, is in the process of being decommissioned. In 1994, before the site was taken over by Estonian authorities, the reactors were defuelled and the spent nuclear fuel was shipped to Russia. Currently the site is under administration of Radioactive Waste Management Agency A.L.A.R.A Ltd.

During the period 2005-2007 there were several works done on the site under EU Phare project 632.03.01 "Safe long-term storage of Paldiski sarcophagi and related dismantling activities". The main objective of the project was to guarantee the safe storage of the reactor compartments for a period of at least 50 years. By that time Estonia should have radioactive waste disposal facility, which could accommodate waste arising from decommissioning of the reactor compartments (approximately 720-2070 m<sup>2</sup>).

## **Section E. Legislative and Regulatory System**

### ***ARTICLE 18. IMPLEMENTING MEASURES***

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

### ***ARTICLE 19. LEGISLATIVE AND REGULATORY FRAMEWORK***

- 1. Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of spent fuel and radioactive waste management.*
- 2. This legislative and regulatory framework shall provide for:*
  - i. the establishment of applicable national safety requirements and regulations for radiation safety;*
  - ii. a system of licensing of spent fuel and radioactive waste management activities;*
  - iii. a system of prohibition of the operation of a spent fuel or radioactive waste management facility without a licence;*
  - iv. a system of appropriate institutional control, regulatory inspection and documentation and reporting;*
  - v. the enforcement of applicable regulations and of the terms of the licences;*
  - vi. a clear allocation of responsibilities of the bodies involved in the different steps of spent fuel and of radioactive waste management.*
- 3. When considering whether to regulate radioactive materials as radioactive waste, Contracting Parties shall take due account of the objectives of this Convention.*

The main legal instrument is the Radiation Act. The licensing system for practises is described in Chapters 3-4 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.

In 2006 the Radiation Act was amended in order to take into account the requirements of 2003/122/Euratom directive of 22 December 2003 on the control of high-activity sealed radioactive sources and orphan sources. The amendments included 3 new definitions – spent sealed source, container of the radioactive source and high activity sealed source. There are additional requirements for the licence holder in case of high activity source, these include:

- secure the information about the the radioactive source in written form. Radioactive source

needs to have unique identification number and the information has to give the overview of the source, container, transportation package and in case it is needed also about the related equipment

- ensure that every sealed source, which is not in use any more, will be given over to another radiation practice licence holder or to the radioactive waste management organization
- in procurement process for the sealed sources, which activity at least 15 years after importation will be higher than 10 MBq. has to prefer the suppliers who agree to take the source back.

A list of relevant Acts and Regulations in force by 1 October 2008 is given in Annex A.

#### **ARTICLE 20. REGULATORY BODY**

*1. Each Contracting Party shall establish or designate a regulatory body entrusted with the implementation of the legislative and regulatory framework referred to in Article 19, and provided with adequate authority, competence and financial and human resources to fulfill its assigned responsibilities.*

*2. Each Contracting Party, in accordance with its legislative and regulatory framework, shall take the appropriate steps to ensure the effective independence of the regulatory functions from other functions where organizations are involved in both spent fuel or radioactive waste management and in their regulation.*

Minister of the Environment made to the Government the proposal to unite several offices under Ministry of the Environment in the beginning of October 2008. The new body, into which it is planned to merge also Estonian Radiation Protection Centre, is supposed to start functioning in January 2009. Unfortunately no more additional information was available during the preparation this report.

Currently 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). Both Estonian Radiation Protection Centre and Environmental Inspectorate have their own budget on the annual Fiscal Act. More information about ERPC can be found in First Estonian National Report for 2006 Review Meeting.

## **Section F. Other General Safety Provisions**

#### **ARTICLE 21. RESPONSIBILITY OF THE LICENCE HOLDER**

*1. Each Contracting Party shall ensure that prime responsibility for the safety of spent fuel or radioactive waste management rests with the holder of the relevant licence and shall take the appropriate steps to ensure that each such licence holder meets its responsibility.*

*2. If there is no such licence holder or other responsible party, the responsibility rests with the Contracting Party which has jurisdiction over the spent fuel or over the radioactive waste.*

No new developments, except additional requirements for the users of high activity sealed sources (Section E) according to Euratom directive. According to the Radiation Act and the pursuant degrees the prime responsibility for the safety of a installation rests with the holder of the licence. The holder of such a license to ensure that all radioactive waste produced under his license is handled in a safe manner and finally either returned to the manufacturer or send to the Waste

Management Agency. In the Radiation Act it is also stated that the Regulatory Authority can redraw a license due to safety concerns or other compelling reasons, i.e. if the holder do not meet its responsibility. Ultimately the punishment for violations of this Act and/or provisions is penalties.

#### **ARTICLE 22. HUMAN AND FINANCIAL RESOURCES**

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

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

No new developments. Requirements on qualifications of and educational programs for staff-members working with safety issues are included in Operational Licence. Chapter 4 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.

#### **ARTICLE 23. QUALITY ASSURANCE**

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

The quality assurance at Paldiski is guaranteed by implementing the set of regulations covering radiological protection of workers, physical safety, waste acceptance criteria, environmental monitoring and written work procedures. The comprehensive quality management system of A.L.A.R.A Ltd. is currently under preparation and is planned to be adopted soon.

Preparation of ERPC own Quality Manual is currently in the final stage. The scope of measurement activities accredited according to IEC 17025:2006 has been widened and Quality Manual for laboratory is approved and goes through review process regularly.

#### **ARTICLE 24. OPERATIONAL RADIATION PROTECTION**

- 1. Each Contracting Party shall take the appropriate steps to ensure that during the operating lifetime of a spent fuel or radioactive waste management facility:*
  - i. the radiation exposure of the workers and the public caused by the facility shall be kept as low as reasonably achievable, economic and social factors being taken into account;*
  - ii. no individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection; and*
  - iii. measures are taken to prevent unplanned and uncontrolled releases of radioactive materials into the environment.*
- 2. Each Contracting Party shall take appropriate steps to ensure that discharges shall be limited:*
  - i. to keep exposure to radiation as low as reasonably achievable, economic and social factors being taken into account; and*
  - ii. so that no individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection.*

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

The reported levels of environmental monitoring from radioactive waste management sites from period 2006 to 2008 are as following. At Paldiski tritium vary between 5 Bq/l and 14 Bq/l and Sr-90 from 0.04 to 0.15 Bq/l. If to take into account only positive determination of Cs-137, the results of discharges measurements has varied from 0.16 to 0.25 Bq/l. A systematic decrease in liquid discharges from Paldiski has occurred during last decade.

Estonian Radiation Protection Centre has carried out monitoring around radioactive waste management facilities. It covers dish, seaweed, seawater and bottom sediments. Sampling is generally conducted on annual basis. The result can be found in annual environmental radiation monitoring reports. For the period 2006-2008 the Cs-137 concentrations varied: in the seawater between 36 Bq/m<sup>3</sup> to 38 Bq/m<sup>3</sup>, for fishes between 0.18 to 81 Bq/kg. Due to the fact that the decontamination and decommissioning can cause the discharges to the environment and the most probabilistic pathways include water, the water samples from dwells (both of Tammiku and Paldiski) site were sampled regularly and tritium measurements were performed. The measurement results are under 9 Bq/l.

#### **ARTICLE 25. EMERGENCY PREPAREDNESS**

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

Emergency preparedness was covered in one of the sections of the Development plan. It concluded that more co-operation is needed between involved institutions and also stated the need for the regular exercise, which would include at least 2 different institutions in Estonia. Development plan also stated that there must be prepared an overview of different equipment what is available.

Emergency preparedness plan for A.L.A.R.A Ltd, is ready and the list of equipment needed for emergency situations is prepared. Procurement of this equipment is planned to start in year 2010.

Otherwise there are no other new developments.

#### **ARTICLE 26. DECOMMISSIONING**

- Each Contracting Party shall take the appropriate steps to ensure the safety of decommissioning of a nuclear facility. Such steps shall ensure that:*
- i. qualified staff and adequate financial resources are available;*
  - ii. the provisions of Article 24 with respect to operational radiation protection, discharges and unplanned and uncontrolled releases are applied;*
  - iii. the provisions of Article 25 with respect to emergency preparedness are applied; and*
  - iv. records of information important to decommissioning are kept.*

No new development. Sites under decommissioning are state properties, and as such, the financial situation are and will be secure also in the future until all the installations are fully decommissioned.

## **Section G. Safety of Spent Fuel Management**

### **ARTICLE 4. GENERAL SAFETY REQUIREMENTS**

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

*In so doing, each Contracting Party shall take the appropriate steps to:*

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

### **ARTICLE 5. EXISTING FACILITIES**

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

### **ARTICLE 6. SITING OF PROPOSED FACILITIES**

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

- i. to evaluate all relevant site-related factors likely to affect the safety of such a facility during its operating lifetime;*
- ii. to evaluate the likely safety impact of such a facility on individuals, society and the environment;*
- iii. to make information on the safety of such a facility available to members of the public*
- iv. to consult Contracting Parties in the vicinity of such a facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.*

*2. In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 4.*

### **ARTICLE 7. DESIGN AND CONSTRUCTION OF FACILITIES**

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

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

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

### **ARTICLE 8. ASSESSMENT OF SAFETY OF FACILITIES**

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

- i. before construction of a spent fuel management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;*
- ii. before the operation of a spent fuel management facility, updated and detailed versions of the safety assessment and of the environmental assessment shall be prepared when deemed necessary to complement the assessments referred to in paragraph (i).*

### **ARTICLE 9. OPERATION OF FACILITIES**

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

- i. the licence to operate a spent fuel management facility is based upon appropriate assessments as specified in Article 8 and is conditional on the completion of a commissioning programme demonstrating that the facility, as constructed, is consistent with design and safety requirements;*
- ii. operational limits and conditions derived from tests, operational experience and the assessments, as specified in Article 8, are defined and revised as necessary;*
- iii. operation, maintenance, monitoring, inspection and testing of a spent fuel management facility are conducted in accordance with established procedures;*
- iv. engineering and technical support in all safety-related fields are available throughout the operating lifetime of a spent fuel management facility;*
- v. incidents significant to safety are reported in a timely manner by the holder of the licence to the regulatory body;*
- vi. programmes to collect and analyse relevant operating experience are established and that the results are acted upon, where appropriate;*
- vii. decommissioning plans for a spent fuel management facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body.*

### **ARTICLE 10. DISPOSAL OF SPENT FUEL**

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

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

## **Section H. Safety of Radioactive Waste Management**

### **ARTICLE 11. GENERAL SAFETY REQUIREMENTS**

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

*In so doing, each Contracting Party shall take the appropriate steps to:*

- i. ensure that criticality and removal of residual heat generated during radioactive waste management are*

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

Estonian legislation together with the Development plan (especially section, which covers radioactive waste management) provide the policy, principles and also strategy for radioactive waste management. Requirements in Operational Limits and Conditions on handling, storing and transport of fissile material make sure that criticality and removal of residual heat generated during radioactive waste management are adequately addressed. The Act and regulation are also refer to working methods for waste minimization. The licensee must have clear working procedures in order to avoid transfer of unnecessary transfer of objects and materials in the controlled areas.

Radioactive waste management is covered also by the requirements of the environmental impact assessment law. This means that all possible hazards are considered in EIA reports.

#### **ARTICLE 12. EXISTING FACILITIES AND PAST PRACTICES**

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

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

No changes since 2006. Radioactive waste sites in Paldiski and Tammiku are covered by the radiation activity licences and they are subject to regular inspections by the enforcement authority.

#### **ARTICLE 13. SITING OF PROPOSED FACILITIES**

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

- i. to evaluate all relevant site-related factors likely to affect the safety of such a facility during its operating lifetime as well as that of a disposal facility after closure;*
- ii. to evaluate the likely safety impact of such a facility on individuals, society and the environment, taking into account possible evolution of the site conditions of disposal facilities after closure;*
- iii. to make information on the safety of such a facility available to members of the public;*
- iv. to consult Contracting Parties in the vicinity of such a facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.*

*2. In so doing, each Contracting Party shall take the appropriate steps to ensure that such facilities shall not have unacceptable effects on other Contracting Parties by being sited in accordance with the general safety requirements of Article 11.*

**ARTICLE 14. DESIGN AND CONSTRUCTION OF FACILITIES**

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

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

**ARTICLE 15. ASSESSMENT OF SAFETY OF FACILITIES**

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

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

**ARTICLE 17. INSTITUTIONAL MEASURES AFTER CLOSURE**

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

- i. records of the location, design and inventory of that facility required by the regulatory body are preserved;*
- ii. active or passive institutional controls such as monitoring or access restrictions are carried out, if required; and*
- iii. if, during any period of active institutional control, an unplanned release of radioactive materials into the environment is detected, intervention measures are implemented, if necessary.*

As stated in section B the Ministry of the Environment prepared Radiation Action Development Plan, which was approved by the government on April 2008. Based on this document there several projects have to start: for example preparation of the technical documentation based on the chosen radioactive waste management strategies. This will be a starting point for the process preparing a basis for decisions concerning a Estonian disposal facility for low and intermediate waste. This initial process will make sure that all necessary steps are taken to implement fundamental principles and requirements for such a disposal facility in compliance with national and international obligations and recommendations. It is also foreseen the starting of EIA procedure for disposal facility.

Prior to siting, construction and commissioning of a Estonian disposal facility the project will be subject to an Environmental Impact Assessment according to Estonian legislation which implements European Council Directive 85/337/EEC and 97/11/EC. In addition, prior to the commissioning of a disposal facility the European Commission will be provided with general data relating to the disposal project making it possible for the Commission to assess whether the implementation of the project is liable to result in a radioactive contamination of the water, soil or airspace of another Member State as called for under the Article 37 of the Euratom Treaty. The presented data will be in compliance with the Commission Recommendation 1999/829 of 6 December 1999.

**ARTICLE 16. OPERATION OF FACILITIES**

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

- i. the licence to operate a radioactive waste management facility is based upon appropriate assessments as specified in Article 15 and is conditional on the completion of a commissioning programme demonstrating that the facility, as constructed, is consistent with design and safety requirements;*
- ii. operational limits and conditions, derived from tests, operational experience and the assessments as specified in Article 15 are defined and revised as necessary;*
- iii. operation, maintenance, monitoring, inspection and testing of a radioactive waste management facility are conducted in accordance with established procedures. For a disposal facility the results thus obtained shall be used to verify and to review the validity of assumptions made and to update the assessments as specified in Article 15 for the period after closure;*
- iv. engineering and technical support in all safety-related fields are available throughout the operating lifetime of a radioactive waste management facility;*
- v. procedures for characterization and segregation of radioactive waste are applied;*
- vi. incidents significant to safety are reported in a timely manner by the holder of the licence to the regulatory body;*
- vii. programmes to collect and analyse relevant operating experience are established and that the results are acted upon, where appropriate;*
- viii. decommissioning plans for a radioactive waste management facility other than a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body;*
- ix. plans for the closure of a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility and are reviewed by the regulatory body.*

The Waste Management Facilities at Paldiski/Tammiku existed before the Radiation Act was put into force in 1997. Consequently this law did not regulate the original design of the installations and the initial constructions. However both sites are licenced and safety assessments have been performed Both licenses for radioactive waste management in Tammiku and Paldiski have been updated during the period between 2 review meetings and in Tammiku case there has been full environmental impact assessment process before issuing the radiation practice licence for the decommissioning of the facility.

**Section I. Transboundary movement****ARTICLE 27. TRANSBOUNDARY MOVEMENT**

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

*In so doing:*

- i. a Contracting Party which is a State of origin shall take the appropriate steps to ensure that transboundary movement is authorized and takes place only with the prior notification and consent of the State of destination;*
- ii. transboundary movement through States of transit shall be subject to those international obligations which are relevant to the particular modes of transport utilized;*
- iii. a Contracting Party which is a State of destination shall consent to a transboundary movement only if it has the administrative and technical capacity, as well as the regulatory structure, needed to manage the spent fuel or the radioactive waste in a manner consistent with this Convention;*
- iv. a Contracting Party which is a State of origin shall authorize a transboundary movement only if it can satisfy itself in accordance with the consent of the State of destination that the requirements of subparagraph (iii) are met prior to transboundary movement;*
- v. a Contracting Party which is a State of origin shall take the appropriate steps to permit re-entry into its*

*territory, if a transboundary movement is not or cannot be completed in conformity with this Article, unless an alternative safe arrangement can be made.*

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

*3. Nothing in this Convention prejudices or affects:*

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

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

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

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

The Government has issued Regulation No. 243 of 8 July 2004 on international transfer of radioactive waste. This Order implements all obligations under Article 27 (Transboundary movement) of the Convention. The regulation is the Estonian implementation of Council Directive 92/3/EURATOM of 3 February 1992 on the supervision and control of shipments of radioactive waste between Member States and into and out of the Community. The amendments of the Radiation Act and Government Regulation are foreseen before end of the year 2008 in order to implement Council Directive 2006/117/EURATOM of 20 November 2006 on the supervision and control of shipments of radioactive waste and spent fuel. The Order does not cover, in compliance with the Council Directive, shipments of sealed radioactive sources not containing fissile material when returned by its user to the supplier of the source in another country.

The Ministry of the Environment has until now never received an application and consequently never issued any licence for a transboundary movement of radioactive waste with Estonia as the country of origin or with Estonia as the country of destination. There has also been no authorisations for transboundary movements of radioactive waste between EU-countries with Estonia as a country of transit since the above-mentioned regulation came into force.

## **Section J. Disused sealed Sources**

### ***ARTICLE 28. DISUSED SEALED SOURCES***

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

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

The use of sealed radioactive sources in industry, hospitals and laboratories is covered by the Radiation Act and several regulations. In 2006 the Radiation Act was amended in order to take into account the requirements of 2003/122/Euratom directive of 22 December 2003 on the control of high-activity sealed radioactive sources and orphan sources. These legal documents implement all obligations under Article 28 of the Convention ensuring that the possession and storage of disused sealed sources take place in a safe manner. Radiation Act requires that there is prior authorization for all activities with radioactive sources for holding the source. This licence is given upon written application. General conditions are laid down in the Radiation Act and regulations. All premises where radioactive sources are employed are inspected regularly at least once in 5 years by

Environmental Inspectorate or by Estonian Radiation Protection Centre (ERPC). For sealed sources the inspection frequency is normally once in 3 years. The main objective of an inspection is to validate that radioactive sources are used and stored safely and other conditions set in the radiation activity licence preserve. Any changes must be notified to the licence provider. Licensing and source information is stored in a database maintained by ERPC and licence holder has the requirement to provide every year the data about the inventory of the sources to Estonian Radiation Protection Centre. When new sources are authorized for use, it is required according to Radiation Act that the applicant has also to present a plan on measures to be taken when it becomes a disused source. As stated in section F it is the responsibility of the licence holder to ensure that disused sealed sources are handled in a safe manner and finally either returned to the manufacturer or send to the Waste Management Agency at Paldiski. The first option is preferred. In Estonia neither manufacturing nor remanufacturing of sealed sources takes place.

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

Fixed monitors for vehicles and railway traffic have been installed to all major crossing points at the Estonian-Russian border and Tallinn Airport. In all crossing points the custom officers are equipped with portable monitors. Biggest scrap metal companies have installed fixed monitors at the gates of their installations. There have been several trainings provided by ERPC to custom officers and staff of the scrap metal companies. Several procedures have been prepared in co-operation. In exceptional cases ERPC will be notified.

## **Section K. Planned Activities to Improve Safety**

Estonia does not declare waste containing only naturally occurring radioactive materials, which do not arise from the nuclear fuel cycle as radioactive waste for the purposes of the Convention.

There has been remarkable improvements since the last review meeting. For the following years most of the planned activities will come from National Radiation Protection Development Plan for 2008-2017, which was approved by the government in April 2008. This document foresees the following actions:

- preparation of more detailed technical radioactive waste management documentation;
- moving radioactive waste from Tammiku site to interim storage in Paldiski site;
- finalization of Sillamäe remediation project;
- preparation works for final depository EIA process;
- regular joint emergency exercises.

## **Annex A. Estonian Legislation – Spent Fuel and Radioactive Waste**

The Estonian legislation listed below is in force per 1 January 2006. The legislation is available in Estonian (and partly in English) at the web site of the Estonian Radiation Protection Centre: [www.kiirguskeskus.ee](http://www.kiirguskeskus.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 Therefor 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