



**Republic of Lithuania**

**Lithuanian National Report on  
Implementation of Council Directive  
2011/70/EURATOM of 19 July 2011  
Establishing a Community Framework for  
the Responsible and Safe Management of  
Spent Fuel and Radioactive Waste**

**VILNIUS, 2015**

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## LIST OF ABBREVIATIONS

CPMA – Central Project Management Agency  
EIA– Environmental Impact Assessment  
EPA – Environmental Protection Agency  
IAEA– International Atomic Energy Agency  
INPP – Ignalina Nuclear Power Plant  
LILW– Low and Intermediated Level Waste;  
LILW-LL – Low and Intermediated Level Waste Long-Lived  
LILW-SL – Low and Intermediated Level Waste Short-Lived  
NPP– Nuclear Power Plant  
PSAR – Preliminary Safety Analysis Report  
RAW – Radioactive Waste  
RPC– Radiation Protection Centre under the Health Ministry  
RATA– State Enterprise Radioactive Waste Management Agency  
SAR – Safety Analysis Report  
SF – Spent Fuel  
SNFSF– Spent Nuclear Fuel Storage Facility  
SSS – Spent Sealed Sources  
VATESI – State Nuclear Power Safety Inspectorate  
VLLW-SL – Very Low Level Waste Short-Lived

# INTRODUCTION

## *Aim of the Report*

This Report was prepared according to Article 14 of Council Directive 2011/70/EURATOM of 19 July 2011 Establishing a Community Framework for the Responsible and Safe Management of Spent Fuel and Radioactive Waste (hereinafter called Waste Directive).

The aim of the Report is to demonstrate how Lithuania implements its obligations under Waste Directive.

Report was prepared according to the European Nuclear Safety Regulators Group (ENSREG) Final Guidelines for MS Reports to the Waste Directive.

## *Sources of Radioactive Waste*

### *1. Nuclear power plants*

There is only one nuclear power plant (NPP) in Lithuania - Ignalina NPP. It is situated in the North-East of Lithuania near the borders of Latvia and Belarus, on the bank of the largest Lithuanian water-body, Drūkšiai Lake. The INPP has two units of RBMK-1500 reactors. RBMK-1500 is the last and the most advanced version of RBMK-type reactor design series (actually only two units were constructed).

The INPP reactors were commissioned in December 1983 and August 1987 respectively. The original design lifetime was until 2013-2017. After the accident in Chernobyl, the safety systems were re-evaluated and it was decided to decrease the maximum thermal power of the units from 4800 to 4200 MW. That limited the maximum electric power to about 1300 MW per unit. A number of safety features was improved at that time also.

Now both units are being prepared for decommissioning. Unit 1 of INPP was shut down on 31 December 2004 and the second unit of INPP was shut down at the end of 2009 according to the obligations of Treaty of Accession of Lithuania to European Union.

INPP is the main source of radioactive waste in Lithuania, producing more than 99% of radioactive waste. Waste from INPP comes from operation and now it comes from decommissioning activities. Spent fuel is considered as radioactive waste in Lithuania. Operational solid waste are stored in storage facilities without conditioning, therefore it will be retrieved, conditioned (super compacted, incinerated, grouted), stored in new storage facilities and later will be placed in repositories. Liquid waste are evaporated and later either bituminized (evaporator concentrate) or cemented (ion-exchange resins, filter aid (perlite), sediments of evaporator concentrate). Two repositories are going to be constructed – one for very low level waste and other for low and intermediate waste. Construction of repository for long lived waste including spent fuel is also planned. Inventory of waste according Lithuanian radioactive waste classification and dates implementation of planned radioactive waste facilities is given in Articles 11-12 of this report.

### *2. Isotope applications*

At the end of 2014 there were 2062 sealed sources (except of sealed sources in smoke detectors) used in Lithuania. This number is continually decreasing - in implementing new technologies many of enterprises discontinue to use sealed sources in gamma radiographs, gamma relays, various control devices and gauges (they are being replaced by other equipment, such as based on X-ray and other modern technologies). When the radioactive sources are declared as disused, and if they are not returned to supplier then they are sent to the INPP radioactive waste interim storage facility.

According to the Law on the Management of Radioactive Waste, State Enterprise Radioactive Waste Management Agency (RATA) is responsible for taking radioactive sources from small waste producers, when sources are declared as disused and considered as radioactive waste, but not returned to supplier. From the moment of transfer of RAW (including disused sealed source) from small waste producer to RATA, RATA is taking responsibility to manage radioactive waste. Then RATA transfers RAW to INPP for storage. INPP is responsible for safe management of this RAW from the moment of receiving them, but RATA stays as the owner of this RAW.

Every year increasing amount of radioactive materials is used in nuclear medicine for diagnostics of various diseases and treatment. These radiopharmaceuticals (liquids, capsules, powder) contain  $^{99m}\text{Tc}$ ,  $^{123}\text{I}$ ,  $^{131}\text{I}$ ,  $^{18}\text{F}$  and other radionuclides. Biomedical and other scientific research apply unsealed sources with  $^{125}\text{I}$ ,  $^{32}\text{P}$ ,  $^{33}\text{P}$ ,  $^3\text{H}$  and  $^{35}\text{S}$  radionuclides. Overall activity of received radioactive materials (unsealed sources) in 2014 exceeded 10,7 TBq.

### ***Legacy waste***

Maišiagala radioactive waste storage site is located near the village of Maišiagala, about 30 km North-West of Vilnius. The storage was designed for institutional waste disposal and it is a typical former USSR *Radon* type facility that has been constructed in the early 1960s in all the Republics of the USSR. In Lithuania it was built in 1964 and closed in 1989. From 1973 till 2002 maintenance of the facility was under the responsibility of the Institute of Physics. In 2002 this responsibility was transferred to RATA. Currently an institutional control of the storage is performed and includes physical protection, environmental monitoring and public information activities.

Waste is stored in a reinforced concrete vault with internal dimensions 14.75x4.75x3 m (volume 200 m<sup>3</sup>). The vault was only partially filled with waste during operation (about 60% of the volume). The waste was inter-layered with concrete. Sealed sources are stored in stainless steel containers. At the time of closure the residual volume was filled with concrete and sand. In 2004-2006 the Maišiagala storage was essentially upgraded by installing new radiological and physical protection barriers. The post closure surveillance license was obtained in 2006.

Institutional waste generated up to 1989 is stored in Maišiagala storage facility. The waste consist of static electricity neutralizers and neutron generators, an assortment of chemical compounds, gamma radiation sources with their shielding, different isotopic instrumentation with beta sources, blocks of gamma re-lays, radium salts, radioactive light emitters and fire sensors, radioactive sources, high-activity gamma sources with their biological shielding. The radionuclides important for long term safety assessment are H-3, C-14, Cl-36, Co-60, Sr-90, Cs-137, Eu-152, Ra-226 and Pu-239.

Transfer of all radioactive wastes from Maišiagala storage facility to the INPP disposal and storage facilities are foreseen and should be performed until 2023.

### ***Competent Regulatory Authority***

#### ***State Nuclear Power Safety Inspectorate (VATESI)***

State Nuclear Power Safety Inspectorate (VATESI) is state regulatory and supervisory authority in Lithuania for activities involving nuclear materials and other activities in the area of nuclear energy involving sources of ionizing radiation. VATESI sets safety requirements and regulations, supervises compliance with them, applies enforcement measures in case of

incompliance with safety requirements and regulations, issues licenses, permits and temporary permits, assess safety of nuclear facilities.

#### *Radiation Protection Centre*

The Radiation Protection Centre (RPC) coordinates actions of state and municipal institutions in the manner established by the Government or, upon direction from the Government, by the Minister of Health, in the area of radiation protection, exercises the state regulation and supervision of both radiation protection in respect of exposure of members of the public and the environment and the practices involving sources of ionising radiation, except of practices in the area of nuclear energy.

#### *Ministry of Environment*

Ministry of Environment:

- coordinates the process of environmental impact assessment of proposed economic activities and methodically manage it; to make decisions whether the proposed economic activities are allowed in the selected site (from 2010 this function was delegated to the Environmental Protection Agency under the Ministry of Environment) as well as organize and coordinate environmental impact assessment in the transboundary context;
- takes part in state supervision and control of design and construction of nuclear facilities
- following the procedure prescribed by legislation and other legal acts, takes part in the issue of licences in radioactive waste management activities;

Environmental Protection Agency under the Ministry of Environment:

- organizes, coordinate and perform state environmental monitoring, and controls environmental monitoring of economic entities;
- exchanges monitoring information with other countries.

More information on regulatory authorities is provided in Article 6.

#### **Licence holders**

All radioactive waste management facilities, except institutional waste management facilities, in Lithuania are considered as nuclear facilities. The operators have to have a license in order to operate these nuclear facilities. All these facilities are situated in the territory of Ignalina NPP, only one exception is Maišiagala storage facility, which is about 30 km northwest from the capital of Lithuania Vilnius. All nuclear facilities in Lithuania are licensed.

Ignalina NPP has licences (either construction or operation) for all radioactive waste management facilities of Lithuania except Maišiagala facility.

State Enterprise Radioactive Waste Management Agency (RATA) has a license for post-closure surveillance of Maišiagala storage facility.

#### **National Policy**

National radioactive waste management policy is described in Article 4.

## **SUMMARY**

Lithuanian Radioactive waste management development program was prepared in response to the nuclear energy development plans, national and international environmental, nuclear and radiation safety requirements and sets of spent nuclear fuel and radioactive waste management goals, objectives, and values of evaluation criteria.

National Programme for the Management of Spent Fuel and Radioactive Waste is the part of the national legal system and it's adopted for the 7 year period. After this period programs should be revised mandatory. The Programme can be reviewed earlier if necessary.

All information on the current situation on implementing national radioactive waste management programme is provided in Articles 11 and 12.

## REPORTING ARTICLE BY ARTICLE

### *Article 4 – General principles*

#### *Article 4.1*

*Member States shall establish and maintain national policies on spent fuel and radioactive waste management. Without prejudice to Article 2(3), each Member State shall have ultimate responsibility for management of the spent fuel and radioactive waste generated.*

#### National Policy

National radioactive waste management policy mainly is described in Law of Radioactive Waste Management. This Law regulates public relations arising during the management of radioactive waste, and shall establish the legal grounds for the management of radioactive waste. Radioactive waste management principals are indicated in the Article 3 of Law on Radioactive Waste Management, as a part of national radioactive waste management policy, and state that management of radioactive waste must ensure that:

- 1) at all stages of the radioactive waste management, individuals, the society and the environment within Lithuania as well as beyond its borders, are adequately protected against radiological, biological, chemical and other hazards that may be associated with radioactive waste by applying the appropriate methods;
- 2) efforts are made to prevent future generations from any reasonably predictable impact greater than those permitted for the current generation and to avoid any undue burden for future generations;
- 3) the generation of radioactive waste is kept to the lowest practical minimum in terms of volume and activity, achieving this through measures during design, operation and decommissioning, including reprocessing and further use of nuclear fuel cycle materials.
- 4) interdependencies among the different steps in the radioactive waste management are taken into account;
- 5) the safety of radioactive waste management facilities is guaranteed during their operating lifetime and there after, applying passive safety measures.
- 6) radioactive waste management safety measures shall be implemented applying graded approach.
- 7) radioactive waste generated in the territory of Republic of Lithuania shall be disposed of in disposal facilities in the territory of Republic of Lithuania or transported for disposal to other country, except cases indicated in Article 24 (cases related to management of spent sealed sources).

Following articles describe other elements of National Policy:

The Article 9 of Law on Radioactive Waste Management states: The radioactive waste generator shall pay all the expenses incurred during the management of radioactive waste from the moment of its generation to its emplacement at a disposal facility, including the expenses related to the post-closure surveillance of disposal facilities.

The Article 24 part 2 of Law on Radioactive Waste Management states: Sealed sources of ionising radiation may be imported into the Republic of Lithuania if after their use it is intended to return them to the supplier of the sealed sources of ionising radiation. The Recipient of a sealed source of ionising radiation shall enter into a contract with the radioactive waste manager on the management of the sealed source of ionising radiation in case the sealed source of ionising radiation cannot be returned to its supplier. The Recipient of a sealed source of ionising radiation shall obtain suretyship insurance in the amount specified in the contract with the radioactive waste manager for the services, except in the cases stipulated in the legal act

establishing the procedure for import to, export from, shipment in transit or transportation within the Republic of Lithuania of radioactive materials, radioactive waste and spent nuclear fuel and for issuance of permits (authorisations), such legal act being approved by the Head of the State Nuclear Power Safety Inspectorate jointly with the Minister of Health, where the contract is made in relation to the sealed source of ionising radiation which will be used and stored until it no longer requires control.

The Article 25 of Law on Radioactive Waste Management states:

1. It shall be prohibited to import to the territory of the Republic of Lithuania radioactive waste and/or spent nuclear fuel, except for the cases where:

- 1) radioactive waste or spent nuclear fuel are shipped in transit via the territory of the Republic of Lithuania;
- 2) radioactive waste exported for treatment is being re-entered;
- 3) radioactive waste recovered from the exported materials is being re-entered;
- 4) radioactive waste produced after reprocessing of the exported spent nuclear fuel is being re-entered;
- 5) spent nuclear fuel exported for reprocessing is being re-entered, if the export was prohibited or the spent nuclear fuel has not been reprocessed.

The Article 25 part 5 of Law on Radioactive Waste Management states: Radioactive waste and/or spent nuclear fuel may be exported only to such countries that have the administrative and technical capabilities to receive it, as well as adequate regulatory and supervision institutions, also other structures required for radioactive waste and/or spent nuclear fuel management in accordance with the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

The Article 25 part 6 of Law on Radioactive Waste Management states: It shall be prohibited to export radioactive waste from the territory of the Republic of Lithuania with an intent of emplacement at disposal sites lying south of 60 degrees latitude South.

The Article 5 part 5 of Law on Nuclear Energy states: It shall be prohibited to produce radioactive materials for a nuclear weapon or for fuel of nuclear power plants, also to reprocess already used elements of such fuel in the territory of the Republic of Lithuania.

According to Article 4 of Law on Nuclear Energy nuclear and radiation safety in the Republic of Lithuania shall be guaranteed by the State.

According to Article 30 Law on Nuclear Energy the licence holder shall be responsible for the adequate and safe operation of the installation in accordance with the requirements stipulated in the laws and other legal acts, also in the articles of association, internal instructions and procedures of the licence holder and in the terms of the issued licence. The licence holder shall be responsible for safety of its activities and the nuclear installation.

According to Article 16 of Law on Nuclear Safety full liability for the nuclear safety of a nuclear installation and for nuclear safety in carrying out other activities with nuclear and/or nuclear fuel cycle materials shall solely fall on persons that are engaged in such activities and hold relevant licences and/or permits.

According to Article 8 of Law on Radiation Protection:

Licensing of Practices, Issuance of Temporary Permits and Permits to Ship Radioactive Materials and Radioactive Waste Generated in the Course of Non-Nuclear Fuel Cycle:

1. It shall be prohibited ...handle (carry out pre-treatment of radioactive waste (collect, sort, decontaminate), carry out treatment of radioactive waste, store) and ship radioactive waste ... without the licence or temporary permit issued in the manner established by the licensing rules approved by the Government.

13. Natural persons, legal entities, other organisation, affiliates of legal entities and other organisations acting in violation of the requirements established under paragraph 1 of this Article shall be liable according to the laws of the Republic of Lithuania.

*Article 4.2*

*Where radioactive waste or spent fuel is shipped for processing or reprocessing to a Member State or a third country, the ultimate responsibility for the safe and responsible disposal of those materials, including any waste as a by-product, shall remain with the Member State or third country from which the radioactive material was shipped.*

Lithuania has never shipped radioactive waste or spent fuel to another country and no agreements to do so are signed between Lithuania and other country.

*Article 4.3*

*National policies shall be based on all of the following principles:*

*(a) the generation of radioactive waste shall be kept to the minimum which is reasonably practicable, both in terms of activity and volume, by means of appropriate design measures and of operating and decommissioning practices, including the recycling and reuse of materials;*

*(b) the interdependencies between all steps in spent fuel and radioactive waste generation and management shall be taken into account;*

*(c) spent fuel and radioactive waste shall be safely managed, including in the long term with passive safety features;*

*(d) implementation of measures shall follow a graded approach;*

*(e) the costs for the management of spent fuel and radioactive waste shall be borne by those who generated those materials;*

*(f) an evidence-based and documented decision-making process shall be applied with regard to all stages of the management of spent fuel and radioactive waste.*

The Article 3 of Law on Radioactive Waste Management states that management of radioactive waste must ensure that:

- 1) at all stages of the radioactive waste management, individuals, the society and the environment within Lithuania as well as beyond its borders, are adequately protected against radiological, biological, chemical and other hazards that may be associated with radioactive waste by applying the appropriate methods;
- 2) efforts are made to prevent future generations from any reasonably predictable impact greater than those permitted for the current generation and to avoid any undue burden for future generations;
- 3) the generation of radioactive waste is kept to the lowest practical minimum in terms of volume and activity, achieving this through measures during design, operation and decommissioning, including reprocessing and further use of nuclear fuel cycle materials.
- 4) interdependencies among the different steps in the radioactive waste management are taken into account;
- 5) the safety of radioactive waste management facilities is guaranteed during their operating lifetime and there after, applying passive safety measures.
- 6) radioactive waste management safety measures shall be implemented applying graded approach.

- 7) radioactive waste generated in the territory of Republic of Lithuania shall be disposed of in disposal facilities in the territory of Republic of Lithuania or transported for disposal to other country, except cases indicated in Article 24 (cases related to management of spent sealed sources).

The Article 9 of Law on Radioactive Waste Management states: The radioactive waste generator shall pay all the expenses incurred during the management of radioactive waste from the moment of its generation to its emplacement at a disposal facility, including the expenses related to the post-closure surveillance of disposal facilities.

*Article 4.4*

*Except for the provisions set out in Article 2(3):*

- (a) repatriation of disused sealed sources to a supplier or manufacturer;*
- (b) shipment of spent fuel of research reactors to a country where research reactor fuels are supplied or manufactured, taking into account applicable international agreements;*
- (c) the waste and spent fuel of the existing Krško nuclear power plant, when it concerns shipments between Slovenia and Croatia.*

*Radioactive waste shall be disposed of in the Member State in which it was generated, unless at the time of shipment an agreement, taking into account the criteria established by the Commission in accordance with Article 16(2) of Directive 2006/117/Euratom, has entered into force between the Member State concerned and another Member State or a third country to use a disposal facility in one of them.*

*Prior to a shipment to a third country, the exporting Member State shall inform the Commission of the content of any such agreement and take reasonable measures to be assured that:*

- (a) the country of destination has concluded an agreement with the Community covering spent fuel and radioactive waste management or is a party to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management ('the Joint Convention');*
- (b) the country of destination has radioactive waste management and disposal programmes with objectives representing a high level of safety equivalent to those established by this Directive; and*
- (c) the disposal facility in the country of destination is authorised for the radioactive waste to be shipped, is operating prior to the shipment, and is managed in accordance with the requirements set down in the radioactive waste management and disposal programme of that country of destination.*

According to the principles of radioactive waste management described in the Article 4.3 radioactive waste generated in the territory of Republic of Lithuania shall be disposed of in disposal facilities in the territory of Republic of Lithuania or transported for disposal to other country.

According article 25 of the Law on Radioactive Waste Management:

2. Radioactive waste and/or spent nuclear fuel shall be imported to, exported from, shipped in transit and transported in compliance with the international treaties ratified by the Republic of Lithuania, laws and other legal acts regulating shipment of radioactive materials.
3. Economic entities of the Republic of Lithuania shall be allowed to export radioactive waste and/or spent nuclear fuel from the territory of the Republic of Lithuania and ship the same in transit via territories of other states only subject to a prior notification and consent of a competent regulatory authority of the state of destination obtained in a prescribed manner.
4. Radioactive waste and/or spent nuclear fuel may be transported by economic entities of the Republic of Lithuania through the transit countries only in compliance with requirements of international agreements and regulations which are relevant to the particular modes of transport.
5. Radioactive waste and/or spent nuclear fuel may be exported only to such countries that have the administrative and technical capabilities to receive it, as well as adequate regulatory and supervision institutions, also other structures required for radioactive waste and/or spent nuclear fuel management in accordance with the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

6. It shall be prohibited to export radioactive waste from the territory of the Republic of Lithuania with an intent of emplacement at disposal sites lying south of 60 degrees latitude South.

Lithuania has never shipped radioactive waste or spent fuel that was produced at INPP to another country and no agreements to do so are signed between Lithuania and other country.

## ***Article 5 – National framework***

### ***Article 5.1***

*Member States shall establish and maintain a national legislative, regulatory and organisational framework ('national framework') for spent fuel and radioactive waste management that allocates responsibility and provides for coordination between relevant competent bodies. The national framework shall provide for all of the following:*

### **Article 5.1 (a)**

A national programme for the implementation of spent fuel and radioactive waste management policy;

Amendments of 2014 in the Law on Nuclear Energy and the Law on Nuclear Safety transpose requirements of the Council Directive 2011/70/EURATOM of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste.

The amendments to the Law on Radioactive Waste Management of 2014 are related to the introduction of the new and revision of the current definitions, introduction additional principles of the radioactive waste management, defining of the content of the radioactive waste management program, specifying authority responsible for preparation and submission of the national reports to the European Commission, establishing deadlines of reporting and notification to the European Commission.

The content of the radioactive waste management program is specified in the Article 8<sup>1</sup> of the Law on Radioactive Waste Management. According the Law on Radioactive Waste Management the Ministry of Energy is responsible for the notification of the European Commission on the content of the national Programme for the Management of Spent Fuel and Radioactive Waste.

National Programme for the Management of Spent Fuel and Radioactive Waste is the part of the national legal system. Regarding Government resolution No. 827 On Approval of the strategic planning methodology (2002, amended 2013) all national programs should be adopted for the 7 year period. After this period programs should be revised mandatory. The programs can be reviewed sooner if necessary.

The implementation of the National Programme for the Management of Spent Fuel and Radioactive Waste is coordinated by the Ministry of Energy. The Ministry of Energy about implementation and progress of the National Programme for the Management of Spent Fuel and Radioactive Waste in the previous year in the beginning of the year inform the Government of the Republic of Lithuania.

Institutions which are involved in to implementation of the National Programme for the Management of Spent Fuel and Radioactive Waste prepare they own programs and plans: State Enterprise Ignalina Nuclear Power Plant decommissioning inter-institutional action plan, RATA and State Enterprise Ignalina Nuclear Power Plant annual operating plans.

Article 5.1 (b)

national arrangements for the safety of spent fuel and radioactive waste management. The determination of how those arrangements are to be adopted and through which instrument they are to be applied rests within the competence of the Member States;

Lithuania has established appropriate legislative and regulatory framework in order to govern safety of spent fuel and radioactive waste management.

All the legal acts concerning spent fuel and radioactive waste management are prepared according best in-country and international practice including IAEA recommendations and WENRA safety levels and objectives. It covers all areas of spent fuel and radioactive waste predisposal management and disposal of very low level waste and disposal of low and intermediate level waste.

Council Directive 2011/70/EURATOM of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste are fully transposed to the national legal acts. Last Transposition Table of the Directive 2011/70/EURATOM submitted in 2014 April 30, all Directive 2011/70/EURATOM articles are covered.

The list of main legal acts regulating the management of spent nuclear fuel and radioactive waste in Lithuania is presented below:

**Laws:**

1. Law on the Management of Radioactive Waste (1999, last amended 2014);
2. Law on Nuclear Energy (1996, last amended 2014);
3. Law on Nuclear safety (2011, , last amended 2015 );
4. Law on Radiation Protection (1999, last amended 2014);
5. Law on the Ratification of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (2003);

**Government Resolutions:**

6. Government Resolution No. 860 On Approval of the Strategy of Radioactive Waste Management (2008, amended 2009);
7. Government Resolution No. 722 On Approval of Rules of Procedure for Issuing Licenses and Permits in the Area of Nuclear Energy (2012);
8. Government Resolution No.653 On Approval of Regulations of Licensing the Practices Involving Sources of Ionizing Radiation (1999, last amended 2014);
9. Government Resolution No. 280 On Approval of Regulations on Management of Illegal (Orphan) Radioactive Sources and Facilities, Contaminated With Radionuclides (2005, last amended 2013);
10. Government Resolution No. 651 On the Establishment of the State Register of Radiation Sources and Exposure to Workers and Approval of Its Statute (1999, amended 2011);
11. Governmental Resolution No. 461 On Approval of the Regulation on Providing of Data Concerning Activities Related with the Disposal of Radioactive Waste to the Commission of the European Communities (2007, amended 2012).

**General requirements:**

12. Nuclear Safety Requirements BSR-3.1.2-2010, Regulation on the Pre-disposal Management of Radioactive Waste at the Nuclear Facilities (2010).
13. Nuclear Safety Requirements BSR-3.1.1-2010, The General Requirements for Dry Type Storage for Spent Nuclear Fuel (2010);

14. Regulation on Disposal of Low and Intermediate Level Short Lived Radioactive Waste P-2002-2 (2002);
15. Regulation on Disposal of Very Low Level Radioactive Waste P-2003-02 (2003);
16. General Radioactive Waste Acceptance Criteria for Disposal in Near Surface Disposal Facilities (2009);
17. Nuclear Safety Requirements BSR-1.4.1-2010, Management System Requirements (2010);
18. The Requirements on the Operational Experience Feedback in the field of Nuclear Energy (2009);
19. Nuclear Safety Requirements BSR-1.8.2-2011 "Categories of Modifications of Nuclear Installations and Procedure of Performing the Modifications" (2011);
20. Nuclear Safety Requirements BSR-2.1.2-2010 "Basic Safety Requirements for Nuclear Power Plants with RBMK-1500 Reactors";
21. Requirements for Notifying about Unusual Events at Nuclear Power Plants (2010);
22. Requirements for the Decommissioning of Nuclear Facilities (2009);
23. Nuclear Safety Requirements BSR-1.1.3-2011 „VATESI Inspections“ (2011);
24. Nuclear Safety Requirements BSR-1.1.4-2011 "Rules of Procedure for Applying the Enforcement Measures Set by VATESI" (2011, amended in 2012);
25. Order of the Minister of Health and the Head of the State Nuclear Power Safety Inspectorate No. V-1271/22.3-139 On the Rules of Radioactive Substances, Radioactive Waste and Spent Nuclear Fuel Import, Export, Transportation in Transit and inside the Republic of Lithuania (2008, amended 2012);
26. Order of the Minister of Health No. V-712 On Regulations of Decommissioning of the Objects in which Practices Involving Sources of Ionizing Radiation Were Executed (2003, amended 2011);
27. Order of the Minister of Health No. V-136 On Approval of Risk Categories of Potentially Dangerous Installations with Sources of Ionizing Radiation and Their State Radiation Protection Supervision and Control (2005);
28. Order of the Minister of Health No. V-687 On Approval of Rules of Safety of the Sources of Ionizing Radiation (2005, amended 2012);
29. Order of the Minister of Environment No. D1-546 "On Approval of Regulation of Environmental Monitoring of Economic Entities" (2009, last amended 2014);

**Radiation protection requirements:**

30. Nuclear Safety Requirements BSR-1.9.3-2011 "Radiation Protection at Nuclear Facilities" (2011);
31. Lithuanian Hygiene Standard HN 73:2001 "Basic Standards of Radiation Protection" (2001, last amended 2014);
32. Lithuanian Hygiene Standard HN 85:2003 "Natural Exposure. Standards of Radiation Protection" (2011);
33. Lithuanian Hygiene Standard HN 99:2011 "Protective Actions of Public in Case of Radiological or Nuclear Accident" (2011);
34. Lithuanian Hygiene Standard HN 89:2001 "Management of Radioactive Waste" (2001) (for institutional waste);
35. Order of the Minister of Health No. V-1020 On Approval of the Rules of the Control of Orphan Sources and Sealed Sources of High Activity (2005, amended 2012);
36. Nuclear Safety Requirements BSR-1.9.2-2011 "Derivation and Use of Clearance Levels of Radionuclides for Materials and Waste Generated during Activities in the Area of Nuclear Energy" (2011);

Lithuania has signed Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management on 30 September 1997 and ratified it on 18 December 2003. This Convention entered in force in Lithuania on 14 June 2004. In 2014 Lithuania prepared fourth Lithuanian National Report on Compliance with Obligations under the Joint Convention.

The basic provisions for the management of spent nuclear fuel and radioactive waste are given in the Law on the Management of Radioactive Waste. This Law defines principles of radioactive waste management, competence of the authorities, duties and responsibilities of the waste generator, duties and responsibilities of radioactive waste manager and provisions for licensing. The basic radiation protection and safety requirements, corresponding to IAEA recommendations and requirements of the legal acts of the European Union, also allocation of responsibilities of the bodies involved in the different steps of spent fuel and of radioactive waste management are established in the Law on Nuclear Energy, the Law on Nuclear Safety, the Law on Radiation Protection.

Article 5.1(c)

a system of licensing of spent fuel and radioactive waste management activities, facilities or both, including the prohibition of spent fuel or radioactive waste management activities, of the operation of a spent fuel or radioactive waste management facility without a licence or both and, if appropriate, prescribing conditions for further management of the activity, facility or both;

The Law on Nuclear Energy and the Law on Nuclear Safety together with the regulations made under other laws establish the licensing system for activities related to nuclear materials or nuclear cycle materials (their transportation, acquisition, etc.), as well as for nuclear facilities of the following life-stages: site evaluation, design, construction, commissioning, operation, and decommissioning. The supervision of the closed radioactive waste repository, acquisition, keeping, use and transportation of nuclear or nuclear fuel cycle materials is also executed according to the laws mentioned above. This regulation should encompass the following areas:

- nuclear safety, radiation safety and physical security of nuclear facilities, nuclear and nuclear fuel cycle materials;
- fire protection of safety related structures, systems and components;
- emergency preparedness in nuclear facilities and during transportation of nuclear and/or nuclear fuel cycle materials;
- radioactive waste management safety;
- the release of radionuclides into the environment;
- management systems of legal entities engaged in a licensed activity and other activities involving nuclear and nuclear fuel cycle materials or carried out in nuclear facility as well as assessment of the nuclear facility construction site.

According to the Law of Nuclear Energy, the concept of nuclear facility includes:

- nuclear power plant,
- unit of nuclear power plant,
- non-power nuclear reactor,
- storage facility for nuclear materials,
- storage facility for radioactive waste,
- radioactive waste processing facility,
- radioactive waste disposal facility.

VATESI is a competent authority for the licensing of activities involving nuclear materials or nuclear cycle materials as well as activities carried out in nuclear facilities within the legally defined life-stages of nuclear facilities.

During the stage of site evaluation, VATESI shall review and assess the site evaluation report. The positive conclusions in respect of the site evaluation report shall be presented by the following institutions: the Ministry of Health, the Civil Aviation Administration, the Lithuanian Geological Survey, the Lithuanian Hydro Meteorological Service and the Fire Prevention and Rescue Department, in order to approve it. Before the design activities start, technical specification for design has to be approved by VATESI. Design of a nuclear facility has to be performed and assessed according to the requirements established by the competent institutions, including VATESI, Ministry of Environment, Ministry of Health, Ministry of Interior and other institutions involved according to the Law on Construction, the Law on Nuclear Energy and the regulations made under the Laws.

According to the Law on Nuclear Safety, the following types of licences and permits are established in order to be issued by VATESI:

- licence for construction of a nuclear facility (or facilities);
- licence for operation of a nuclear facility (or facilities);
- licence for construction and operation of a nuclear facility (or facilities);
- licence for decommissioning of a nuclear facility (or facilities);
- licence for supervision of a closed radioactive waste repository (or repositories);
- licence for transportation of nuclear fuel cycle materials, nuclear materials and other fissile materials with exception of the small amount as described in the Law;
- licence for acquisition, keeping and use of nuclear materials and other fissile materials with exception of the small amount as prescribed in the Law;
- permit for first carry-in of nuclear fuel to site of nuclear power plant, unit or nonpower nuclear reactor;
- permit for the first carry-in and testing of the nuclear facility using nuclear and/or nuclear fuel cycle materials;
- permit for first start-up of unit of nuclear power plant or non-power nuclear reactor;
- permit for industrial operation of the nuclear facility;
- permit for start-up of the nuclear reactor after its short-term shutdown;
- permit for shipment of radioactive waste generated in nuclear fuel cycle;
- permit for shipment of spent nuclear fuel.

Following the provisions of the Law on Radiation Protection VATESI issues licences and temporary permits for the nuclear energy area activities involving the sources of ionising radiation, which mainly are a licence or a temporary permit to carry out activities under ionising radiation at a nuclear facility and a licence or a temporary permit to store, maintain and use sources of ionising radiation at a nuclear facility.

Every licence may have licence conditions attached. Conditions attached to the licence ensure necessary control and enforcement of the purposes of the laws. Licence conditions should be oversights during the construction, commissioning, operation and decommissioning stages of the facility.

As stipulated in the Law on Nuclear Safety, licences and permits shall be issued to legal entities or persons having sufficient technological, financial, management system, human, emergency preparedness, physical security capacities, capacities of safe storage, transportation, accounting for and control of nuclear materials meeting the provisions of IAEA and EURATOM for safeguard, allowing proper fulfilment of the conditions of the licensed activity and ensuring nuclear safety.

Lists of information and documents that applicant is required to provide for the issue of an appropriate licence or permit are established by the Resolution of the Government of Lithuania.

Radiation Protection Centre (RPC) under Ministry of Health is responsible for issuing licences for transportation of radioactive waste (except nuclear fuel cycle, nuclear and fissile material in accordance with scope of Law on Nuclear Energy) and for issuing licences for small producers

(waste producer with the exception of the operator of a nuclear plant and other nuclear facilities) to manage institutional waste excluding disposal - to collect, sort radioactive waste, to undertake its pre-treatment, treatment, and conditioning, to store, recover and decontaminate it. On purpose to carrying out the single transport of radioactive waste of small producers, in addition to the licence, the single permit is needed, that is issued by the RPC.

Article 5.1(d)

a system of appropriate control, a management system, regulatory inspections, documentation and reporting obligations for radioactive waste and spent fuel management activities, facilities or both, including appropriate measures for the post-closure periods of disposal facilities

Institutional control of nuclear facilities is ensured by the licence given to the operator. In the licence conditions there are defined all aspects which operator shall comply with. Licence conditions ensure that the oversight of operator of facility by the regulatory body will last while the licence is valid and even if the validity of licence was suspended, the responsibility for ensuring of safety remains with the operator.

According article 28 of the Law on Nuclear Safety VATESI shall supervise the performance of licensed or permitted activities, and shall evaluate safety of nuclear facilities as well as safety of operations with nuclear and/or nuclear fuel cycle materials by conducting inspections.

VATESI regulatory inspections are conducted at all stages of the lifetime of a nuclear facility: during the evaluation of a construction site (site) for a nuclear facility, its design, construction, commissioning, operation or decommissioning stages, as well as in oversight of the closed radioactive waste repository, procuring, storing or transporting nuclear and / or nuclear fuel cycle materials and / or dual use nuclear commodities. VATESI inspects applicants for obtaining licences and permits, license and permit holders, suppliers of goods or contractors performing works and other companies performing operations related to nuclear or nuclear fuel cycle materials. While performing inspection activities, it is critically important to adequately assess the current situation in the nuclear power sector, to identify priority areas in terms of ionizing radiation hazard so that the safety related issues would be given proper attention. Every year VATESI develops a plan of inspections in accordance with the established criteria and with regard to the available human and financial resources. In addition to planned inspections unplanned inspections which may be announced or unannounced are performed as well.

VATESI areas of inspections are following: nuclear safety, radiation protection, physical security, control over dual use nuclear commodities and accounting of and control over nuclear materials. VATESI conducts inspection according Nuclear Safety requirements BSR-1.1.3-2011 „VATESI Inspections“ and VATESI integrated management document “The Procedures for Special Inspections and for Routine Inspections”.

Law on Nuclear Safety, Nuclear Safety Requirements BSR-3.1.2-2010 “Regulation on the Pre-disposal Management of Radioactive Waste at the Nuclear Facilities” and Nuclear Safety Requirements BSR-3.1.1-2010, “The General Requirements for Dry Type Storage for Spent Nuclear Fuel” requires that licence holder shall provide annual reports on the activities with radioactive waste or spent nuclear fuel. According mentioned nuclear safety requirements all the activities with radioactive waste and spent fuel shall be documented.

Pursuant to provisions of the Law on the Management of Radioactive Waste and the Law on Radiation Protection, the RPC is in charge of state supervision and control for management of radioactive waste generated by small producers (institutional radioactive waste). As regards the inspection order and frequency, they are outlined in the Regulation for Radiation Protection State Supervision (2009, last amended 2013). Detailed inspection procedures (including inspection questionnaires and forms of inspection protocols) are established and approved by the Director of the RPC.

Article 5.1(e)

enforcement actions, including the suspension of activities and the modification, expiration or revocation of a licence together with requirements, if appropriate, for alternative solutions that lead to improved safety;

In performing the state regulatory and supervision functions of nuclear safety, pursuant to Article 11 Paragraph 2 of the Law on Nuclear Safety, VATESI applies enforcement measures in the manner set out by the Law on Nuclear Safety and other legal acts, requires relevant persons to implement corrective measures and (or) to eliminate the violations, and supervises the implementation of such requirements.

Enforcement measures are being applied in accordance with legal principal of graded approach. All enforcement measures which are used by VATESI are arranged progressively considering the character of violation.

VATESI is empowered to impose following administrative enforcement measures according to the Law of Nuclear Safety and other laws:

- to provide mandatory requirements to licence or permit holders, committing them to eliminate the detected violations, to suspend the works within the time-limits set by the Head of VATESI and/or to shut-down the nuclear reactor, to decrease its capacity, to discontinue operation of other equipment or activities according to Law on Nuclear Safety;
- to impose administrative fines on natural persons according to Code of Administrative Offences of the Republic of Lithuania;
- to impose fines on legal entities according to the Law on Nuclear Safety (otherwise known as economic sanctions).

Pursuant to the Article 6 of the Law on Nuclear Safety mandatory requirements are imposed on the legal entity in any of below listed cases:

- After the issuance of a licence or a permit it emerges that the information provided in the application and in other submitted documents was false, and within the time-limit prescribed by the Head of VATESI correct information is not provided;
- The licence or permit holder breaches the requirements of the legal acts;
- The licence or permit holder does not longer meet the requirements which it had met at the moment of issuance of the licence or permit, and fails to eliminate the detected violations within the time-limit prescribed in the notice of Head of VATESI as stated in the Law on Nuclear Safety;
- In case of failure to meet the requirements arising out of the international obligations for non-proliferation of nuclear weapons as assumed by the Republic of Lithuania;
- The licence or permit holder fails to meet, or meets improperly, the established terms and conditions of operation;
- On other occasions established by the Law on Nuclear Energy or other laws.

The Head of VATESI issues mandatory requirements as soon as the nuclear safety violations are detected in the activities of the licence or permit holder, taking into account the requirements for nuclear safety set by the Law on Nuclear Safety and other legal acts, as well as adhering to the nuclear safety requirements, the nuclear safety rules, the standards and the terms and conditions of the licence or permit. The type of mandatory requirements and their extent, on a case-by-case basis, have to be established upon evaluation of eventual threats, their impact on, scope of, and risk to residents, their property and the environment. The mandatory instructions have to be given on the basis of proportionality, justice, rationality and fairness.

VATESI is also empowered to take the following actions related to the issued licences and permits:

- warn the legal entity about suspending of the license, permit;
- suspend the license, permit;
- revoke the license, permit.

According to the Law on Radiation Protection and the Law on the Management of Radioactive Waste, licences to small producers for the activities related to radioactive waste management (to collect, sort radioactive waste, to undertake its treatment, to store, reprocess, transport and decontaminate it) are issued, the radiation protection state supervision and control is carried out, and in case if requirements are violated, administrative penalties (according the Code of Administrative Violations) are applied by the RPC. The licences issued by RPC also can be suspended or revoked in case of violations of requirements.

Article 5.1(f)

(f) the allocation of responsibility to the bodies involved in the different steps of spent fuel and radioactive waste management; in particular, the national framework shall give primary responsibility for the spent fuel and radioactive waste to their generators or, under specific circumstances, to a licence holder to whom this responsibility has been entrusted by competent bodies;

Article 3 of the Law on Nuclear Safety stipulates: The full responsibility for ensuring nuclear safety shall fall on the persons in charge of the nuclear installation or the activities posing a risk of exposure to ionising radiation.

Article 30 of the Law on Nuclear Energy stipulates: The licence holder shall be responsible for the adequate and safe operation of the installation in accordance with the requirements stipulated in the laws and other legal acts, also in the articles of association, internal work rules of the licence holder and in the terms of the issued licence. The licence holder shall be responsible for safety of its activities and the nuclear installation.

Small producers (generators) are responsible for all steps radioactive waste management according to the Law on the Management of Radioactive Waste:

Article 9 of the Law on the Management of Radioactive Waste stipulates:

1. It shall be the duty of a radioactive waste generator (small producers included) to manage, in accordance with the requirements established by legal acts, radioactive waste until transferring it to a radioactive waste manager.
2. The radioactive waste generator shall pay all the expenses incurred during the management of radioactive waste from the moment of its generation to its emplacement at a disposal facility, including the expenses related to the post-closure surveillance of disposal facilities.
3. The radioactive waste generator shall not be exempted from the duties and responsibilities to manage radioactive waste safely even in the event of a temporary suspension or cancellation of the licence.

Article 5.1(g)  
national requirements for public information and participation

Pursuant to Article 39 of Law on Nuclear Safety VATESI and the holders of licences must inform both the state and municipal institutions and the general public as well as other persons whose business activities are directly related to the licensed activities of a relevant licence holder about the conditions of nuclear safety in the manner required under the Law on Provision of Information to the Public of the Republic of Lithuania and other legal acts. VATESI shall deliver public announcements on the results of monitoring of the implementation of nuclear safety requirements. The organisations operating nuclear installations must inform general public about the measures that are foreseen in the emergency preparedness plans which may have an impact on regular living conditions.

Pursuant to Paragraph 2 of Article 42 of Law on Nuclear Safety not less frequently than once per year the holder of a licence shall be required to publicly announce the information about the nuclear safety condition of a relevant installation.

More details on public information can be found in Article 10 Transparency.

Information on public participation is provided in Article 10.2 of this report.

Article 5.1(h)  
the financing scheme(s) for spent fuel and radioactive waste management in accordance with Article 9.

In general according to the Law on Radioactive Waste Management Article 9, the radioactive waste generator shall pay all the expenses incurred during the management of radioactive waste from the moment of its generation to its emplacement at a disposal facility, including the expenses related to the post-closure surveillance of disposal facilities. Taking in to account that in Lithuania main producer of the radioactive waste is Ignalina Nuclear Power Plant (more than 99 %) and institutional waste producers produce only 1-2 m<sup>3</sup> of radioactive waste annually, financing schemes for the management of this radioactive waste are separate and different:

1. Financing scheme for the management of spent fuel and radioactive waste from Ignalina Nuclear Power Plant are described in the Revised Final Decommissioning Plan of Ignalina NPP (FDP). FDP was approved by the Ministry of Energy on 25 August 2014. There are several financing sources for the management of radioactive waste and spent fuel of Ignalina Nuclear Power Plant: State Enterprise INPP Decommissioning Fund, State budget, Ignalina International Decommissioning Support Fund, Ignalina Programme. New radioactive waste management facilities, which are or will be built as part of the INPP decommissioning process, such as solid radioactive waste management and storage facility, interim spent nuclear fuel storage facility, landfill and near surface disposal facilities and others, are being financed by the Ignalina International Decommissioning Support Fund, Ignalina Programme and co-financed by the State Enterprise INPP Decommissioning Fund or State budget.

2. Institutional waste producers pay for their waste collection, transport, treatment, and storage and disposal services. The fees of the services were approved by the Order of the Minister of Energy. RATA collect fees from the Institutional waste producers into separate dedicated account. Management of historical institutional waste (collected before 2003) is funded from the state budget.

3. Specific attention is given to the management of spent sealed sources. In Article 24 of the Law on Radioactive Waste Management are stated that in the case of import of sealed sources into Lithuania it is obligatory for licence holder to obtain a written commitment from the source provider to return the sealed source after its disuse and to contract the state enterprise

Radioactive Waste Management Agency (RATA) for the management of source in a case, if due to arisen circumstances it would be impossible to return the source to the supplier, and to insure for the value equivalent to RATA services.

4. According Law on Radioactive Waste Management Article 9, management of the orphan sources is funded from the state budget or municipal budget.

*Article 5.2*

*Member States shall ensure that the national framework is improved where appropriate, taking into account operating experience, insights gained from the decision-making process referred to in Article 4(3)(f), and the development of relevant technology and research.*

One of fundamental principles set in the Article 3 of the Law on Nuclear Safety is the principle of state regulation of nuclear safety, which requires to develop and maintain an effective legal framework and a public management structure (national framework) involving an independent state regulation of the activities in the area of nuclear energy. The mandate to create, maintain and improve the state regulatory and supervision system for nuclear safety, including preparation of relevant nuclear safety requirements and rules, is given to VATESI by Article 11, Paragraph 1 of the Law on Nuclear Safety and by Statute of VATESI.

Drafting of new and revision of the approved regulations, including relevant Laws and Governmental documents, is performed in accordance with Nuclear Safety Requirements BSR-1.1.1-2011 “Rules of Procedure for Drafting of Nuclear Safety Requirements and Nuclear Safety Rules“ and VATESI internal procedure. According to BSR-1.1.1-2011 5-year program (program for development of technical-normative documents) and annual plan for drafting of new regulations and revision of approved is established. When drafting nuclear safety requirements and rules, operating experience of Lithuanian nuclear facilities, advanced international practice and advanced practice of foreign countries, recommendations of IAEA, WENRA and other international organizations or institutions shall be taken into account.

According to the Law on Radiation Protection Radiation Protection Centre in accordance with the procedure established by laws, participates in developing and implementing state policy in the area of radiation protection, and prepares the draft legal acts related to radiation protection issues. The draft legal acts or proposals for their amendments are prepared according annual plan of activities of the Radiation Protection Centre, taking into account operating and supervision experience, development of relevant technology and research, legal acts of the European Union, international practices, recommendations of IAEA and other international organizations (ICRP, HERCA), harmonization with other national legal acts.

One of the main tasks in establishing and renewing the national framework in the field of radiation protection in a next few years will be transposition of the requirements of the Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom. Lithuania shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive 2013/59/Euratom by 6 February 2018. The Law on Radiation Protection of the Republic of Lithuania, the Lithuanian Hygiene Standard HN 73:2001 “Basic Standard of Radiation Protection”, approved by the Order No 663 of the Minister of Health of the Republic of Lithuania of 21 December 2001 and other legal acts of Republic of Lithuania regulating radiation protection and safety are expected to be basically revised and updated in compliance with Directive 2013/59/Euratom.

## ***Article 6 - Competent regulatory authority***

### ***Article 6.1***

*Each Member State shall establish and maintain a competent regulatory authority in the field of safety of spent fuel and radioactive waste management.*

### ***Article 6.2***

*Member States shall ensure that the competent regulatory authority is functionally separate from any other body or organisation concerned with the promotion or utilisation of nuclear energy or radioactive material, including electricity production and radioisotope applications, or with the management of spent fuel and radioactive waste, in order to ensure effective independence from undue influence on its regulatory function.*

### ***Article 6.3***

*Member States shall ensure that the competent regulatory authority is given the legal powers and human and financial resources necessary to fulfil its obligations in connection with the national framework as described in Article 5(1) (b), (c), (d) and (e).*

## ***Competent regulatory authority***

### ***VATESI***

State Nuclear Power Safety Inspectorate (VATESI) is state regulatory and supervisory authority in Lithuania for activities involving nuclear materials and other activities in the area of nuclear energy involving sources of ionizing radiation. VATESI sets safety requirements and regulations, supervises compliance with them, applies enforcement measures in case of incompliance with safety requirements and regulations, issues licenses, permits and temporary permits, assess safety of nuclear facilities.

The mission of VATESI is to exercise the state regulation of, and supervise over the nuclear installations and the activities related to nuclear and nuclear fuel cycle materials, in order to protect the society and the environment against the harmful impact of exposure to ionising radiation.

The main tasks of VATESI are regulation and supervision of nuclear safety, radiation safety of nuclear energy activities involving sources of ionizing radiation, physical security of nuclear installations, nuclear materials and/or nuclear fuel cycle materials and accountancy and control of nuclear materials as well as supervision of requirements arising from international nuclear weapon non-proliferation obligations of Republic of Lithuania.

According to the Law on Nuclear Energy VATESI performs the following functions:

- exercises functions of the state regulation and supervision of nuclear safety, physical security of nuclear installations, nuclear materials and the nuclear fuel cycle materials, accounting for and control of the nuclear materials, also of radiation safety in operating nuclear installations;
- monitors the compliance with the requirements set forth by the legal acts for activities in the area of nuclear energy subject to licences or permits and monitors exercising of the rights and obligations of licence holders and/or permit holders;
- drafts and approves the requirements and rules for nuclear safety, radiation safety in the area of nuclear energy, accounting for and control of the nuclear materials, physical security of nuclear materials and the nuclear fuel cycle materials mandatory to all the state and municipal authorities, also to all the persons engaged in such activities;
- supervises the compliance with requirements of the legal acts regulating nuclear safety, radiation safety in the area of nuclear energy, physical security of nuclear installations,

nuclear materials and nuclear fuel cycle materials, accounting for and control of the nuclear materials;

- analyses and assesses the documents submitted by applicants for obtaining a licence or a permit, also the documents submitted by licence holders or permit holders or other persons, adopt relevant decisions regarding such documents, review and evaluate the nuclear safety;
- supervises and inspects applicants, licence and permit holders or the persons rendering services, supplying goods or performing works for them or other persons engaged in activities pertaining to nuclear materials and nuclear fuel cycle materials;
- in the cases specified in the laws and other legal acts issue, suspends licences and permits, revokes suspension of licences and permits, or cancels licences and permits, establishes or changes their terms, supervises compliance with such terms;
- subject to coordination with the Ministry of Health establishes norms for release of radionuclides from nuclear installations and monitors compliance with the norms for release of radionuclides;
- drafts and approves the modification categories of a nuclear installation and a description of the procedure for carrying out modifications;
- cooperates with foreign institutions exercising state regulation and supervision in the sector of nuclear energy, within its competence participate in activities of international organisations and institutions, committees and groups of the European Union;
- within its competence and in accordance of legal acts prepares and/or submits to the Government the draft laws and legal acts of the Republic of Lithuania on the issues of nuclear safety, physical security of nuclear installations, nuclear materials and nuclear fuel cycle materials, accounting for and control of nuclear materials, also of radiation safety in carrying out nuclear energy related activities involving sources of ionising radiation;
- prepares and submits to the Government or its authorised institution proposals regarding the national policy and strategy in the sector of nuclear energy and implementation thereof;
- prepares and submits to the Government or its authorised institutions proposals regarding improvements of the system ensuring nuclear safety, radiation safety in the area of nuclear energy, physical security of nuclear installations, nuclear materials and nuclear fuel cycle materials, accounting for and control of nuclear materials;
- in the event of a nuclear and/or radiological accident provides the interested state and municipal authorities with the time-critical information about the radiation situation in the nuclear installation, estimated threats of the nuclear and/or radiological accident and other related information.

### ***Independence of regulatory authority***

National legislation provides clear division between the responsibilities and functions of VATESI and those organizations or bodies engaged in development/promotion of the nuclear energy or use of nuclear energy, including production of electricity.

Paragraph 3 of Article 23 of the Law on Nuclear Energy states, that VATESI has a power to take decisions independently in carrying out its statutory functions. To address nuclear safety issues, functions are clearly divided between the operating and regulatory institutions. VATESI acts as independent governmental institution subordinated directly to the Cabinet of Government and the President, hence its place in the governmental structure helps to assure an effective separation of the regulatory body from the institutions responsible for promotion of nuclear energy. Pursuant to Paragraph 10 of the Article 23 of the Law on Nuclear Energy, the Head and Deputy Heads of VATESI in their official capacity shall act independently from the persons

engaged in activities in the field of the nuclear energy sector, also from other agencies, institutions or organisations engaged in expansion of the nuclear energy or use of nuclear energy, including generation of electricity. Independent activities imply a prohibition to be a member of a body of a legal entity, to accept other remunerated or public positions, to provide services or consultations, except the ones provided acting in the official capacity at VATESI, or to be engaged in other activities due to which a certain person, other agency, institution or organisation acting in the nuclear energy sector would or might gain unjustified competitive advantage over the persons engaged in relevant activities. A breach of this requirement shall be qualified as a serious misconduct.

## ***Resources of regulatory authority***

### *Human Resources*

Pursuant to Paragraph 3 of Article 21 of the Law on Nuclear Energy, “the structure, competence of the State Nuclear Power Safety Inspectorate and its provision with resources shall correspond with the nature and scope of the activities in the field of nuclear energy, activities involving nuclear materials and other activities in the field of nuclear energy involving sources of ionising radiation undertaken and planned to be undertaken in the Republic of Lithuania”.

The maximum number of positions of the VATESI is established by the Government of Lithuania. The Head of VATESI establishes the concrete number of positions and approves the administrative structure of the VATESI and job descriptions of all employees.

The assessment of the adequacy of human resources is done through following procedures:

- Strategic Planning, which includes planning of the need of a particular number of employees, which is based on main strategic goals (such as main foreseen functions, main legislative initiatives) of the VATESI for the planning period (3 years). The Strategic Plan of the VATESI is approved by the Head of VATESI;
- Annual evaluation of qualification and activities of civil servant, conducted pursuant to Law on Civil Service. This procedure is also used to establish the training needs of the VATESI employees.

In case of foreseen changes, e.g., expanding nuclear programme, the practice is to establish internal working groups for evaluation of particular needs for changes in the structure of the VATESI, the number of positions and distribution of functions among its employees.

Pursuant to VATESI integrated management procedures, heads of divisions have an obligation to monitor constantly the work load and functions performed by their employees and inform the head of VATESI about the need for additional human resources.

The need for services of technical support organizations (experts) is evaluated annually through the procedure of establishing the Public Procurement Plan (i.e., while planning the procurement of services). This need is also evaluated during Strategic Planning procedure.

VATESI has 75 full-time staff positions approved by the Government of Lithuania. 68 of these 75 positions are occupied (57 public servants, 8 employees under employment contracts and 3 state officials). The number of personnel employed at VATESI is appropriate for current stage of nuclear programme.

### *Financial Resources*

According to Paragraph 2 of Article 21 of the Law on Nuclear Energy, VATESI activities are financed by the Lithuanian state budget appropriations and other legitimate income.

To fulfil its mission and strategic goals every year VATESI prepares Strategic Activity Plan for next three years. It is a part of national strategic planning and budgeting system. According to this plan, Government approves allocations for the implementation of the VATESI Programme.

Financial resources of VATESI cover the need for offices and office equipment, the salaries of staff, the costs of communications, transport, training, consultancy services, technical support and international co-operation. Financing of VATESI is appropriate for current stage of nuclear programme and covers VATESI's needs related to regulatory activities.

### ***Radiation Protection Centre***

The Radiation Protection Centre (RPC) coordinates actions of state and municipal institutions in the manner established by the Government or, upon direction from the Government, by the Minister of Health, in the area of radiation protection, exercises the state regulation and supervision of both radiation protection in respect of exposure of members of the public and the environment and the practices involving sources of ionising radiation, except of practices in the area of nuclear energy.

RPC is under Ministry of Health. Ministry of Health is responsible for approving regulatory enactments and general rules on the radiation protection. Following this and according to the Law on Radiation Protection (Paragraph 5 of Article 7) the competence of RPC is:

- in accordance with the procedure established by laws, participates in developing and implementing state policy in the area of radiation protection, and prepares the draft legal acts related to radiation protection issues;
- exercises state radiation protection supervision and control ensuring radiation protection and physical protection of the sources of ionising radiation and the radioactive waste management at small producers;
- in the manner established by the licensing rules approved by the Government, issues licences or temporary permits to obtain, keep, use and transport radioactive materials, to manage with radioactive waste by small producers;
- issues permits to transport radioactive materials and radioactive waste;
- manages the State Register of Sources of Ionising Radiation and Exposure of Workers;
- controls compliance with the standards of emission of radionuclides into the environment from medical, industrial (excluding nuclear installations), agricultural objects and when conducting scientific researches, and issues permits authorising to emit radionuclides into the environment;
- is responsible for dose assessment to public (in the vicinity of radioactive waste management and storage facilities as well) on the results of environmental monitoring, including foodstuffs, drinking water, gamma dose equivalent etc. For this purpose data from other state institutions involved in the environmental monitoring network are delivered to RPC, the data from the Ignalina NPP environmental monitoring as well;
- controls implementation of the preventative measures that are used for warning about occurrence of the orphan sources of ionising radiation and the objects contaminated with radionuclides, and monitors handling of the objects contaminated with radionuclides;
- in the manner established by the Government, organises management of radiological incidents and accidents, participate in elimination of their consequences, and, within its competence, shall take part in the management of nuclear accidents and in elimination of their consequences

### ***Financial and Human Resources***

Radiation Protection Centre (RPC) basically is financed by the state budget. RPC also generates non-budget income, i.e., income for provided services (income contribution funds). For the implementation of the particular assignments and projects other financial sources can be obtained (funds of EU and other international organizations).

RPC has 59 civil servants and employees employed on a labour contract basis.

## *Ministry of Environment*

Ministry of Environment:

- participates as stakeholder in the strategic environmental assessment of national level plans and programs: the Ministry examines documents of strategic environmental assessment and the draft plans and programs and provides conclusions concerning them;
- organizes and coordinates environmental impact assessment in the transboundary context;
- takes part in state supervision and control of design and construction of nuclear facilities;
- following the procedure prescribed by legislation and other legal acts, takes part in the issue of licences in radioactive waste management activities.

Environmental Protection Agency (EPA)

EPA is under Ministry of Environment. EPA:

- participates as stakeholder in the strategic environmental assessment of plans and programs of local level (municipality level or smaller): the Agency examines documents of strategic environmental assessment and the draft plans and programs and provides conclusions concerning them;
- coordinates the process of environmental impact assessment of proposed economic activities and methodically manages it; to make decisions whether the proposed economic activities are allowed in the selected site;
- coordinates and performs state environmental monitoring, and controls environmental monitoring of economic entities;
- exchanges monitoring information with other countries.

EPA has its own analytical laboratory for radiological investigations (accredited in accordance with ISO 17025:2005) and the network of automatic radiation monitoring stations.

## *Human Resources*

There are 4 specialists dealing with radiological investigations and 2 dealing with automatic radiation monitoring. Separate division is responsible for Environmental Impact Assessment (8 specialists), however it deals with Environmental Impact assessments for all type of activities, not only related to management of spent fuel and radioactive waste.

## *Financial Resources*

EPA activities are financed by the Lithuanian state budget appropriations and other legitimate income. Additional financing for equipment is provided from European Regional Development Fund.

To fulfil its mission and strategic goals every year EPA prepares Strategic Activity Plan for next three years. It is a part of national strategic planning and budgeting system. Financial resources of EPA cover the need for offices, laboratories, automatic measurement networks, the salaries of staff, and other costs related to activities.

## ***Article 7 - Licence holders***

### *Article 7.1*

*Member States shall ensure that the prime responsibility for the safety of spent fuel and radioactive waste management facilities and/or activities rest with the licence holder. That responsibility cannot be delegated.*

Article 3 of the Law on Nuclear Safety stipulates: The full responsibility for ensuring nuclear safety shall fall on the persons in charge of the nuclear installation or the activities posing a risk of exposure to ionising radiation.

Article 16 of the Law on Nuclear Safety: Full responsibility for the nuclear safety of a nuclear installation and for nuclear safety in carrying out other activities with nuclear and/or nuclear fuel cycle materials shall solely fall on persons that are engaged in such activities and hold relevant licences and/or permits.

Article 30 of the Law on Nuclear Energy stipulates: The licence holder shall be responsible for the adequate and safe operation of the installation in accordance with the requirements stipulated in the laws and other legal acts, also in the articles of association, internal work rules of the licence holder and in the terms of the issued licence. The licence holder shall be responsible for safety of its activities and the nuclear installation.

In the licence issued for the operator there is always emphasized that the licence holder is fully responsible for the safety in the nuclear facility and even if the licence is suspended the responsibility for safety rests with the operator. For evaluating if the licence holder undertakes proper measures in ensuring safety of the management of spent nuclear fuel and radioactive waste, and how safety measures are implemented, the inspections are carried out. The licence holder shall provide safety reports of operation of nuclear facilities to regulatory bodies. Any changes in practice are coordinated with regulatory authorities and are allowed only after there was assured, that safety requirements will be not violated.

### *Article 7.2*

*Member States shall ensure that the national framework in place require licence holders, under the regulatory control of the competent regulatory authority, to regularly assess, verify and continuously improve, as far as is reasonably achievable, the safety of the radioactive waste and spent fuel management facility or activity in a systematic and verifiable manner. This shall be achieved through an appropriate safety assessment, other arguments and evidence.*

National legislation of Lithuania for the safety of spent fuel and radioactive waste management is described in Article 5.1 (b).

Paragraph 2 Article 17 of the Law on Nuclear Safety states: Organisations operating nuclear installations and other holders of licences and/or permits must on a regular basis analyse the state of nuclear safety and improve it;

Paragraph 7 Article 32 of the Law on Nuclear Safety states: Not less frequently than every 10 years after the issuance of a permit of starting the industrial operation of a nuclear installation, the licence holder must make a periodic safety evaluation and substantiation and prepare a periodic safety evaluation report, which shall be submitted to the VATESI for its review and evaluation. Thereafter, the Head of the VATESI shall adopt a decision regarding the coordination (approval) of such report. During the periodic safety evaluation and substantiation it shall be established whether, considering the changes in legal regulation and the construction site

and/or surroundings of a nuclear installation as well as taking into account ageing of constructions, systems and components and other factors that might have an impact on safety, it is ensured that a nuclear installation complies with its design, legal acts and normative technical documentation requirements of nuclear safety. If there are any inconsistencies detected, the licence holder shall prepare and implement indispensable corrective measures which would secure the nuclear installation's compliance with its design, as well as ensure proper fulfilment of all requirements set in legal acts and technical standard documentation of nuclear safety. During the periodic safety analysis and substantiation it shall be also established whether radioactive discharges, their intensity as well as the pathways, media or points of their spread comply with those defined in the plan for radioactive discharges into environment, and together with the periodic safety evaluation report shall provide the updated plan for radioactive discharges into environment. The requirements for preparation of the periodic safety analysis and substantiation shall be established by the Head of the State Nuclear Power Safety Inspectorate.

*Article 7.3*

*As part of the licensing of a facility or activity the safety demonstration shall cover the development and operation of an activity and the development, operation and decommissioning of a facility or closure of a disposal facility as well as the post- closure phase of a disposal facility. The extent of the safety demonstration shall be commensurate with the complexity of the operation and the magnitude of the hazards associated with the radioactive waste and spent fuel, and the facility or activity.*

*The licensing process shall contribute to safety in the facility or activity during normal operating conditions, anticipated operational occurrences and design basis accidents. It shall provide the required assurance of safety in the facility or activity. Measures shall be in place to prevent accidents and mitigate the consequences of accidents, including verification of physical barriers and the licence holder's administrative protection procedures that would have to fail before workers and the general public would be significantly affected by ionising radiation. That approach shall identify and reduce uncertainties.*

The Law on Nuclear Energy and the Law on Nuclear Safety together with the regulations made under other laws establish the licensing system for activities related to nuclear materials or nuclear cycle materials (their transportation, acquisition, etc.), as well as for nuclear facilities of the following life-stages: site evaluation, design, construction, commissioning, operation, and decommissioning. The supervision of the closed radioactive waste repository, acquisition, keeping, use and transportation of nuclear or nuclear fuel cycle materials is also executed according to the laws mentioned above. This regulation should encompass the following areas:

- nuclear safety, radiation safety and physical security of nuclear facilities, nuclear and nuclear fuel cycle materials;
- fire protection of safety related structures, systems and components;
- emergency preparedness in nuclear facilities and during transportation of nuclear and/or nuclear fuel cycle materials;
- radioactive waste management safety;
- the release of radionuclides into the environment;
- management systems of legal entities engaged in a licensed activity and other activities involving nuclear and nuclear fuel cycle materials or carried out in nuclear facility as well as assessment of the nuclear facility construction site.

In the Article 3 of the Law on Radioactive Waste Management, as one of the principles of radioactive waste management is indicated: radioactive waste management safety measures shall be implemented applying graded approach.

Article 35 of the Law on Nuclear Safety states: In order to prevent nuclear and/or radiological accidents, nuclear incidents and other unusual events as well as to avoid their reoccurrence and to

secure and further improve safety in the area of nuclear energy, at all stages of a lifecycle of a nuclear installation or in the course of relevant activities the licence holder shall be required to regularly analyse its own or other persons that are engaged in the nuclear energy sector experience as well as to exchange such experience and take necessary preventive and/or corrective measures that would ensure proper performance of nuclear safety requirements in the manner prescribed by the Head of the State Nuclear Power Safety Inspectorate.

Regulation on Disposal of Low and Intermediate Level Short Lived Radioactive Waste Article 17: For environmental protection in the post-closure phase, the focus shall be on the protection of the environment from radioactive contaminants including such factors as the content of chemically or biologically toxic materials in the waste, engineered barriers introduced during construction or operation, protection of groundwater resources, the ecological sensitivity of the environment into which radioactivity or other contaminant releases from the repository may occur, and potential impacts on bio-diversity and ecological sustainability.

Regulation on Disposal of Low and Intermediate Level Short Lived Radioactive Waste Article 53: A monitoring program of the repository shall be worked out ... and shall include the following:

53.1. radiological and other monitoring of the repository and its environment in order to prove the absence of any unwanted environmental impact;

53.2. measurements of repository parameters demonstrating that the barriers have the features as expected;

54. If an unanticipated release of radionuclides to the environment is detected appropriate measures allowing control over such release and mitigation of its effects shall be carried out.

According to nuclear safety requirements, typical safety analysis report (document provided during licensing of nuclear facilities) of radioactive waste management or spent fuel management facility shall include general description of the facility and the environment of the facility, design basis, description of systems, structures and components, description of activities, analysis of activities during normal operations and in case of emergencies, emergency preparedness, management system and etc.

More information on licensing system is described in the Article 5.1 (c).

*Article 7.4*

*Member States shall ensure that the national framework require licence holders to establish and implement integrated management systems, including quality assurance, which give due priority to safety and are regularly verified by the competent regulatory authority.*

According to the Law on Nuclear Safety the one of the main areas of nuclear safety regulation is the management systems of the persons engaged in the licensed activities and in other operations related to nuclear and/or nuclear fuel cycles materials, as well as in the evaluation of construction site of a nuclear installation. The highest priority in the management system of such persons shall be the assurance of nuclear safety. Organizations operating nuclear installations and other holders of licences and/or permits must ensure high level of safety culture and competence of the organization and its workers, on a regular basis analyses the state of nuclear safety and improve it, consider human factors (human capabilities and their limits) at all stages of life of a nuclear installation and maintain an effective integrated management system with reasonable priority on nuclear safety.

On the 21st of June, 2010, BSR-1.4.1-2010 “Management Systems Requirements”, based onto the IAEA safety standard GS-R-3, was approved. The regulations specify regulatory requirements for development, implementation and maintenance of an effective management

system for the organizations operating nuclear facilities and require covering all activities related to the use of safety important systems and components by management system's documentation and periodically assess effectiveness of the management system. To this end an operating organization must establish an independent department to oversee application of management system requirements and coordinate its improvement. The licensee and its safety-important contractors shall comply with all national legal requirements and regulations, including those in the area of nuclear safety.

According to the BSR-1.4.1-2010 licensee by developing management system shall consider application of the IAEA recommendations published in the IAEA guides on management systems. The BSR-1.4.1-2010 establishes requirements for implementation and continuous improvement of the integrated management system based upon GS-R-3 process approach including requirements as follows:

- periodically assess, monitor and continuously develop safety culture;
- to establish and constantly update management system documentation, and manage changes to the documents and identify the changed content within the documents;
- to approve safety as the top priority and the related commitment of management of a licence holder;
- to take into account requirements of interested parties during establishment and development of the management system, in decision-making process and in activities of a licence holder;
- to identify clearly responsibilities and roles of all employees for safety, implementation of the system requirements and adherence to safety and other legal requirements;
- to plan and ensure necessary human, financial and other resources necessary to ensure safety and implement goals and commitments of a licence holder;
- to identify, implement and improve processes with strict and systematic consideration of safety and other requirements when establishing processes and their interactions so the applicable legal requirements and standards are implemented in a safe and proper way;
- to ensure proper cooperation of management levels and different divisions for safe and effective performance;
- to apply reliable control mechanisms over activities performed by safety important contractors and still to retain the ultimate responsibility of a licence holder for safety;
- carefully prepare, plan, implement, monitor, adjust organizational changes and assess them after implementation to preclude deterioration of safety;
- to apply sufficient measurements, monitoring, control and checking activities and needed methods to ensure high level of safety, identification and following-up of needed improvements and effectiveness of the management system;
- to apply management self-assessment through all levels of management and to use the results to improve safety, safety culture and activities;
- to apply independent assessments and audits as an additional mechanism to proactively resolve safety issues and retro-actively identify needed corrections and opportunities to improve processes, the management system and (or) their documents;
- periodically perform comprehensive management reviews of the management system and to plan continuous improvement and resources to implement improvement activities.

VATESI requirements for handling of radioactive waste in nuclear facilities before disposal (BSR-3.1.2-2010) include requirement for licensee to establish and implement management system applicable throughout the lifetime of a facility and for the entire duration of operation activities in normal, transient and emergency situations.

Licensee's management system for radioactive waste handling before disposal shall be developed and implemented to ensure compliance with requirements and technical conditions necessary for activities to be carried out in a safe manner; compliance with requirements for storage and disposal; quality, integrity and tightness of stored radioactive waste packages throughout the entire

storage period; quality of required documentation, records and identification of radioactive waste packages.

*Article 7.5*

*Member States shall ensure that the national framework require licence holders to provide for and maintain adequate financial and human resources to fulfil their obligations with respect to the safety of spent fuel and radioactive waste management as laid down in paragraphs 1 to 4.*

Article 17 of the Law on Nuclear Safety states:

1. Organisations operating nuclear installations or other persons engaged in the activities referred to in paragraphs 1 and 2 of Article 22 (*this article is described below*) below must hold a licence and/or permit issued by the State Nuclear Power Safety Inspectorate and must have the material, financial and human resources that are sufficient for involvement in the licensed activity or operations regulated by permits in compliance with the legal acts and technical standard documents of nuclear safety.

2. Organisations operating nuclear installations and other holders of licences and/or permits must:

- 1) ensure high level of safety culture and competence of the organisation and its workers;
- 2) on a regular basis analyse the state of nuclear safety and improve it;
- 3) consider human factors (human capabilities and their limits) at all stages of life of a nuclear installation;
- 4) maintain an effective integrated management system with reasonable priority on nuclear safety.

Pursuant to Paragraph 1 of Article 23 of Law on Nuclear Safety the licences and permits shall be issued to persons with sufficient capacities in terms of technological and financial resources, management system, human resources allowing to properly fulfil the conditions required by the licence or permit and to ensure nuclear safety.

## *Article 8 – Expertise and skills*

### *Article 8*

*Member States shall ensure that the national framework require all parties to make arrangements for education and training for their staff, as well as research and development activities to cover the needs of the national programme for spent fuel and radioactive waste management in order to obtain, maintain and to further develop necessary expertise and skills.*

The National Energy Strategy, approved by Resolution No. X-1046 of the Seimas of the Republic of Lithuania dated 18 January, 2007, provided that „It is necessary to draft a national programme for the training of energy specialists and specify therein the tasks for organising the studies, the quality of the study programmes and the maintenance of the material base of the institutions organising studies by taking into consideration new needs and sources of financing. When drafting and implementing this programme, national priority has to be given to ensuring the timely preparation of specialists for work in the new nuclear power plant regarding the phase of mounting its technological equipment.”

To address future workforce demand and the quality and quantity of nuclear education the National plan for preparation of the nuclear energy specialists was approved by the order of Ministry of Energy and Ministry of Education and Science No.V-906/1-133 on 25 May, 2011.

Ministry of Education and Science of Lithuanian Republic is responsible for implementation of The National Training Programme of Qualified Specialists in Nuclear Energy for 2008–2015. The Program is intended to provide the Lithuanian nuclear energy infrastructure with highly skilled nuclear professionals. The aims of the Program are to ensure the effective preparation of highly qualified nuclear energy specialists for Visaginas NPP and the entire nuclear industry and further develop nuclear knowledge, experience and practical, educational and scientific excellence.

In order to achieve this objectives three study programs were started:

- The Study of Physics of Energy at Vilnius University;
- Graduate (bachelor) Study of Nuclear Energy at Kaunas Technological University;
- Postgraduate (master) Studies of Nuclear Energy at Kaunas Technological University.

About 115 students are studying according these programs at present. During the study the students have possibilities to perform practice at Ignalina NPP.

The goal of Nuclear Energy Physics study program – to prepare highly qualified nuclear physicist with expert knowledge in nuclear physics, neutron physics, nuclear reactors physics, radiation chemistry, nuclear material physics, nuclear fuel cycle, radiation ecology and safety, materials science, and to provide necessary university education in social and the human sciences.

The main purpose of Graduate and Postgraduate Studies of Nuclear Energy is to provide general technical and special nuclear energy education. During these studies students gain essential knowledge on fundamental theories and principles of physics, necessary for further development of nuclear power engineering, including decommissioning of Ignalina NPP, and manufacturing companies. Between some students and INPP an agreements are signed according to which, after graduation they will be employed at INPP.

It is expected that after implementation of the Programme about 30-50 highly skilled nuclear energy specialists and nuclear physicists will be prepared each year. Also about 100 specialists will be retrained and improve their professional skills and will be certified annually.

According to the the Order of the Minister of Health of the Republic of Lithuania No. V-1001 on the Approval of the “Compulsory Radiation Protection Training and Instruction Procedure”,

Vilnius, 22<sup>nd</sup> November 2011 (hereinafter - Order of the Minister of Health) it is required, that the main following groups have to be trained in radiation protection:

- Workers, dealing with the sources;
- Governmental officials (Customs officers, State Border Guard Service officers etc.) and other employees and persons (as workers of metal scrap yards) whose work (activities) is associated with the orphan sources and detection of materials contaminated with radionuclides;
- Staff responding to emergency situations (firemen, police officers, medical personnel).

Based on the Order of the Minister of Health, 14 modules of radiation protection training have been drawn, which are a guide for developing radiation protection training programmes. There are two main criteria by which the programmes have to be prepared:

- The various groups of the specialists (i.e. RPOs, workers dealing with the sources, officials etc.);
- The risk category of the sources (I – V).

For more effective training and paying an attention to the appropriateness of the education, there are determined the minimum requirements of education levels for persons, dealing with the sources on their work.

## **VATESI**

Pursuant to Paragraph 1 of Article 24 of Law on Nuclear Energy, “State Nuclear Power Safety Inspectorate shall employ qualified personnel with experience and special knowledge necessary to perform functions of this institution, based on the qualification, education and other criteria established for certain positions. State Nuclear Power Safety Inspectorate shall build and further develop such competences of the employees of State Nuclear Power Safety Inspectorate which would allow drawing conclusions regarding the safety level of operation of nuclear installations and other activities involving nuclear materials and the nuclear fuel cycle materials and (or) other activities in the area of nuclear energy involving sources of ionising radiation and the compliance of such safety level with the requirements set forth in the legal acts and technical standard documents, also adopting the required decisions in the area of regulation.”

Procedures for training of VATESI personnel are established in its integrated management documents. The established training methods are: formal training (courses, workshops), introductory training of public servants, initial internal training, lecturing by VATESI employees, self-study and work with more experienced specialists. Major part of courses and workshops related to the nuclear safety of nuclear installations are the ones organized by IAEA. The procedure for analysis of training needs and organizing different types of training events is as follows:

- each employee of VATESI is required (by their job description) to meet and further develop the qualification needed for properly carrying out their functions;
- the need for training (improvement of qualification) is evaluated in the beginning of every year during annual evaluation of civil servants. The main aspects considered during evaluation and establishment of training needs (improvement of qualification) are priority of safety, promotion of safety culture, experience, present and required knowledge of the employee, needs of licensees (e.g. fields in which the highest number of consultations were needed), latest regulation practices and etc.;
- based on above mentioned evaluation, Annual plans for improvement of qualification are drafted and carried out.

## **Environmental Protection Agency (EPA)**

Procedures for training of EPA personnel are established in its integrated management documents. Additionally for specialist in laboratory trainings are planned in accordance with requirements of international standard ISO 17025:2005. The established training methods are: formal training (courses, workshops), introductory training of public servants, initial internal training, self-study. Major part of courses and workshops related to the nuclear safety and radiation safety of nuclear installations are the ones organized by IAEA.

The procedure for analysis of training needs and organizing different types of training events is as follows:

- each employee of EPA is required (by their job description) to meet and further develop the qualification needed for properly carrying out their functions;
- the need for training (improvement of qualification) is evaluated in the beginning of every year during annual evaluation of civil servants and evaluation of laboratory specialists. Based on this evaluation, annual plan for improvement of qualification is drafted and carried out.

## ***Article 9 – Financial resources***

### *Article 9*

*Member States shall ensure that the national framework require that adequate financial resources be available when needed for the implementation of national programmes referred to in Article 11, especially for the management of spent fuel and radioactive waste, taking due account of the responsibility of spent fuel and radioactive waste generators.*

According to the Law on Radioactive Waste Management Article 9, the radioactive waste generator shall pay all the expenses incurred during the management of radioactive waste from the moment of its generation to its emplacement at a disposal facility, including the expenses related to the post-closure surveillance of disposal facilities.

According the Law on the Management of Radioactive Waste, an operator of a radioactive waste management facility must take the appropriate steps to ensure that sufficient qualified staff and adequate financial resources are available during the decommissioning.

Required financial resources for the management of spent fuel and radioactive waste from Ignalina Nuclear Power Plant are described in the Revised Final Decommissioning Plan of Ignalina NPP (FDP) and in the the National Programme for the Management of Spent Fuel and Radioactive Waste.

As mentioned in Article 5.1(h) there are several financing sources for the management of radioactive waste and spent fuel in Ignalina Nuclear Power Plant: State Enterprise INPP Decommissioning Fund, State budget, Ignalina International Decommissioning Support Fund, Ignalina Programme. New radioactive waste management facilities, which are or will be built as part of the INPP decommissioning process, such as solid radioactive waste management and storage facility, interim spent nuclear fuel storage facility, landfill and near surface disposal facilities and others, are being financed by the Ignalina International Decommissioning Support Fund, Ignalina Programme and co-financed by the State Enterprise INPP Decommissioning Fund or State budget. These financing sources are identified in Article 4 the Law on Decommissioning of Ignalina Nuclear Power Plant.

The State Enterprise INPP Decommissioning Fund is accumulated in the special Treasury Account and contains funds that have been transferred by INPP as part of their revenue earned from electricity sales. Since Unit 2 of INPP was shut-down on 31 December 2009, payments to the Fund ceased. Starting from 2014, all the INPP revenue earned from sales of redundant assets are allocated to the Fund.

The Ignalina International Decommissioning Support contains contributions of the donors, where the main contributor is the European Commission. The European Bank for Reconstruction and Development is the administrator of the fund, while the governing body is the Donors Assembly. The Ignalina Programme is financed by the European Union budget. The Ignalina Programme was created under Protocol 4 of the Act of Accession of Lithuania into the European Union in order to provide assistance for the decommissioning of INPP (including radioactive waste management) and consequential measures in the energy sector. The European Commission by its decisions provides funding under the Ignalina Programme through two channels – the above mentioned Ignalina International Decommissioning Support Fund and the National Agency in Lithuania (Central Project Management Agency). With endorsement of the Government of Lithuania, the Central Project Management Agency (CPMA) has been designated by the European Commission to act on its behalf as the National Agency of the Ignalina Programme. The CPMA is an agency under the Ministry of Finance of Lithuania. The funding for Ignalina Programme is based on annual commitments. Therefore a radioactive waste management project which lasts more than 1 year will be financed from funding commitments accumulated in several years. Projects that have received the favourable opinion of the Nuclear Decommissioning Assistance Programme Committee and approval of the European Commission are contracted through the CPMA in accordance with the Lithuanian Public Procurement Law. The Republic of Lithuania takes responsibility and provides full financial guarantees to the European Commission in respect to activities of the CPMA.

The funding (both from the EU and national sources) is sufficient to continue decommissioning of INPP and ensure safe management of radioactive waste and spent nuclear fuel until 2020.

Council of the European Union adopted regulation on Union support for the nuclear decommissioning assistance programme in Lithuania on 13 December 2013. The financial envelope for the implementation of the Ignalina programme for the period 2014-2020 is set at EUR 450.8 million at current prices. Lithuania contributes 12 percent of the funds required for the Ignalina Programme.

Revised Final Decommissioning Plan of Ignalina NPP (FDP) was approved by the Ministry of Energy on 25 August 2014. Ignalina NPP decommissioning would last until 2038. In order to ensure proper funding of Ignalina NPP decommissioning process from 2020 until 2029, Lithuania will be need additional support for this period. Lithuania expects that the EU will continue to follow the agreement reached under Treaty of Accession and will provide additional adequate financing for Ignalina decommissioning after 2020.

Institutional waste producers pay for their waste collection, transport, treatment, and storage and disposal services. The fees of the services were approved by the Order of the Minister of Energy. RATA collect fees from the Institutional waste producers in to separate dedicated account. Management of historical institutional waste is funded by the state budget.

Funding scheme for post-closure operation of waste disposal and storage facilities is currently under consideration.

## ***Article 10: Transparency***

### *Article 10.1*

*Member States shall ensure that necessary information on the management of spent fuel and radioactive waste be made available to workers and the general public. This obligation includes ensuring that the competent regulatory authority inform the public in the fields of its competence. Information shall be made available to the public in accordance with national legislation and international obligations, provided that this does not jeopardise other interests such as, inter alia, security, recognised in national legislation or international obligations.*

### VATESI

Pursuant the Law on Nuclear Safety and other legal acts VATESI and the licence holders must inform both the state and municipal institutions and the general public as well as other persons whose business activities are directly related to the licenced activities of a relevant licence holder about the conditions of nuclear safety.

VATESI is developing open communication tools to ensure transparency. The ongoing dialogue and interaction with main licensees and other stakeholders are the main priorities in daily communication tasks.

Annually VATESI issues report on the activities of regulation in nuclear safety, presents this report to the President, the Government and the Parliament and provides information to the local authorities, international organizations and the general public. In addition, VATESI specialists proactively participate in different workshops and conferences to share information about relevant nuclear safety issues in Lithuania and worldwide.

While implementing delegated supervision functions VATESI provides public consultations to the legal entities that submitted written questions or provides public consultations on its own initiative. The procedure of public consultations is outlined in Nuclear Safety Requirements BSR-1.1.2-2011 “Rules on providing confirmed written and publicly announced consultations”. Information meetings or consultations in informal manner with licensees help to promote dialogue and more favorable working environment with high degree of transparency. It is important to add that INPP and VATESI managers have quarterly meetings to discuss about relevant nuclear safety issues.

Accessible website [www.vatesi.lt](http://www.vatesi.lt) for public and the licensees is in place. On this website, licensees can find comprehensive information on all aspects of regulatory decisions. Website includes information on specific events and unusual incidents, annual VATESI and national reports, press releases, relevant guidelines and legislation, information about main VATESI activities and performance indicators. Up to date information on electronically basis provided in Lithuanian and English languages. General public and media inquiries are handled in a timely manner. Information and documents are being made public according to national legislation regulating restricted information. Public opinion surveys regarding nuclear safety issues were organized by VATESI in 2009, 2011 and 2014.

Arrangements have been made for providing useful, timely, truthful, consistent and appropriate information to the public in the event of a nuclear or radiological emergency.

The State Emergency Management Operation Centre is responsible for providing information to public in case of emergency. The State Emergency Management Operation Centre shall activate the Press Centre in the Press Service of Government of Republic of Lithuania or in Fire and

Rescue Department. In case of an emergency State and municipality's institutions, public offices and citizens is notified using existing public warning and notification system.

In 1994 Lithuania has joined Convention on Early Notification of a Nuclear Accident and in 2000 to Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency. According to Resolution No 972 of the Government of the Republic of Lithuania on 13th October 1994 VATESI is responsible for implementation of Article 7 and provision of information to IAEA and neighboring countries according Article 5 of Convention on Early Notification of a Nuclear Accident. According to Resolution No 1168 of the Government of the Republic of Lithuania on 29th October 2005 Fire and Rescue Department is responsible for implementation of Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency. According to the IAEA EPR-IEComm manual, VATESI is National Warning Point (NWP), National Competent Authority for events abroad NCA(A) and Fire and Rescue Department – National Competent Authority for domestic events NCA(D). VATESI is also a contact point and competent authority in ECURIE arrangements.

## INPP

INPP ensures transparency and provides detail up-to-date information about the enterprise activities, completed and ongoing decommissioning projects, radioactive waste management to general public via INPP webpage <http://www.iae.lt/> on regular basis in Lithuanian, English and Russian languages. INPP maintains an active communication policy with media via press releases, press conferences, interviews and presentations to journalists.

INPP publishes official publications and leaflets that are free of charge to the visitors covering the following subject matters: quantities, management and storage of radioactive waste, management of spent fuel, decommissioning projects, decommissioning funding, environmental safety and other decommissioning relevant data. Short movie about the INPP decommissioning covering all key projects and radioactive waste management was created and is shown in INPP Communication Division Information Center for visitors and was shown on national TV for general public.

Environmental Impact Assessment Reports (EIAR) are being conducted and presented to the local municipality. The presentation of EIAR is an open event and public participants can participate and discuss during the event. Information about the time and place of the event is being provided in Visaginas municipality's webpage. Hard copies of EIAR are available for general public and workers at INPP Communication Division and digital copies are available on INPP webpage.

INPP organizes excursions to interested legal and private entities in the Communication Division Information Center and INPP controlled area during which the information about the decommissioning projects, spent fuel and radioactive waste management, radiation etc. is provided and questions of visitors answered.

INPP maintains an active communication with employees via inner webpage where information is provided about the activities of the plant and each employee may ask questions to the management anonymously. Monthly newspaper for employees is being published providing information and articles about the decommissioning projects, radioactive waste management, radiation levels and other data that may be relevant to employees.

International seminars and workshops are organized in order to share the experience of uranium graphite reactors decommissioning, irradiated graphite waste management and storage issues.

## RATA

Radioactive Waste management Agency (RATA) continuously informs the public and responsible institutions about its activities, radioactive waste and spent fuel management through the media, internet, special publications, etc.

RATA prepares annual reports on its activities. The approved reports are published on RATA website [www.rata.lt](http://www.rata.lt) in Lithuanian and English. According to the law of Environmental Monitoring, Annual Reports on environmental monitoring of the Maišiagala Repository are submitted to the Environmental Protection Agency, the Radiation Protection Centre, VATESI, the Environmental Protection Agency of the Širvintos Region. Environmental monitoring reports are also published on RATA website in Lithuanian. The news, press releases, legislation and other information about RATA activities, spent fuel and radioactive waste management are published in Lithuanian and English on RATA website.

Also RATA performs educational activities so that the public could understand and constructively take part in the decision making process on radioactive waste management. Informative publications, video materials about radioactive waste management technologies have been prepared and issues by RATA. The educational material is distributed during seminars, meetings, press conferences and other public information and communication events.

### *Article 10.2*

*Member States shall ensure that the public be given the necessary opportunities to participate effectively in the decision- making process regarding spent fuel and radioactive waste management in accordance with national legislation and international obligations.*

In Lithuania public is given the opportunity to participate in the decision making process, regarding spent fuel and radioactive waste management, during strategic environmental assessment and environmental impact assessment process.

Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programs on the environment is transposed into national legislation: Law on Environmental Protection of the Republic of Lithuania; Order of Assessment of the Effects of Certain Plans and Programs on the Environment approved by governmental resolution; Regulation on Public participation in the Territorial Planning Process approved by governmental resolution; Order of Public Participation in Strategic Environmental Assessment Procedures of Plans and Programs and Informing of the Stakeholders, European Union Member States and Other Foreign States approved by the minister of environment and other implementing acts.

The strategic environmental assessment procedures, requirements for documentation and public participation also comply with the following international conventions:

- Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, 25<sup>th</sup> June 1998;
- Protocol on Strategic Environmental assessment to the Convention on the Environmental Impact assessment in a Transboundary Context, Kyiv, 21<sup>th</sup> May 2003.

Directive 2011/92/EU of European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (codification) is transposed into national legislation: Law on the Environmental Impact Assessment of Proposed Economic Activity; Order of Informing the Public and Public Participation in Environmental Impact Assessment Process approved by the minister of environment and other implementing acts.

The environmental impact assessment EIA procedures, requirements for documentation and public participation also comply with the following international conventions:

- Convention on Environment Impact Assessment in a Transboundary Context, Espoo, 25<sup>th</sup> February 1991;
- Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, 25<sup>th</sup> June 1998.

## *Articles 11 and 12– National programmes*

### *Article 11.1*

*Each Member State shall ensure the implementation of its national programme for the management of spent fuel and radioactive waste ('national programme'), covering all types of spent fuel and radioactive waste under its jurisdiction and all stages of spent fuel and radioactive waste management from generation to disposal.*

### *Article 11.2*

*Each Member State shall regularly review and update its national programme, taking into account technical and scientific progress as appropriate as well as recommendations, lessons learned and good practices from peer reviews.*

### *Article 12.1*

*The national programmes shall set out how the Member States intend to implement their national policies referred to in Article 4 for the responsible and safe management of spent fuel and radioactive waste to secure the aims of this Directive, and shall include all of the following:*

*..*

*(c)an inventory of all spent fuel and radioactive waste and estimates for future quantities, including those from decommissioning, clearly indicating the location and amount of the radioactive waste and spent fuel in accordance with appropriate classification of the radioactive waste*

The content of the radioactive waste management program is specified in the Article 8<sup>1</sup> of the Law on Radioactive Waste Management.

National Programme for the Management of Spent Fuel and Radioactive Waste is the part of the national legal system and is adopted for a 7 year period. The programme must be revised every 7 years. The programmes can be reviewed sooner if necessary.

The implementation of the National Programme for the Management of Spent Fuel and Radioactive Waste is coordinated by the Ministry of Energy. The Ministry of Energy about implementation and progress of the National Programme for the Management of Spent Fuel and Radioactive Waste in the previous year in the beginning of the year inform the Government of the Republic of Lithuania.

Radioactive waste management development program was prepared in response to the nuclear energy development plans, national and international environmental, nuclear and radiation safety requirements and sets of spent nuclear fuel and radioactive waste management goals, objectives, and values of evaluation criteria.

The strategic ultimate goal of the program is safe management of all radioactive waste and spent nuclear fuel available in Lithuania, protection of people and the environment from harmful effects of ionizing radiation and avoiding to impose undue burdens on future generations. The implementation of the safety principles follows the rule that the radioactive waste, including spent fuel must be isolated for a long period of time from humans and the living environment, ensuring the safety by passive means. Storage of spent fuel and radioactive waste, including long-term storage, is an interim solution and can not be an alternative to the disposal.

The first objective of the program is to reduce generation of radioactive waste. Lithuanian legislation requires to reduce the volume of radioactive waste to a minimum as practically and reasonably possible. Minimization of waste generation should be achieved via waste clearance (through reuse of materials, devices and equipment that have been contaminated with radionuclides or disposal as non-radioactive waste). In 2016 Ignalina NPP will install metal waste decontamination facility to increase the efficiency of decontamination. In addition, it has

been foreseen to develop and introduce technologies reducing the amount of radioactive waste or activity.

The second objective of the program is to achieve a high level of nuclear and radiation safety and environmental protection of spent nuclear fuel and radioactive waste.

Very low level of short-lived radioactive waste, accumulated in Ignalina NPP storage facilities will be retrieved, and sorted in accordance with the requirements. After initial treatment the waste will be disposed of in a very low level waste repository, which will be constructed not far from the NPP. Lithuanian legislation allows to dispose of both treated and untreated waste, if it meets the repository waste acceptance criteria.

Short-lived low- and intermediate-level radioactive waste meeting low and intermediate level waste acceptance criteria for the repository will be emplaced into reinforced concrete vaults of the near- surface repository to be constructed. This repository will be in operation from 2021 to 2038. Active institutional control will last for 100 years after the closure of the repository. After that, passive control will continue at least 200 years.

Long-lived low- and intermediate-level radioactive waste and spent sealed radiation sources will be separated from the short-lived wastes and loaded into appropriate containers. The containers with long-lived radioactive waste will be stored in a long-lived waste storage facility. Graphite from the dismantled reactors will be moved to the storage facility in 2022 - 2038. The waste will be stored up to 2066 and will be disposed of in a geological repository.

For storage of the spent nuclear fuel Lithuania has selected the dry storage option. Till 2017 construction of a new dry storage will be completed and up to 2022 the fuel will be transferred to the storage facility. The design lifetime of the existing storage facility is up to 2050, and that of the new facility is until 2067. After the storage period the spent nuclear fuel should be disposed of in a geological repository.

Since the operation period of the existing spent nuclear fuel storage ends earlier than the planned commissioning of the geological repository a possibility of extending the storage period of the dry storage for spent nuclear fuel will be analyzed. This analysis program will be developed until 2025.

Radioactive waste stored in Maišiagala radioactive waste storage facility will be retrieved, the territory rehabilitated and transferred for the uncontrolled use.

RATA infrastructure to manage institutional radioactive waste and orphan sources of ionizing radiation will be strengthened.

Data on waste packages containing very low-level, low and intermediate level waste are stored in a computerized Ignalina NPP decommissioning management system: it will be maintained until the end of passive institutional control period. In order to increase the reliability of data storage is necessary to regularly upgrade the data storage hardware and software.

The third objective of the program is to ensure sustainable management of spent fuel and long-lived radioactive waste in the long-term safety. Lithuanian laws prohibit the processing of spent nuclear fuel in Lithuania. Spent nuclear fuel can be recycled abroad, and the resulting secondary waste returned to Lithuania. However, this solution is not economical and the resulting secondary long-lived high-level radioactive waste has to be managed the same way as the spent fuel. As the storage of spent nuclear fuel and radioactive waste is only a temporary solution, the spent fuel and long-lived radioactive waste eventually has to be disposed in a geological repository. The geological repository will be needed before the end of the spent nuclear fuel and long-lived radioactive waste storage period (2050 - 2067). Usually the installation programs for geological repositories (research and development, site selection, construction) last for approximately 30 years. Therefore, in 2015 - 2016 a repository development project including timetable for implementing the project, preliminary research, and repository design, construction and operation will be developed.

The second task is to select the location for the geological repository. It will be a combination of successive stages ("step by step"). Selection of suitable geological formations and investigation

of the repository environment will be included in the site selection program. The main repository site selection stage are: site selection process planning (2015-2016), detailed research to choose a few regions of interest (2017-2019), detailed characterization (2020-2031) and site approval phase (2032-2036). The final stage will include an environmental impact assessment and a comparative analysis of the alternative sites. The specific location will be selected according to technical, social and economic conditions. Repository site should be selected by the year 2036.

Concept of the geological repository will be based on appropriate studies and safety analysis. Repository concept will be developed gradually and in coordination with the site selection process and making sure that the safety requirements are met. Upon completion of each site selection stage the concept will be updated and the repository installation price adjustment carried out. Lithuanian geological repository concept will be developed in 2032.

When the selection of the repository site and its concept are completed the design of the facility and later, the construction will be initiated. Deep repository construction will start in 2039, following a technical design expertise and safety justification. The construction and commissioning of the repository will be completed in 2066.

The fourth objective of the program is to ensure transparency of spent nuclear fuel and radioactive waste management.

It is foreseen to disseminate knowledge in the field of radioactive waste safety and to inform the public about management and disposal of spent nuclear fuel and radioactive waste. Dissemination of information about radioactive waste generation, their type, management practices and safety will be carried out to improve public confidence level. Efforts will be made to inform the public and to involve it in the initial decision-making already in project planning and early implementation stages.

The radioactive waste management development program will be reviewed and updated every 7 years. Comments submitted by the Commission and other stakeholders, international peer reviews results, technical progress and the best international practice will be considered. State Enterprise RATA is responsible for drafting of the program amendments and submitting to the Ministry of Energy.

### **Current inventories**

As of 2015-05-30, the first SNFSF contained 20 CASTOR RBMK casks and 98 CONSTOR RBMK casks, with a total of 12032 spent fuel bundles (6016 spent fuel assemblies) of RBMK type, with uranium enriched to no more than 2%. The total activity of the spent fuel that is stored at the first SNFSF is of  $3.09E18$  Bq.

In new Interim SNFSF at present time (2015-05-30) no casks with spent fuel are stored.

At present time the inventory of spent fuel was: 7175 fuel assemblies in the pools of Unit 1 and 7246 fuel assemblies in the SFP and 1134 in reactor of Unit 2. The amount of heavy metal (HM) in one assembly is 110-112 kg. Total amount of heavy metal (mass of spent fuel pellets in SFA and SFB) about 799247 kg in Unit 1 and about 927157 kg in Unit 2.

Total amount of radioactive wastes at INPP before decontamination, conditioning and package formation for disposal or storage estimated at 2015 including all wastes foreseen from decommissioning of INPP including RAW in storage facilities of operational wastes are presented in table below.

Class	Waste type	Amount of radioactive wastes, m <sup>3</sup>	Amount of radioactive wastes, t
VLLW-SL (Class A)	Concrete	~40000	83466
	Burnable	~10000	4156
	Non burnable	~80000*	87989
LILW-SL (Class B + C)	Burnable	~500	161
	Non burnable	~ 7000	7277
	Cementation of liquid radioactive wastes ***	1638.8	14000
	Bituminization of liquid radioactive wastes**	14384	19356
LILW-LL (graphite) (Class D+E)	Non burnable	~4000	3819
LILW-LL (Class D+E)	Non burnable	~200	627
SSS (Class F)	Non burnable	~60****	15,7

\*already prepared for final disposal and located at buffer storage facility for Landfill disposal facility about 2000 m<sup>3</sup>.

\*\* Planned amount of bituminized liquid radioactive wastes until 2021 will be about 16130 m<sup>3</sup>.

\*\*\* Total amount of packages with cemented compound after treatment of liquid radioactive wastes are 8800 200 l drums filled by 93 % of volume. Total planed amount of cemented compound until 2038 will be 44500 drums or 8277 m<sup>3</sup> of radioactive cemented compound in 200 l drums.

\*\*\*\* Volume with packages of SSS in the temporary storage facilities of operational wastes.

### Future prospects

As additional radioactive wastes are expected to be generated as secondary wastes of decommissioning activity of Ignalina NPP.

Planned amounts of radioactive wastes after decontamination and conditioning for the disposal (short live radioactive wastes) or interim storage (for long lived radioactive wastes) of all radioactive waste at Ignalina NPP (Lithuania, because INPP is only NPP which are at decommissioning stage).

Class	Waste type	Amount of radioactive wastes with package for disposal, m <sup>3</sup>	Disposal or storage facility
VLLW-SL (Class A)	Concrete	~65000	Landfill
VLLW-SL (Class A)	Non burnable	~40000	Landfill
LILW-SL (Class B + C)*	Burnable	~80000	Near surface repository
	Non burnable		
	Cementation of liquid radioactive wastes		
LILW-SL (Class B + C)	Bituminized liquid radioactive wastes	16130	Transformation of bituminized waste storage facility to repository
LILW-LL (graphite) (Class D+E)	Non burnable	~7500	Interim storage, Deep geological disposal**

LILW-LL (Class D+E)	Non burnable	~2000	Interim storage, Deep geological disposal**
SSS (Class F)	Non burnable	~200	Interim storage, Deep geological disposal**

\* Including class A burnable wastes and packages of cemented liquid radioactive wastes.

\*\* construction of deep geological disposal are foreseen at the territory of Lithuania, but no real work starts at present time.