



**Republic of Lithuania**

**Lithuanian 2nd 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, 2018**

## **Contributors to the Lithuanian National Report**

State Nuclear Power Safety Inspectorate (VATESI) prepared this report with the contribution of:

Ministry of Energy of the Republic of Lithuania  
Ministry of Environment of the Republic of Lithuania  
Radiation Protection Centre under the Ministry of Health of the Republic of Lithuania  
State Enterprise Ignalina Nuclear Power Plant  
State Enterprise Radioactive Waste Management Agency

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A.Goštauto str. 12, LT-01108 Vilnius Lithuania  
[www.vatesi.lt](http://www.vatesi.lt); [atom@vatesi.lt](mailto:atom@vatesi.lt);

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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  
RSC – 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*

The present Report was prepared according to Article 14.1 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 referred to as the Waste Directive).

This is the second Report of Lithuania for the Waste Directive. The aim of the Report is to demonstrate how Lithuania implements its obligations under the Waste Directive since the last Report.

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

## *Sources of Radioactive Waste*

### *1. Nuclear power plants*

There is only one nuclear power plant in Lithuania - Ignalina NPP (INPP). 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).

INPP reactors were commissioned in December 1983 and August 1987 respectively. Original design lifetime was until 2010-2015. After the accident in Chernobyl, INPP 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 1250 MW per unit.

Now both INPP units are under 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 of INPP came from operation and now from the decommissioning activities. Spent fuel is considered as radioactive waste in Lithuania. Operational solid waste is stored in storage facilities without conditioning, therefore it will be retrieved, conditioned (sorted, super compacted, incinerated, grouted), stored in new storage facilities and later will be placed in repositories. Liquid waste is 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 short-lived very low level waste and other for short-lived low and intermediate waste. Construction of a Deep Geological repository for long lived waste including spent fuel is also planned. Inventory of waste according to Lithuanian radioactive waste classification and dates for the implementation of planned radioactive waste facilities is given in Articles 11-12 of this report.

### *2. Radioactive sources*

At the end of 2017 there were 1877 sealed radioactive sources (except of 8800 Pu-239 sealed sources in 4400 smoke detectors at INPP) used in Lithuania. The number of sealed radioactive sources is continually decreasing due to implementation of new technologies. Lithuanian enterprises discontinue using 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 sealed radioactive sources are declared as disused, and if for some

reason they are not returned to supplier then they are sent to INPP radioactive waste interim storage facility.

According to the Law on Radioactive Waste Management, State Enterprise Radioactive Waste Management Agency (RATA) as an appointed radioactive waste manager is responsible for collecting radioactive sources from small waste producers, when radioactive sources are declared as disused and considered as radioactive waste, but there is no possibility to return them to the supplier. From the moment of transfer of RAW (including disused sealed sources) from a small RAW producer, it is RATA that takes responsibility for the management of radioactive waste sources. After initial treatment (e.g. volume reduction, etc.) RATA transfers the radioactive waste sources for storage at INPP, which then becomes responsible for the safe management of the radioactive waste, however, the ownership and accountability of radioactive waste sources remains with RATA. From beginning of the 2019 will entry into force the amendments of the Law on Radioactive Waste Management of the Republic of Lithuania (amendments of the Law made in 2018) and INPP will overtake all responsibilities of the RATA regarding management of radioactive sources from small waste producers: collecting, treatment, storage and disposal.

The amount of unsealed radioactive sources used in nuclear medicine for diagnostics of various diseases and treatment is increasing every year. The unsealed radioactive sources such as 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 applies unsealed radioactive sources with  $^{125}\text{I}$ ,  $^{32}\text{P}$ ,  $^{33}\text{P}$ ,  $^3\text{H}$  and  $^{35}\text{S}$  radionuclides. The overall activity of received unsealed radioactive sources in 2017 exceeded 10.3 TBq.

### ***Legacy waste***

Maišiagala radioactive waste storage facility is located near the village of Maišiagala, about 30 km to the North-West of Vilnius. This storage facility was designed for institutional waste disposal as a typical *Radon* type facility, which had been constructed since the early 1960s in all the countries of the former USSR. Maišiagala radioactive waste storage facility was in operation between 1964 and 1989. Maišiagala facility contains institutional waste generated up to 1989. The waste consists 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 relays, 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.

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. RATA received the license in 2006, which was updated in 2016 as “License for the operation of the Maišiagala radioactive waste storage facility”.

From 1973 to 2002, the operation and maintenance of this facility was under the responsibility of the Institute of Physics. In 2002 this responsibility was transferred to RATA. Currently institutional control of the storage is performed which includes physical protection, environmental monitoring and public information activities.

In accordance with amendments of Law on Radioactive Waste Management made in 2018 INPP will be responsible for surveillance of Maišiagala radioactive waste storage facility and has to receive the license for the operation of the Maišiagala radioactive waste storage facility.

One of the major projects for RATA at present is the decommissioning of the Maišiagala radioactive waste storage facility. Agreement for "Decommissioning of the Maišiagala radioactive waste storage facility" between RATA and Environmental Project Management Agency was signed on December 15, 2016. The EU Cohesion Fund Structural Assistance Programme finances the project for 2014-2020.

The following decommissioning stages are planned:

- ✓ Development of the Final Decommissioning Plan and Environmental Impact Assessment Report and receiving approval from Lithuanian Authorities;
- ✓ Development of Decommissioning Project and Safety Analysis Report (SAR);
- ✓ Obtaining the Decommissioning License;
- ✓ Retrieval of all radioactive waste stored at the Maišiagala radioactive waste storage facility, initial sorting and transportation to INPP.

The project is currently at the stage of the approval of the Final Decommissioning Plan and Environmental Impact Assessment Report. The documents have already been drafted and provided to the Authorities for review and approval.

Taking into account amendments made in Law on Radioactive Waste Management in 2018, INPP from beginning of the 2019 will be responsible for implementation of the project of decommissioning of the Maišiagala radioactive waste storage facility.

The project is scheduled to be completed in 2023.

### ***Specific items regarding radioactive waste management in Lithuania***

It should be noted that according to the Law on Radioactive Waste Management the spent fuel is considered as radioactive waste in Lithuania.

All radioactive waste management facilities in Lithuania considered as nuclear facilities. Operators have to have a license in order to operate nuclear facilities. All nuclear facilities are situated at the territory of INPP, with the exception of Maišiagala radioactive waste storage facility, which is about 30 km north-west from the capital of Lithuania Vilnius. All nuclear facilities in Lithuania are licensed.

### ***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 (incl. inspections), 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 (RSC)*

Radiation Protection Centre (RSC) under the Ministry of Health coordinates actions of state and municipal institutions implementing the Government policy in the area of radiation protection, exercises the state regulation and supervision, issues licenses for the activities involving sources of ionising radiation, except of the activities in the area of nuclear energy.

### *Ministry of Environment*

Ministry of Environment coordinates the process of environmental impact assessment of proposed economic activities in the transboundary context and takes part in the issue of licences in the radioactive waste management activities.

State Territorial Planning and Construction Inspectorate under the Ministry of Environment takes part in state supervision and control of design and construction of nuclear facilities.

Environmental Protection Agency under the Ministry of Environment (EPA) organizes state environmental monitoring and coordinates the process of environmental impact assessment and makes decisions.

More information on regulatory authorities is provided in Article 6.

### **Licence holders**

Ignalina NPP has licences (either construction or operation) for all radioactive waste management facilities in Lithuania except Maišiagala radioactive waste storage facility. Taking into account amendments made in Law on Radioactive Waste Management in 2018 INPP has to receive the license for the operation of the Maišiagala radioactive waste storage facility.

State Enterprise Radioactive Waste Management Agency (RATA) has a license for the operation of Maišiagala radioactive waste storage facility (updated in 2016). RATA also holds the licence for activities in nuclear facilities with ionizing radiation in order to be able to perform waste package inspections at INPP.

### **National Policy**

National radioactive waste management policy is described in Article 4 of this Report.

## **RECENT DEVELOPMENTS**

Recent developments in the area of spent fuel and radioactive waste management in Lithuania since the presentation of the first Report as follows:

### **National framework**

The amendments of the Law on Radioactive Waste Management of 2014 reflected the transposition of the requirements of the Waste Directive. The amendment of the Law has triggered the preparation of the new Radioactive Waste Management Development Programme that was adopted on 23 December 2015 by the Government of the Republic of Lithuania by Resolution No 1427. The new Radioactive Waste Management Development Programme defines the general objectives of radioactive waste management and the steps of their fulfilment, each including concepts and technical solutions, description of radioactive waste inventory and calculation of quantities, research and development, division of responsibilities and main progress indicators, financial resources, public communication (details in Article 11 and 12);

2. The amendments of the Law on Radioactive Waste Management of 2018 are related to the revision of the current definitions, adjustment of the principles of the radioactive waste management (seeking better transposition of the requirements of the Waste Directive), specified authority responsible for the organisation of the international peer review of the national framework, competent regulatory authority and national programme, State Enterprise Ignalina Nuclear Power

Plant assigned as sole entity which would be responsible for safe management of the all Lithuanian radioactive waste and spent nuclear fuel, defined major requirements for the preparation of the final closure plan of the disposal facility. From the Law on Radioactive Waste Management was removed the Article 8<sup>1</sup> which defined content of the radioactive waste management program, because was decided that the content of the radioactive waste management program should be defined in the new legal act dedicated for the preparation of the national radioactive waste management program. This special legal act should be prepared until the end of the 2018.

3. Full scope Integrated Regulatory Review Service (IRRS) mission took place at the VATESI and RSC Headquarters in Vilnius in 2016. The IRRS mission has covered all civilian nuclear and radiation facilities and related activities regulated in Lithuania. The review compared the Lithuanian safety regulatory framework against IAEA safety standards as the international benchmark for safety. The IRRS team carried out the review in different areas including radioactive waste and SF management (details in Article 14.3). The amendments of the Law on Nuclear Safety and other legal acts were implemented taking into account recommendations of IRRS mission.

### **New nuclear facilities of INPP decommissioning infrastructure**

1. Technical Design and preliminary Safety Analysis Report (SAR) of Near Surface Repository (NSR, project B25) were finally approved by State Institutions in May 2017. Permission for NSR construction was granted by the Ministry of Environment in May 2017. License for NSR construction and operation was granted by VATESI in November 2017. Currently the procurement documentation for construction stage of NSR is under preparation. The aim is to start the tender for the NSR construction in the beginning of 2019.

2. Permission for Construction of Very Low-Level Radioactive Waste Landfill Disposal Modules (project B19-2) was granted by Ministry of Environment in October 2015. License for construction and operation of Landfill Disposal Modules was granted by VATESI in December 2015. The contract for construction works was signed in June 2017. Construction of Landfill Disposal modules started in October 2017 with completion being scheduled in February 2019.

3. New interim spent nuclear fuel storage facility (SNFSF – 2) in the frame of project B1 was put into industrial operation in May 2017 after successful hot commissioning trials completion and final SAR approval by VATESI.

The Technical Design documentation and PSAR for Heavily Damaged Spent Fuel Handling System (DFHS) within the frame of project B1 was approved by VATESI in January 2016. Currently DFHS is under detailed designing and manufacturing by the contractor with the aim to start installation of appropriate equipment in the beginning of 2019.

4. Solid Waste Retrieval Facility (SWRF, project B2) construction works had been entirely completed by the Contractor in 2017. On June 9, 2017, the B2 hot trials have started after completion of cold trials and VATESI has issued the operation licence. INPP will prepare and agree with VATESI the final SAR for SWRF after completion of hot trials. It is scheduled to put SWRF into industrial operation in November 2018.

5. The construction of the new solid radioactive waste treatment and storage facility (SWTSF, project B3/4) was completed by the Contractor in 2017. On October 13, 2017, SWTSF hot trials have started after completion of cold trials and VATESI has issued the operation licence. Following completion of hot trials the final SAR will be prepared and agreed with VATESI. It is scheduled to put SWTSF in industrial operation in November 2018.

### **INPP dismantling and decontamination (D&D) projects**

1. The D&D project B9-1 aiming at dismantling and decontamination of the equipment located at INPP Unit 1 Turbine Hall (Building G1) was commenced in October 2007. To date, all the scheduled project works have been performed. INPP prepared and agreed with VATESI the corresponding report on project completion in March 2017.

2. The D&D project B9-1(2) aiming at dismantling and decontamination of the equipment located at INPP Unit 2 Turbine Hall (Building G2) was commenced in September 2011. To date, D&D works are ongoing in accordance with the schedule and about 70% of works have been completed (about 13208 tons were dismantled and treated).

3. The D&D project B9-3(1) aiming at dismantling and decontamination of the equipment (such as top metal structure filled with serpentinite, sand cylinder, annular water tank, reactor vessel, bottom metal structure, steel blocks, roller supports, graphite stack) located at INPP Unit 1 reactor building (building A1):

- Technical Design documentation for preparatory works and creation of Block A Pre-treatment Workshop (APW) was prepared by INPP and agreed by VATESI. Unit 1 operation licence amendment for implementation of preparatory works was issued in October 2016. Procurement of equipment for a Block A Pre-treatment Workshop and preparatory works is ongoing.

4. In frame of the projects MTF.01 and MTF.02 (Metal Treatment Facility) additional decontamination equipment is being procured and installed in auxiliary building 130/2 in order to enhance INPP Unit 1 and Unit 2 D&D projects in their capacities for initial treatment of the anticipated metal waste streams.

### ***Article 12.1 (c), Article 14.2 (b) - Scope and inventory***

#### **Current inventories at INPP as follows:**

As of 2018-02-01, the operated SNFSF-1 contains 20 CASTOR RBMK casks and 98 CONSTOR RBMK casks, with 12032 spent fuel bundles (6016 spent fuel assemblies) of RBMK type, with initial uranium enrichment 2%. The total activity of spent fuel at the operated SNFSF-1 is - 3.09E18 Bq.

As of 2018-02-01, 43 casks containing 3883 SF assemblies are stored in the SNFSF – 2.

At the same time the inventory of SF was: 5173 fuel assemblies in SFP of Unit 1, 6356 fuel assemblies in the SFP and 143 fuel assemblies in the reactor of Unit 2. The amount of heavy metal (HM) in one fuel assembly is 110-112 kg. Total amount of heavy metal (mass of SF pellets in SFA and SFB) 579376 kg in Unit 1 and 727888 kg in Unit 2.

Total amount of radioactive wastes at INPP before decontamination, conditioning and package formation for disposal or storage estimated on 2017-12-31 including all wastes foreseen from decommissioning of INPP including RAW in storage facilities of operational waste is presented in tables below.

***Table 1: Example of a translation matrix that can be used for transition from a national classification system to international classification GSG-1***

National Waste Classification Name	VLLW	LLW	ILW	HLW
Class A	100 %			
Class B		100 %		
Class C		100 %		
Class D			100 %	
Class E			100 %	
Class F (DSRS)	30 %	30 %	40 %	

**Table 2a: Solid Radioactive Waste in Storage\***

Waste Class	Total Current Volume (m <sup>3</sup> )	Estimated Disposal Volume (m <sup>3</sup> )	Planned Disposal Route (if known)
Class A**	35000	50000	Engineered near surface (Landfill)
Class B	25000	40000	Engineered near surface
Class C			
Class D	4000	10000	DGR (Deep geological repository)
Class E			
Class F (DSRS)	15	100	Engineered near surface or DGR (Deep geological repository)
<i>NORM</i>	67	67	Landfill

**Note:**

\* total amount of waste estimated.

\*\* total amount of class A SRW after planned decontamination techniques. Without planned decontamination, the amounts of waste should be approximately three time higher (100.000 m<sup>3</sup>). Without contaminated concrete (amount of contaminated concrete from 50.000 up to 200.000 m<sup>3</sup>).

**Table 2b: Liquid Radioactive Waste in Storage**

Waste Class	Total Current Volume (m <sup>3</sup> )	Estimated Disposal Volume (m <sup>3</sup> )	Planned Disposal Route (if known) <sup>11</sup>
Class A	-	-	-
Class B and C* (Evaporated concentrates)	21000	16000	Engineered near surface for bituminized waste
Class B and C (sediments, perlite, spent resins)	4300	30000	Engineered near surface (disposal in same NSR with SRW)
Class D	-	-	-
Class E	-	-	-

**Note:**

\*Total amount of evaporated concentrates per NPP life circle are provided (only 2000 m<sup>3</sup> should be generated and treated in future (up to the end of NPP decommissioning) these amounts have not been generated yet) 19000 m<sup>3</sup> already treated and 14500 m<sup>3</sup> bitumen compound are prepared and placed in to the storage facility which will be transformed into the repository or retrieved. In case of retrieval amount of volume for disposal will be increase.

**Table 3a: Solid Radioactive Waste Disposed (as disposed volume)**

Waste Class	Estimated Disposal Volume (m <sup>3</sup> )	Disposal Route Used
Class A	0	Engineered near surface (Landfill)
Class B	0	Engineered near surface
Class C	0	
Class D	0	
Class E	0	DGR (Deep geological repository)
Class F (DSRS)	0	Engineered near surface or DGR (Deep geological repository)

<i>NORM</i>	0	
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**Table 3b: Liquid Radioactive Waste Disposed (as disposed volume)**

Waste Class	Estimated Disposal Volume (m <sup>3</sup> )	Disposal Route Used
Class A	-	-
Class B and C* (Evaporated concentrates)	0	Engineered near surface for bituminized waste
Class B and C (sediments, perlite, spent resins)	0	Engineered near surface (disposal in the same NSR with SRW)
Class D	-	-
Class E	-	-

**Table 4: Spent fuel in Storage (tHM)**

Type	Current Amount (NPP)	Current Amount (Research Reactors and others)
Total Spent Fuel Storage	2415,952 tHM	-
Wet storage (AR)	1348,03 tHM	-
Wet storage (AFR)	-	-
Dry storage (AR)	1067,92 tHM	-
Dry storage (AFR)	-	-
Total spent fuel held in storage for other countries	-	-

AR = "at reactor site", including fuel pools at NPP  
 AFR = "away from reactor site"

**Table 5: Spent fuel sent for reprocessing (in the country or sent to another country) (MTHM)**

Type	Amount (NPP)	Amount (Research Reactors and others)
Total amount of national Spent Fuel sent for reprocessing (in your country)	-	-
Total amount Spent Fuel sent to reprocessing (in another country)	-	-
Total amount of Spent Fuel received from another country for reprocessing	-	-
Total amount of spent fuel reprocessed in your country	-	-
Current reprocessing capacity in your country	-	-

**Part 6:****Tabulation of disposal facilities for waste and spent fuel, including their capacities and Status****Table 6: Summary of disposal facilities for radioactive waste and spent fuel**

Type	Planned	Construction commissioning	In Operation	Shutdown /closed	Other	Total
Spent Fuel disposal	1	0	0	0	0	1
Waste disposal:	2*	1	0			3
<i>(multiple lines by country waste class)</i>						

**Note**

\* It is planned to start construction of NSR in 2019 and to transform the bituminized LRW storage facility into repository. Project related to transformation of the existing bituminized LRW storage facility to repository is initiated and under development.

**Part 7:****Tabulation of major sources of waste****Table 7: Summary of major sources of waste**

Type	Planned (a)	Construction/ commissioning	In Operation	Permanent Shutdown	In Decommissioning (b)	Fully decommissioned	Total
Research reactors and others(c)	0	0	0	0	0	0	0
NPP reactors	0	0	0	0	2	0	2
Spent Fuel Reprocessing	0	0	0	0	0	0	0
Other (define)(d)	0	0	1*	0	0	0	1

**Notes:**

\* *Maišiagala facility contains institutional waste generated up to 1989. The plan for RADON type facility (at present a storage facility) is to retrieve and transport all waste to other facilities for storage and disposal.*

a) 'Planned' means under siting or licensing for construction

b) includes facilities in SAFSTOR status

c) research reactors and others with thermal rating > 1 MW

d) if applicable, where included in national inventory, e.g. decommissioning of contaminated facilities, clean up of accident related sites.

**Part 8:****Future forecasts (volumes of waste and spent fuel arising, waste and spent fuel management facilities)****Table 8: Forecasts (please provide data for 2030 and, if possible, for 2050)**

Type	Total Amount	Storage capacity (at reference date)	Estimated total amount when prepared for disposal*	Total disposal capacity (at reference date)	Total forecast at 2030	Total disposal Capacity in 2030	Total forecast at 2050	Total disposal Capacity in 2050
Spent Fuel Storage	2415,952 tHM	2700 tHM			2415,952 tHM		2415,952 tHM	
Total amount Spent Fuel sent to reprocessing (see foot note 17)	-				-		-	
Total amount Spent fuel disposed	2415,952 tHM			0	2415,952 tHM	0	2415,952 tHM	0
Waste in storage*:	90000 m <sup>3</sup> **		135000 m <sup>3</sup>		90000 m <sup>3</sup> **		90000 m <sup>3</sup> **	
Class A	35000 m <sup>3</sup>		40000 m <sup>3</sup>		35000 m <sup>3</sup>		35000 m <sup>3</sup>	
Class B and C	50000 m <sup>3</sup> ***		85000 m <sup>3</sup>		50000 m <sup>3</sup> ***		50000 m <sup>3</sup> ***	
Class D and E	4000 m <sup>3</sup>		10000 m <sup>3</sup>		4000 m <sup>3</sup>		4000 m <sup>3</sup>	
Class F	15 m <sup>3</sup>		100		100 m <sup>3</sup>		100 m <sup>3</sup>	
Waste disposal:	14417 m <sup>3</sup>			20000 m <sup>3</sup>	m <sup>3</sup>	150000 m <sup>3</sup>	m <sup>3</sup>	150000 m <sup>3</sup>
Class A	0 m <sup>3</sup>			0 m <sup>3</sup>	30000 m <sup>3</sup>	60000 m <sup>3</sup>	50000 m <sup>3</sup>	60000 m <sup>3</sup>
Class B and C	14417 m <sup>3</sup>			20000 m <sup>3</sup>	30000 m <sup>3</sup>	90000 m <sup>3</sup>	80000 m <sup>3</sup>	90000 m <sup>3</sup>
Class D and E	0 m <sup>3</sup>			0 m <sup>3</sup>	1000 m <sup>3</sup>	0 m <sup>3</sup>	10000 m <sup>3</sup>	0 m <sup>3</sup>
Class F****	0 m <sup>3</sup>			-	50 m <sup>3</sup>	0 m <sup>3</sup>	50 m <sup>3</sup>	-

\* calculated equivalent amount when waste has been conditioned and packaged for disposal as per table of conversion factors given.

\*\* total amount of waste without contaminated concrete. Total estimated amount of concrete (mainly Class A) is from 50.000 m<sup>3</sup> up to 150.000 m<sup>3</sup> but different ways of it's release can be found (restricted usage, Landfill, disposal in the existing areas of compartments below ground level etc.)

\*\*\* LRW 21300 m<sup>3</sup> + 4300 m<sup>3</sup>, SRW 25000 m<sup>3</sup>.

\*\*\*\* Total amount of DSRS in Lithuania is approx. 90000 pcs of which 87 % are at Ignalina NPP, about 10 % in Maišiagala storage facility, which will be retrieved and transported to Ignalina NPP, and about 2-3 % are used in Lithuania outside of Ignalina NPP. Partially DSRS can be disposed in the near surface repository, in Landfill or free released (for DSRS below controlled levels of activities) all the remaining will be disposed in deep geological repository. The specific amounts are now at evaluation stage.

### Part 9: National strategy overview (optional)

A visual overview of the total national spent fuel and waste arising and the intended strategy for managing and disposing of it can be obtained through filling out the following overview table using the information that has been presented in the tables above.

Spent fuel and radioactive waste inventories, management strategies and disposal routes			
Country: _____ Reference			
date for inventory: _____			
SF/RW types (in national terms)	No strategy	SF reprocessing/ service	Disposal in:

		home	abroad	UF-1		UF-2		NSF-1		NSF-2		Others
(A)	(B)	(C1)	(C2)	(D1)	(D2)	(E1)	(E2)	(F1)	(F2)	(G1)	(G2)	<input type="checkbox"/>
<b>1. SF (tHM)</b>												
<b>1.1. NPP</b>				2420								
<b>1.2. Other reactors</b>												
<b>2. HLW, [m<sup>3</sup>]</b>												
<b>3. A class, [m<sup>3</sup>]</b>		home							50000			
<b>4. B and C class, [m<sup>3</sup>]</b>		home						80000				
<b>5. D and E class, [m<sup>3</sup>]</b>		home		10000								
<b>6. F class, [m<sup>3</sup>]</b>		home		50				50				
<b>Equivalence with IAEA GSG-1</b>	2.											
	3.		home						VLLW			
	4.		home					LLW				
	5.		home		ILW							
	6.		home		DSRS				DSRS			

## 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

The National radioactive waste management policy is described in the Law on Radioactive Waste Management. The Law regulates social relations arising during the management of radioactive waste, and establishes the legal grounds for the management of radioactive waste. Radioactive waste management principles are indicated in the Article 3 of Law on Radioactive Waste Management, as a part of national radioactive waste management policy, and they 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 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) 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 (edition from 2019: interdependencies among all steps in the radioactive waste management are taken into account);
- 5) safety of radioactive waste management facilities is guaranteed during their operating lifetime and there after, applying passive safety measures (edition from 2019: safety of radioactive waste and radioactive waste management facilities is guaranteed during management of radioactive waste

and radioactive waste management facilities operating lifetime and there after, applying passive safety measures);

6) radioactive waste management safety measures shall be implemented by applying graded approach;

7) radioactive waste generated in the territory of the Republic of Lithuania shall be disposed of in disposal facilities in the territory of the 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 following articles describe other elements of the National Policy:

Article 9 of the Law on Radioactive Waste Management states: The radioactive waste generator shall cover 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 24 part 2 of the Law on Radioactive Waste Management states: Sealed sources of ionizing radiation may be imported into the Republic of Lithuania provided that after their use it is intended to return them to the supplier of the sealed sources of ionizing 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 ionizing 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.

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 repatriated;

3) radioactive waste recovered from the exported materials is being repatriated;

4) radioactive waste produced after reprocessing of the exported spent nuclear fuel is being repatriated;

5) spent nuclear fuel exported for reprocessing is being repatriated, if the export was prohibited or the spent nuclear fuel has not been reprocessed.

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.

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.

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. 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.*

Policy on nuclear safety and radiation protection is established in Article 3 and Article 9 of Law on Radioactive Waste Management (ref. to answer on Article 4.1.). The Law on Nuclear Safety and the Law on Radiation Safety also maintain parts establishing policies of the radioactive waste management.

Radioactive Waste Management Development Programme (Programme) implements the national policy of radioactive waste management, which is mainly established in the Law on Radioactive Waste Management.

According to Article 22 of the Law on Nuclear Safety, licences and permits are established in order to be issued by VATESI (ref. to Article 5.1 (c)). Article 32 of the Law on Nuclear Safety and Rules of Procedure for Issuing Licenses and Permits in the Area of Nuclear Energy, confirmed by Government decision No. 722, establishes the set of safety documentation which must be submitted for VATESI assessment before issuing an appropriate licence.

According to Article 30 of the Law on Nuclear Safety:

1. "...The assessment of nuclear safety shall be conducted as required at all the stages of a lifecycle of a nuclear installation...";

3. Analysis and substantiation of nuclear safety in the area of nuclear energy activities as well as other activities involving nuclear and/or nuclear fuel cycle materials shall be carried out by the applicant or the licence holder; whereas the analysis and substantiation of nuclear safety during the evaluation of the construction site of a nuclear power plant shall be carried out by the persons implementing a nuclear installation project. The results of the analysis and substantiation of nuclear safety shall be outlined in the documents evidencing nuclear safety, which shall be established according to the requirements of this Law and other legal acts. The results of the analysis and substantiation of nuclear safety shall be independently verified in the manner set out by the Head of VATESI. The applicant or the licence holder shall be responsible for the performance of such independent verification, whereas in case of the construction site of a nuclear power plant evaluation – the responsibility for performance of an independent verification falls on persons implementing the nuclear installation project design.

#### *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 the Republic of Lithuania shall be disposed of in

disposal facilities within the territory of the Republic of Lithuania or transported for disposal to another 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 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 content of the radioactive waste management program was defined in the amendments to the Law on Radioactive Waste Management of 2014. 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.

Taking into account requirements of the national Strategic planning methodology (Government resolution No. 827 On Approval of the strategic planning methodology (2002, amended 2013) the Law on Radioactive Waste Management was amended in 2018 and Article 8<sup>1</sup> which defined content of the radioactive waste management program is removed. The content of the radioactive waste management program will be defined in the new legal act dedicated for the preparation of the national radioactive waste management program. This special legal act should be prepared and adopted by the order of Minister of Energy until the end of the 2018.

The Radioactive Waste Management Development Programme was adopted on 23 December 2015 by the Government of the Republic of Lithuania Resolution No 1427. The strategic ultimate goal of the programme 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 avoid imposing undue burdens on future generations. The programme covers all radioactive waste management steps, including the preparatory steps to the final disposal site for spent nuclear fuel. Four main measures are identified in the programme: 1) reduction of the generation of radioactive waste; 2) ensure of high-level nuclear and radiation safety and environmental protection in the management of SNF and radioactive waste; 3) ensure of long-term safety of SF and long-lived radioactive waste and 4) ensure of transparency of spent nuclear fuel and radioactive waste management and public awareness.

The Ministry of Energy coordinates the implementation of the Radioactive Waste Management Development Programme. At the beginning of each year, the Ministry of Energy informs the Government of the Republic of Lithuania about the implementation and progress of the Radioactive Waste Management Development Programme in the previous year.

Institutions, which are involved into 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, 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 to the 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 is 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 2018);
2. Law on Nuclear Energy (1996, last amended 2018);
3. Law on Nuclear Safety (2011, last amended 2017 );
4. Law on Radiation Protection (1999, last amended 2017);
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);
6. Law on Environmental Impact Assessment (1996, last amended 2017);

## **Government Resolutions:**

7. Government Resolution No. 1427 On Approval of the Development Programme of Radioactive Waste Management (2015);
8. Government Resolution No. 722 On Approval of Rules of Procedure for Issuing Licenses and Permits in the Area of Nuclear Energy (2012);
9. Government Resolution No.653 On Approval of Regulations of Licensing the Practices Involving Sources of Ionizing Radiation (1999, last amended 2016);
10. Government Resolution No. 280 On Approval of Regulations on Management of Illegal (Orphan) Radioactive Sources and Facilities, Contaminated With Radionuclides (2005, last amended 2013);
11. 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);
12. 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);
13. Government Resolution No. 1165 On Approval of the Rules for Issuing of Permits for Construction, Reconstruction, Major Repair or Demolition of Nuclear Facility (2002, last amended 2015);
14. Government Resolution No. 1873 On Approval of the Procedure for Agreement of Project for Construction or Reconstruction of Nuclear Facility (2002, last amended 2016).

## **General requirements:**

15. Nuclear Safety Requirements BSR-3.1.2-2017, Regulation on the Pre-disposal Management of Radioactive Waste at the Nuclear Facilities (2017).
16. Nuclear Safety Requirements BSR-3.1.1-2016, The General Requirements for Dry Type Storage for Spent Nuclear Fuel (2016);
17. Nuclear Safety Requirements BSR-3.2.2-2016, Radioactive Waste Repositories (2016);
18. Nuclear Safety Requirements BSR-3.2.1-2015 Radioactive Waste Acceptance Criteria for Near Surface Disposal Facilities (2015);
19. Nuclear Safety Requirements BSR-1.4.1-2016, Management System (2016);
20. The Requirements on the Operational Experience Feedback in the field of Nuclear Energy (2009);
21. Nuclear Safety Requirements BSR-1.8.2-2015 Categories of Modifications of Nuclear Installations and Procedure of Performing the Modifications (2015);
22. Nuclear Safety Requirements BSR-2.1.2-2010 Basic Safety Requirements for Nuclear Power Plants with RBMK-1500 Reactors (2010);
23. Nuclear Safety Requirements BSR-1.8.1-2010 Requirements for Notifying about Unusual Events at Nuclear Power Plants (2010);
24. Nuclear Safety Requirements BSR-1.5.1-2015 Requirements for the Decommissioning of Nuclear Facilities (2015);
25. Nuclear Safety Requirements BSR-1.1.3-2016 „VATESI Inspections“ (2016);
26. Nuclear Safety Requirements BSR-1.1.4-2011 “Rules of Procedure for Applying the Enforcement Measures Set by VATESI“ (2011, amended in 2012);
27. 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 2016);
28. 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);

29. Order of the Minister of Health No. V-362 On Approval of Risk Categories of Sources of Ionizing Radiation (2016);
30. Order of the Minister of Environment No. D1-546 “On Approval of Regulation of Environmental Monitoring of Economic Entities” (2009, last amended 2016);
31. Order of the Minister of Health No. V-687 On Approval of Rules of Safety of the Sources of Ionizing Radiation (2005, amended 2016).

**Radiation protection requirements:**

32. Nuclear Safety Requirements BSR-1.9.3-2016 “Radiation Protection at Nuclear Facilities” (2016);
33. Lithuanian Hygiene Standard HN 73:2001 "Basic Standards of Radiation Protection" (2001, last amended 2015);
34. Lithuanian Hygiene Standard HN 85:2003 "Natural Exposure. Standards of Radiation Protection" (2015);
35. Lithuanian Hygiene Standard HN 99:2011 “Protective Actions of Public in Case of Radiological or Nuclear Accident” (2017);
36. Lithuanian Hygiene Standard HN 89:2001 "Management of Radioactive Waste" (2001) (for institutional waste);
37. 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);
38. Nuclear Safety Requirements BSR-1.9.2-2018 “Derivation and Use of Clearance Levels of Radionuclides for Materials and Waste Generated during Activities in the Area of Nuclear Energy” (2011, amended 2018);
39. Nuclear Safety Requirements BSR-1.9.1-2017 „Limits of Radioactive Discharges into Environment from Nuclear Facilities and Requirements for a Plan for Radioactive Discharges into Environment” (2017).

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 2018, Lithuania prepared fifth 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 and 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 on 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 Article 22 of 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 non-power 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.

A licence for the construction of a nuclear facility may be granted only if the Parliament of Lithuania (in case of NPP) or the Government of Lithuania (in case of other facilities) has adopted a legal act on the facility.

As stipulated in the Law on Nuclear Safety, licences and permits shall be issued to legal entities or persons which have 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 (RSC) under Ministry of Health is responsible for issuing licences for transportation of radioactive waste and 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) for small producers (waste producer with the exception of the operator of a nuclear plant). 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 RSC. An environmental impact assessment of proposed activity, coordinated by Environmental Protection Agency, must be performed to acquire license or permit for construction or decommissioning of nuclear facility designed for radioactive waste treatment, disposal, storage or re-use.

According to the Article 24, para. 1, 2 and 3 of the Law on the Management of Radioactive Waste, sealed sources might be imported into Lithuania, only if after their useful life it is planned to return them back to supplier. In addition, the recipient shall agree with RATA for the management of radioactive sources for cases, if due to unforeseen circumstances there are no possibilities to return them back to supplier, and to insure the source for value of RATA services. In licensing practice (for small users), agreement with RATA and insurance of the source for value of RATA services is required before licence to use the source in practice will be granted.

RSC does not take part in the licensing of SF and radioactive waste management activities at the nuclear plants and centralized radioactive waste management facilities, however takes part in evaluation of the environment impact assessment of the activities of nuclear facilities in regard of radiological impact to the public health.

According to the Law on Nuclear Energy, the Law on the Management of Radioactive Waste and the Law on Radiation Protection it is prohibited to carry out any activity, related to the radioactive waste management and SF in Lithuania, without a licence. Otherwise, the measures of enforcement described in the Article 5.1e will be implemented.

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

According to the 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 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: 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-1.1.3-2016 „VATESI Inspections“ and VATESI quality management document “The Procedure for Inspections”.

Law on Nuclear Safety, Nuclear Safety Requirements BSR-3.1.2-2017 “Regulation on the Pre-disposal Management of Radioactive Waste at the Nuclear Facilities”, Nuclear Safety Requirements BSR-3.1.1-2016 “The General Requirements for Dry Type Storage for Spent Nuclear Fuel” and Nuclear Safety Requirements BSR-3.2.2-2016 “Radioactive Waste Repositories” requires that licence holder shall provide annual reports on the activities with radioactive waste or spent nuclear fuel. According to the 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 RSC 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 2016). Detailed inspection procedures (including inspection questionnaires and forms of inspection protocols) are established and approved by the Director of the RSC.

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 on 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;
- 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;
- operation parameters of the equipment of the nuclear facility do not comply with the permissible limits specified in the normative technical documents, design documentation of the nuclear facility or the operating documents of licensee or permit holder;
- operation of the nuclear facility does not correspond to the safe operating conditions specified in the normative technical documents, design documentation of the nuclear facility or the operating documents of licensee or permit holder;
- the properties of the structures, systems and components of the nuclear facility that are important for safety are not or may not comply with the design of the nuclear facility;
- actions or inactions of the operator that may lead to breach confinement barriers for radionuclides;
- actions or inactions of the operator that may lead to release of radionuclides into the environment exceeding the limits set in the plan of radionuclides release into the environment;
- the actions or inactions of the operator, when doses of radiation exposure to workers may exceed or exceed the limits set by the Minister of Health;
- violation that may cause or led to international sanctions.

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 requirements have to base on 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 RSC. The licences issued by RSC 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 as well as 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 (which is licensed by VATESI).
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 exempt 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

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 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. The organizations operating nuclear installations also must inform general public about the measures that are foreseen in the emergency preparedness plans which may have an impact on regular living conditions. VATESI has to deliver public announcements on the results of supervision the implementation of nuclear safety requirements. While implementing its supervision functions VATESI provides confirmed written and/or public consultations to the legal entities that submitted written requests and/or questions or provides public consultations on its own initiative.

The main means of ensuring the transparency of the decisions:

- draft legal documents are public in order to inform and get a response (suggestions, remarks, comments) from interested parties;
- consultations and meetings are organized on different issues with interested parties;
- regular public announcements on the information about the condition of nuclear safety in Republic of Lithuania are announced;

Information on nuclear safety is prepared and disseminated using these methods:

- reports on conventions and other legal acts of Lithuania, EU, international institutions;
- VATESI annual reports (Nuclear Power Safety in Lithuania) and annual reports to The President and the Government in terms of its activities and finances;

- VATESI website, press releases and other publications;
- possibility for students from universities to visit VATESI.

Pursuant to Article 39<sup>1</sup> of Law on Nuclear Safety the public, as defined in this article, as one or more person and/or juridical persons, their associations, organizations or groups, can participate in the adoption of the following decisions in the field of nuclear energy: evaluation of site, construction, operating, decommissioning and post-closure surveillance of disposal facilities. 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 collects fees from the Institutional waste producers into a separate dedicated account. Management of historical institutional waste (collected before 2003) is funded from the state budget.

3. Specific attention given to the management of spent sealed sources. Article 24 of the Law on Radioactive Waste Management states, 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. From beginning of the 2019 will entry into force the amendments of the Law on Radioactive Waste Management of the Republic of Lithuania (amendments of the Law made in

2018) and INPP will overtake all responsibilities of RATA regarding the management of radioactive sources.

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 the 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-1.1.1-2014 “Rules of Procedure for Drafting of Nuclear Safety Requirements and Nuclear Safety Rules“ and VATESI internal procedure. According to BSR-1.1.1-2014 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, RSC, in accordance with the order 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 RSC, 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.

## ***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 (incl. inspections), 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 the 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 the 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 Government of Lithuania establishes the maximum number of positions of the VATESI. 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 workload 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 71 full-time maximum staff (civil servants and employees under employment contracts) positions approved by the Government of Lithuania. Out of this number, VATESI has established 67 positions of civil servants and employees under employment contracts (64 from 3<sup>rd</sup> of July 2018, due to centralization of financial and personnel administration functions). Additionally there are 3 positions of state officials established pursuant to provisions of the Law on Nuclear Energy (all filled). 66 positions are occupied overall at the moment (April 2018). 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 (RSC) 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.

RSC 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 RSC 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 RSC, the data from INPP 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 (RSC) basically is financed by the state budget. For the implementation of the particular assignments and projects other financial sources can be obtained (funds of EU and other international organizations). RSC 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;
- following the procedure prescribed by legislation and other legal acts, takes part in the issue of licences in radioactive waste management activities.

State Territorial Planning and Construction Inspectorate under the Ministry of Environment:

- takes part in state supervision and control of design and construction of nuclear facilities.

Environmental Protection Agency under the Ministry of Environment (EPA):

- participates as stakeholder in the strategic environmental assessment of plans and programs of local level (municipality lever 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; makes decisions whether the proposed economic activities are allowed in the selected site;
- participates in the procedure of agreement of technical project for construction or reconstruction of nuclear facility and in the procedure of completion of construction;
- 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 (EPA)*

There are 4 specialists dealing with radiological investigations and 2 dealing with automatic radiation monitoring. Separate department with eight divisions (including 6 regional divisions) is responsible for environmental impact assessment, strategic environmental assessment (about 50 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, as well as 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.

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 (which is licensed by VATESI).
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 exempt from the duties and responsibilities to manage radioactive waste safely even in the event of a temporary suspension or cancellation of the licence.

The duties and responsibilities of small producers in management of radioactive waste are set in Regulations of Licensing the Practices Involving Sources of Ionizing Radiation. Before issuing the licence, it is persuaded, that licence holder has all administrative, technical capabilities to carry out the practices with sources of ionizing radiation in safe manner and (or) safely manage the radioactive waste.

*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 that 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 VATESI.

*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.

The Article 15 of the Law on Radioactive Waste Management states, that safety assessment of the existing and newly constructed radioactive waste management facilities shall be carried out in accordance with the requirements of the Law on Nuclear Safety. The safety assessment must cover full operating lifetime of the facility. Safety assessment of a disposal facility shall also cover the post-closure period.

The Article 25 of the Law on Nuclear Energy states, that the design of a nuclear installation shall comply with the nuclear safety requirements and rules approved by the Head of VATESI, also with the requirements of other legal acts. Safety of a nuclear installation shall be substantiated in the

safety analysis report which shall comply with the nuclear safety requirements and rules approved by the Head of VATESI.

Nuclear Safety Requirements - BSR-3.1.1-2016 “The General Requirements for Dry Type Storage for Spent Nuclear Fuel”, BSR-3.1.2-2017 “Regulation on the Pre-disposal Management of Radioactive Waste at the Nuclear Facilities” and BSR-3.2.2-2016 “Radioactive Waste Repositories” states, that safety must be ensured during normal operation, anticipated operational occurrences and design basis accidents.

Article 35 of the Law on Nuclear Safety states:

- In order to prevent or mitigate nuclear and radiological accidents, the principle of defence in-depth must be established meaning that more than one physical barrier for the confinement of radionuclides must be established during design, commissioning and operation of the facility. Technical and / or administrative measures must be envisaged in order to ensure the integrity of these barriers and measures to mitigate the effects of ionizing radiation if these barriers are degraded or their effectiveness reduced;
- technologies used for design and construction of a nuclear facility must be in line with established engineering practice. The technology must be based on experience or its suitability be determined by testing or analysis;
- the usage of design solutions, technical and organizational measures for prevention of nuclear and radiological accidents during design, construction, commissioning, operation and decommissioning of a nuclear facility must be ensured;
- technical and administrative measures in order to control nuclear and radiological accidents and to limit the consequences of these accidents in nuclear facilities must be established;
- in order to prevent nuclear and / or radiological accidents or other unusual events and to ensure and improve safety, licensee must regularly analyses the experience of its own and other persons in the field of nuclear energy as well as to share and take the necessary preventive and / or corrective measures ensuring the proper implementation of nuclear safety requirements.

Article 38 of the Law on Nuclear Safety states:

- based on the Law on Civil Protection of the Republic of Lithuania, a plan for national civil protection of population in the event of a nuclear accident shall be prepared and reviewed on a regular basis. Such plan shall foresee measures for protection of the population of the Republic of Lithuania, their property and environment against nuclear accidents and consequential radiological hazards, irrespective of whether the source of radiological hazard is within or outside the territory of the Republic of Lithuania;
- in case of a nuclear accident or incident, the holder of a relevant licence shall take part in the implementation of the national plan for the protection of population in the event of a nuclear accident and shall provide required information to the institutions specified therein;
- the emergency preparedness plans shall be developed in all nuclear installations and shall be effective (as further amended) until the full decommissioning of such installations. The emergency preparedness plans shall be tested not less frequently than once per year by organising trainings and exercise. The Head of VATESI shall establish special requirements for emergency preparedness and shall coordinate the emergency preparedness plans. The emergency preparedness plans of nuclear installations shall be approved by the licensee.

The licensee must submit the emergency preparedness plan of facility to VATESI before issuing the appropriate licence.

Typical safety analysis report of radioactive waste management or spent fuel management facility, which must be submitted to VATESI assessment before issuing appropriate licence, shall include general description of the facility and the environment of the facility, design basis, description of

structures, systems and components, description of activities, analysis of activities during normal operations and in case of emergencies, emergency preparedness plan, 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.*

*National Requirements*

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.

BSR-1.4.1-2016 “Management Systems Requirements”, based onto the IAEA safety standard GSR part 2, is approved. This regulation specify regulatory requirements for development, implementation and maintenance of an effective management system for the organizations which operate 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 of effectiveness of the management system. An operating organization must establish an independent department in order 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 BSR-1.4.1-2016, operating organization or licensee shall consider application of the IAEA recommendations published in the IAEA guides on management systems before developing or improving management system. BSR-1.4.1-2016 establishes requirements for implementation and continuous improvement of the integrated management system based upon GSR part 2 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 decommissioning (BSR-1.5.1-2015) include the requirement for licensee to establish and to implement management system covering all activities having an impact on safe decommissioning, and prepare quality assurance programme outlining in it quality management measures, the allocation of responsibilities and resources, implementation procedures of actions of specific projects and storage of documents relating to the design, operation, final shutdown and decommissioning of the facility.

VATESI requirements for handling of radioactive waste in nuclear facilities before disposal (BSR-3.1.2-2017) include requirement for licensee to establish and implement quality 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 quality assurance programme 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.

#### Radiation Protection Centre

Radiation Protection Centre is responsible to monitor how small waste producers establish and implement quality assurance measures according to HN 73:2001 "Basic Standards of Radiation Protection". Safety culture, which encourages licensees and workers to improve radiation protection that guarantee implementation of requirements on protection and assessment of quality control and efficiency of protection measures, shall be implemented in practices.

Small producers of radioactive waste in the quality assurance programme shall:

- designate and appoint person (service) responsible for establishment and implementation of the quality assurance programme;
- foresee the order of registration and accountancy of implemented procedures;
- describe the method (certain procedures), the order of how the workers familiarize with them;
- indicate quality control procedures, which shall be carried, and their periodicity.

#### *Status of Implementation of the national requirements*

#### Ignalina Nuclear Power Plant (INPP)

According to BSR-1.4.1-2016 and taking into account organizational changes related to decommissioning process, INPP has started the transition from quality assurance system to integrated and process-based management system. As part of the transition period, level 1 documents (management system manual, policies, strategies) and level 2 documents (management procedures) are being reviewed.

The INPP management system integrates all organizational components (including its structure, resources, processes and safety culture) so as to establish the goals and objectives of the organization and enable the organization to achieve all of these goals and objectives.

The application of the integrated management system requirements is graded so as to deploy appropriate resources, on the basis of the consideration of the significance and complexity of each product or process, the hazards and the magnitude of the potential impact associated with the safety, health, environmental, security, quality and economic elements of each product or process and the possible consequences if a product fails or a process is carried out incorrectly.

Management procedures “Reactor core control and nuclear fuel handling” (with references include 39 references to instructions, certificates and methods’ descriptions) and “Waste management” (with references to 38 instructions and a regalement) have been implemented at INPP to control the processes of nuclear fuel and radioactive waste handling. The management procedures contain information necessary for administration to manage these works at INPP:

- Objective and field of application of the management procedure;
- Responsibility and authorities of the administration for the activity defined by the management procedure;
- Information on how the work is performed including processes of planning and scheduling;
- Administrative and technical data necessary for the work performance;
- Information on how the plant divisions co-operate when performing work;
- Information on the documents and records necessary for the work performance, information on the records, which have to be kept after the work will be completed;
- References to the detail working procedures.

#### Radioactive Waste Management Agency (RATA)

In 2016 RATA has updated its QMS to meet the requirements of the new version of the Quality Standard (ISO 9001:2015) and also the new version of the regulator’s requirements for QMS (Nuclear Safety requirements 1.4.1-2016 “Management System”). In December 2016 the QMS was audited by a certification authority and received an appropriate compliance certificate.

Licensing process and control of small radioactive waste producers warrants that appropriate quality assurance programmes concerning the safety of SF and radioactive waste management are established and implemented. The quality management system of RSC conforming to EN ISO 9001 standard was implemented in 2009 and covers all activities of RSC in Management of State Register of Sources of Ionising Radiation and Occupational Exposure, Authorization of Activities with the Sources of Ionizing Radiation, State Radiation Protection Supervision and Control, Emergency Preparedness and Response, Public, Occupational and Environmental Exposure Monitoring and Expertise, Radiation Protection Education and Training. The external and internal auditors’ reports confirmed that the Quality Management System of RSC successfully operates and is a daily working tool the staff performs everyday tasks according to the system procedures and work instructions.

#### *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 that operate nuclear installations or other persons engaged in these activities must hold a licence and/or permit issued by the VATESI 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 that operate nuclear installations and other licensees must:

1) maintain and improve the level of safety culture in order to ensure prevention of unusual events in nuclear facilities;

2) ensure to have enough qualified staff in the area of nuclear, radiation, physical safety, emergency preparedness and international nuclear non-proliferation responsibilities in order to warrant its activity and prepare to respond to nuclear and radiological accidents and nuclear incidents in accordance with legislation;

3) constantly analyze the state of nuclear, radiation and physical safety and improve it;

4) consider human factors (human capabilities and their limits) at all stages of life of a nuclear installation;

5) have an integrated management system that gives priority to nuclear, radiation and physical 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.

The process of selection and training of staff at INPP is performed in accordance with the second and third level of INPP management system procedures that guarantee sufficient skills of personnel involved in all fields of activity at INPP, including SF and radioactive waste handling.

Management system procedures such as “Human resources management procedure” MS-2-014-1, “Nuclear fuel handling procedure” MS-2-012-1 and “Waste management procedure” MS-2-013-1, which regulate requirements for personnel involved in SF and radioactive waste management activities, are developed in accordance with IAEA documents TRS No. 380, NS-G-2.8, SSR-4, TS-6-1.2, NS-G-2.5, GS-G-3.1.

Initial and continuous training of personnel is performed on the basis of a Systematic Approach to Training, providing the highest level of personnel training.

All activities regarding on personnel recruitment, initial, continuous and re-qualification training, personnel certification and career development are performed in order to provide INPP with sufficient number of skilled personnel for safe and in time decommissioning of the plant.

Human resources at RATA are managed according RATA’s Quality Management System, certified according ISO standards 9001:2015. The management system guarantees qualification and competences of personnel involved in all fields of RATA activity. The system foresees short term and long term staff quantity planning, verification of staff competence, description of responsibilities, recruitment and selection of employees, assignment to a position and training.

## ***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. XI-2133 of the Parliament of the Republic of Lithuania dated 11 July 2012, provided that „Lithuania will develop new skills and competences, improve qualifications of specialists and develop research in the areas most relevant to the Lithuanian energy: nuclear energy, its security, radioactive waste management, decommissioning of nuclear power plants”.

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 (Program). 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 the entire nuclear industry and further develop nuclear knowledge, experience and practical, educational and scientific excellence.

In order to achieve these 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 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 Order of the Minister of Health of the Republic of Lithuania No. V-546 on the Amendment of the “Compulsory Radiation Protection Training and Instruction Procedure”, April 28, 2016 (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 emergencies (firemen, police officers, medical personnel).

Based on the Order of the Minister of Health, 16 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 staff 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.

## **Radiation Protection Centre (RSC)**

Generating new knowledge and skills is an integral part of the work of RSC civil servants. Staff is compulsorily required to engage in a training and education courses for professional qualification. They are obliged to complete 120 hours of training in every five-year period.

The need for training and education is evaluated in the beginning of every year and personal qualification development and training plans are prepared annually with respect to the demands of civil servants and results of performance evaluation. The proceeding of the plan implementation is supervised and the qualification development report and analysis are prepared.

RSC specialists share the experience, knowledge and the ways to apply them in their direct work. After returning from training courses, conferences or other events, RSC specialists indicate in their reports how the knowledge gained will be applied to perform the functions specified in their job descriptions.

## **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 NPP 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 Lithuania: State Enterprise INPP Decommissioning Fund (hereinafter referred to as the National Decommissioning Fund or NDF), 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 from the Ignalina International Decommissioning Support Fund, Ignalina Programme and co-financed from the NDF or state budget. These financing sources are identified in Article 4 of the Law on the Decommissioning of Ignalina Nuclear Power Plant.

The NDF 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 is transferred to the NDF.

The Ignalina Programme is financed from 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 implementing decisions allocates annual Union contributions under the Ignalina Programme through two channels – the Ignalina International Decommissioning Support Fund and the National Agency in Lithuania (Central Project Management Agency or CPMA). 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. With endorsement of the Government of Lithuania, the 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 Council of the European Union adopted Council 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 was set at EUR 450.8 million. Lithuania contributes approximately 14 percent of the funds required for INPP decommissioning.

Lithuania believes that the EU will remain committed to the agreement under Protocol No 4 of the Accession Treaty and seamlessly continue cooperation and the provision of financial assistance, which is vital for Lithuania in confronting with this decommissioning project. Negotiation actions regarding adequate EU financial support for INPP decommissioning after 2020 have already been started.

Institutional waste producers pay for their waste collection, transportation, treatment, and storage and disposal services according to contracts with RATA (from 2019 with INPP). The fees for these services were approved by the Order of the Minister of Energy No. 1-303 On the State Enterprise Radioactive Waste Management Agency Fees for the Management of Radioactive Waste. Mandatory revisions of the fees are carried out once in two years and agreed by RATA and INPP. RATA collects fees from the institutional waste producers into a separate dedicated account. The management of historical institutional waste and orphan sources is funded from the state budget or municipal budget.

As there were no specific decommissioning funds since the start of operation of INPP, the financing of Deep Geological Repository for Spent Nuclear Fuel and high and intermediate level radioactive waste seems to be outside the scope of the current financial arrangements for decommissioning, Ministry of Energy has therefore requested RATA to perform investigation of the viable DGD financing options. The work is ongoing.

Another major project outside the scope of decommissioning of Ignalina NPP is Decommissioning of the Maišiagala radioactive waste storage facility. The project is financed by the EU Cohesion Fund Structural Assistance Programme for 2014-2020.

The project is currently at the stage of the approval of the Final Decommissioning Plan and Environmental Impact Assessment Report. The documents have already been drafted and provided to the Authorities for review and approval.

## ***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 to Article 39 of the Law on Nuclear Safety, VATESI and licensees must inform the state and municipal institutions, the general public and persons whose commercial activities are directly related to the licensed activities of licensees in regard to the nuclear, radiation and physical safety of nuclear facilities at least once a year, publicly announce information about their activities in media and/or on their website. VATESI also arranges meetings with municipal and state institutions, the public and other persons in the vicinity of the nuclear facility at least once every three years to inform them about the state of nuclear, radiation and physical safety of this facility. VATESI shall, at least once a year, publish in the media and/or on its website reports on the results of the supervision of the activities of economic entities whose activities are monitored in accordance with this and other laws by VATESI.

The licensees and the holders of the permits shall submit to their employees and other persons legally present at the site of the nuclear facility, the following information about the existing conditions of operation of the nuclear facility and their compliance with normal operating conditions:

- 1) information on the radiological conditions at the site of the nuclear facility and in the placements where such persons are expected to work or visit and their compliance with the requirements of legal acts and nuclear normative technical documents which regulate radiation safety in nuclear facilities;
- 2) information on existing deviations from normal operating conditions, if they can affect the health of these persons.

This information shall be provided to persons each time before they enter to the site of the nuclear facility.

The licensees of operated facilities shall provide to the general public the following information about the existing conditions of operation of the nuclear facility and its compliance with normal operating conditions:

- 1) radiological conditions at the site of the nuclear facility and/or their compliance with the requirements of legal acts and normative technical documents of nuclear safety which regulate radiation safety in nuclear facilities;
- 2) the release of radionuclides into the environment from the nuclear facility and/or its compliance to the requirements established in legislation;
- 3) deviations from normal operating conditions if they can influence to the human health, safety, their property and the environment.

Mentioned above information shall be published on the website of the licensee or permit holder. When public or person makes an application, the information must be submitted no later than one day after receipt of the request for submission.

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 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-1.1.2-2016 “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.

At 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), as an appointed waste management organization, continuously informs the public and responsible institutions about its activities, radioactive waste and spent fuel management through the media, internet, special publications, etc.

RATA's annual reports are published on RATA website [www.rata.lt](http://www.rata.lt). According to the Law on Environmental Monitoring and Regulation of Environmental Monitoring of Economic Entities, Annual Reports on environmental monitoring of the Maišiagala Radioactive Waste Storage Facility are submitted to the Environmental Protection Agency, Radiation Protection Centre, VATESI, and the Environmental Protection Agency of the Sirvintos Region. Environmental monitoring reports are also published on RATA website. The news, press releases, legislation and other relevant information about RATA activities, spent fuel and radioactive waste management are published in Lithuanian and English on RATA website.

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

RATA performs periodic public opinion surveys in order to assess whether the public feels sufficiently informed about the waste management issues and to identify what measures could be taken to increase the public awareness of radioactive waste management.

### *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.*

Lithuanian 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.

Pursuant to Article 39<sup>1</sup> of the Law on Nuclear Safety, the public, as defined in this article, as one or more person and/or juridical persons, their associations, organizations or groups, can participate in the adoption of the following decisions in the field of nuclear energy: evaluation of site, construction and operating, decommissioning and post-closure surveillance of disposal facilities.

The process of public participation in decision-making in the field of nuclear energy includes:

- 1) provision of information to the public on the start of the proceedings of: evaluation of site, construction, operating, decommissioning and post-closure surveillance of disposal facilities;
- 2) public access to the documents necessary for the adoption of the decisions for: evaluation of site, construction, operating, decommissioning and post-closure surveillance of disposal facilities;
- 3) public knowledge of draft of decisions for: evaluation of site, construction, operating, decommissioning and post-closure surveillance of disposal facilities;
- 4) provision of public comments, information, analyzes or opinions regarding the documents referred to in p. 2 and draft decisions referred to in p. 3;
- 5) public discussion about the final documents required for the adoption of the decisions or the final draft decisions for: evaluation of site, construction, operating, decommissioning and post-closure surveillance of disposal facilities.

VATESI informs the public that a draft decision for evaluation of site, construction, operating, decommissioning and post-closure surveillance of disposal facilities has been prepared and allows the project and documents, submitted for the decision, to receive access and submit written proposals in time terms, established by the Law on Nuclear Safety.

All proposals submitted by the public must be evaluated. The information on how the proposals are evaluated, together with the arguments, if the proposals have not been taken into account or partially taken into account, the economic entity submits to the representatives of the public who has submitted proposals to the economic entity in writing and VATESI publishes them together with the final decision.

Documents that contain confidential information are not submitted for public discussion.

The procedure for organizing public participation in decision-making in the field of nuclear energy is established in Nuclear Safety Requirements BSR-1.1.5-2017 “Description of procedure for public participation in decision-making in the field of nuclear energy” (2017).

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 Government 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, Aarhus, 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 (amended by Directive 2014/52/EU) is transposed into national legislation: the Law on the Environmental Impact Assessment of Proposed Economic Activity (last amended in 2017) and acts implementing the law.

In accordance with amended Law on the Environmental Impact Assessment of Proposed Economic Activity competent authority makes information on screening regarding EIA and/or EIA documentation (scoping document, EIA report) publically available shortly after receiving application from developer of the project. Public has possibility to express and the decision-maker to take account of opinions and concerns which may be relevant to those projects.

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, Aarhus, 25<sup>th</sup> June 1998.

## ***Articles 11 and 12– Implementation of the national programme***

### *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 (from 2019 content of the radioactive waste management program will be defined in the new legal act dedicated for the preparation of the national radioactive waste management program).

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 might be sooner reviewed if necessary.

The Ministry of Energy coordinates the implementation of the National Programme for the Management of Spent Fuel and Radioactive Waste. The Ministry of Energy informs the Government of the Republic of Lithuania about implementation and progress of the National Programme for the Management of Spent Fuel and Radioactive Waste in the previous year at the beginning of the current year.

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 tasks.

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 due course of implementation of decommissioning infrastructure, INPP was installed 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 INPP 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 disposing of both treated and untreated waste, if it meets the repository waste acceptance criteria.

Decision shall be taken on management of waste from dumpsite of INPP industrial waste as it may contain very low level of short-lived radioactive waste.

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 2023 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 2027 - 2038. The waste will be stored up to 2066 and will be disposed of in a geological repository.

Lithuania has selected the dry storage option for storage of the spent nuclear fuel. A new dry storage facility is in operation since May 2017 and up to 2022 the fuel will be transferred to the storage facility. The design lifetime of the existing operated 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 up to 2025.

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

Radioactive waste management 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 up to the end of passive institutional control period. In order to increase the reliability of data storage there is necessary 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 necessary 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, 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 stages are – site selection process planning (2016-2017, completed), detailed research to choose a few regions of interest (2019-2022), detailed characterization (2022-2030) and site approval phase (2030-2033). 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 2033.

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 2031.

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.

Taking into account the fact that INPP was prematurely shut down and there were no specific decommissioning and radioactive waste management funds, also considering the fact that there is no other nuclear industry in Lithuania, there is no funding collected for the disposal of Spent Nuclear Fuel and for construction of Deep Geological Repository. Therefore, currently possible financing sources for the construction of DGR are being investigated.

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 in order to improve public confidence level. Efforts will be made in order to inform the public and to involve it in the initial decision-making already in project planning and early implementation stages.

### ***Article 14.3 – Peer review and self-assessments***

#### *Article 14.3*

*Member States shall periodically, and at least every 10 years, arrange for self-assessments of their national framework, competent regulatory authority, national programme and its implementation, and invite international peer review of their national framework, competent regulatory authority and/or national programme with the aim of ensuring that high safety standards are achieved in the safe management of spent fuel and radioactive waste. The outcomes of any peer review shall be reported to the Commission and the other Member States, and may be made available to the public where there is no conflict with security and proprietary information.*

The Council Directive 2014/87/Euratom of 8 July 2014 provides that the Member States shall, at least once every 10 years, arrange for periodic self-assessments of their national framework and

competent regulatory authorities and invite an international peer review of relevant segments of their national framework and competent regulatory authorities with the aim of continuously improving nuclear safety. Respective provisions are included into Law on Nuclear Safety.

From 17 to 29 April 2016 full scope Integrated Regulatory Review Service (IRRS) mission took place at the VATESI and Radiation Protection Centre (RSC) Headquarters in Vilnius. The IRRS mission has covered all civilian nuclear and radiation source facilities and activities regulated in Lithuania. The review compared the Lithuanian regulatory framework for safety against IAEA safety standards as the international benchmark for safety. The IRRS team carried out the review in the deferent areas including radioactive waste and SF management.

Before IRRS mission self-assessment of compliance of Lithuanian waste and SF management legal system to IAEA safety standards was performed. Number of possible improvements of legislation were identified, especially in waste disposal area. After self-assessment Lithuanian legislation was reviewed and new regulations approved, including identified improvements. As example, in comparison to the previous nuclear safety requirements related to radioactive waste repositories, new requirements cover all types of radioactive waste repositories (very low level, low and intermediate level and geological) to be constructed in Lithuania. More detailed requirements were introduced on: waste acceptance to the repositories, safety analysis, design, closure and supervision of closed radioactive waste repositories, also detailed requirements for site evaluation and commissioning of radioactive waste facilities were introduced which were not explicitly provided in previous regulation.

The IRRS team identified a number of good practices and made recommendations and suggestions that indicate where improvements are necessary or desirable to continue enhancing the effectiveness of regulatory functions in line with IAEA safety standards. Concerning waste and spent nuclear fuel management it was recommended to revise and improve legislation according results of self-assessment (already performed) and initiate amendment of the legal framework to ensure there are distinct steps for authorizing the closure of repositories (need for change of the Law on Radioactive Waste Management, change is planned). Lithuania follows these recommendations.

It is planned that the IRRS follow-up mission will be organised in 2020.

The report of (IRRS) mission to Republic of Lithuania is published VATESI official site: [www.vatesi.lt](http://www.vatesi.lt).

It is planned that the Integrated Review Service for Radioactive Waste and Spent Fuel Management, Decommissioning and Remediation (ARTEMIS) mission to Republic of Lithuania will be organized in 2021. Ministry of Energy is responsible authority for the organisation ARTEMIS mission in Lithuania.

## ***Future plans to improve safe and responsible management of spent fuel and radioactive waste***

### *INPP safety improvements*

INPP continuously improves safety of the radioactive waste and SF handling.

The modernization of the radioactive waste handling system includes the change to a new classification, compliant with international standards, and the operation of solid radioactive waste storage and processing facilities in 2018. The content of the project for new solid radioactive waste storage and management facility, a retrieval facility (to retrieve waste from the existing storage) and the solid radioactive waste treatment facility, which includes provisions for:

- receipt of retrieved solid radioactive waste (SRW);
- sorting;
- fragmentation;
- compaction of combustible low level SRW;

- combustion of combustible medium and low level waste;
- super-compaction of medium and low level waste;
- compacting in containers;
- cementation;
- decontamination of transport containers;
- measurement and accounting;
- transport system;
- interim storage for the SRW bales;
- management of INPP decommissioning waste.

The other radioactive waste management modernization projects, currently under implementation are:

- Additional investigations shall be performed and a decision shall be taken whether the bituminized radioactive waste storage facility could be converted into a repository or not. Depending on the decision, the bituminized radioactive waste storage facility shall be licensed as a repository or the bituminized waste shall be retrieved and enclosed into suitable containers as required for storage, transport and disposal in the near surface repository.
- Decision about irradiated graphite interim storage will be made in the near future (during the envisaged designing and licensing phase of the project 2103 to be performed by Contractor). Preliminarily, two principal options were considered at INPP: construction of new storage facility to store irradiated graphite only and storage of irradiated graphite in building 158/2.

#### *Disposal Facilities*

It is planned to construct a disposal facility for VLLW (Landfill) and a disposal facility for short lived LILW (Near Surface Repository).

The scope of the project for the Landfill Facility for short lived VLLW includes Buffer Storage (project B19-1) for waste awaiting landfill disposal (with capacity of about 4000 m<sup>3</sup> of packaged waste) and 3 Landfill disposal modules (project B19-2) (each module has capacity of 20000 m<sup>3</sup> of packaged waste or 60000m<sup>3</sup> total capacity of Landfill facility).

Construction and commissioning of the Landfill disposal modules are planned under separate contract in 2018. Carrying out of the first waste disposal campaign is planned in 2018.

Licence for construction and operation of the near surface repository (NSR) for short-lived LILW was issued in November 2017. NSR at Stabatiškè site will be a hill-type construction located above the ground water with reinforced concrete vaults and engineered low-permeable barriers. Safety of the disposed waste should be ensured by a multiple barrier system as follows: the waste matrix, waste packaging or container, concrete vault and surrounding low permeable clay as well as the natural barrier.

Volume of conditioned waste to be disposed in NSR is 100,000 m<sup>3</sup>. However, the planned repository is a modular type facility, therefore it should be easy to adapt for other disposal volumes by reducing or increasing the number of vaults. As waste disposal in the NSR occurs over a long period of time, for practical and financial reasons the disposal vaults will be built section by section to keep up with the disposal rate. Disposal rate is 2 vaults per year.

Tendering, construction and commissioning of first group of NSR disposal vaults are planned in 2021-2023.

In the Radioactive Waste Management Development Programme (2015), a task to ensure sustainable management and long-term safety of SF and long-lived radioactive waste is set. In the Programme, it is stated that the storage of spent nuclear fuel and radioactive waste is only a

temporary solution, SF and long-lived radioactive waste must eventually be disposed in a geological repository. Taking into account this statement, four measures for the implementation of the abovementioned task are formulated:

a) planning of the installation of the deep 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). Therefore, in 2015–2017, a repository development project including implementation timetable, preliminary research and repository design, construction and operation will be developed.

b) selection of the location for the deep geological repository. Selection of suitable geological formations and investigation of the repository environment will be included in the site selection programme. The main repository site selection stages are: site selection process planning (2016–2017, completed), detailed research to choose several regions of interest (2019–2022), detailed characterization (2022–2030) and site approval phase (2030–2033). 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 2033.

c) development of the concept of the deep geological repository based on appropriate studies and safety analysis. The concept of the repository will be developed gradually and in coordination with the site selection process, making sure that safety requirements are met. Upon the completion of each site selection stage, the concept will be updated and the repository installation price adjustment carried out. The Lithuanian geological repository concept will be developed in 2031.

d) building and commissioning of the deep geological repository and disposal of spent nuclear fuel and long-lived radioactive waste. The construction of the repository will start in 2039, following a technical design expertise and safety justification. The construction and commissioning of the repository will be completed in 2066. Spent nuclear fuel and long-lived radioactive waste should be disposed of in the deep geological repository before the end of 2072.