



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

**LITHUANIA**

**Country Group 5  
Vienna, 11 May 2015**

# Presentation Outline

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- **Existing waste installations and inventory**
- **Management of Disused Sealed Sources and Institutional Waste**
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- **Summary of basic information on the national programme, including the agreed matrix**
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# Organizations Contributing to the National Report

- **State Nuclear Power Safety Inspectorate (VATESI)**
- **Ignalina Nuclear Power Plant**
- **Radioactive Waste Management Agency (RATA)**
- **Ministry of Health (Radiation Protection Centre)**
- **Ministry of Energy**
- **Ministry of Environment (Environmental Protection Agency)**

# Introduction

- Lithuania has signed this Convention on 30 September 1997 and ratified it on 18 December 2003. This Convention entered in force in Lithuania on 14 June 2004
- This is the fourth National Report of Lithuania on Joint Convention
- Sources of radioactive waste
  - One nuclear power plant in Lithuania - Ignalina NPP with two RBMK reactors that produces more than 99 % of radioactive waste in Lithuania;
  - Isotope applications in medicine, industry and research produces less than 1 %

# Introduction (continued)

- **Status of Ignalina NPP:**
  - **First reactor was shut down at the end of 2004**
  - **Second reactor was shut down at the end of 2009**
  - **Decommissioning of Ignalina NPP is in progress**
- **Status of new planned Visaginas NPP:**
  - **On 21 April, 2009 the Ministry of Environment of the Republic of Lithuania adopted the decision, that Visaginas NPP may be constructed in the vicinity of the Ignalina Nuclear Power Plant**
  - **On 30 of October 2014 Safety analysis report of possible construction sites were reviewed and approved by VATESI**
  - **Preparatory works undergoing**
- **Status of planned and existing waste management facilities will be discussed later during presentation**

# **Legal Framework of Radioactive Waste management in Lithuania (Main Laws)**

- **Law on the Management of Radioactive Waste (1999, last amended in 2014)**
- **Law on Nuclear Safety (2011)**
- **Law on Nuclear Energy (1996, last amended in 2014)**
- **Law on Radiation Protection (1999, last amended 2011)**
- **Law on Ratification of Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (2003)**

# **Legal Framework of Radioactive Waste management in Lithuania (Main Government Resolutions)**

- **Government Resolution No. 174 On Approval of the Strategy of Radioactive Waste Management (revised in 2008)**
- **Government Resolution No. 722 On Approval of Regulations of Licensing and Issuing Permits for Nuclear Power Related Activities (2012)**
- **Government Resolution No. 653 On Approval of Regulations of Licensing the Practices Involving Sources of Ionizing Radiation (1999, revised 2014)**
- **Government Resolution No. 280 On Approval of Regulations on Management of Orphan Radioactive Sources, Orphan Nuclear Fuel Cycle Materials, Orphan Nuclear and Fissile Material and Facilities, Contaminated With Radionuclides (2005, revised in 2013)**



# **Legal Framework of Radioactive Waste management in Lithuania (Main General Requirements 1)**

- **Nuclear Safety Requirements BSR-3.1.2-2010, Regulation on the Pre-disposal Management of Radioactive Waste at the Nuclear Facilities (2010)**
- **Nuclear Safety Requirements BSR-3.1.1-2010, The General Requirements for Dry Type Storage for Spent Nuclear Fuel (2010)**
- **Regulation on Disposal of Low and Intermediate Level Short Lived Radioactive Waste P-2002-2 (2002)**
- **Regulation on Disposal of Very Low Level Radioactive Waste P-2003-02 (2003)**

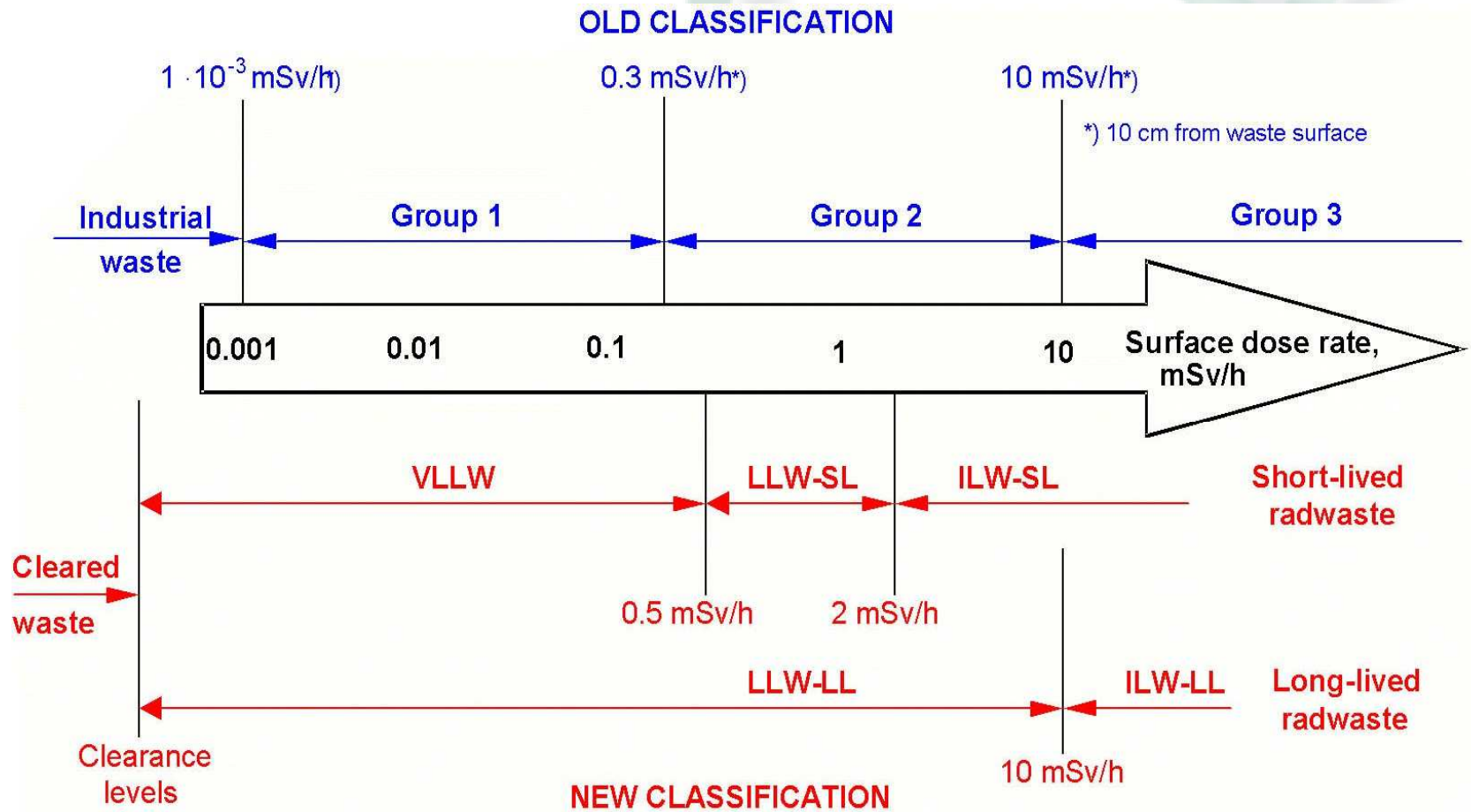
## **Legal Framework of Radioactive Waste management in Lithuania (Main General Requirements 2)**

- **Order of the Minister of Health and the Head of VATESI No. V-1271/22.3-139 On the Rules of Radioactive Substances, Radioactive Waste and Spent Nuclear Fuel Import, Export, Transportation in Transit inside the Republic of Lithuania (2008, amended 2014)**
- **Nuclear Safety Requirements BSR 1.9.3-2011 “Radiation Protection in Nuclear Facilities” (2011)**
- **Lithuanian Hygiene Standard HN 73:2001 "Basic Standards of Radiation Protection" (2001, amended 2014)**
- **Lithuanian Hygiene Standard HN 89:2001 "Management of Radioactive Waste" (2001) (for institutional waste)**

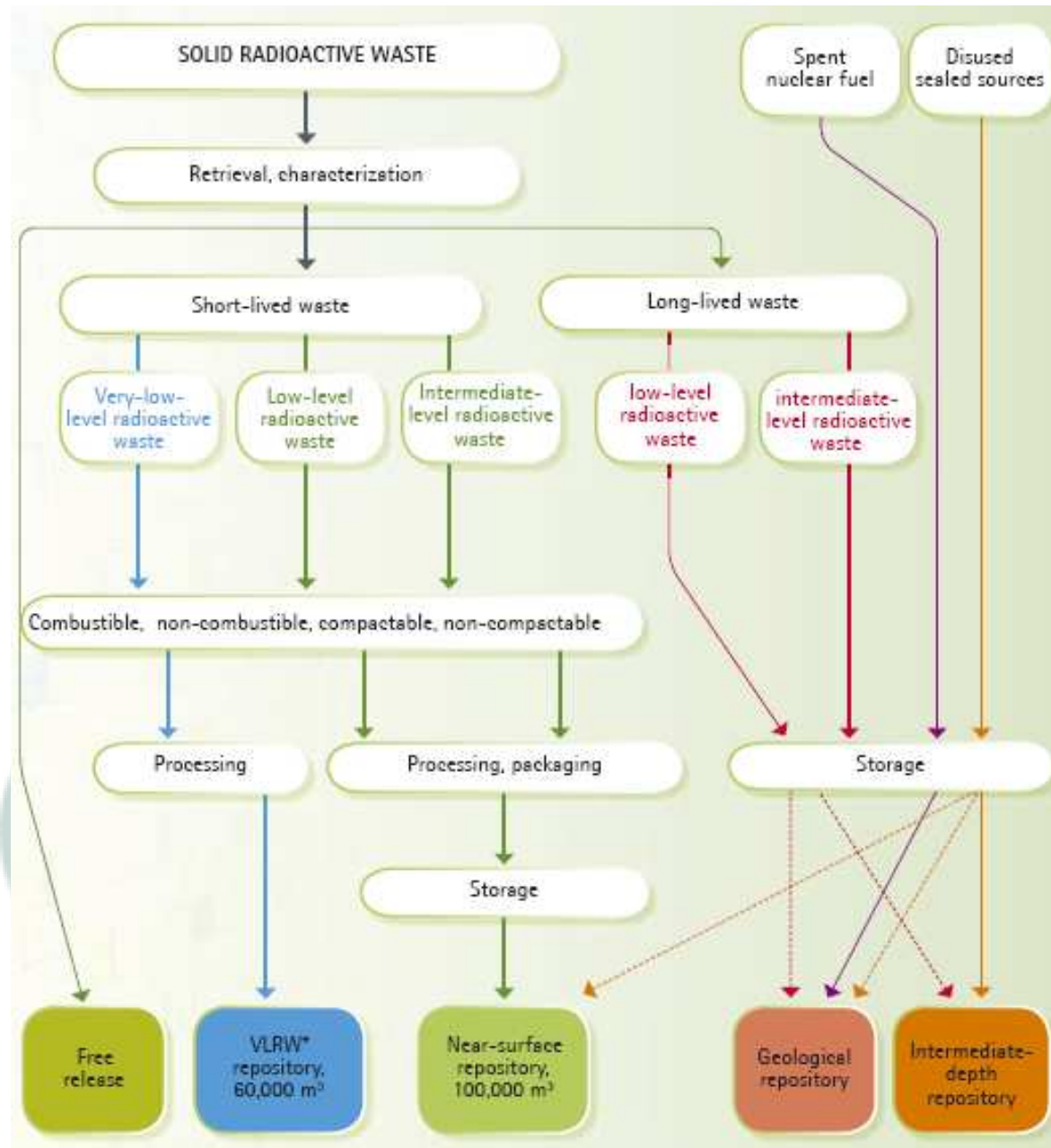
## **Legal Framework of Radioactive Waste management in Lithuania (Main General Requirements 3)**

- **Nuclear Safety Requirements BSR-1.9.2-2011 “Derivation and Use of Clearance Levels of Radionuclides for Materials and Waste generated during Activities in Nuclear Energy” (2011)**
- **Nuclear Safety Requirements BSR-1.9.1-2011 „Limits of Radioactive Discharges into Environment from Nuclear Facilities and Requirements for a Plan for Radioactive Discharges into Environment.” (2011)**
- **Order of the Minister of Health V-900 “Rules of issuing of Permits for Radioactive Discharges into environment from Facilities of Medicine, Agriculture, Research and Industry except Nuclear Facilities” (2011)**
- **Order of the Minister of Environment No. D1-546 “On Approval of Regulation of Environmental Monitoring of Economic Entities” (2009, last amended 2014)**

# Radioactive Waste classification in Lithuania (comparison of previous and new classification)



# Waste management scheme in Lithuania





# Existing waste installations and inventory

## Spent Fuel

<b>No.</b>	<b>Installation</b>	<b>Waste inventory</b>
1.	Ignalina NPP spent fuel in “dry” type storage facility	6018 spent fuel assemblies
2.	Ignalina NPP spent fuel in “wet” type storage facility in pools Unit 1	7175 spent fuel assemblies
3.	Ignalina NPP spent fuel in “wet” type storage facility in pools Unit 2	7246 spent fuel assemblies

# Existing waste installations and inventory

Solid Radioactive Waste (Buildings 155, 155/1, 157, 157/1)

Type of waste	1 group comb.	1 group non-comb.	2 group comb.	2 group non-comb.	3 group	Total volume (m <sup>3</sup> )
Volume of the waste (m <sup>3</sup> )	11 719	8 639	2 246	3030	910	26 544



# Existing waste installations and inventory

## Liquid Radioactive Waste

No.	Installation	Waste inventory
1.	Building 151 - Ion-exchange resins, filter aid (perlite), evaporator concentrate and its sediments	3 227 m <sup>3</sup>
2.	Building 158 - Bituminized waste storage facility (conditioned evaporator concentrate)	14384 m <sup>3</sup>
3.	Building 158/2 - Cemented waste storage facility (ion-exchange resins, filter aid (perlite), sediments of evaporator concentrate)	8492 (drums of 200 l)

# Existing waste installations and inventory

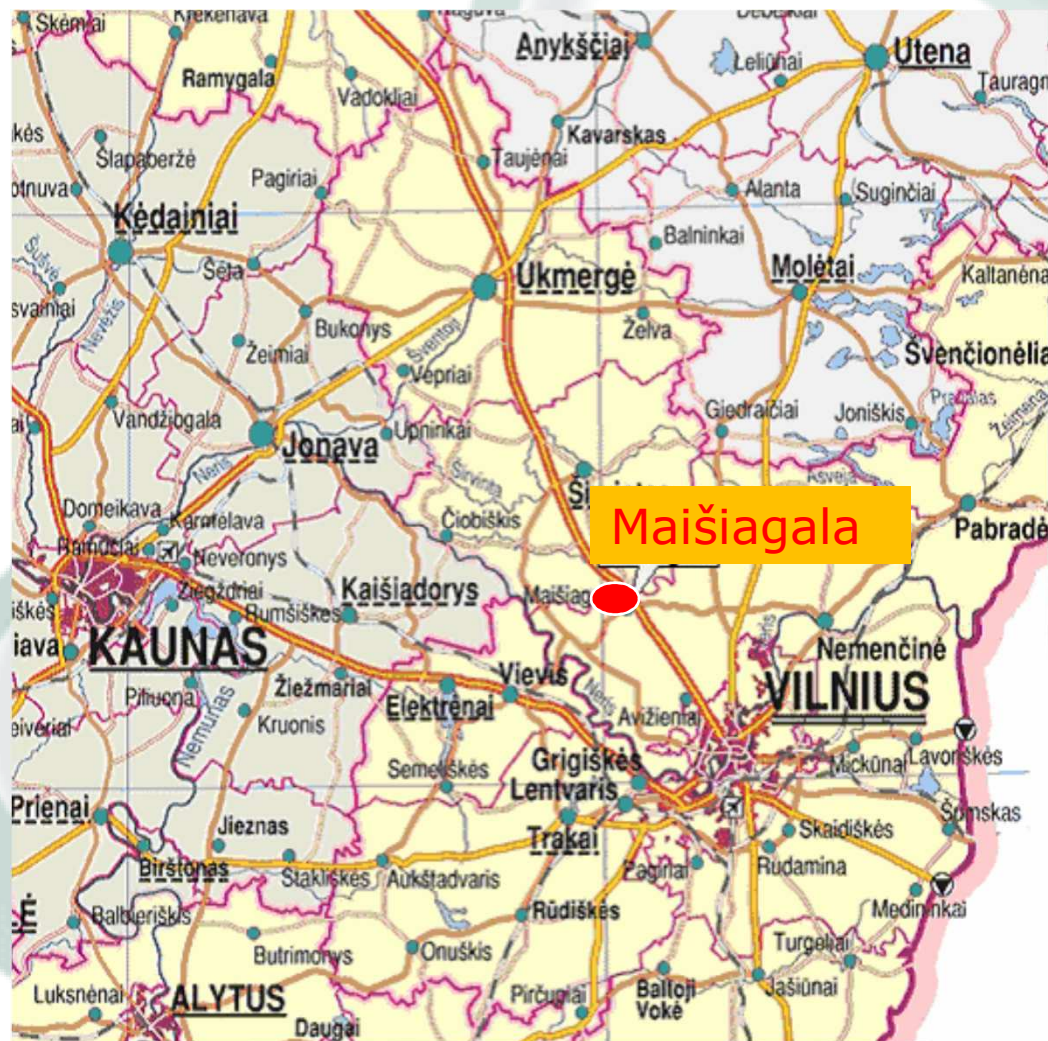
## Storage Facility for Very Low Waste

- Capacity - 4000 m<sup>3</sup>
- Started of operation in 2013
- In the beginning of 2015 about 2000 m<sup>3</sup> of waste were stored



# Existing waste installations and inventory

## Location of Maišiagala storage facility



# Existing waste installations and inventory

## Maišiagala storage facility

- **The facility is situated about 35 km north west from Vilnius (the capital of Lithuania)**
- **Typical “Radon” type facility that has been constructed in all former USSR Republics**
- **Was constructed in 1963 and closed in 1988**
- **The volume is about 200 m<sup>3</sup>**
- **Total activity for 2011 was about  $9.14 \cdot 10^{13}$  Bq, mostly tritium**

# Existing waste installations and inventory

## Maišiagala upgrading

- **The facility was licensed in 2006**
- **Before issuing license safety assessment was done**
- **After safety assessment upgrading of storage facility was performed**
- **Maišiagala does not fulfill long term safety requirements for disposal, so it was licensed as storage facility**
- **According to Maišiagala preliminary decommissioning plan the waste will be retrieved**

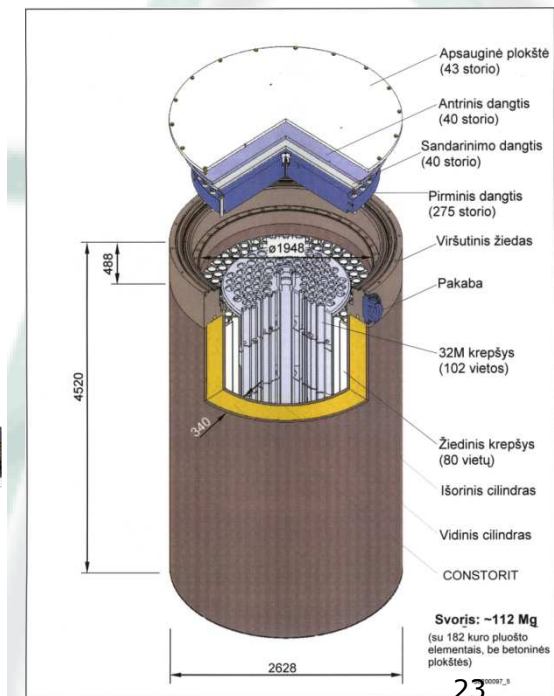
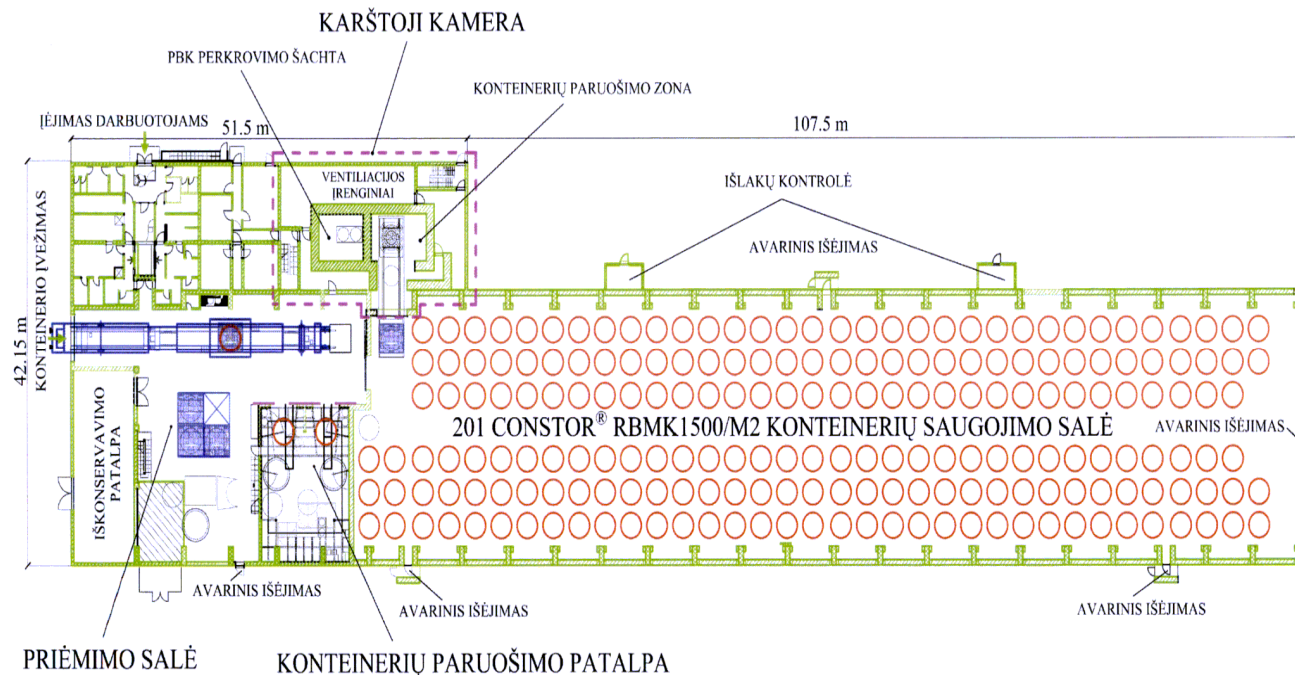
# Management of Disused Sealed Sources and Institutional Waste

- **Radioactive Waste Management Agency (RATA) is responsible for management of Institutional Waste and orphan sources**
- **The following non-nuclear waste was managed during year 2014:**
- **136 Disused Sealed Sources were collected from industry, medical and research institutions and placed in storage facility**
  - **Clear decline tendency of the DSS number is observed during the last decade**
- **On single orphan  $^{60}\text{Co}$  source was found and safely handled**
- **200 kg of contaminated scrap metal was collected and transferred for storage**
- **Such kind of waste is sent for storage to Ignalina NPP.**

# Planned facilities

## New spent nuclear fuel storage facility

- Purpose – to store all the rest spent nuclear fuel of Ignalina NPP (part of fuel is already stored in existing spent nuclear fuel storage facility)
- Planned start of operation – 2016-2017
- Capacity for 16 000 – 17 000 spent nuclear fuel assemblies



# Planned facilities

New management and storage facility for solid waste

- **Purpose – to manage and store solid operational and decommissioning waste of Ignalina NPP**
- **Operational waste to be processed - 28 000 m<sup>3</sup> and decommissioning waste about 100 000 m<sup>3</sup>**
- **Capacity of processing of radioactive waste will be about 15 m<sup>3</sup> per day**
- **Start of operation 2017-2018**



# Planned facilities

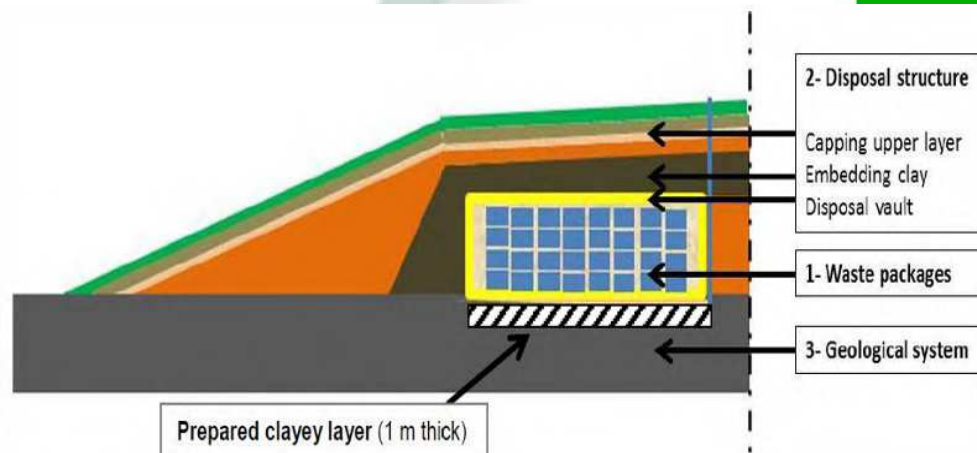
New management and storage facility for solid waste



# Planned facilities

## Low and Intermediate Level Short Lived waste disposal facility

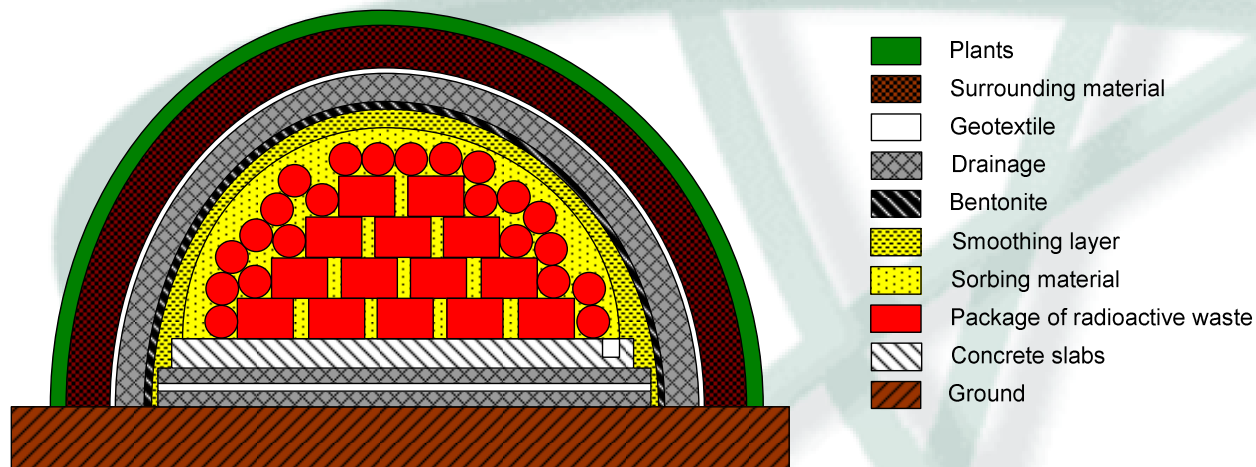
- Purpose – to dispose Low and Intermediate Level Short Lived waste
- EIA report approved in 2007
- Site for the repository construction selected
- Capacity 100 000 m<sup>3</sup>
- Start of operation in 2019-2020



# Planned facilities

## Disposal Facility for Very Low Waste

- Purpose – to dispose very low waste
- Capacity 60 000 m<sup>3</sup>
- Start of operation – 2016-2017



## **Summary of basic information on the national programme, including the agreed matrix (1)**

- **The Strategy on Radioactive Waste Management of Lithuania is in place. It has been revised in 2008**
- **Implementing Council Directive 2011/70/EURATOM National Radioactive Waste Management Programme of Lithuania is drafted and it will replace The Strategy on Radioactive Waste Management of Lithuania. It shall be done before/in August 2015**

## **Summary of basic information on the national programme, including the agreed matrix (2)**

**The strategy on radioactive waste management of Lithuania (in power before approval of National Radioactive Waste Management Programme of Lithuania) has three main objectives:**

- **Strive to achieve a high level in nuclear and radiation safety in management of spent fuel and radioactive waste**
- **To improve the radioactive waste management infrastructure, which shall be based on modern technologies**
- **Strive to minimize activity and volume of radioactive waste**
- **Informing the Lithuanian public to achieve a better understanding of the main radioactive waste management principals and achieve acceptance of waste management projects**

# Changes in the national programme since the last Review Meeting

National Radioactive waste Management Programme includes goals, tasks implementing the goals, clear allocation of responsibilities for implementation of the tasks, milestones, timeframes, criteria of implementation and sources of financing.

**Goals identified in Programme:**

- Quantities of radioactive waste shall be kept to the minimum
- Achieve a high level of nuclear, radiation safety and environmental protection in management of spent nuclear fuel and radioactive waste
- Ensure long term safety of spent nuclear fuel and long lived radioactive waste
- Ensure transparency in management of spent nuclear fuel and radioactive waste

# Agreed Matrix

Type of Liability	Long Term Management Policy	Funding of Liabilities	Current Practice / Facilities	Planned Facilities
<b>Spent Fuel</b>	Storage for 50 years. Disposal in deep geology	Funding available for storage only.	On site storage- dry (storage facility) and wet (in pools)	Construction of new dry storage facility. Investigation for disposal
<b>Nuclear Fuel Cycle Waste</b>	Storage on site, management and disposal	Funding available except for disposal of HLW	Conditioning and storage on site	Retrieval of old waste, storage and disposal facilities
<b>Application Wastes</b>	State register, collection, pretreatment and storage, disposal	Waste producers pay	Some waste in Maišiagala (old practice). Other stored at Ignalina NPP.	No additional facilities. Shall be treated in existing or planed for nuclear fuel cycle facilities.
<b>Decommissioning Liabilities (1)</b>	Immediate dismantling	EU support under Accession Treaty and national co-financing	Continuation of decommissioning activities of Unit 1 and Unit 2.	Facilities for waste management, storage and disposal
<b>Disused Sealed Sources</b>	Returned to supplier. Recovery of orphan sources	Waste producers pay. State budget for orphan sources	Registration, collection and storage	No additional facilities. Shall be treated in existing or planed for nuclear fuel cycle facilities.

# **Actions on challenges from the last Review Meeting**

**Challenges identified in the last review meeting:**

- **Implementation of all planned projects including decommissioning of Ignalina NPP and development of waste treatment and disposal facilities (*Information on implementation status of all radioactive waste and decommissioning projects was provided above*)**
- **Acquiring funding for decommissioning**
- **Maintaining investigation program on final solution of spent nuclear fuel and other long lived radioactive waste**



# Challenges (1)

## Acquiring funding for decommissioning

- **National and international funds are in place**
- **The negotiations regarding the amount of financial support to be provided in respect of Ignalina NPP decommissioning during the period of 2014 - 2020 are finished. Council of the European Union adopted regulation on Union support for the nuclear decommissioning assistance programme in Lithuania on 13 December, 2013**
- **Lithuania follows its international obligations and will ensure nuclear safety during the decommissioning of Ignalina NPP**

# Challenges (2)

## Maintaining investigation program on final solution of spent nuclear fuel and other long lived radioactive waste

- The progress in maintaining the investigation program on final solution of spent nuclear fuel and other long lived radioactive since the last Review Meeting was not significant.
- The development of the investigation program on final solution of spent nuclear fuel and other long lived radioactive waste currently is in a process of political discussions, however the tangible decisions have not been made yet.
- The new National Radioactive Waste Management Program which includes goals, tasks, clear allocation of responsibilities, milestones, timeframes, criteria of implementation and sources of financing has been drafted. Adoption of the Program will give impetus to clear political decision and inspire progress in finding final solution of spent nuclear fuel and other long lived radioactive waste.

## Significant events since the last Review Meeting

- April 2011 a licence for construction of solid radioactive waste retrieval facility (to retrieve waste from part of the existing storage facilities buildings 155, 155/1 at Ignalina NPP) was issued by VATESI. During the period between JC Review Meetings construction of the facility was undergoing. Planned start of operation is 2016-2017
- September 2009, the License for Construction of new spent fuel storage facility was issued by VATESI. During the period between JC Review Meetings construction of the facility was undergoing
- August 2009, the license for construction of new solid waste treatment and storage facility was issued by VATESI. During the period between JC Review Meetings construction of the facility was undergoing
- License for Operation of the Buffer Storage for VLLW was issued by VATESI on 16 May 2013
- Draft of National Radioactive Waste Management Program prepared. Final version shall be prepared in 2015

# Good practices

- **Legal framework updated**
- **National radioactive waste strategy is in place**
- **Draft of National Radioactive Waste Management Program prepared**
- **Funding of projects is in place**

# Current challenges

- **Implementation of all planned projects including decommissioning of INPP and waste treatment and disposal facilities**
- **Maintain the investigation program on final solution of spent nuclear fuel and other long lived radioactive waste**

## **Efforts (including Planned measures to improve safety)**

- **Construction and operation of new spent fuel storage facilities**
- **Construction and operation new treatment and storage facilities for solid waste**
- **Retrieval, characterization and conditioning of operational solid waste at Ignalina NPP old storage facilities**
- **Construction and operation of low and intermediate level short lived waste and of very low waste disposal facilities**

# Proposals for overarching issues

- **Transparency. Working with the public ensuring clear understanding on the spent fuel and waste management and its safety**
- **Disposal of spent fuel and the waste in shared repository. Is it possible at all?**

# Responses to questions posted to the Report

**Questions - 61**

**Countries - 10** – Belarus, Poland, Germany, France, USA, Ukraine, Luxemburg, Japan, Belgium, Russian Federation

## **Main points of interest:**

- **Spent fuel management**
- **Waste management**
- **Disposal of waste**
- **Legislation and licensing system**
- **Maišiagala storage facility**
- **Financing system**
- **Decommissioning of Ignalina NPP**



# Responses to questions posted to the Report

## Main questions(1)

### Question:

Was there an assessment of the cumulative effect of radiation and nuclear facilities on the environment and trans-boundary transfer performed?

### Answer:

Environmental impact assessment procedure is performed in accordance with the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo convention) if a proposed activity is likely to cause a significant adverse transboundary impact and national legislation.

# Responses to questions posted to the Report

## Main questions(2)

### Question:

Assuming that geological disposal of spent fuel will occur on the Lithuania territory, geological disposal is considered as a “final solution” despite the difficulties described in article 10 of section G. However, does the possibility still exist in the future, that other approaches (e.g. deep boreholes), which might arise and judged trustworthy, would be considered?

### Answer:

Various spent fuel disposal methods are still under consideration. The major plan is to investigate applicability of the “traditional” repository design for Lithuania, consisting of excavated underground tunnels and caverns (Geological disposal). Other spent fuel disposal methods (like deep boreholes approach and other) will be investigated too.

# Responses to questions posted to the Report

## Main questions(3)

### Question:

Could Lithuania provide more information or preliminary conclusions for the long term management of spent fuel?

### Answer:

In general, direct disposal of the spent fuel is considered as a basic spent fuel management option. All feasibility and cost investigations are based on this strategic approach. As it is foreseen to store the spent fuel in the dry storage containers for 50 years, and repository siting and construction takes about 30 years, the final decision on future management of the spent fuel has to be taken by 2030. Up till then all management and disposal options should be analyzed and compared.

# Responses to questions posted to the Report

## Main questions(4)

### Question:

Could you give more detailed information on the decommissioning of the Maišiagala storage facility?

### Answer:

Maišiagala radioactive waste storage facility decommissioning process will be performed in two stages:

1. Preparation for the storage facility decommissioning: preparation of licensing documentation and submission to the competent authority - VATESI (State Nuclear Power Safety Inspectorate) as well as elaboration of decommissioning design documentation. Expected dates 2016-2019;
2. Construction of infrastructure necessary to retrieve the radioactive waste, radioactive waste retrieval, processing and transporting to Ignalina NPP for conditioning and storage. Expected dates 2019 – 2022.

# Responses to questions posted to the Report

## Main questions(5)

### **Question:**

It is acknowledged that the Ignalina plants are both shut down. However, there is no mention of application of lessons learned from the Fukushima event to spent fuel storage in Lithuania. Please explain.

### **Answer:**

Following the decision of the European Council the “stress tests“ were carried out at INPP in mid of 2011 during which potential adverse impacts of earthquakes, flooding, extreme weather conditions, loss of electrical power and loss of the ultimate heat sink to the safety of the finally shut-down Ignalina NPP Units, the operated Spent Nuclear Fuel Storage Facility of Dry Type and the newly constructed Interim Spent Fuel Storage Facility were analyzed.

The results of the Final Stress Tests Report revealed that the relevant technical and organizational measures are available at INPP enabling to adequately control the emergency situation in order to protect to the maximum extent the environment, workers and the general public against the hazardous effects of radiation even in the most adverse conditions, such as earthquake, flooding, long-term blackout and failure of the SNF cooling systems.

# Responses to questions posted to the Report

## Main questions (6)

### **Question:**

How the responsibilities between VATESI, Radiation Protection Centre and Ministry of Environment are delimited?

### **Answer:**

VATESI is a competent authority for the licensing of activities involving nuclear or nuclear cycle materials and activities carried out in nuclear facilities. Radioactive waste management in nuclear facilities is licensed and supervised by VATESI.

Radiation Protection Centre issues licences to small producers (generators) for the activities related to radioactive waste management. Ministry of Environment (Environmental Protection Agency) coordinates the process of environmental impact assessment of proposed economic activities and organizes, coordinates and performs state environmental monitoring, and controls environmental monitoring of economic entities. Competences and responsibilities are described in Laws of the Republic of Lithuania - Law on Nuclear Energy, Law on Radiation Protection and Law on the Management of Radioactive Waste.

# Responses to questions posted to the Report

## Main questions (7)

### **Question:**

What is the quota of exposure (dose constraint) for population established in Lithuania and used in evaluating safety of radioactive waste management in planned exposure situations?

### **Answer:**

According to the requirements of the Lithuanian Hygiene Standard HN 73:2001 and nuclear safety requirements BSR-1.9.1-2011 the annual dose constraint applied for the members of public during design, operation and decommissioning of nuclear facilities is 0.2 mSv. This dose constraint is applicable for safety evaluation of radioactive waste (including spent nuclear fuel) management at nuclear facilities.

# Responses to questions posted to the Report

## Main questions (8)

### **Question:**

The decommissioning of the INPP is divided into a number of projects. Is this intended to divide the work to ensure safety? If so, please describe your policy and strategy for dividing the projects?

### **Answer:**

All INPP decommissioning projects are grouped subject to programs defining specific areas of decommissioning activities: enterprise management; post-operation; preparatory works; equipment dismantling; facility demolition and the site restoration; SNF handling; waste management. Safety is justified for those activities that are subject of authorization by nuclear safety regulatory authority VATESI. Subdivision of projects/works based on safety related aspects has not been performed.



# Responses to questions posted to the Report

## Main questions (8)

### **Question:**

What is the procedure for the management of spent nuclear fuel that has been damaged during operation at Unit 1 and Unit 2?

### **Answer:**

Damaged fuel handling includes its loading into special baskets which are later inserted inside the cask. The cask body is the same as of the cask dedicated for non-damaged fuel, however the number of fuel bundles to be loaded into the cask is considerably less: (depending on the damage nature – from 10 to 36).

Development of the damaged fuel handling technology is included into the scope of B1 Project Basic Design.

Working procedures will be developed on the basis of the Basic Design requirements.

# General overview of questions posted by Lithuania to other Contracting Parties

**Questions - 45**

**Countries - 9** – Belarus, Russian Federation, Luxemburg, Croatia, Ukraine, Hungary, Tajikistan, Morocco, Vietnam.

**Main points of interest:**

- **Waste disposal**
- **Radiation protection**
- **Management of spent sealed sources**
- **Legislation**
- **Waste management practices**

# Conclusions

- **National report was prepared according to guidelines**
- **Relevant organizations have been involved into the preparation**
- **Answers to questions from other Contracting Parties were prepared and provided**
- **Questions to national reports of Contracting Parties were provided**
- **Lithuania fulfils the obligations under the Joint Convention**