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

First National Report of Lithuania in accordance with Article 32 of the Convention

2005

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LIST OF ABBREVIATIONS

DSS – Disused sealed sources;
DW- Drainage water;
EIA- Environmental impact assessment;
EDW - Emergency drainage waters;
HC –Hot cell;
HLW- High level waste;
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;
RPC- Radiation Protection Centre;
RATA- Radioactive Waste Management Agency;
RWMF - Radioactive waste management facility;
RWMSF- Radioactive Waste Management and Storage Facility;
SAR – Safety Analysis Report;
SF- Spent fuel;
SNFSF- Spent nuclear fuel storage facility;
SPH - Storage pools hall;
SRW- Solid radioactive waste;
QAS - Quality assurance system;
VATESI – State Nuclear Power Safety Inspectorate;
VLLW –Very low level waste;

SECTION A. INTRODUCTION

Aim of the report

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 first report of Lithuania for this Convention. The aim of the report is to give the information on the fulfillment of obligations of this Convention to other Contracting Parties. This report will be discussed in the Second Review Meeting to be held in Vienna on 15-26 May 2006.
This report was prepared according the Guidelines Regarding the Form and Structure of National Reports.

Sources of radioactive waste

1. Nuclear power plants

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

The Ignalina NPP reactors were commissioned in December 1983 and August 1987 respectively. The original design lifetime is projected to 2010-2015. After the accident in Chernobyl, the safety systems were re-evaluated and it was decided to decrease the maximum thermal power of the units from 4800 to 4200 MW. That limits the maximum electric power to about 1250 MW per unit. The Ignalina NPP is and, for the foreseeable future, will be a vital component in Lithuania's energy balance because it is producing more than 80 % of the total electricity production in Lithuania. There are a variety of reasons for this high percentage, but the main is a significantly lower production cost at the present economical and technical circumstances in the Lithuanian power sector.

2. Isotope applications

Lithuania has a wide application of radioactive sources in industry, medicine and research. As of 31 December 2004, there were 1056 facilities, which conducted practices with 32397 sources. The number of sources in Lithuania is continually decreasing - in implementing of new technologies many of enterprises discontinue to use the sources (they are being replaced by other equipment). When the sources are declared as disused, and if they are not returned to supplier then they are sent to the Ignalina NPP radioactive waste interim storage facility.

Specific items regarding radioactive waste management in Lithuania

It should be noted that according to the Law on Nuclear Energy the spent fuel in Lithuania is the radioactive waste. Spent fuel is long lived radioactive waste that shall be disposed in the deep geological repository.

All radioactive waste management facilities in Lithuania are considered as nuclear facilities. The operators have to have a licence in order to operate these nuclear facilities. All these facilities are situated in the territory of Ignalina NPP, only one exception is Maišiagala disposal facility, which is about 30 km north-west from the capital of Lithuania Vilnius. All facilities in Ignalina NPP are licensed. The licensing of Maišiagala is in progress at the time.

The operator of radioactive waste management facilities is fully responsible for the safety of these facilities. Ignalina NPP is responsible for the safe management of radioactive waste produced during operation or accepted for storage or processing, and produced during decommissioning until this waste is transferred for disposal. Radioactive Waste Management Agency (RATA) is responsible for the management and disposal of all radioactive waste transferred to it. Agency is the operator of the assigned to it storage facilities and repositories.
The legislative and regulatory system in Lithuania is non-prescriptive. The regulators are responsible for supervising all steps of radioactive waste management.

SECTION B. POLICIES AND PRACTICES

Article 32: Reporting, paragraph 1

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

A Strategy on Radioactive Waste Management was approved by the Government of Lithuania on February 6, 2002. Its objective is to define radioactive waste management policy. This strategy is approved to implement the provisions of the Law of the Republic of Lithuania on Radioactive Waste Management, which establish the basic principles of Radioactive Waste Management. The Law states that management of radioactive waste must ensure that:
1) at all stages of the radioactive waste management, by applying appropriate methods, individuals, society and the environment in Lithuania and beyond its borders are adequately protected against radiological, biological, chemical and other hazards that may be associated with radioactive waste;
2) efforts are made to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation and to avoid imposing undue burdens on future generations;
3) the generation of radioactive waste is kept to the minimum practicable;
4) interdependencies among the different steps in the radioactive waste management are taken into account;
5) safety of radioactive waste management facilities is guaranteed during their operating lifetime and after it.

The strategic issues are: 1) to improve the legal basis for radioactive waste management; 2) to modernize the system of radioactive waste management at Ignalina NPP and to introduce a new radioactive waste classification system; 3) to get ready for the management of wastes, which will result from the Ignalina NPP decommissioning, providing the plant with necessary waste management facilities; 4) to modernize the management infrastructure for institutional waste; 5) to construct new repositories for radioactive waste.

(i) spent fuel management policy;

According to the Law on Environmental Protection (1992, last amended 2003), in the Republic of Lithuania, both the reprocessing of radioactive material used for the production of nuclear weapons or for fuel elements of nuclear power plants and the reprocessing of spent nuclear fuel is prohibited. According to the Law on the Management of Radioactive Waste (1999, last amended 2004) spent fuel is categorized as radioactive waste. The Strategy on Radioactive Waste Management states that the optimal solution would be to store spent nuclear fuel in dual-purpose storage systems suitable for both long term storage and transport. With a view to ensuring safe disposal of the spent nuclear fuel the following measures are foreseen:

- To draft and implement the long-term research program “Possibilities to dispose of spent nuclear fuel and long-lived radioactive waste in Lithuania”;
- To analyze the possibilities of having in Lithuania a deep geological repository for spent nuclear fuel and long-lived radioactive waste;

- To analyze the possibility of constructing a regional repository with joint efforts of several countries;
- To analyze the possibility of disposing of spent nuclear fuel in other countries, and to estimate the justification for the cost of such disposal;
- To analyze the possibilities of extending the storage period in interim storage for up to 100 and more years.

(ii) spent fuel management practices;

Storage of spent nuclear fuel (SF) at Ignalina NPP is performed by means of two methods. “Wet” storage in spent fuel storage pools near the reactor and “dry” storage in the detached storage facility at NPP territory. Wet storage was provided by the initial design of NPP. NPP design was developed in 70ies of the last century in the former Soviet Union. It was intended to store the fuel unloaded from the reactor within several years and then to direct it to processing. In the beginning of 90ies, when it became finally obvious that the matter of spent fuel processing is not considered any more, a decision was made to build up a dry type interim storage for spent nuclear fuel at INPP and store it for 50 years.

(iii) radioactive waste management policy;

The policy on management of solid radioactive waste of INPP is following:

1. Within 2002-2009 it is foreseen to modernize the management and storage of solid short-lived and long-lived radioactive waste of Ignalina NPP and to:

- reduce both the total activity and volume of radioactive waste, for such purpose to implement best available technologies;
- implement the new classification system for radioactive waste;
- arrange a licensed landfill for disposal of very low level waste;
- retrieve, characterize, radioactive waste accumulated in existing storage facilities and fulfill the conditioning of and send to storage facilities the solid short-lived radioactive waste or fulfill proper treatment or long-lived radioactive waste;
- create and implement the radioactive waste inventory record keeping system;
- strive for the direction of the radioactive waste for clearance as much as possible;
- perform investigations and prepare projects suggesting methodologies for calculation of conditional clearance levels and best management methods for materials with contamination exceeding unconditional clearance levels.
- to get ready to dispose of solid short-lived radioactive wastes from Ignalina NPP in a near surface repository.
- To install proper interim storage facilities and store long-lived radioactive waste in the storage facilities without final immobilization until the final disposal methods are decided.

The policy on management of liquid radioactive waste of Ignalina NPP is following:

1. Liquid radioactive waste should be solidified and waste forms should be enclosed into suitable containers as required for storage, transport, and disposal in the near surface repository.

2. Spent resins and sludge shall be cemented.

3. Investigations shall be performed and it shall be decided 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 retrieved and enclosed into suitable containers as required for storage, transport and disposal in the near surface repository.

4. Suitable treatment technology for spent oil shall be chosen.

Gaseous waste processing systems shall ensure the removal from off-gases the radioactive contaminants as aerosols, noble gases and iodine under both normal and abnormal conditions to levels permissible to discharge effluents in accordance with requirements set in regulatory document Limits of Discharge of Radioactive Substances from Nuclear Facilities and Basic Requirements for Monitoring of Radioactive Effluents and Monitoring of the Environment, Normative Document of Environmental Protection of Lithuanian Republic LAND 42-2001.

The policy on management of institutional radioactive wastes is following:

1. Disused radioactive sealed sources shall be managed separately from other radioactive waste. These disused radioactive sealed sources that could not be reused or sent back to the supplier shall be treated without the final immobilization until the acceptance criteria for disposal are established.

2. Perform the safety analysis of existing “Radon” type radioactive waste facility near Maišiagala. The investigations shall be performed and it shall be decided whether this facility could be licensed as a repository or the site shall be after the waste retrieval and site remediation released for the free use.

3. Radioactive waste generated by enterprises in bankruptcy, the waste without owner and the illegitimate radioactive waste shall be collected, treated and temporary stored at Ignalina NPP storage facilities until a new near surface repository is constructed.

4. It is foreseen to modernize the technical basis for the treatment of radioactive waste generated by small producers.

(iv) radioactive waste management practices;

Solid radioactive waste generated at Ignalina NPP is segregated into three groups by the surface dose rate, according to standards that were applied in a formal USSR and applicable at Ignalina NPP. The new classification is approved in 2001. However, a transition period and the new waste management facilities required for the implementation of the new system. Both waste classification systems described in item (v).

Brief Description of Waste according to its Content

- Group I waste.

Waste with insignificant contamination, generated as a result of Units’ operation on nominal power, equipment repair works and refurbishment of rooms.
Content (roughly): paper, cotton waste, pieces of cable, filters and parts of repaired equipment, construction waste, rubber and thermal insulation.

- Group II waste.

Waste generated as a result of repair works, small volumes of operational waste generated in the Central Hall and in the Spent Fuel Cooling Pools Hall.
Content (roughly): depreciated equipment, parts of equipment, pipelines, elements of structures from non-serviced rooms.

- Group III waste.

The main constituent is the parts retrieved from the reactor core. Content (roughly): elements of Fuel Assemblies, Fuel Channels, CPS channels, sensors, etc.

The solid waste at Ignalina NPP is dumped into reinforced concrete compartments in storage buildings No. 155, 155/1, 157, 157/1 located on Ignalina NPP site. Currently, storage buildings 157 and 157/1 are under operation. There is no reprocessing of solid waste before it is dumped. Part of the Group I combustible/compactable waste is compacted with 70 ton press.

Liquid radioactive waste at Ignalina NPP is collected in special tanks, from where it is directed to evaporating facilities. The concentrate is processed and conditioned in the bitumen solidification facility, i.e. mixed with bitumen. The bitumen compound then is pumped into a special storage (build. 158). The building is also located on Ignalina NPP site.

Spent ion-exchange resins, filter aid (Perlite) and part of evaporator concentrate with solid particle sediments are not processed and stored in special tanks. At present cementation facility is installed and storage facility for cemented waste is constructed. The final cement solidified waste product is a compound of liquid radioactive waste and the dry components cement and betonite. The compound is poured into metallic 200 l drums. The filled drums are placed into the reinforced concrete storage containers, containing 8 drums. Commissioning tests of the facilities are performed.

Since 1964 all radioactive waste from the research, medical and industrial institutions was sent to disposal facility at Maišiagala. That facility closed in 1989. Since then, all collected institutional waste is stored at Ignalina NPP storage facilities. The Maišiagala facility was originally designed as final repository. However, there have been well-founded doubts regarding safety of the facility in the long-term perspective. RATA overtook responsibility of facility supervision and shall assess long-term safety of the facility in 2005-2006.

(v) criteria used to define and categorize radioactive waste.

Radioactive waste in Lithuania is defined as spent nuclear fuel and substances contaminated with or containing radionuclides at concentrations or activities greater than clearance levels and for which no further use is foreseen.

Radioactive waste in the Republic of Lithuania is classified based on disposal principle and radiological characteristics. According to the Regulation on the Pre-disposal Management of Radioactive Waste at the Nuclear Power Plant VD-RA-01-2001 following waste categories are distinguished:

Very low level waste (VLLW). Radioactive waste with radiological characteristics values exceeding clearance levels, however, lower than levels characteristic of low level waste. VLLW considered for disposal in licensed landfills.

Low and intermediate level waste (LILW). Radioactive waste with radiological characteristics between those of very low level waste and high level waste. These may be long lived waste (LILW-LL) or short lived waste (LILW-SL).

High level waste (HLW). The radioactive liquid containing most of the fission products and actinides present in spent nuclear fuel – which forms the residue from the first solvent extraction cycle in reprocessing – and some of the associated waste streams, this material following solidification, spent nuclear fuel or any other waste with similar radiological characteristics.

Unconditional clearance levels are established by the Normative Document LAND 34 – 2000 "Clearance Levels of Radionuclides, Conditions of Reuse of Materials and Disposal of Waste" (2000).

Solid radioactive waste is classified into six classes.

Table B-1: Solid waste radiological classification

Waste classes	Definition	Abbreviation	Surface dose rate mSv/h	Conditioning	Disposal method
*Short lived low and intermediate level waste**					
A	Very low level waste	VLLW	≤0.5	Not required	Very low level waste repository
B	Low level waste	LLW-SL	0.5-2	Required	Near surface repository
C	Intermediate level waste	ILW-SL	>2	Required	Near surface repository
*Long lived low and intermediate level waste***					
D	Low level waste	LLW-LL	≤10	Required	Near surface repository (cavities at intermediate depth)
E	Intermediate level waste	LW-LL	>10	Required	Deep geological repository
Spent sealed sources					
F	Disused sealed sources	DSS		Required	Near surface or deep geological repository***

* Containing beta and/or gamma emitting radionuclides with half-lives less than 30 years, including Cs^{137}, and/or long lived alpha emitting radionuclides with measured and/or calculated, by using approved methods, activity concentration less than 4000 Bq/g in individual waste packages on condition that an overall average activity concentration of long lived alpha emitting radionuclides is less than 400 Bq/g per waste package

** Containing beta and/or gamma emitting radionuclides with half-lives more than 30 years, not including Cs^{137}, and/or long lived alpha emitting radionuclides with measured and/or calculated, by using approved methods, activity concentration more than 4000 Bq/g in individual waste packages on condition that an overall average activity concentration of long lived alpha emitting radionuclides exceeds 400 Bq/g per waste package.

*** Depending on acceptance criteria applied to sealed sources

Liquid radioactive waste shall be classified and segregated according to:

(a) The specific activity - in low level ($\leq 4\cdot10^5$ Bq/l) and intermediate level ($> 4\cdot10^5$ Bq/l) waste;
(b) The chemical nature - in aqueous and organic waste;
(c) The phase state - in homogeneous and heterogeneous waste.

It shall be noted, that radioactive waste classification system introduced in 2001 is applied for new radioactive waste treatment facilities. Currently, at Ignalina NPP classification of radioactive waste complies with the old regulations of the Soviet Union (SP AS-88). The new classification compliant with VD-RA-01-2001 shall be adopted after the modernization of radioactive waste management system at Ignalina NPP and becoming operational the new waste management facility.
Hence, currently solid radioactive waste is classified according to Table B-2. In practice only surface dose rate is applied.

Table B-2: Radioactive waste classification

Waste group	γ-dose rate at 0.1m distance from the surface (mSv/h)	Total activity Bq/kg	Total activity Bq/kg	Surface contamination (particle/cm^2min)	Surface contamination (particle/cm^2min)
		β- emitter	α- emitter	β- emitter	α- emitter
I low	$1x10^{-3} \div 0.3$	$7.4x10^4$-$3.7x10^6$	$7.4x10^3$-$3.7x10^5$	$5.0x10^2$-$1.0x10^4$	5.0-$1.0x10^3$
II medium	$0.3 \div 10$	$3.7x10^6$-$3.7x10^9$	$3.7x10^5$-$3.7x10^8$	$1x10^4$- $1.0x10^7$	$1x10^3$- $1.0x10^6$
III high	over 10	over $3.7x10^9$	over $3.7x10^8$	over $1.0x10^7$	over $1.0x10^6$

According to fire hazard (For group I - II waste):

- combustible
- non-combustible

According to possibility to reduce volume by compaction:

- compactable
- non-compactable

Liquid radioactive waste is classified into three groups according to specific activities:

- Low level - $\leq 3.7 \cdot 10^5$ Bq/l
- Intermediate level - $3.7 \cdot 10^5 – 3.7 \cdot 10^{10}$ Bq/l
- High level - $> 3.7 \cdot 10^{10}$ Bq/l.

SECTION C. SCOPE OF APPLICATION

Article 3: Scope of application

1. This Convention shall apply to the safety of spent fuel management when the spent fuel results from the operation of civilian nuclear reactors. Spent fuel held at reprocessing facilities as a part of a reprocessing activity is not covered in the scope of this Convention unless the Contracting Party declares reprocessing to be part of spent fuel management.

In Lithuania we have no reprocessing facilities of spent nuclear fuel. According to the Law on Environment Protection, such kind of activity is not allowed. Spent fuel from Ignalina NPP is stored for several decades at the storage facility.

2. *This Convention shall also apply to the safety of radioactive waste management when the radioactive waste results from civilian applications. However, this Convention shall not apply to waste that contains only naturally occurring radioactive materials and that does not originate from the nuclear fuel cycle, unless it constitutes a disused sealed source or it is declared as radioactive waste for the purposes of this Convention by the Contracting Party.*

The Lithuanian Hygiene Standard HN 73:2001 „Basic Standards of Radiation Protection" regulates the following requirements for protection in such areas of the practices with natural and artificial sources (where natural sources are or have been used due to their radioactive or other properties):

- production, processing, use, storage, transport, import, export to and from the Republic of Lithuania of radioactive substances and management of the radioactive waste;
- practices with substances containing natural radionuclides to whom exemption criteria cannot be applied.

Lithuanian Hygiene Standard HN 85:2003 "Natural Exposure. Standards of Radiation Protection" sets forth detail radiation protection requirements against natural exposure. Among other practices, this document regulates radiation protection against natural exposure in case of reprocessing of materials, containing natural radionuclides, in management of radioactive waste produced as a result of such reprocessing, and in other fields of practices, when activities or specific activities of natural radionuclides in materials exceed exemptions levels.
At present, there are no such activities in Lithuania, during which the radioactive waste, containing natural radionuclides, could be produced (for example, such occurring in mining).
However, as we can see from requirements presented above, due to reprocessing of radioactive materials containing natural radionuclides, the requirements of Lithuanian legal acts, which regulate management of radioactive waste, are applicable.

3. This convention shall not apply to the safety of management of spent fuel or radioactive waste within military or defence programmes, unless declared as spent fuel or radioactive waste for the purposes of this Convention by the Contracting Party. However, this Convention shall apply to the safety of management of spent fuel and radioactive waste from military or defence programmes if and when such materials are transferred permanently to and managed within exclusively civilian programmes.

As was mentioned above, according to the same Law on Environment Protection, such kind of activity is not allowed in Lithuania. So, we have no spent fuel and radioactive waste from military or defence programmess.

SECTION D. INVENTORIES AND LISTS

Article 32: Reporting, paragraph 2

2. This report shall also include:

(i) a list of the spent fuel management facilities subject to this Convention, their location, main purpose and essential features;

"Wet" storage for spent fuel.
Just after the unloading from the reactor till sending to interim dry storage the SF is stored in spent fuel storage pools near the reactors of the NPP.
The whole complex of storage pools of the spent fuel storage and handling system comprises 12 pools. They are as follows:

- two pools (Rooms 236/1, 236/2), intended to store spent fuel assemblies after they are extracted from the reactor;
- five pools (Rooms336, 337/1, 337/2, 339/1, 339/2), intended to store spent fuel fragmentized assemblies placed in baskets;
- a pool (Room 234), intended to accumulate spent fuel assemblies prepared to be fragmentized, to cut suspension brackets from the spent fuel assembles, transport spent fuel assembly to the "hot" cell and full 102 placed transport baskets from the "hot" cell to the storage pools, store the 102 placed transport baskets when the storage pools hall is under repair;
- two pools (Rooms 338/1, 338/2), intended to perform operations to load the transport baskets with the spent fuel assemblies into the transport casks and store the102 placed transport baskets when the storage pools hall is under repair;
- transport corridor (Room 235), intended to transport spent fuel assemblies and transport baskets loaded with spent fuel assemblies between the pools;
- transport corridor (Room 157), intended to transport fresh fuel and reactor assemblies from the fresh fuel assembly preparation bay of SPH to the reactor and return spent fuel and reactor assemblies from the reactor to the storage pools.

The equipment of the spent fuel storage and handling system is installed in the reactor building.

The spent fuel assembly extracted from the reactor and spent fuel bundles in casks are stored in the storage pools the ceilings of which penetrate into the SPH. All process operations related to handling of the spent fuel are performed in the spent storage pools hall. The fuel assembly remains in the pool for at least a year, after which it may be removed to be cut. The cutting bay is located in the reactor building between the storage pools hall and reactor hall. The bay includes a hot cell, control room and maintenance area and is designed to:

- Cutting spent fuel assemblies into halves (two fuel bundles);
- Putting them into a transport 102 placed basket;
- Cutting long parts of fuel assemblies into smaller pieces (central rod, bearing tube);

Before and after the spent fuel assembly is subject to cutting, it is to be stored in the pool for a certain time. When the time to store the assembly after its extraction from the reactor is off, the

102 placed transport baskets with spent fuel are loaded into the casks and taken away for a long-term (up to 50 years) storage to the on-site spent fuel storage facility.

"Dry" storage for spent fuel.

The intermediate fuel storage facility is located on the Ignalina NPP site in the distance of 1 km of the available plant units and 400 meters of Drūkščiai Lake.

It is a dry storage facility where the spent fuel is stored in the same casks it is transported to the facility CASTOR RBMK and CONSTOR RBMK of GNB (Germany)

The storage is designed for allocation of 20 CASTOR RBMK casks and 60 CONSTOR RBMK casks.

The primary buildings and structures of the intermediate spent fuel storage are as follows:

- The platform to store full casks in the open air fenced with the shielding concrete wall (Structure 192);
- Personnel Access Control and Accommodation Building (Building192A);
- Transformer Sub-Station (Building193);
- Industrial and Administrative Building (Building194)
- Accumulators of Rainfalls and Special Sewerage Systems (Building 195);
- Check-Point (Building 196)
- Gate Control Building (Building 196A);
- Monitoring Wells (Observation);
- Power Supply System;
- Technical Applications and Security System;
- Radiation and Dose Rate Monitoring System;
- Motorways and railways.

The spent fuel storage facility is fenced in perimeter with the shielding reinforced concrete wall and supported by the 3-row fence equipped with the alarming system.
The process structures are located behind the shielding reinforced concrete wall, which ensures the safe operation of the facility. The platform to store the casks of CASTOR RBMK and CONSTOR RBMK in the vertical position is located between the rails of the girder crane.
The storage is a passive storage system, which does not require the decay of heat from any auxiliary equipment.
The girder crane ГК-100 with lifting capacity of 100 t performs the cask handling and loading activities. The casks are placed on the reinforced concrete plate in groups with the distance of 3 meters from each other. The distance between the cask groups is adequate to 4.1 meters.
The perimeter of the storage site is equipped with the continuous radiation monitoring system the signals from which are transferred to the Radiation Monitoring Control Room.

(ii) an inventory of spent fuel that is subject to this Convention and that is being held in storage and of that which has been disposed of. This inventory shall contain a description of the material and, if available, give information on its mass and its total activity;

As of the end of 2004, our interim spent nuclear storage facility contained 20 CASTOR RBMK casks and 52 CONSTOR RBMK casks, with a total of 7344 spent fuel elements (3677 spent fuel assemblies) of RBMK type, with the enrichment of uranium no more than 2%. The total activity of the spent fuel that is stored at the dry spent fuel storage facility is of 2.55E9GBq.

As of the end of 2004, in the "Wet" storage pools we had such inventory of spent fuel: 6890 fuel assemblies in the pools of Unit 1 and 5520 fuel assemblies in the pools of Unit 2. Amount of heavy metal (HM) in one assembly is 112-114 kg.

iii) a list of the radioactive waste management facilities subject to this Convention, their location, main purpose and essential features;

The location of the facilities listed below is site Ignalina NPP. These facilities are used for operational waste from Ignalina NPP and for the waste from small producers in Lithuania. The volume of the waste from small producers is only about 1-2 m^3 per year, so more than 99% of radioactive waste in Lithuania is produced at Ignalina NPP.

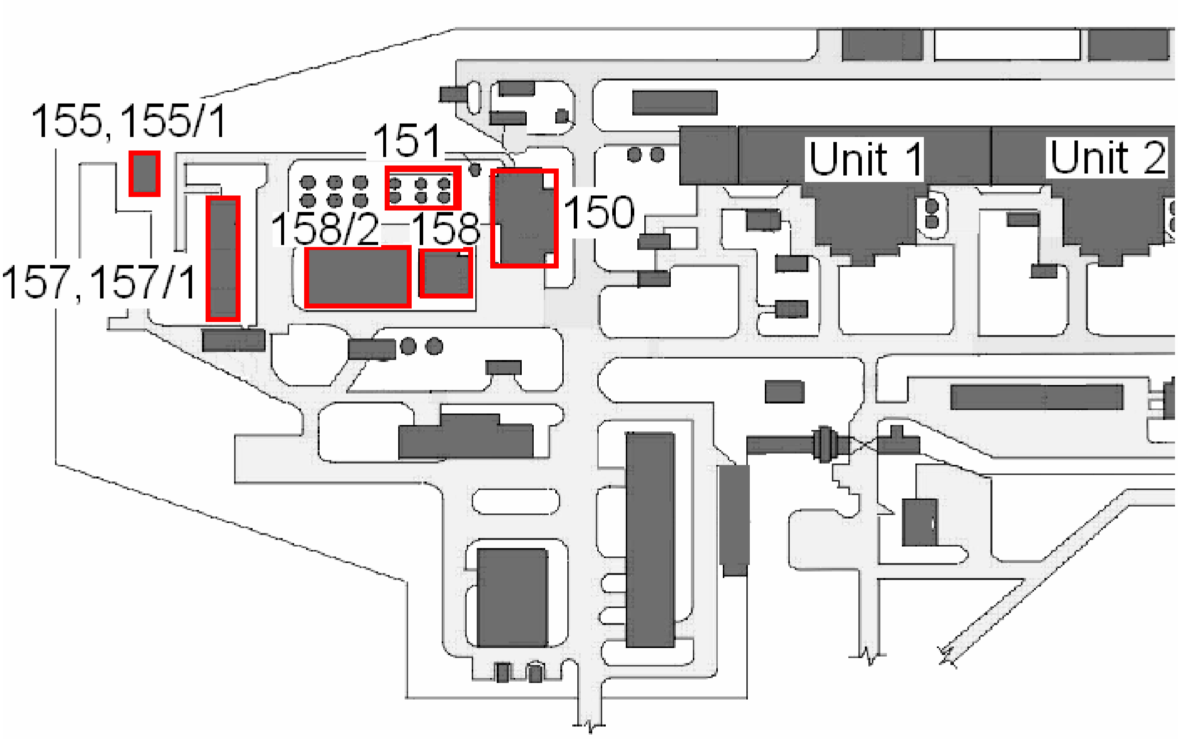

Figure D-1. Layout of radioactive waste facilities at Ignalina NPP

Brief technical specification of the solid waste storage and management facilities at Ignalina NPP

Storage facility ***Building 157***

Building 157 is a reinforced concrete ground structure. The bottom part is a reinforced concrete slab; external walls – precast concrete panels. Standard reinforced concrete building blocks were used to reach the required thickness of walls. The structure is separated into 15 compartments with precast concrete partitions. The covering is made of cast-in-place concrete. Group I and II waste (according old classification of the radioactive waste) is loaded into the compartments through 6x4.5 m square apertures. Group III waste is loaded through 1200 mm round apertures (6 per each compartment) covered by reinforced concrete plugs. Asphalt concrete hydraulic insulation is used to conserve the compartments' covering. Compartments with combustible solid radioactive waste are equipped with fire alarm and automatic carbon dioxide fire extinguishing system. At the moment the automatic fire extinguishing system is switched to manual carbon dioxide supply mode.

Storage facility Building 157/1

Building 157/1 is a reinforced concrete ground structure, consisting of three separate blocks. The distance between the blocks is 1 meter. The bottom part is a reinforced concrete slab; external walls are made of cast-in-place concrete in retained formwork. The structure is separated with precast concrete partitions into 29 compartments. The covering is made of cast-in-place concrete and has 6x4.5 m apertures. Asphalt concrete hydraulic insulation is used to conserve the compartments' covering. The covering over compartment No. 8 is made of cast-in-place concrete covered with metal liner and has one 1000x830 mm aperture used to load containers with filters. Compartments with combustible solid radioactive waste are equipped with fire alarm and carbon dioxide fire extinguishing system.

Storage facility Building 155

Building 155 is a composite reinforced concrete ground structure. The bottom part is a reinforced concrete slab; external walls – reinforced concrete panels. Additional concrete protection is introduced inside. Metal panels are used as covering. Asphalt concrete hydraulic insulation is used to conserve the structure's covering. As for today, the building is completely filled with waste and conserved.

Storage facility Building 155/1

Building 155/1 is a composite reinforced concrete ground structure. The bottom part is a reinforced concrete slab; external walls – reinforced concrete panels. Cast-in-place concrete in retained framework is used inside to introduce additional biological shielding of the walls. Two precast concrete partitions are used to separate the building into three compartments. Two compartments are 12x21 m each; the third one is 6x21 m. The covering is made of metal panels 3x10.5 m., which can be removed to load waste into the compartments. Asphalt concrete hydraulic insulation is used to conserve the structure's covering. Inside and outside the building there is a fire extinguishing system. Inside the building there is a pit provided to collect atmospheric precipitation. As for today, the building is completely filled with waste and conserved.

Storage facility Building 151 (Liquid waste)

The water purification and liquid waste treatment systems of Ignalina Nuclear Power Plant (Ignalina NPP) generate liquid radioactive waste. This waste are collected and stored in three 1,500 m^3 metal lined concrete tanks which are located above ground level and covered with soil. The waste is stored in three storage tanks denoted as TW18 B01, TW18 B02 and TW11 B03 in building 151. The waste accumulated in storage tanks TW18 B01 and TW11 B03 consists of ion exchange bead resins and filter aid (Perlite) mixture in water with very low salt content. The volume of the waste in these two tanks is 2260 m^3. The waste accumulated in storage tank TW18 B02 consists of evaporator concentrate with solid particle sediments and filter aid (Perlite), the volume of the waste is 1350 m^3.

Bituminisation facility Building 150

The purpose of this facility is to condition the operational liquid waste from Ignalina NPP

The first bituminisation unit BU-1 was commissioned in 1986 and the second, BU-2 in 1993. The design capacity of the bituminisation unit is 0.5 m^3/h of evaporator concentrate. The units are located in building 150.

The units mix radioactive salts into pure bitumen. A thin film of evaporates with specific activity of 3,7E-3GBq - 3,7E-1GBq and pure bitumen is mixed into bitumen compound with specific activity of 3,7E-3GBq -3,7E-2GBq.

The process of the collection of the liquid radioactive waste and the following bituminisation at Ignalina NPP is presented in Figure D-2. The contaminated water from different sources is accumulated in storage tanks. After evaporation in units EU-1, 2, the residual, evaporator concentrate, is accumulated. The bituminisation is carried out with two bituminisation units and the bitumen compound is transported through by heated pipeline to the storage canyons of building 158.

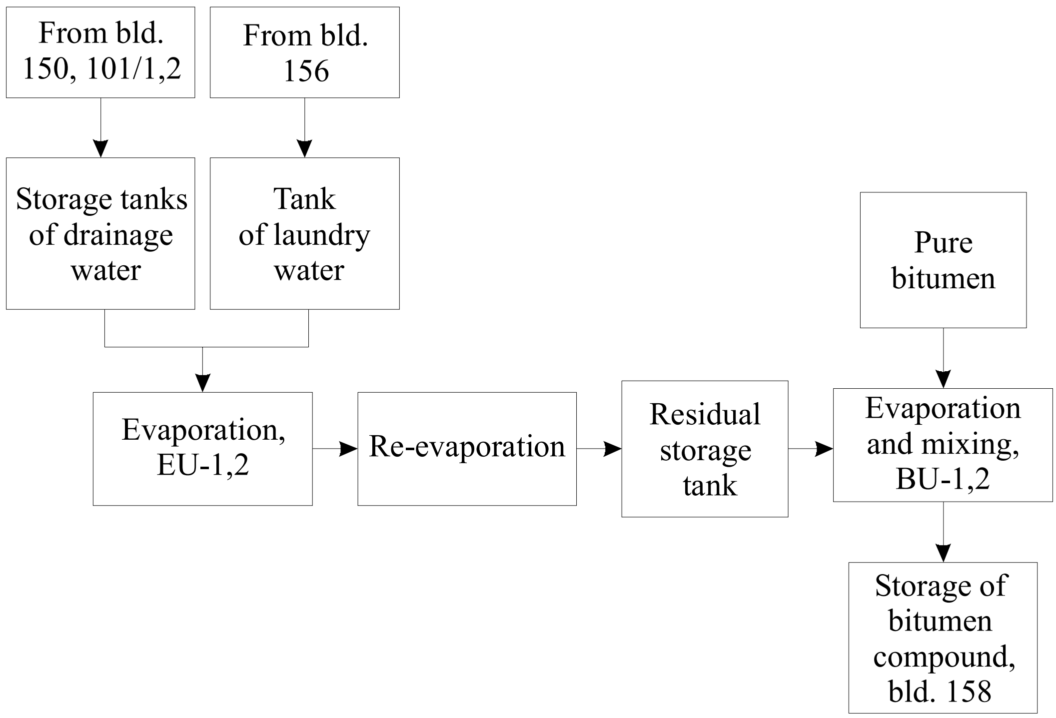

Figure D-2. The process of the collection of the liquid radioactive waste and the following bituminisation at Ignalina NPP

Storage facility Building 158 (Bituminised waste)

The bituminised waste storage facility, building 158, is located in the Northwest side of Ignalina NPP site, 200 m. to the West of unit 1. The facility is a two-storey building with supporting walls and biological shielding from concrete blocks. The foundation is from monolithic reinforced concrete slabs. The first floor contains 11 canyons with a volume of 2500 m^3, each and an effective volume of 2000 m^3. One canyon has a volume of 1000 m^3 and an effective volume of 800 m^3. The second floor contains a servicing hall, pipe-shaped communication channels with pipelines and instrumentation rooms. A gallery with three communication channels for bitumen compound pipelines joins the storage building with the liquid waste treatment facility (building 150).

Cementation facility Building 150

The ion-exchange resins from Ignalina NPP water purification and liquid waste treatment systems together with filter aid (Perlite) as one waste mixture type and solid particle sediments from evaporator concentrate also with filter aid (Perlite) as another waste mixture type is to be solidified in cement which is poured into drums and put in storage container (waste packages) in order to reduce any further risk associated with the liquid waste storage in tanks and to assure safe storage and management of solidified waste.
The cementation facility is designed to process approximately 450 m^3 of liquid radioactive waste per year. A total amount of 6,000m^3 liquid radioactive waste is envisaged to be processed. In addition to the accumulated liquid radioactive waste already in storage, the liquid waste which will be generated during operation of Ignalina NPP in the future and potentially also during future decommissioning of Ignalina NPP shall be processed.

The cement-waste mixture will be filled into 200 l drums. The filled drums will be capped and then loaded into a concrete storage container. Each storage container has a storage capacity of 8 drums.
The storage containers are designed for shielding design and to protect the loaded drums against mechanical loadings. For transport from the cementation facility to the building 158/2 the filled storage container is placed into a transport container. This waste transport package fulfils the IAEA requirements for radioactive waste transport.

Storage Building 158/2 (Cemented waste)

The cemented waste will be stored in building 158/2. This facility is already built and will start operation in 2005. The building 158/2 is tree-bay shop reinforced concrete structure. The design basis for the storage building is to provide storage capacity for waste packages produced from a total quantity of 6,000 m^3 of liquid processed radioactive waste for duration of 60 years. The capacity is 6300 storage containers. The volume of the container is about 5,6m^3.
Cementation facility and building 158/2 are designed in such a way that in normal operation only a very small amount will be added to the discharge of radioactive substances from the overall Ignalina NPP site, so that the radiation exposure due to these facilities will be negligible.

Maišiagala disposal facility

The site is located near the village of Maišiagala, about 30 km north-west of Vilnius capital of Lithuania. The repository is designed for institutional waste and is a typical “Radon” type facility that has been constructed in the early 1960s in all the former USSR Republics. In Lithuania it was built in 1964 and closed in 1989. From 1973 till 2002 maintenance of the facility was under the responsibility of Institute of Physics. In 2002 RATA took this task. Institutional control of the repository includes physical protection, environmental monitoring and public information activities.
The waste is disposed of in the reinforced concrete vault with internal dimensions 14.75x4.75x3 m (volume – 200 m^3). The vault was only partially filled with waste during operation (about 60% of the volume). When stored, the waste was interlayered with concrete. In addition, sealed sources were disposed of in two stainless steel containers, each with a volume of 10 liters. Medical sources have been disposed of with biological shielding. At the end of the disposal period the residual volume was filled with concrete and sand.

The institutional waste generated up to 1989 is disposed of in this repository. It consists of: neutralizers of static electricity and targets of neutron generators, an assortment of chemical compounds, sources of gamma radiation with their biological protectors, different isotopic instrumentation with beta sources, blocks of gamma re-lays, radium salts, radioactive light emitters, static electricity neutralizers 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, Pu-239.

(iv) an inventory of radioactive waste that is subject to this Convention that:
(a) is being held in storage at radioactive waste management and nuclear fuel cycle facilities;

Principal information about waste volumes, activities and specific radionuclides in the storage buildings listed above is presented in the Annex 1 in the Section L. Inventory of Maišiagala disposal facility is presented in subsection b).

(b) has been disposed of; or

The historical waste from research, industry and medical institutions are accumulated in Maišiagala disposal facility. Total volume is about 200 m^3. Main radionuclides of Maišiagala disposal facility that are important for safety are provided in Table D-1.

Table D-1: Main radionuclides of Maišiagala disposal facility

Radionuclide	**Activity, Bq 01 October 2004**
H-3	1,14E+14
C-14	1,77E+11
Cl-36	1,20E+09
Co-60	9,24E+11
Ni-63	3,71E+10
Kr-85	8.02E+08
Sr-90	4,40E+11
Ba-133	1,46E+06
Cs-137	3,88E+13
Eu-152	2,40E+10
Bi-207	4,77E+05
Ra-226	1,10E+11
U-234	1,45E+03
U-238	4,31E+07
Pu-239	9,15E+11
Total activity	**1,55E+14**

(c) has resulted from past practices.

Maišiagala facility and the waste disposed in it are the result of past practices. Information concerning the inventory of Maišiagala is described above in subsection (iv) b).

(v) a list of nuclear facilities in the process of being decommissioned and the status of decommissioning activities at those facilities.

Unit 1 of Ignalina NPP was shut down in on 31 December 2004, and now this unit is in the stage of preparedness for decommissioning. Preliminary the second unit of Ignalina NPP will be shut down at the end of 2009.

SECTION E. LEGISLATIVE AND REGULATORY SYSTEM

Article 18: Implementing measures

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

Lithuania has taken all necessary legislative, regulatory and administrative measures implementing the obligations under this Convention. The legal basis of the Lithuania ensures safe management of radioactive waste and spent nuclear fuel. At the same time the legal basis is constantly in development process, considering the present situation and changes in the country's nuclear energy field. The existing legislative situation in Lithuania is described below in the report.

Article 19: Legislative and regulatory framework

1. Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of spent fuel and radioactive waste management.

Lithuania has established appropriate legislative and regulatory framework in order to govern safety of spent fuel and radioactive waste management.
All the legal acts concerning spent fuel and radioactive waste management are prepared according best in-country and international practice including IAEA recommendations. 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.
Before adoption of the Law on Nuclear Energy in 1996, there were only individual laws and regulations based either on former Soviet rules or on IAEA documents. The law provides a legal basis for the activities of natural and legal persons in the sphere of nuclear energy and defines the licences needed for nuclear activities and the authorities responsible for licensing and control.

2. This legislative and regulatory framework shall provide for:
(i) the establishment of applicable national safety requirements and regulations for radiation safety;

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 2004);
2. Law on Nuclear Energy (1996, last amended 2004);
3. Law on Radiation Protection (1999, last amended 2004);
4. Law on Environmental Protection (1992, last amended 2003);
5. Law on the Ratification of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (2003);

Government Resolutions:

6. Government Resolution No. 174 On Approval of the Strategy of Radioactive Waste Management (2002);
7. Government Resolution No. 103 On Approval of Regulations of Licensing of Nuclear Power Related Activities (1998);
8. Government Resolution No. 205 On Approval of Regulations of Licensing the Practices Involving Sources of Ionizing Radiation (1999, amended 2004);
9. Government Resolution No. 280 On Approval of Regulations on Management of Illegal (Orphan) Radioactive Sources and Facilities, Contaminated With Radionuclides (2005);
10. Government Resolution No. 651 On the Establishment of the State Register of Radiation Sources and Exposure to Workers and Approval of Its Statute (1999);

General requirements:

11. Regulation on the Pre-disposal Management of Radioactive Waste at the Nuclear Power Plant, VD-RA-01-2001 (2001);
12. The General Requirements for Dry Type Storage for Spent Nuclear Fuel, VD-B-03-99 (1999);
13. Regulation on Disposal of Low and Intermediate Level Short Lived Radioactive Waste P-2002-2 (2002);
14. Regulation on Disposal of Very Low Level Radioactive Waste P-2003-02 (2003);
15. General Requirements for Quality Assurance System at NPP and other Nuclear Power Facilities, VD-KS-02-99 (1999);
16. Requirements for Modifications of Nuclear Facilities VD-E-08-2000 (2000);
17. Order of the Minister of Health No. V-834 On Regulations of Radioactive Waste and Radioactive Substances Import, Export, Carrying in Transit and Transport within the Country (2004);
18. Order of the Minister of Health No. V-712 On Regulations of Decommissioning of the Facilities in which Practices Involving Sources of Ionizing Radiation Is Carried Out (2003);
19. Lithuanian Hygiene Standard HN 89:2001 "Management of Radioactive Waste" (2001) (for institutional waste);

Radiation protection requirements:

20. Lithuanian Hygiene Standard HN 73:2001 "Basic Standards of Radiation Protection" (2001);
21. Lithuanian Hygiene Standard HN 85:2003 "Natural Exposure. Standards of Radiation Protection" (2003);
22. Lithuanian Hygiene Standard HN 87:2002 “Radiation Protection in nuclear facilities” (2002);
23. Lithuanian Hygiene Standard HN 99:2000 “Protective Actions of Public in Case of Radiological or Nuclear Accident” (2000);
24. Lithuanian Hygiene Standard HN 52:2005 "Radiation Protection in Industrial Radiography" (2005);

Environment protection requirements:

25. Normative Document LAND 34 – 2000 “Clearance Levels of Radionuclides, Conditions of Reuse of Materials and Disposal of Waste” (2000);

26. Normative Document LAND 41 – 2001 “Limitation of Radioactive Discharges from Facilities of Medicine, Industry, Agriculture and Research and Permitting of Discharges and Radiological Monitoring” (2001);
27. Normative Document LAND 42 – 2001 “Limitation of Radioactive Discharges from Nuclear Facilities, Permitting of Discharges and Radiological Monitoring” (2001).

The main strategic directions of the management of spent nuclear fuel and radioactive waste in Lithuania are provided in the Strategy of Management of Radioactive Waste, approved by Lithuanian Government. The main provision of this Strategy is that in management of spent nuclear fuel and radioactive waste the efforts must be made to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation and to avoid imposing undue burdens on future generations. The strategy is based on the provisions of the IAEA Safety Series No. 111-F „The Principles of Radioactive Waste Management”.
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 producer, functions of the Radioactive Waste Management Agency and provisions for licensing.
The Law on Radiation Protection regulates the relations of legal persons and natural persons from activities involving sources of ionizing radiation and radioactive waste management. This Law shall regulate relations arising during the use of nuclear energy in as much as they are not regulated by the provisions of the Law on Nuclear Energy.

(ii) a system of licensing of spent fuel and radioactive waste management activities;

Laws on Nuclear Energy and on the Management of Radioactive Waste defines all activities that can not be performed without a having a licence issued by the authority.
The Law on Nuclear Energy stipulates:

Without a licence issued by the authority of the Republic of Lithuania in a prescribed manner, it shall be prohibited:
- To design, construct and reconstruct nuclear facilities, installations and equipment;
- To operate nuclear facilities and repair their protection systems;
- To engage in any activity that might have an effect on a safe operation of nuclear facilities;
- To retire a nuclear facility from service;
- To store and bury nuclear and radioactive materials and their waste;
- To acquire, possess and transport radioactive materials;
- To export, import and carry in transit in the territory of Lithuania nuclear, radioactive and other materials used in the nuclear energy sector, nuclear equipment, and dual purpose goods that may be used in nuclear technologies.

The Law on the Management of Radioactive Waste stipulates:

Without a licence issued by the authority it shall be prohibited:
- To design, construct, or reconstruct, operate storage facilities and repositories, decommission storage facilities, to permanently close repositories and carry out post-closure surveillance;
- To engage in transport of radioactive waste;
- To collect, sort radioactive waste, to undertake its pre-treatment, treatment, and conditioning, to store, recover and decontaminate it.

The process of licensing of radioactive waste management activities is not strictly centralized in Lithuania. According to the Law on the Management of Radioactive Waste the main regulatory body in radioactive waste management in Lithuania is State Nuclear Power Safety Inspectorate (VATESI). VATESI is responsible for issuing licences for the design, construction, modification, operation and maintenance of nuclear facilities, and storage and disposal of radioactive waste.

The Radiation Protection Centre (RPC) under Ministry of Health is responsible for issuing licences for transportation of radioactive waste and for issuing licences for small producers (waste producer with the exception of the operator of a nuclear plant) to manage institutional waste excluding disposal - to collect, sort radioactive waste, to undertake its pre-treatment, treatment, and conditioning, to store, recover and decontaminate it. On purpose to carrying out the single transport of radioactive waste, in addition to the licence, the single permit is needed, that is issued by the RPC.

A scheme of licensing of construction or reconstruction, operation and decommissioning or closure of radioactive waste management facility (RWMF) in Lithuania is provided below:

Construction or reconstruction

The Ministry of Economy

Submits to the Government draft of decision to design RWMF

The Government

Decides to start designing of RWMF

Operator

Application for licence to design RWMF

VATESI

Examines an application and issues the licence to design RWMF after coordination with Ministry of Environment or its delegated institution, RPC and local municipality

Operator

Prepares Design of RWMF and coordinates it with authorities

Ministry of Environment

Organize State Expertise of RWMF Design

Operator

Applies for the licence for construction of RWMF

VATESI

Examines an application and issues the licence for construction of RWMF after coordination with Ministry of Environment or its delegated institution, RPC and local municipality and issues the licence for construction

↓

Operator
Operator constructs the RWMF

Operation

Commission for the commissioning of RWMF designated by the Government
Accepts constructed RWMF and issues an approval act

↓

Operator
Performs trials and sends to VATESI application for Operational Licence of RWMF

↓

VATESI
Examines an application and issues an Operational Licence for RWMF after coordination with Ministry of Environment or its delegated institution, RPC and local municipality.

Decommissioning or Closure

The Government

Decides to decommission a storage facility or to close disposal facility

↓

Operator

Applies for the Licence

↓

VATESI

Examines an application and issues a Licence after coordination with Ministry of Environment or its delegated institution, RPC and local municipality within its territory

Post-closure surveillance of the repository

Operator

Post-closure surveillance of the repository shall be exercised by RATA. RATA applies for the Licence for post-closure surveillance

↓

VATESI

Examines an application and issues a Licence for post closure surveillance after coordination with Ministry of Environment or its delegated institution, RPC and local municipality within its territory *iii) a system of prohibition of the operation of a spent fuel or radioactive waste management facility without a licence;*

According to the Law on Nuclear Energy, to the Law on the Management of Radioactive Waste and to the Law on Radiation Protection without a licence it is prohibited to make any activity related to the radioactive waste management in Lithuania. Otherwise the measures of enforcement described in the subchapter v) of Section E will be implemented.

iv) a system of appropriate institutional control, regulatory inspection and documentation and reporting;

Institutional control of nuclear facilities is ensured by the licence given to the operator. In the licence conditions there are defined all aspects which operator shall comply with. Licence conditions ensure that the control of facility operator by the regulatory body will last while the licence is valid and even if the licence is not valid the responsibility remain with the operator.

According to the Article 13 of the Law on Nuclear Energy: the bodies exercising state control and supervision shall inspect the state of nuclear safety, radiation protection and physical safety of nuclear facilities, and, within the scope of their competence, shall take all necessary measures for the elimination of the identified defects.

Decisions taken by officers of state control and supervision bodies within the scope of their competence shall be binding on all natural and legal entities and shall be implemented strictly within the established time limits and in accordance with the prescribed procedure.

VATESI as the main regulatory body in spent fuel and radioactive waste management in Lithuania has issued internal document General procedure of VATESI's inspection. This document clearly defines the procedure of inspections of VATESI in nuclear facilities. It gives the guidelines for preparation, implementation and documentation of inspections and defines what actions shall follow after inspection if some nonconformities or deficiencies are found. Every year VATESI approves its plan of inspections, according which intended inspections are implemented.

Pursuant to provisions of the Law on the Management of Radioactive Waste and the Law on Radiation Protection, the Radiation Protection Centre is in charge of state supervision and control for management of radioactive waste generated by small producers (institutional radioactive waste). It also supervises and controls how the requirements on exposure of workers and public during normal operation and accident situations are being followed during the management of radioactive waste at nuclear facilities. As regards the inspection order and frequency, they are outlined in the Regulation for Radiation Protection State Supervision and Control (2000). Detailed inspection procedures (including inspection questionnaires and forms of inspection protocols) are established in the Manual on Radiation Protection State Supervision and Control (2004), approved by the Director of the RPC.

v) the enforcement of applicable regulations and of the terms of the licences;

According to the Regulations for Licensing of Nuclear Power Related Activities, approved by the Government, licensing authority VATESI must take all necessary actions, including the sanctions (legal actions of the licensing authority to impose penalties in order to eliminate

violation of conditions of licence, it can be administrative penalties) established by legislation in order to ensure that the licensee follows the conditions of licence validity, requirements of nuclear safety regulations, and additional requirements of the licensing authority. VATESI has the right to oblige the licensee to eliminate all observed deficiencies of the activity and (or) violations of licence conditions.
The regulatory authority has the right to suspend the licence or revoke it before its expiry date, if the licensee does not fulfill the conditions of the licence, the requirements established by the regulations and (or) by the regulatory authorities (under the competence of them) or seriously violates them, submits incomplete or confusing information.
According to the Law on Radiation Protection and the Law on the Management of Radioactive Waste, licences to small producers for the activities related to radioactive waste management (to collect, sort radioactive waste, to undertake its treatment, to store, reprocess, transport and decontaminate it) are issued, the radiation protection state supervision and control is carried out, and in case if requirements are violated, administrative penalties (according the Code of Administrative Violations) are applied by the RPC.

(vi) a clear allocation of responsibilities of the bodies involved in the different steps of spent fuel and of radioactive waste management;

Article 4 of the Law on Nuclear Energy stipulates: The safe operation of individual nuclear facilities shall be the responsibility of their operators. Radioactive waste management facility is a nuclear facility. The operator is responsible for all steps and aspects of radioactive waste management in the nuclear facility.

Small producers are responsible for all steps radioactive waste management according to the Law on the Management of Radioactive Waste.

Article 11 of the Law on the Management of Radioactive Waste stipulates:

It shall be the duty of a waste producer to manage, in accordance with norms and regulations, radioactive waste safely before transferring it to the Radioactive Waste Management Agency. Following the receipt by the Radioactive Waste Management Agency from the waste producer, the Agency assumes responsibility for the management of the waste.
The waste producer shall pay all the expenses involved in the management of radioactive waste from the moment of its generation to its disposal, including the expenses related to scientific research, the upgrading of the radioactive waste management facility, as well as to the post-closure surveillance of the repository.
The waste producer shall not be exempt from the duties and responsibilities to manage radioactive waste safely even in the event of a temporary suspension or expiration of the licence.

3. When considering whether to regulate radioactive materials as radioactive waste, Contracting Parties shall take due account of the objectives of this Convention.

Radioactive waste in Lithuania is spent nuclear fuel and substances contaminated with or containing radionuclides at concentrations or activities greater than clearance levels and for which no further use is foreseen. This definition complies with the definition and of radioactive waste and with objectives of this Convention.

Article 20: Regulatory body

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

According to the Law on Nuclear Energy, Article 8: The Government of the Republic of Lithuania shall prepare the nuclear safety and radiation protection regulatory system and the mechanism of its functioning, establish nuclear energy control and supervision institutions and approve their regulations; Article 64: Implementation of the state regulatory objectives of nuclear energy safety and radiation protection and the activities of the control and supervision bodies shall be financed from the national budget.

There are three regulators bodies in Lithuania:

According to the Law on the Management of Radioactive Waste VATESI is the key institution regulating safety of radioactive waste management. VATESI competence is:

- implementing state regulation of nuclear safety, radiation protection, accounting for and control of nuclear materials in the sphere of nuclear energy;
- issuing licences for the design, construction, modification, operation and maintenance of nuclear facilities, storage and disposal of radioactive waste;
- shall co-ordinate the Radioactive Waste Management Strategy developed by the Radioactive Waste Management Agency;
- after consultation with the Radiation Protection Centre and the Ministry of the Environment, shall establish the criteria for the classification and acceptance of radioactive waste;
- during radioactive waste management shall control and guarantee compliance with the requirements of legal acts;

Competence of the RPC in the sphere of Radioactive Waste Management is radiation protection against the possible negative impact of ionizing radiation:

- shall within the limits of its competence exercise state radiation protection supervision and control of radioactive waste management;
- shall issue 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 and for transportation of radioactive waste;
- shall issue licenses for transport of radioactive materials and waste.

Competence of the Ministry of the Environment in the sphere of Radioactive Waste Management:

- to establish the limits of radioactive discharges from economic entities into the environment, monitor compliance with them, establish the procedure for discharges authorization;
- to establish the clearance levels of radionuclides, conditions of reuse of materials and disposal of waste;
- to coordinate the process of environmental impact assessment of proposed economic activities and methodically manage it; to make decisions whether the proposed economic

activities are allowed in the selected site as well as organize and coordinate environmental impact assessment in the transboundary context;
- to organize, coordinate and perform state environmental monitoring, and control environmental monitoring of economic entities;
- to exchange monitoring information with other countries;

There are more ministries or institutions that are involved in regulating some specific questions in radioactive waste management according to their competence but these institutions are not regulatory bodies as defined in this Convention. These institutions are Ministry of Economy, Ministry of Social Security and Labour, Ministry of Transport and Communications, Ministry of National Defence, Ministry of the Interior, the State Security Department and Governmental Emergencies Commission. The competence of these institutions is defined in the Law on Nuclear Energy. According to this Law they participate only in one step of licensing – state expertise when evaluating the design of nuclear facility.

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

In Lithuania operators and regulators are fully independent. Neither of regulators performs any activity related to the radioactive waste management. Their functions are limited to regulating the waste management. Article 14 of the Law on Management of Radioactive Waste stipulates: In performing its functions VATESI shall act independently, in accordance with laws, its own regulations and other legal acts.

SECTION F. OTHER GENERAL SAFETY PROVISIONS

Article 21: Responsibility of the licence holder

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

The main provisions, which describe the duties and responsibilities in management of spent nuclear fuel and radioactive waste are established in the Law on Nuclear Energy, the Law on Radiation Protection and the Law on the Management of Radioactive Waste.

According to the Article 4 of the Law on Nuclear Energy, the safe operation of individual nuclear facilities shall be the responsibility of their operators. 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 rests with the operator. The licence holder shall provide safety reports of operation of nuclear facilities to regulatory bodies, so regulator always know if the licensee meets its responsibility. 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. Any changes in practice are coordinated with regulatory authorities and are allowed only after there was assured, that safety requirements will be not violated.
The duties and responsibilities of small producers in management of radioactive waste are set forth 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 possibilities to carry out the practices with sources of ionizing radiation in safe manner and (or) safely manage the radioactive waste.

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

Article 4 of Law on Nuclear Energy stipulates: Nuclear safety in the Republic of Lithuania shall be guaranteed by the State. If there are non-licensed facilities from former practices then there is an institution that performs surveillance of this facility until this facility will be transferred to the operator. Then operator performs assessment of the facility and applies for the licence. For example Maišiagala disposal facility was managed in such a manner. At first it belonged to several institutions then it was transferred to RATA and RATA now performs assessment of Maišiagala and will get a licence for post-closure surveillance of this facility.
If the licensee does not meet the requirements or do not follow the licence conditions, the licence is suspended, but the responsibility rests with the operator.

Article 22: Human and financial resources

(i) qualified staff are available as needed for safety-related activities during the operating lifetime of a spent fuel and a radioactive waste management facility;

The process of selection and training of the personnel at Ignalina NPP is performed in accordance with the second level quality assurance system procedures that guarantees sufficient skills of the personnel involved in all fields of activity at Ignalina NPP, including spent fuel and radioactive waste handling.
Safety management procedures “Personnel” QA-2-014, “Reactor core control and fuel handling” QA-2-012 and “Radioactive waste, maintenance of order” QA-2-013, which regulate requirements to the personnel involved in spent fuel and radioactive waste handling activities, are developed in accordance with IAEA documents 50-C-QA (Rev.1), 50-SG-QA1(Rev.1), 50-C\SG-Q and TRS No. 380 “Nuclear Power Plants’ personnel training and its assessment”.
Training and continuous education of the personnel are performed on the basis of systematic approach to the education, which provides the highest level of the personnel training.
The procedures regulate requirements to:

- Personnel recruitment;
- Initial training of the personnel;
- Personnel certification;
- Leave for independent work;
- Continuous education;
- Constant work with personnel.

All activities on personnel recruitment, initial and continuous training of the personnel, professional development, personnel certification and career development are performed in order to provide Ignalina NPP with sufficient number of skilled personnel for safe and reliable operation of the plant.

The personnel of Radioactive Waste Management Agency (RATA) is under development - the staff is increasing but still there is need for more staff.

(ii) adequate financial resources are available to support the safety of facilities for spent fuel and radioactive waste management during their operating lifetime and for decommissioning;

Financing system of management of radioactive waste and spent fuel is multiple in Lithuania. Management of an operational radioactive waste and spent fuel, control of existing facilities and storages in Ignalina NPP is included in the production expenditures of the enterprise.

New management facilities, which are or will be built by the Ignalina NPP decommissioning programme, such as solid radioactive waste management and storage facility, spent nuclear fuel storage, landfill and near surface disposal facilities and others, are being financed by the Ignalina International Decommissioning Support Fund and co-financed by the State Enterprise Ignalina NPP Decommissioning Fund.
State Enterprise Ignalina NPP Decommissioning Fund is accumulated in the special Treasury Account from 6 % of yearly Ignalina NPP revenue received from sold electricity. The Council of the Fund was founded by the Regulation of the Government and is the governing body of the Fund.
Ignalina International Decommissioning Support Fund is accumulated by the contributions of the countries-donors and one of the contributors is European Community. It supports decommissioning of INNP according the commitments that were set in the Protocol No. 4 on the Ignalina NPP in Lithuania of the Treaty of Accession to the European Union. The European

Bank for Reconstruction and Development is an administrator of the fund, while the governing body is the Donors Assembly.
Institutional waste producers pay for their waste collection, transportation, treatment, storage and disposal service according to a contract with RATA. The fees of the services were approved by the order of the minister of economy.
By the Law on the Management of Radioactive Waste an operator of a radioactive waste management facility must take the appropriate steps to ensure that enough qualified staff and adequate financial resources are available during the decommissioning. It is obligatory, during the decommissioning of a radioactive waste management facility.

(iii) financial provision is made which will enable the appropriate institutional controls and monitoring arrangements to be continued for the period deemed necessary following the closure of a disposal facility;

RATA is performing control and monitoring of the only existing closed radioactive waste disposal facility in Maišiagala, which is not considered like repository and was inherited from soviet times. Those works are resourced from the State Budget of the Republic of Lithuania through the Ministry of Economy.

Article 23: Quality assurance

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

National Requirements

According to the requirements of Law on Nuclear Energy, Government established the licensing procedures and appointed national authorities that responsible to inspect implementation, application and effectiveness of the quality assurance measures in nuclear energy operating organizations.

VATESI is responsible for establishing the requirements and evaluation of their implementation and adjustments. In 1999 VATESI issued national requirements on quality assurance (VD-KS-02-99). The requirements are based on IAEA code 50CSG-Q on quality assurance and other recommendations; also it requires implementing valid national standards for quality management systems (e.g. LST EN ISO 9001:2001). The new edition of the VATESI requirements is now under preparation to take into account new international practices and transitional stage of Ignalina NPP.
VATESI requirements on quality assurance (VD-KS-02-99) apply to all organizations operating nuclear facilities, including organizations performing radioactive waste management activities (further in text – operators).
According to the national requirements all operators are required to implement effective quality assurance programmes (quality management systems). Operators are responsible to maintain and constantly demonstrate efficiency of their quality assurance programs in all stages of their life:
“2.1 In order to ensure safety of nuclear power plants and other nuclear energy objects, it is very important that in all stages of their operation a quality assurance system would be established and implemented. Requirements for quality assurance system of nuclear plants and other nuclear energy objects are the main normative document, establishing requirements of VATESI for

preparation, implementation and maintenance of quality assurance system in neo.” *(Taken from VD-KS-02-99).*
General VATESI requirements on decommissioning include requirement for pro-active adjustment of quality assurance system to needs of decommissioning (VD-EN-01-99, amended in 2003). It requires from an operator to extend existing quality assurance system to include all decommissioning activities (section 5.8 within VD-EN-01-99).
According to VD-KS-02-99, quality assurance documentation including internal and external audit programmes, nuclear facility operator shall submit main quality assurance system documentation (level 1 and 2) to VATESI for review before the documents come in force. Reports on internal checking and copies of regular reports of quality management division to executive of the operating organization shall also be submitted to VATESI. The requirements also define that VATESI representatives have right to take part as observers during execution of internal checking of quality assurance system and to perform external checking of quality assurance system within divisions or in the whole operating organization.
Radiation Protection Centre is responsible to monitor how small producers establish and implement quality assurance measures according to HN 73:2001 "Basic Standards of Radiation Protection" that 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 programmes:

- designate and appoint person (service) responsible for establishment and implementation of the quality assurance programme;
- validate, that only persons with appropriate training will work with sources of ionizing radiation (or with equipment) and only approved procedures will be used;
- 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;
- indicate the order of calibration of sources (equipment) etc.

According to requirements of HN 87:2002 „Radiation Protection in Nuclear Facilities“, the licence holders ensure that all procedures assigned for the implementation of the radiation protection programme during operation and decommissioning of nuclear facility, are performed in accordance with the requirements of the quality assurance programme of the nuclear facility.

Status of Implementation of the national requirements

Ignalina NPP

Management procedures “Reactor core control and nuclear fuel handling” (with references include 33 references to instructions, certificates and methods’ descriptions) and “Radioactive waste. Order maintenance” (with references to 20 instructions and a regalement) have been implemented at Ignalina NPP to control the processes of nuclear fuel and radioactive waste handling. The management procedures contain information necessary for administration to manage these works at Ignalina NPP:

- 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)

RATA Quality Assurance System (QAS) needs some revising to comply to established national and IAEA requirements. Agencie's activities to develop the QAS documentation aim at distribution of responsibilities, clarification of procedures, better management of processes and resources.
QAS guide provides more general information about agency's mission, aims, safety policy, management principles, responsibilities, process of staff qualification and training, identifies approved QAS procedures, the main legal documentation applicable for RATA activities, and other information.
Description of management and monitoring of RATA's processes already was presented to VATESI according to national requirements and now are under revision on the basis of VATESI remarks. The prepared procedures of RATA include ones on management of documentation and records, environment protection, radiation protection, fire prevention, work safety, emergency response plan, public procurement, physical protection and radioactive waste management, and others. This documentation is of the 2nd level QAS documentation and it provides information how activities to be performed and managed.
The original QAS documentation of RATA also includes 3rd level documents (instructions, drawings, plans and charts). This documentation aims to describe requirements for individual activities and individual safety.

Article 24: Operational radiation protection

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

The basic radiation protection requirements, corresponding to IAEA requirements, are established in the Law on Nuclear Energy, Law on the Management of Radioactive Waste, Law on Radiation Protection and Law on Environmental Protection. All practices with radiation sources are carried out in accordance with the basic principles of radiation protection: justification, optimization and limitation.
The basic standards and safety requirements for occupational and public exposure in practices with sources of ionizing radiation and also in management of radioactive waste are established in Lithuanian Hygiene Standard HN 73:2001 "Basic Standards of Radiation Protection", which is in line with the requirements of IAEA Safety Series No. 115, International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, and the Council Directive 96/29/EURATOM of 13 May 1996 Basic safety standards for the protection of the health of workers and the general publics against the dangers arising from ionizing radiation.

The limits for occupational and public exposure, established in HN 73:2001, are given in the table below:

Table F-1: Limits for occupational and public exposure

Application	Dose limits	
	Occupational	Public
Effective dose	maximum annual 50 mSv, 100 mSv in a consecutive 5 year period	1 mSv annual, in special circumstances - 5 mSv, provided that the average dose over 5 consecutive years does not exceed 1 mSv per year
Equivalent dose for:		
the lens of eye	150 mSv	15 mSv
the skin, hands, forearms and feet and ankles	500 mSv	-
the skin	-	50 mSv

HN 87:2002 „Radiation Protection in Nuclear Facilities“ sets forth requirements for radiation protection of workers working at the nuclear facilities and for radiation protection of members of the general public during the operation and decommissioning of nuclear facilities. This standard establishes the dose constraint for the members of general public due to operation and decommissioning of nuclear facility, which is 0.2 mSv/year.

In 2004, the collective dose in Spent Nuclear Fuel Interim Storage Facility (SNFSF) (that means, during the transport operations with spent fuel casks, maintenance of SNFSF equipment, carrying out of IAEA inspections, checking the CASTOR casks for leakage, carrying out repair works of the crane) was 11.294 man mSv, and collective dose of workers, who worked in spent nuclear fuel interim storage facility was 5.346 man mSv.

The collective dose of workers, who worked with spent nuclear fuel casks in 2004, is given in the table below (there were 10 casks transported to the SNFSF in 2004):

Table F-2: The collective dose of workers, who worked with spent nuclear fuel casks in 2004

	Collective gamma dose, man□mSv		Collective neutron dose, man□mSv		Total collective dose, man□mSv	
	During operation*	SNFSF workers	During operation*	SNFSF workers	During operation*	SNFSF workers
Fuel transport technological operations with shielding casks	0.656	0.335	0,656	0.335	1.312	0.670
The time period, when the casks were not transported to the SNFSF)	2.746	0.862	2.746	0.862	5.492	1.724
Total, works in the SNFSF	5.647	2.673	5.647	2.673	11.294	5.346

* during the transport operations with spent fuel casks, maintenance of SNFSF equipment, carrying out of IAEA inspections, checking the CASTOR casks for leakage, carrying out repair works of the crane.

The radiation protection requirements for radioactive waste management for small producers are set forth in HN 89:2001 "Management of Radioactive Waste". In this Hygiene Standard the requirements for management of liquid, solid, gas radioactive waste and spent sealed sources are established.

Liquid radioactive waste management is managed by one of the manners:

1) is discharged to the environment, if the activity levels do not exceed clearance levels, set in legislation;

2) the radioactive waste containing short lived radionuclides (half live not more than 100 days) is stored until the activity will become below the clearance levels and thereafter it is discharged to the environment;

3) if the requirements of points 1) and 2) are not satisfied, liquid radioactive waste is solidified and disposed of in radioactive waste storage facility.

Solid radioactive waste management is managed by one of the manners:

1) is discharged as non radioactive, if the activity levels do not exceed clearance levels;

2) the solid radioactive waste containing short lived radionuclides (half live not more than 100 days) is stored until the activity will become below the clearance levels and thereafter it is discharged to the environment;

3) if the requirements of points 1) and 2) are not satisfied, then solid radioactive waste is disposed of in radioactive waste storage facility.

Radioactive waste in gaseous form, which contains aerosols, is discharged after filtration. The gaseous radioactive waste is discharged to the environment, if activity levels do not exceed clearance levels, set in legislation.

The disused sealed sources are sent to the radioactive waste interim storage facility (located at Ignalina NPP) in accordance with the order, established in the Law on the Management of Radioactive Waste.

iii)*measures are taken to prevent unplanned and uncontrolled releases of radioactive materials into the environment.*

According to the laws (mentioned in Article 24;1), the standards of radionuclide discharges into the environment and the order of issuing of permits for radionuclide discharges as well as clearance levels of radionuclides, conditions of reuse of materials and disposal of waste are set by the Ministry of Environment.

The requirements for radioactive releases limitation are set forth in the Normative Document LAND 42–2001 “Limitation of Radioactive Discharges from Nuclear Facilities, Permitting of Discharges and Radiological Monitoring” and the Normative document LAND 41-2001 “Standards of Radioactive Discharges from Medical, Industrial, Agricultural and Research facilities; Permitting of Discharges”.

The Normative Document LAND 34-2000 “Clearance Levels of Radionuclides, Conditions of Reuse of Materials and Disposal of Waste” establishes criteria when materials, equipment, installations, buildings and waste, contaminated with radionuclides or containing radionuclides may be used or disposed of without any application of requirements of radiation protection.

2. Each Contracting Party shall take appropriate steps to ensure that discharges shall be limited:
i) to keep exposure to radiation as low as reasonably achievable, economic and social factors being taken into account; and
ii) so that no individual shall be exposed, in normal situations, to radiation doses which exceed national prescriptions for dose limitation which have due regard to internationally endorsed standards on radiation protection.

The objective of the Normative Document LAND 42 – 2001 "Limitation of Radioactive Discharges from Nuclear Facilities, Permitting of Discharges and Radiological Monitoring" is to protect humans, other living organisms, natural resources (the land, forest, water) and other environmental entities from harmful impact of ionizing radiation and contamination by radionuclides from nuclear installations. The requirements of the Document are applied to nuclear facilities when designing, constructing and operating them as well as to nuclear facilities during decommissioning.
Only those subjects may release radioactive substances into the environment (in liquid or gaseous form) that have obtained respective permission in advance. The Ministry of Environment issues this permission after studies of the plan of radioactive discharges as well as the programme of radiological monitoring. Limits of discharges are indicated in the permission. Ignalina NPP got permission for discharges of radioactive substances to the environment in 2002. Radiological monitoring, consisting from both radioactive discharges monitoring and monitoring of environment (in sanitary protective zone (3 km) and monitoring (30 km) zone), is carried out in Ignalina NPP. Additional control within the zone of the nuclear facility is provided by Environmental Protection Agency of the Ministry of Environment. Some data on atmospheric discharges from Ignalina NPP and the dose for critical group of members of the public, caused by these discharges in 2000-2004 are given in the table (dose constraint for nuclear facility is 0.2 mSv/year):

Table F-3: Data on atmospheric discharges from Ignalina NPP

Years	Radioactive noble gas, TBq		Radioactive aerosols, GBq		^{131}I, GBq		Annual dose to the critical group
	Activity	% of DL*	Activity	% of DL	Activity	% of DL	□Sv
2000	61.29	0.36	1.59	0.31	2.64	0.78	0.237
2001	96.40	0.57	1.34	0.26	1.95	0.58	0.219
2002	100.,80	0.60	0.91	0.18	2.49	0.74	0.219
2003	67.18	0.4	0.83	0.16	1.42	0.42	0.145
2004	61.57	0.36	0.86	0.16	10.63	3.14	1,894

*DL – Discharge Limit

Activity of water discharges from Ignalina NPP was 263,9 MBq in 2004. Annual dose for critical group members from discharges into water was 0,61 µSv in 2004. Total annual dose from discharges into air and water was 2,5 x 10^{-3} mSv.

The Normative Document LAND 41-2001 "Standards of Radioactive Discharges from Medical, Industrial, Agricultural and Research facilities; Permitting of Discharges" sets forth main requirements, when planning and organizing the discharges into the environment of materials containing radionuclides, resulting from the use of radionuclides in medicine, industry, agriculture and research.

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

In all cases, if the discharge limits are exceeded, the licence holders analyze the causes, reasons, circumstances and consequences of increased discharges and take measures to liquidate the causes of the releases and ensure that the situation will not repeat again. They also inform the Ministry of Environment, Ministry of Economy, RPC, VATESI and institutions of local municipalities about the causes of the increased releases, measures taken and preventive activities that are followed or will be followed as well as ensure conditions to control it. In the case of continual and extremely serious malfunction or damage of nuclear facility and significant discharge of radionuclides, not corresponding the conditions of permission, The Ministry of Environment obligates subject to eliminate damage, to curtail it's activities and may suspend or revoke the permission. In this case the Ministry of Environment present proposal to State Nuclear Power Safety Inspectorate for licence termination. Validity of permission and licence must be cancelled and the operation of the facility shall be stopped according to the legislation statements of the Republic of Lithuania in the case of the mistakenly elimination of nuclear facility operation or significant excess of radionuclide discharge limits, after having submitted by the reliable data of radiological monitoring.

Article 25: Emergency preparedness

1. Each Contracting Party shall ensure that before and during operation of a spent fuel or radioactive waste management facility there are appropriate on-site and, if necessary, off-site emergency plans. Such emergency plans should be tested at an appropriate frequency.

In the Republic of Lithuania there are legalized all main infrastructure and functional requirements for emergency preparedness and countermeasures.
The Civil Protection Law defines how the civil protection and rescue system shall be organized in Lithuania, provides the basis for legislative and organizational matters and describes responsibilities that lie on state and municipal authorities and subjects.
The Law on Nuclear Energy defines allocation of functions for responsible institutions in the field of nuclear accident prevention and management of accidents and their consequences.
The Law on Radiation Protection establishes the legal basis for radiation protection allowing to protect people and the environment from the harmful effects of ionizing radiation and defines state management system of radiation protection.
The Law on the Management of Radioactive Waste regulates the relations of legal and natural persons in management of radioactive waste, it also establishes the legal grounds for management of radioactive waste. According to this law, the operating organization of the radioactive waste management facility, before the operation or commissioning of the facility, is responsible for establishment of incidents or accidents emergency and consequences elimination plans.
The Order No. 371 of Minister of Defense, dated 11 April 2000, approves the National Emergency Response Plan in the Event of Radiation Accident at Ignalina Nuclear Power Plant. In this national document, there are in detail the functions, responsibilities, interaction and communication of state and municipal institutions established, which are responding to radiation accident.
Following the provisions of the Convention on Early Notification of Nuclear Accident (1986) and implementing the Council Decision 87/600/EURATOM and 89/600/EURATOM, the

Government Resolution No. 559 „On Approval of Order of Public Information In Case of Radiological or Nuclear Accident" was approved in 2002.
Having regard the provisions of the IAEA Safety Series No. 115, No. 120, the Council directives 96/29/Euratom, 97/43/Euratom, the Hygiene Standard HN 73:2001 „Basic Standards of Radiation Protection" sets forth the intervention and action levels, dose levels at which intervention are needed to be undertaken under any circumstances. Also there is established the obligatory preparedness of licence holders to apply the intervention levels, requirements for establishment of emergency preparedness plans are set forth etc.
Operational intervention levels, organization of iodine prophylaxis, control of drinking water, dosimetric control of general public, decontamination and other procedures are established in the HN 99:2000 „Protective Actions of Public in Case of Radiological or Nuclear Accident". This hygiene standard was prepared taking into account the provisions of the IAEA SS No. 109, 55 and of other documents.
The Regulations on Dosimetric Control in Case of Nuclear or Radiological Accident set forth the order of dosimetric control of accident liquidators, vehicles, equipment, goods and other objects in the hotspot of radiological or nuclear accident. The dosimetric control methods are legalized in the Regulations, by means of which it is strived to avoid an unjustified high exposure of accident liquidators, to establish, how long they are allowed to work in the territory of high exposure etc. The regulations takes into account provisions of the IAEA TECDOC-1162 „Generic procedures for assessment and response during a radiological emergency".
The applicant for a licence to conduct practices with sources of ionizing radiation or manage the radioactive waste, among other documents, submits the plan for accident prevention and elimination of its consequences. The actions and measures that will be taken in case of radiation accident are foreseen in the plan. In conducting the nuclear safety and radiation protection state supervision and control of practices, the emergency preparedness plans and their renewal are controlled. It is also controlled, how the emergency preparedness plans are tested in practice (organizing and conducting exercises in this field).

On-site emergency preparedness plan, was developed at Ignalina NPP. Emergency preparedness in all aspects of Ignalina NPP activity, including spent fuel and radioactive waste handling systems, is performed in accordance with this plan. This plan is the main management directive for implementation of all organizational, technical, medical and other protective measures, in order to protect the public, plant personnel and environment from the consequences of accidents. The objective of the plan is to provide an order of emergency planning arrangements at Ignalina NPP to achieve the appropriate level of preparedness of the plant personnel, public administration institutions and actions in case of an accident at Ignalina NPP.
An Emergency Preparedness Plan for Maišiagala repository (the description of the repository provided in Article 12) was developed and approved in 2005. The plan foresees actions of RATA personal in case of emergency. The Emergency Preparedness Plan foresees two stages of events: local emergency and radiological accident.
Those plans shall be reviewed every 3 year or after significant changes in operation procedures.

2. Each Contracting Party shall take the appropriate steps for the preparation and testing of emergency plans for its territory insofar as it is likely to be affected in the event of a radiological emergency at a spent fuel or radioactive waste management facility in the vicinity of its territory.

The Government Resolution No. 111 of 1 February 2000 approved the Order of Exercises and Training in Civil Protection. Implementing the provisions and order of this resolution, national training courses and exercises in emergency response are organized for staff of state and municipal institutions which take part in emergency response. During recent 5 years, there were organized many national, regional and international workshops, drills and exercises in the field of preparation of emergency response plans, conducting of training and exercises, dosimetric

control and decontamination, international co-operation and communication between countries in case of accident etc.
Following above mentioned Resolution procedures all licence holders are required to conduct drills and exercises as it is foreseen in their procedures.
Director General of Ignalina NPP as the manager of Emergency Preparedness Organization, and Technical Director as the manager of the plant operation, once per three years pass training courses in Training Center of Civil Defense Department by Ministry of Defense. Director General conducts:

- Annual training of a definite group of management staff according to the 6-hour program;
- Not less than once per year – staff exercises with emergency preparedness services managers;
- Once per three years – integrated exercises.

Head of Civil defense and emergency situations staff at Ignalina NPP conducts annual training of a definite group of management staff according to the 6-hour program.
Every year Director General conducts staff exercises with emergency preparedness services managers.
Once per three year the Emergency Preparedness Organization personnel (definite group of the personnel) take part in integrated exercises, where the level of the personnel emergency preparedness and its ability to work in complicated conditions while executing the stated objectives are checked. Such exercises also are used as a basis for general national exercise of all state and municipal authorities

Article 26: Decommissioning

Each Contracting Party shall take the appropriate steps to ensure the safety of decommissioning of a nuclear facility. Such steps shall ensure that:
(i) qualified staff and adequate financial resources are available;

In order to plan and implement the decommissioning activities, Decommissioning Service was founded at Ignalina NPP in 2000. At present, 67 people work there. The Service is staffed by Ignalina NPP personnel, who have been previously involved in operation and maintenance of the plant. In addition, the Decommissioning Project Management Unit (DPMU) was founded in 2001 to assist the Decommissioning Service. DPMU consists of the Consortium (NNC,UK, Belgatom, Belgium and SwedPower, Sweden). The Consortium shares its own experience with the Decommissioning Service staff and assists in engineering, planning of decommissioning and project management.
Financing system and funds of decommissioning are described in Article 22 of the Report.

(ii) the provisions of Article 24 with respect to operational radiation protection, discharges and unplanned and uncontrolled releases are applied;

The basic requirements for spent fuel and radioactive waste facilities operation and decommissioning are set forth in the Law on Nuclear Energy.
Detail requirements for Ignalina NPP decommissioning are set out by VATESI in General Requirements for Ignalina NPP Decommissioning. According to this document, before decommissioning is started, the Final Decommissioning plan should prepared and approved by corresponding authorities. Final Decommissioning Plan of Ignalina NPP was approved in July 2005.
The radiation protection requirements for decommissioning of nuclear facilities are set forth in HN 87:2002 „Radiation Protection in Nuclear Facilities“. Before the decommissioning of nuclear facility, the radiation protection programme is established. It shall be presented to the regulatory authorities with the Final Decommissioning Plan. During the planning of appropriate

radiation protection measures and implementation of the radiation protection programme, the licence holder:

- foresees and applies the optimization and dose limitation principles;
- estimates labour expenditures, collective and individual doses for each decommissioning phase and approves with the Radiation Protection Centre;
- estimates the committed effective dose for the general public for each decommissioning phase of NF;
- performs the individual monitoring of workers and monitoring of workplaces, analyzes obtained results and presents them to the Radiation Protection Centre according to order established by legal acts;
- where expedient, describes which and how the methods for decontamination of equipment and components of the nuclear facility are applied;
- estimates the radiation environment at the beginning and at the end of each decommissioning phase of the nuclear facility;
- estimates the amount of radioactive waste resulting during the decommissioning of the nuclear facility and estimates the exposure of workers, managing the radioactive waste;
- estimates planned amounts of radioactive materials released to the environment, controls the releases and not exceeds the release limits, established by legal acts;
- in accordance with provisions, established in LAND - 42, ensures, that conditional and unconditional clearance levels are applied for the radioactive substances that are transported from the nuclear facility or reused.

A Regulation on Decommissioning of Facilities in which Practices Involving Sources of Ionizing Radiation is carried out establishes requirements for decommissioning of non-nuclear facilities. The radioactive contamination of premises, equipment and territory of the facility and surface contamination of the goods is evaluated. Contamination levels shall not exceed clearance levels, set in legislation. If there are possibilities of radioactive waste contamination, the decontamination of the contaminated premises, facilities and territory is provided until clearance levels are met. If due to increased contamination it is not reasonably to perform additional decontamination, then contaminated materials and equipment are managed as radioactive waste. The dose constraint for the members of public (critical group) due to decommissioning of non-nuclear facilities shall not exceed 0.2 mSv/year.

In principle radiation protection of workers and public as well as authorization, control and monitoring of discharges and unplanned and uncontrolled releases are applied as during operation. The detailed description is provided in Article 24 of the Report.

(iii) the provisions of Article 25 with respect to emergency preparedness are applied; and

On-site and off-site emergency preparedness during decommissioning will rest the same as during operation lifetime. The appropriate emergency preparedness arrangements are described in Article 25 of the Report.

(iv) records of information important to decommissioning are kept;

A specific project aiming at providing a new archive system at INPP was launched in 2003. This system is now close to completion and will ensure safe long term storage of the information needed for (and produced by) the decommissioning.

SECTION G. SAFETY OF SPENT FUEL MANAGEMENT

Article 4: General safety requirements

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

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

(i) ensure that criticality and removal of residual heat generated during spent fuel management are adequately addressed;

All spent nuclear fuel in Lithuania is located in Ignalina NPP's storage pools, or in dry interim storage facility. In both cases the spent fuel is handled according to the design documentation, adopted by regulatory body, both methods are licensed (in the licensing process the experts from Western Europe take part), where the safety justification is provided. It is shown, that the safety criteria, particularly criticality and sufficiency of removal of residual heat, are fulfilled during normal operation and during design basis accidents.

(ii) ensure that the generation of radioactive waste associated with spent fuel management is kept to the minimum practicable, consistent with the type of fuel cycle policy adopted;

In order to minimize the amount of spent fuel the measures are taken to increase the nuclear fuel burnup, to implement the fuel assemblies with uranium - erbium and to avoid the appearance of leaky fuel assemblies. Due to decision to terminate operation of the first Unit of Ignalina NPP, the project of burn-up of spent fuel from Unit 1 in the reactor of Unit 2 was started. In current time the project is in phase of safety justification and installation.

(iii) take into account interdependencies among the different steps in spent fuel management;

The technical process of the management of spent fuel is developed striving to simplify operations of transportation and minimize number of it, also to fit interdependencies among the different steps in spent fuel management. The fuel assemblies after one year storage are hold in special basket, which are compatible with containers for interim dry storage. The containers are suitable for storage and transportation. In the future, in case of decision to change the technology of management it will be no difficulties to take out the casks or separate assemblies.

(iv) provide for effective protection of individuals, society and the environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation which has due regard to internationally endorsed criteria and standards;

Protection of individuals, society and the environment from the effects of ionizing radiation is a subject of the radiation and environmental protection legislation, in which the system of radiation protection, consisting of justification, optimization and dose limitation, is implemented. The applicable dose limit for members of the public of 1mSv effective dose per year and a dose limit for workers of 20mSv per year is implemented. Compliance of spent fuel management facilities with the legislation is ensured during the licensing and operational phase. At each licensing step a safety analysis report demonstrating compliance has to be submitted and is reviewed by regulatory body.

(v) take into account the biological, chemical and other hazards that may be associated with spent fuel management;

Biological, chemical and other hazards are subject to the environmental and radiation protection legislation, which also aims at human health protection. Hazards other than radiation encountered by workers during handling of spent fuel are covered by general legislation on safety in working places.

(vi) strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;

In Lithuania there are several legal requirements which aim to avoid impacts on future generations. The principle is formulated that the risk to humans and the environment shall at no time in the future exceed the levels permissible in Lithuania today.

(vii) aim to avoid imposing undue burdens on future generations.

There are currently no disposal facilities for spent fuel in operation or under construction in Lithuania, but our legal requirements explicitly formulates, as one of the overall objectives of disposal that no undue burdens are to be imposed on future generations. It is required show in SAR that safety of radioactive waste management facilities will be ensured and after closure of the facility.

Article 5: Existing facilities

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

The aim of the safety analysis report is to show that a storage facility may be constructed and operated safely, i.e. that it will satisfy the requirements of the laws and regulated documents of the Republic of Lithuania. That would be achievable after it has been proven to the concerned authorities that the proposed storage facility and its components have been properly technically evaluated.
The followings shall be analyzed and presented in the Safety Analysis Report:

- The essential assumptions where the proposed storage project is based on paying special attention to the amount and characteristics of the spent fuel;
- The foreseen conditions under which a storage facility may be operated and the risk factors potentially affecting the storage facility;
- A documentation of the typical storage operational limits such as the kef factor, the maximum fuel element temperature, and the ionising radiation levels inside the storage facility and outside its boundaries;

The Safety Analysis Report shall be of such extent and content that could fully describe the following:

1. The storage buildings, systems and elements; such description shall:

- identify the purpose of the whole storage, its buildings, systems and elements, and outfits being used,

- investigate and properly substantiate those project circumstances which could affect the safety;

2. The applicable operational limits, which shall:

- reflect the main safety related technical aspects,

- be coordinated with VATESI and other state or state delegated authority and/or the supervising institutions;

3. The designing process of the storage facility; the description of which shall be detailed enough so that:

- the designing methods and factors, which have been taken into consideration, are properly presented and documented;

- the safety analysis report proving that the design of the storage facility has been completed, reviewed, and approved by the appropriate authorities, and that the project has been divided into parts which are properly investigated and described and all significant factors have been properly accounted for, evaluated, and accepted;

- it is clear that the proper technical investigations have been applied both for the individual parts of the storage facility, as well as the storage facility itself, and that the complete analyses and calculations have been successfully performed, reviewed, and approved by the appropriate authorities;

4. The engineering aspects of the storage facility shall include the followings:

- The spent nuclear fuel shall be fully characterized by giving its physical, chemical, radiological, and engineering properties, its enrichment, history of burn up, and the specifications for the storing of the radiation exposed fuel in the pools. It is necessary to describe the expected alterations in the fuel characteristics during the lifetime of the fuel. It is also necessary to indicate the minimum duration of fuel storing in the pools after which the fuel may be placed into a storage facility.

- The safe operational conditions showing that sufficient number of reliable elements and systems has been designed and that those systems are of different construction, or if they are alike, their number is sufficient so that in case of failure of one the other would ensure functioning of the desired function of the storage facility,

- It should be clear for an expert evaluating the safety analysis report that functioning and conformity of all elements have been ensured, and the elements will supplement each other ensuring functioning of the system as a whole,

- It should be indicated how the principle of “the deep down protection” has been realized in the project;

- It should be demonstrated that the project is technically reliable and may be realized with the available technologies and after the fulfillment of well-grounded acceptable improvements;

5. The storage administration aspects (procedures, controls, monitorings, etc.)

6. The storage operation parameters;

7. The anticipated storage operational conditions, including descriptions of the methods with the help of which they have been determined, keeping in mind the followings;

- it is necessary to describe the impact of the outside conditions (site conditions, process, events; nature's and outside influence predetermined by a man) upon the storage facility, evaluation of such impact and expected alterations in the course of time. Also, it is necessary to indicate the extent of impact for which a storage facility has been designed,
- with the help of structural analysis method, the integrity of the storage facility elements during normal operations and during accidents shall be determined. This structural analysis shall evaluate the future structural loads and alterations of substance properties in the course of time, etc.,
- it is necessary to evaluate the size and the nature of the impact of the storage facility (radiological impact: radiation exposure, release, doses, and if needed, the non-radiological impact as well) upon the environment and people and to compare it with the operational criteria. The circumstances and alteration subsequent to the impact shall be described and evaluated in the course of time, including the expected changes of the number of surrounding population,
- the completed analysis and the documented evidences shall be clear and exact, i.e. it shall be completely clear which models have been used, what parameters have been chosen, and what limiting conditions and assumptions have been applied. The reasons why exactly those methods, parameters, limiting conditions, or assumptions have been chosen shall be also documented,
- it shall be evident that the chosen models are proper, that they are related to the concerned problem, that they properly reflect the concerned processes, and that they have been united into a fluent and consistent systematic model,
- the circumstances and methods used during validation, verification, and sensitivity analysis shall be documented,
- the evaluations and calculations shall be presented in such way that an expert analyzing the safety analysis reports would have the possibility to draw a conclusion that they have been properly performed and completed,
- it should be clearly shown that the whole design process, including data collection, evaluation and project preparation, has been carried out in accordance with quality assurance procedures and that a proper general quality assurance program will be prepared during project realization and storage operation; also, a quality assurance program applied in carrying out the analysis itself and preparing the safety analysis report shall be clearly described and documented.

Article 6: Siting of proposed facilities

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

(i) to evaluate all relevant site-related factors likely to affect the safety of such a facility during its operating lifetime;

A new spent fuel storage facility will be constructed at the territory of Ignalina NPP control area within the frames of Ignalina NPP Decommissioning Programme. According to the performed tender results a consortium of German companies NUKEM and GNS won a contract on the design making and construction of spent fuel storage.
Within the frames of this tender a whole complex of works will be fulfilled, including choice of a site, development of environmental impact assessment report and so on, in compliance with standard base of Republic of Lithuania, which is nowadays meets all international requirements and recommendations (see Article 4 “General requirements of safety”).
In the frameworks of the procedure of the site selection all necessary steps will be performed permitting:

- To assess all possible factors of the chosen site impact on the storage safety over its life time;
- To assess possible impact of the storage on personnel, population and environment safety;

All the questions connected with the storage safety will be discussed with the community, as it requires Lithuanian legislation.

According to the Law on Environmental Impact Assessment of the Proposed Economic Activity of the Republic of Lithuania, it is possible to decide whether the proposed economic activity by virtue of its nature and environmental impacts may be carried out on the chosen site only after having performed environmental impact assessment.

(ii) to evaluate the likely safety impact of such a facility on individuals, society and the environment;

The organizer of the proposed economic activity (developer) or preparer of EIA documentation obliged by the organizer (developer) shall carry out EIA procedures and prepare EIA documentation: the EIA program and the EIA report. The program shall define the content of the report on EIA. The program shall include an outline of the main alternatives, including site selection and an indication of the reasons for their choice. The report shall include exhaustive examination of all the issues provided for in program, an analysis of the alternatives, a plan for environmental monitoring, information about the problems encountered as well as a summary of all information considered in the report.

Environmental impact assessment (EIA) is carried out according to the requirements of the following legal acts:

- Law on Environmental Impact Assessment of the Republic of Lithuania (Official Journal, 1996, No. 82-1965; 2000, No. 39 – 1092);
- Governmental Resolution No. 900 On Empowering the Ministry of Environment and the Subordinate Institutions (Official Journal, 2000, No. 57 – 1698);
- Order of the Minister of Environment No. 262 On Approval of Regulations on Preparation of the Environmental Impact Assessment Program and Report (Official Journal, 2000, No. 57 – 1697);
- Order of the Minister of Environment No. 277 On Informing the Public and Public Participation in the Process of Environmental Impact Assessment (Official Journal, 2000, No. 65 – 1970);
- Order of the Minister of Environment No. 305 On Approval of Guidelines on the Quality Control of Environmental Impact Assessment of a Proposed Economic Activity (Official Journal, 2000, No. 65 – 1971);
- Order of the Minister of Environment No.333 On Investigating the Environmental Impact Assessment Documents at the Ministry of the Environment and Subordinate Institutions (Official Journal, 2000, No. 69 – 2062).

Procedures of the Law on Environmental Impact Assessment of Proposed Economic Activities of the Republic of Lithuania take into account Council Directive 97/11 EC of 3 March 1997 amending Directive 85/337/EEC of June 1985 on the assessment of the effects of certain public and private projects on the environment and the 1991 United Nations Convention on Environmental Impact Assessment in a Transboundary Context.

(iii) to make information on the safety of such a facility available to members of the public;

The organizer of proposed economic activity shall organize public presentation of EIA report, shall submit EIA report to the relevant EIA parties, who check whether the issues, which fall

within their competence and are provided for in program are sufficiently examined in the report, and forward their conclusions to the organizer (developer). Informing and public participation in the process of EIA of a proposed economic activity shall be organized and financed by the organizer (developer) of the proposed economic activity.
Upon the examination of the report, the conclusions of relevant parties of EIA regarding the report and the possibilities to carry out the proposed economic activity as well as justified evaluation of the public proposals, the competent authority shall make a justified decision if the proposed economic activity by virtue of its nature and environmental impacts may be carried out on the chosen site.
A positive decision adopted by the competent authority regarding the possibilities of carrying out a proposed economic activity is valid for 5 years following its adoption. If the competent authority decides that the proposed economic activity cannot be carried out on the chosen site because of its potential negative environmental impacts, the proposed economic activity may not be carried out.

(iv) to consult Contracting Parties in the vicinity of such a facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.

According to the Law on Environmental Impact Assessment of the Proposed Economic Activity, in the cases when an economic activity that is proposed to be carried out in the territory of the Republic of Lithuania may cause a significant negative impact on the environment of any foreign State which is a party to the 1991 United Nations Convention on Environmental Impact Assessment in a Transboundary Context (ESPOO), or upon request of such State, the environment impact assessment process shall be performed in compliance with the ESPOO Convention, international agreements between the Republic of Lithuania and relevant States and this Law.
In addition, the Government Resolution No. 1872 adopted on 6 December 2002 (based on requirements of Article 37 of the EURATOM Treaty) requires to provide the European Commission with the general data relating to any plan for the disposal of radioactive waste in whatever form which will enable it to determine whether implementation of such plans is liable to result in the radioactive contamination of the water, soil and airspace of another member State.

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

The nearest foreign countries from INPP is Republic of Latvia and Belarus. As it was mentioned above we must also inform our neighbors about our plans to build any nuclear facility, to provide them with general data and to ensure that such facilities shall not have unacceptable effects for them.

Article 7: Design and construction of facilities

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

(i) the design and construction of a spent fuel management facility provide for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases;

Wet SF storage facility was designed as a part of the Unit at the end of 70ies beginning of 80ies according to the rules existing at that time in the former Soviet Union, but within the last ten years a number of measurements was implemented, they improved SF storage safety to the level required by the modern standard base of Lithuanian Republic. Required level of safety is confirmed by the "wet" storage safety analysis that has been performed within the limits of SAR of INPP Units 1 and 2.

The existing dry SF storage facility was designed at the end of 90ies and meets all safety requirements. Design of the existing dry SF storage facility also contains safety analysis that confirms that the storage radiological influence on personnel, population and environment is limited with prescribed limits (see Article 4).

(ii) at the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a spent fuel management facility are taken into account;

This design provides also measurements on the storage decommissioning with its life-time completed.
In accordance with the Technical Specification the new SF storage facility, which will be designed and constructed by the consortium of German companies NUKEM and GNS, will meet all modern Lithuanian and international safety requirements imposed to the structures of such type.
A storage facility of spent nuclear fuel shall be designed in the way making it possible to decommission it. The measures enabling easier decontamination of the systems and devices, minimizing the amount of radioactive waste and contaminated devices to the lowest possible level and helping elimination of the radioactive waste and contaminated substances during final decommissioning of a storage facility shall be provided. The project shall give a preliminary program of decommissioning of a storage facility and provide its periodical renewal during operation.

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

In accordance with the Technical Specification, the technologies incorporated in the design and construction of a spent fuel management facility are supported by experience, testing and analysis from company GNB (Germany), and must be licensed.

Article 8: Assessment of safety of facilities

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

(i) before construction of a spent fuel management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;

Since it was not required to perform safety analysis at the moment of Ignalina NPP units design making, the assessment of wet storage facility safety was executed within the frames of Ignalina NPP Power Unit 1 licensing during its operation. Safety analysis report was developed in 1999, passed a procedure of international expertise (review) and was adopted by regulatory body of Lithuanian Republic VATESI as the basic document for licence granting.
Assessment of the existing dry SF storage facility safety was performed within the process of design making and passed a procedure of coordination in accordance with the requirements of Lithuanian legislation and standard acts and was found meeting these requirements.

(ii) before the operation of a spent fuel management facility, updated and detailed versions of the safety assessment and of the environmental assessment shall be prepared when deemed necessary to complement the assessments referred to in paragraph(i).

Assessment of the next SF storage facility safety will also be performed in accordance with standard base of Lithuanian Republic, as it is provided by the contract concluded with the consortium of German companies NUKEM and GNS.
Content of SAR completely corresponds to the content, recommended in IAEA document "Safety Assessment for Spent Fuel Storage Facilities" Safety series No. 118 and to the Lithuanian "The General Requirements for Dry Type Storage for Spent Nuclear Fuel", VD-B-03-99.
It includes:

- design description of facility components;
- natural site characteristics description;
- description of human environment surrounding the site;
- design basis;
- design justification and so on. All possible initial events and emergency situations are considered and analyzed in the frames of the project, including the following ones:
- all possible variants of cask with fuel drop;
- all possible variants of baskets with SF drop to the bottom of the pool and to the cask;
- electric power blackout;
- drop of the equipment and cask elements (e.g. cask lid drop to the open cask with SF);
- water leakage from the pool;
- crane failure;
- fire;
- human factor;
- seismic impact.

Article 9: Operation of facilities

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

(i) the licence to operate a spent fuel management facility is based upon appropriate assessments as specified in Article 8 and is conditional on the completion of a commissioning programme demonstrating that the facility, as constructed, is consistent with design and safety requirements;

Wet SF storage facilities (storage pools near the reactor) operate from the moment of INPP Power Unit 1 commissioning in December 1983. As it was mentioned above, at that moment it was not required to obtain a licence for operation. Permission for the operation was granted by the State Commission after considering of appropriate documents, confirming execution of all procedures necessary for commissioning. All systems of the facility were tested prior to the commissioning; characteristics of the systems and possibility of safe functioning were tested. Checks and testings were performed according to the specially developed procedures coordinated with regulating bodies responsible for NPP operation safety. Licence for operation of wet storage facilities at Units 1 and 2 was obtained within the frames of obtaining of the licence for operation of the Units themselves in 1999 and 2004 correspondingly.
Permission for operation of "Dry" spent fuel storage facility was also granted by the State Commission, after "Cold trial" and "Hot trial" testings were made and after considering of

appropriate documents, confirming execution of all procedures necessary for commissioning. All systems and possibility of safe functioning were tested in the same way as for “Wet” SF storage facility, and only then in 2000 the licence for operation of dry storage facility was obtained. This licence was updated in 2004.

(ii) operational limits and conditions derived from tests, operational experience and the assessments, as specified in Article 8, are defined and revised as necessary;

As it was mentioned above, the storage limits of spent fuel in the interim spent fuel storage facility, is described in the conditions of the licence - 20 CASTOR and 60 CONSTOR casks, but at the moment we are thinking about possibilities to enlarge existing spent fuel storage facility, for 14 CONSTOR RBMK casks.

The conditions of spent fuel are described in the licence and they are as follows:

- enrichment of isotope of uranium U 235 shall be no more than 2%;
- burnup shall be no more than 20 MWd / kg of uranium;
- the criteria of tightness of spent fuel assemblies is increasement of activity of Cs 137 in the water of container, it shall be no more than $5 \cdot 10^{-6}$;
- the minimum time of storage in the pools is not less than 5 years.

(iii) operation, maintenance, monitoring, inspection and testing of a spent fuel management facility are conducted in accordance with established procedures;

Operation, maintenance, examination, inspections and testings of the wet storage facility (SF storage pools) are performed in accordance with the adopted procedures, that are described in design documentation and internal procedures. Within the period of storage pools operation there were registered no safety related incident.
As it was mentioned above, regular operation of the existing dry SF storage facility started in 2000 after the licence was obtained.
Operation, maintenance, examination, inspections and testings of the dry storage facility are performed in accordance with the adopted procedures.

(iv) engineering and technical support in all safety-related fields are available throughout the operating lifetime of a spent fuel management facility;

A Group of handling of spent nuclear fuel and radioactive waste was established in 1995 within the structure of Ignalina NPP Engineering Support Department in order to provide an engineering and technical support in the field of spent nuclear fuel handling. This group provides constant engineering support to the operation of SF handling systems and deals with matters of the SF handling equipment and systems modification and implementation of new projects within this field.

Besides, beginning from 1993 a Safety Improvement Programme is being implemented at Ignalina NPP, this Programme covers the issues of SF handling. Within the frames of this Programme the following has been implemented from 1993:

- dry storage facility for the spent nuclear fuel with CASTOR and CONSTOR casks has been designed, constructed and commissioned;
- SF dry storage facility capacity increasing to 80 casks has been implemented and procurement of additional casks has been performed;

- Equipping of hot chambers of the Power Units 1 and 2 with the system of SF spillage collecting and removal.

(v) incidents significant to safety are reported in a timely manner by the holder of the licence to the regulatory body;

INPP procedures concerning information are developed in accordance with General Requirements to the System of Unusual Events Report at Nuclear Power Plants, VD-E-04-98, VATESI; recommendations of IAEA documents were considered when developing the procedure.
INPP managers, VATESI person on duty and local authorities of neighboring towns inform Plant Shift Supervisor about events happening at INPP in accordance with the Procedure requirements (Instruction on unusual events report).
Written information reports about events are prepared and transferred to VATESI and cooperating organizations by Safety Surveillance Department in accordance with the Instruction on unusual events report at INPP. In accordance with the same Procedure the information on the events evaluated as level 2 and higher according to the INES scale are transferred to IAEA.
Written information reports for mass media, public and local authorities are prepared and transferred by INPP Information Center in accordance with the Procedure (Instruction on Preparation and Transformation of Informational Reports on Operation and Unusual Events at INPP to Mass Media, Local Authorities, Ministries and Department).
In case of accidents at INPP the information is transferred by Emergency Preparedness Organization in Accordance with Management Procedure QA-2-015, “Emergency preparedness”.

(vi) programmes to collect and analyze relevant operating experience are established and that the results are acted upon, where appropriate;

Analysis and record of INPP operational experience are performed in accordance with Management Procedure QA-2-003, Evaluation of the own and industrial experience at INPP and with corresponding working procedures.
Selection of events for the analysis is performed in accordance with criteria, established by the Procedure (Instruction on unusual events analysis).
In accordance with this Procedure Plant Shift Supervisor provides preliminary collection of information necessary for the analysis and prepares the shift report on the event, which is then sent to the event analysis commission.
Analysis of the events is performed according to the ASSET methodology by officially appointed commissions. The commissions perform analysis of the root causes of the events, define correcting measures and prepare the report, Manual for International Scale of Nuclear Events INES Users, IAEA, is applied for evaluate the event impact to safety.
Reports on the events are distributed inside and outside the plant in accordance with the distribution criteria. Reports’ distribution criteria consider the event importance for safety.
Documentation Control Department performs registration, distribution of the prepared reports inside the plant, their storage, control of the corrective measures fulfillment in accordance with Management Procedure QA-2-002, Management of documents and records.
Safety Surveillance Department performs distribution of the reports outside the plant. Reports on events distributed outside the plant undergo an independent review in Quality Assurance Department in accordance with the Procedures’ requirements (Instruction on unusual events analysis, and Instruction on performance of periodical review of events at INPP).
The reports on events are stored in the archive system and Information system on unusual events as computer files, that provides possibility of fast search for required information.
Safety Surveillance Department keeps the list of events, which took place during the year, all

events selected for the analysis are included into the list.
Safety Surveillance Department performs analysis of tendency and causes of the events and informs Safety Committee and INPP Information center in accordance with the Procedure (and Instruction on performance of periodical review of events at INPP).
Once a month Safety Surveillance Department develops a report on review of events, which took place during this period in accordance with the Instruction on performance of periodical review of events at INPP. The reports are sent to the plant managers, to INPP departments and services and to VATESI Surveillance department at INPP.
Every month Safety Surveillance Department directs to VATESI the list of events, which took place during the bygone month. List of events for the calendar year and results of the analysis of all these events are included to the Annual Report on INPP safety.

Programme of own and industrial experience evaluation

Evaluation and usage of operational experience are performed according to the Procedure (Instruction on Evaluation and Usage of Own and Industrial Experience).
All information on own and industrial experience is directed to Documentation Control Department, which performs registration, copying and distribution of the documents, as well as o feedback on operational experience usage.
A Coordinator on usage of own and industrial experience is appointed in each division, he is responsible for coordination of this activity in the division.
Proposals on improvement according to the Procedures (Instruction on Evaluation and Usage of Own and Industrial Experience and Instruction on the Work with INPP Employees Proposals) are summarized by the divisions' Coordinators in order to submit for approval to the divisions managers, following which they are given Documentation Control Department Coordinator.
Corrective measures and proposals requiring changing of the procedures and equipment are performed in accordance with Management Procedure QA-2-016 "Plant Modifications". Corrective measures requiring changing of the procedures are performed in accordance with Management Procedure QA-2-002 "Management of Documents and Records".
INPP Training Center in accordance with Management Procedure QA-2-014 "Personnel" includes information on own and industrial experience into the personnel training process and applies it to improve the training program.

(vii) decommissioning plans for a spent fuel management facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body.

Plan of dry storage facility decommissioning was presented in the facility design and passed a procedure of coordination with all instances as a part of the design during the facility licensing. According to the requirements of the existing legislation, final decommissioning plan for a spent management facility, must be prepared 5 years before stating the decommissioning, and can be updated as necessary.

Article 10: Disposal of spent fuel

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

In 2002 the Government of Republic of Lithuania approved Strategy on Radioactive Waste Management. Regarding management of spent nuclear fuel the strategy states that with a view to ensuring safety of spent nuclear fuel it is essential:

- To draft and implement the long-term research program “Possibilities to dispose of spent nuclear fuel and long-lived radioactive waste in Lithuania”;
- To analyze the possibilities of having in Lithuania a deep geological repository for spent nuclear fuel and long-lived radioactive waste;
- To analyze the possibility of constructing a regional repository with joint efforts of several countries;
- To analyze the possibility of disposing of spent nuclear fuel in other countries, and to estimate the justification for the cost of such disposal;
- To analyze the possibilities of extending the storage period in interim storage for up to 100 and more years.

Some initial studies on geological disposal possibilities of the spent fuel were performed. The main objective was to demonstrate that in principle it is possible to implement direct disposal of spent nuclear fuel in Lithuania in a safe way. The objective is not to indicate that direct disposal of spent nuclear fuel will take place in Lithuania. What option to use for the eventual disposal of the Lithuanian spent nuclear fuel is to a large extent a political decision, and this investigation will be an important input to such a decision once it will have to be taken.

Table G-1: Long – lived wastes to be disposed of in a geological repository

Waste	Estimates
Spent fuel, tons of uranium	2436
Spent graphite, m^3	7054
Operational and decommissioning waste, m^3	5185
Spent sealed sources, m^3	19

The following main conclusions were made during the studies:

1. Employing present technologies it would in principle be possible to dispose of spent nuclear fuel and other long lived high level radioactive wastes in the repository built in the crystalline basement of Lithuania. Modeling of safety relevant radionuclide migration shows that doses to humans will not exceed the existing dose restrictions. Clays having very good confining properties is an alternative media to the crystalline basement. Further studies of the two rock types are necessary to find the optimal solution.

2. The internationally agreed safety standards have been established, which, if fulfilled, ensure protection of human health and environment. Despite a scientific evidence of achievable safety, the implementation of geological disposal encounters difficulties because of lack of confidence from the general public.

SECTION H. SAFETY OF RADIOACTIVE WASTE MANAGEMENT

Article 11: General Safety Requirements

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

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

(i) ensure that criticality and removal of residual heat generated during radioactive waste management are adequately addressed;

The principles of radioactive waste management, which are in compliance with the IAEA SS No. 111-F, are set out in the Law on Radioactive Waste Management (See section B).
For management of low and intermediate level radioactive waste, sub criticality and removal of heat do not represent specific problem. It is prohibited by the Law on Environmental Protection to reprocess nuclear fuel. Hence, spent nuclear fuel is a high level waste only, according to the waste categorization. But the safety of spent fuel management covered by the section G of the report. Regulatory document Regulation on the Pre-disposal Management and Disposal of Radioactive Waste at the Nuclear Power Plant states that radioactive waste shall be treated and conditioned in such a way that it complies with the waste acceptance criteria for disposal set up by VATESI. The Generic waste acceptance criteria for near surface disposal require that the fissile mass of the waste package shall be limited in such a way that it can be exempted from the transport requirements applying to fissile material. Regulations for the Safe Transport of Radioactive Material, IAEA Safety Standards Series No. ST-1, IAEA, are applied as transport requirements.

(ii) ensure that the generation of radioactive waste is kept to the minimum practicable;

One of the basic principles established by the Law on Radioactive Waste Management that the generation of radioactive waste is kept to the minimum practicable. The regulation on Pre-disposal management of radioactive waste at NPP, VD-RA-2001-01, requires reduction of waste by measures of reduction of waste at source of generation, authorised discharge of effluents by optimizing environmental pollution with radionuclides, reuse of equipment and materials and clearance of waste from regulatory control. Waste reduction at the source of generation shall be considered as the most efficient method and shall be implemented by the following:

- careful selection of materials, processes and equipment;
- containment and packaging of radioactive materials to retain integrity;
- decontamination of areas, premises, and equipment and prevention of the spread of contamination;
- detailed analysis of possibilities aiming at minimizing the production of secondary radioactive waste resulting from procedures being used, e.g. decontamination;
- avoidance of introduction of non-radioactive materials (e.g. packing materials) into controlled areas;

- avoidance of materials, decontamination of which is complicated (e.g. wood), in controlled areas.
- operating the reactors in such a way as to avoid fuel failures, and discharging failed fuel from the core as soon as possible;
- reduction of leakage from the main circulation circuit;
- keeping coolant impurity levels as low as practicable.
- used as clean coolant as possible.

(iii) take into account interdependencies among the different steps in radioactive waste management;

Waste management principle that interdependencies among the different steps in the radioactive waste management shall be taken into account is required by the Law on Radioactive Waste Management. More detailed the requirements are specified in the regulation VD-RA-2001-01. All the activities from generation of the waste to its disposal shall be seen as parts of the whole process, each component of which shall be selected to be compatible with the others. It is required that a quality assurance programme for the pre-disposal radioactive waste management shall be developed and implemented by NPP in accordance with the basic quality assurance requirements set up by VATESI and it shall provide adequate confidence that pre-disposal radioactive waste management steps, from generation through conditioning, support compliance with known or projected requirements for storage and disposal.
Following requirements on the waste management are related to the waste management steps interdependencies principle:

- *Waste classification*. Solid waste classification scheme references to the disposal method of the particular waste class. Solid waste should be classified according to the treatment method applied at NPP in the following categories: combustible, non-combustible, compactable, non-compactable and non-treatable waste. Liquid radioactive waste shall be classified and segregated according to the chemical nature and the phase state.
- *Collection of waste.* Liquid waste shall be collected in suitable vessels according to the chemical and radiological characteristics and volume of the waste, and the handling and storage requirements. Solid waste shall be collected in proper containers according to the physical and radiological characteristics and volume of the waste, and the handling and storage requirements.
- *Waste processing.* The radioactive waste shall be treated and conditioned in a manner that will give reasonable assurance that the conditioned waste can be accepted for storage, transporting and disposal.
- *Storage.* Each storage facility should have the internal criteria for acceptance of radioactive waste packages for storage. The acceptance criteria for the storage facility shall reflect both the requirements for storage and the known or likely (interim) acceptance criteria for waste disposal.

In the Generic Waste Acceptance Criteria for Near Surface Disposal, VATESI set out the requirement that For each type of conditioned solid and immobilized low and intermediate level short lived waste candidate for near-surface disposal NPP shall present a Waste Package Specification (WPS) to RATA for approval before operating a waste conditioning facility.

(iv) provide for effective protection of individuals, society and the environment, by applying at the national level suitable protective methods as approved by the regulatory body, in the framework of its national legislation which has due regard to internationally endorsed criteria and standards;

The protection of individuals, society and the environment against radiological hazards is ensured by the application of requirements established in the legislation (see section E). Operational radiation protection is described on Article 24.
According to the Law on Radioactive Waste Management, before the start of the construction of a radioactive waste management facility, a systematic safety assessment, and an assessment of a likely impact on individuals and the environment must be carried out in accordance with the Law on the Environmental Impact Assessment of Planned Economic Activity. The assessment must be appropriate to the hazard presented by the facility and cover its operating lifetime, for repositories including the post closure period. Environmental Impact Assessment Report is produced in manner approved by the Law on Environmental Impact Assessment of the Proposed Economic Activity of the Republic of Lithuania. In the report potential environmental impacts are analyzed and evaluated. It form basis for taking decision if the planned economic activity is acceptable on particular site. The applicant for the construction licence shall submit to regulatory authorities the Safety Analysis Report. Before the operation of a radioactive waste management facility, an updated and detailed version of the safety assessment must be prepared. According to the established requirements SAR shall be periodically renewed. The established period of review of SAR for the repositories is at least every 10 years. Regarding the existing old radioactive waste management facilities, the Law states, that operator of the facility shall perform safety assessment pursuant and shall submit a report of safety analysis to all the institutions involved in the licensing process. The operator shall make all practicable improvements to upgrade the safety of this facility.

(v) take into account the biological, chemical and other hazards that may be associated with radioactive waste management;

Radioactive waste management principle of protection against biological, chemical and other hazards that may be associated with radioactive waste management is established by the Law on Radioactive Waste Management. Radioactive waste shall be treated and conditioned in such a way that it complies with the waste acceptance criteria for disposal. Established requirements for disposal of radioactive waste requires that for environmental protection in the post-closure phase, the focus shall be on the protection of the environment from radioactive contaminants including such factors as the content of chemically or biologically toxic materials in the waste. Physical, chemical, and biological characteristics of packages must not put a repository in jeopardy. General waste acceptance criteria for near surface disposal require to consider the following waste properties in addition to properties related to radioactivity: Chemical properties (chemical stability and confinement, chemical composition, pyrophoricity, ignitability, reactivity, corrosivity, explosiveness, chemical compatibility, gas generation, toxicity, decomposition of organic wastes), physical properties (permeability and porosity, homogeneity, voidage), mechanical properties (mechanical strength against external stresses, mechanical stability), thermal properties (fire resistance, freeze/thaw stability (take into account temperatures as low as $-40^{o}C$)).

(vi) strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation;
(vii) aim to avoid imposing undue burdens on future generations.

(vi)and (vii) the Law on Radioactive Waste Management states that management of radioactive waste must ensure that efforts are made to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation and to avoid imposing undue burdens on future generations. One of the overall objectives of waste disposal established by the Regulation on Disposal of Short Lived LILW, shall be to fully ensure long-term protection avoiding undue burden of unsolved issues (e.g. technical, financial, organizational or in terms of restriction of resource use) on future generations. A near surface repository shall be sited, designed, constructed and closed to provide the safety of the waste over the long term. According to the existing requirements long term safety assessment shall be performed using the same safety criteria, which are applied at present. It shall be demonstrated that after the expiry of the post-closure surveillance the radiological consequences of the events that might break the integrity of the repository and/or the capability of the repository to stem radionuclides will meet the requirements established.

Article 12: Existing Facilities and Past Practices

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

(i) the safety of any radioactive waste management facility existing at the time the Convention enters into force for that Contracting Party and to ensure that, if necessary, all reasonably practicable improvements are made to upgrade the safety of such a facility;

(ii) the results of past practices in order to determine whether any intervention is needed for reasons of radiation protection bearing in mind that the reduction in detriment resulting from the reduction in dose should be sufficient to justify the harm and the costs, including the social costs, of the intervention.

Radioactive Waste Management Facilities were designed as a constituent part of the Power Plant Units at the end of 70s and at the beginning of 80s in accordance with the rules applicable at that time in the former Soviet Union. Disposal facility for disused sources and institutional radioactive waste at Maišiagala was built in the 1960s accordance with the rules applicable at that time. Brief technical specification of the facilities is given in section D. Safety of radioactive waste management system at Ignalina NPP was evaluated within frame of licensing Ignalina NPP Unit 2 operation.. SAR of Unit 2 covered all radioactive waste management aspects, except the storage facilities for solid radioactive waste and bitumenised waste, like emissions to the environment and monitoring, management of solid, liquid and gaseous waste. In 2000 two Safety Analysis Reports were issued for the existing storage facilities of solid radioactive waste and bitumen compound as interim storage facilities. Objective of the reports is to justify safety of the storage facilities for 10 years. The conclusion is that the waste storage facilities: Building 155, 155/1 157, 157/1 and 158 can be used as interim storage facilities for the time period ending December 2010. Those facilities are covered by the operational licence of Ignalina NPP Unit 1.
Cement solidification facility for spent ion exchange resins, perlite and evaporator concentrate sediments and the storage facility for cemented waste are constructed according the current

legislation. Environmental Impact Assessment Report and the Safety Analysis Report were produced before construction. The regulatory authorities accepted both documents.
It is recognised that present radioactive waste management system does not comply current requirements and shall be modernised. Transition to the new Ignalina NPP radioactive waste management system compliant with the new requirements and rules of the Republic of Lithuania as well as up-to-date IAEA and European standards governing solid radioactive waste management shall be implemented within the scope of Projects for preparation of INPP for decommissioning which include construction of the new INPP Solid Radioactive Waste Management and Storage Facility (RWMSF). All collected solid waste shall be retrieved, characterised and treated or conditioned considering the disposal routes. The new RWMSF is projected to be commissioned in year 2009.

Article 13: Siting of Proposed Facilities

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

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

Siting procedure for the radioactive waste management facilities is the same as for spent fuel management facilities. The Law on Radioactive Waste Management states that siting of a radioactive waste management facility shall be made pursuant to the requirements of the Law on Territorial Planning and the Law on the Environmental Impact Assessment of Planned Economic Activity. The Law on Radioactive waste management requires: to evaluate all relevant site-related factors likely to affect the safety of such a facility during all its operating lifetime, and in case of a repository - its safety in the post-closure period; to assess the likely safety impact of such a facility on individuals, society and the environment, taking into account possible evolution of the site conditions of the repository in the post-closure period; to inform the public about the safety of such a facility; to inform the neighboring countries in the vicinity of the present or projected radioactive waste management facility, insofar as they are likely to be affected by that facility, and provide them, upon their request, with general data relating to the facility to enable them to evaluate the likely safety impact of the facility upon their territory.
All above mentioned issues are addressed in the Environmental Impact Assessment Report. Description of the EIA procedure is given on Article 6 in section G.
Siting of Radioactive waste management facilities at INPP was performed within frame of siting of NPP Units in accordance with the rules applicable at that time in the former Soviet Union. Before the construction of the storage facility for the cemented waste, EIA report was produced according to the EIA procedure. Site of the new INPP Solid Radioactive Waste Storage and Management Facility was selected in compliance with the current rules. The preliminary geological survey of the proposed construction site has been carried out by INPP prior to tender notification for RWMSF. EIA Report and Safety Analysis Report (SAR) shall be developed within the scope of the project for construction of the Facility and agreed with regulatory authorities and shall serve as a prerequisite for applying for permit for construction of the new

INPP Solid Radioactive Waste Storage and Management Facility. Prior to being issued with facility design requirements the Project has been publicly presented to the local administration authorities. Sites for the planed disposal facilities shall be selected according to the current legislation as well.

In order to implement provisions of the Radioactive Waste Management Strategy, RATA has started to prospect for a site suitable for the near surface repository. An area survey, which involves regional screening to define the regions of interest and identification of potential sites within suitable regions was performed. Objectives of the performed studies was to analyse Lithuanian legal requirements, to summarize the international experience, to exclude territories which are not acceptable according to various ecological, land use and technical criteria, to determine regions with geographical and geological conditions most suitable for the near surface repository, to select several possibly suitable sites and to characterize their geological and hydrological structure. Aspects of technical safety as well as possible social and environmental impacts have not been analyzed in deep. It will be done during the subsequent stages. According to the Master (General) Plan of the Republic of Lithuania the country is divided into zones according to their functional priorities. The vicinity of Ignalina NPP is appointed as a region of energy sector, industry and transport. It was concluded that a vicinity of Ignalina NPP is among the best suitable regions for the near surface repository. At the present investigation level the sites with the most favorable conditions are identified.

The repository concept is based on multi-barrier system consisting of several engineered and natural barriers, restricting access of water to the radioactive waste and waste dispersion in the environment. A"hill"-type repository with reinforced concrete vaults was proposed to be constructed above the groundwater level in order to avoid waste saturation by water. A low-permeable smectitic clay cover should prevent from rainwater percolation. Three most potentially suitable sites have been selected. All three sites are located in rather close distance from Ignalina NPP. More detailed investigations, including preliminary field investigations, to validate the preliminary ranking sequence and to get the additional information have been performed. The preliminary drilling was carried out in order to define in detail the geological and hydrogeological structure of the uppermost part of sediments covering the territories of the most promising sites, to make preliminary evaluation of their geomechanics.

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

Impact on society and the environment beyond the border shall be considered within the EIA process.

Article 14: Design and Construction of Facilities

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

(i) the design and construction of a radioactive waste management facility provide for suitable measures to limit possible radiological impacts on individuals, society and the environment, including those from discharges or uncontrolled releases;

The new Radioactive Waste Management Facilities, mentioned in Section K, as the radioactive waste management modernization projects, shall be designed and constructed in compliance with Article 18 of Section 6 of the Law on Radioactive Waste Management and the established requirements in approved regulatory documents (see Article 19 in Section E). Impacts on individuals, society and the environment, including those from discharges or uncontrolled releases for the Cement Solidification and Storage Facilities have been evaluated in EIA report and Preliminary SAR, before the facilities construction. The Technical Specification for design and construction of a new Ignalina NPP RW Management Facility binds the Contractor to propose, in his tender, such waste conditioning and storage technologies the hazardous impact of which shall not exceed the set limits for personnel, public and the environment considering the already existing limits valid at Ignalina NPP.

(ii) at the design stage, conceptual plans and, as necessary, technical provisions for the decommissioning of a radioactive waste management facility other than a disposal facility are taken into account;

Decommissioning issue of the radioactive waste management facility is considered in assessing the safety of the facility. In the Preliminary Safety Analysis Report, which is produced before construction of facility, conceptual decommissioning of the facility shall be described. Engineering and organizational measures for decommissioning of the Ignalina NPP Radioactive Waste Management Facility following the expiration of its operating lifetime shall be included into the scope of the project for the new facility. Decommissioning of the existing and new facilities shall be in accordance with the INPP Final Decommissioning Plan. The existing radioactive waste management facilities and the Cement Solidification Facility at Ignalina NPP decommissioning activities will be covered by the decommissioning projects within the Ignalina NPP decommissioning.

(iii) at the design stage, technical provisions for the closure of a disposal facility are prepared;

According to the Regulation on Disposal of Low and Intermediate Level Short Lived Radioactive Waste, P-2002-02, in order to obtain construction licence of the repository, the applicant shall submit a general description of the closure of the repository. Hence, for the new disposal facilities a closure shall be considered at the design stage. The existing Maišiagala disposal facility for institutional waste closed according to the typical project for such facility.

(iv) the technologies incorporated in the design and construction of a radioactive waste management facility are supported by experience, testing or analysis.

Cement Solidification Facility for the spent resins, perlite and evaporator concentrate sediments is designed considering the worldwide experience. The cement solidification technology of liquid radioactive waste is one of the most advanced well developed and practically proven technology for the waste conditioning. The technique of immobilizing radioactive waste in cement has been used in the nuclear industry and at nuclear research centers for more than 40 years. The Technical Specification for design and construction of a new INPP RA Management Facility binds the Contractor to propose, in his tender, such waste conditioning and storage practices that have already been licensed in some Western European country or are based on approved experience of commercial operation of the proposed facilities. Concept of the near surface repository for the short-lived LILW developed on the basis of experience of design of similar facilities in other countries.

Article 15: Assessment of Safety of Facilities

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

(i) before construction of a radioactive waste management facility, a systematic safety assessment and an environmental assessment appropriate to the hazard presented by the facility and covering its operating lifetime shall be carried out;

Due to the fact that safety analysis was not required at the time of designing Ignalina NPP units, thus safety analysis of the existing INPP radioactive waste management facilities was performed within the frame of licensing of Ignalina NPP Unit 1 and Unit 2 (see also article 12). Before the installation of the cement solidification facility for spent resins, perlite and evaporator concentrate sediments and construction of the storage facility for the conditioned waste, EIA report and the Preliminary Safety Analysis Report were produced and approved by the regulatory body. Safety assessment of the new INPP RWMSF shall be performed in compliance with the normative standards of the Republic of Lithuania as foreseen in tender requirements for Contract of Project RWMSF. Environmental Impact Assessment Report and Safety Analysis Report shall be included into to be approved part of the Project and shall be agreed with the state institutions of the Republic of Lithuania.

(ii) in addition, before construction of a disposal facility, a systematic safety assessment and an environmental assessment for the period following closure shall be carried out and the results evaluated against the criteria established by the regulatory body;

Siting of the near surface repository for short lived LILW is ongoing. EIA report covering both operational and post closure periods have been developed. Design and construction of repositories shall be carried out according the established requirements (see Article 11).

(iii) before the operation of a radioactive waste management facility, updated and detailed versions of the safety assessment and of the environmental assessment shall be prepared when deemed necessary to complement the assessments referred to in paragraph (i).

The Final SAR has been produced for the cement solidification facility and storage facility for solidified waste on the basis of Preliminary SAR and commissioning tests results, which is subject to regulatory approval before the issue operational licence. The Final SARs have to be developed for the other waste management modernisation projects.

Article 16: Operation of Facilities

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

(i) the licence to operate a radioactive waste management facility is based upon appropriate assessments as specified in Article 15 and is conditional on the completion of a commissioning programme demonstrating that the facility, as constructed, is consistent with design and safety requirements;

(ii) operational limits and conditions, derived from tests, operational experience and the assessments as specified in Article 15 are defined and revised as necessary;

(iii) operation, maintenance, monitoring, inspection and testing of a radioactive waste management facility are conducted in accordance with established procedures. For a disposal facility the results thus obtained shall be used to verify and to review the validity of assumptions made and to update the assessments as specified in Article 15 for the period after closure;

(iv) engineering and technical support in all safety-related fields are available throughout the operating lifetime of a radioactive waste management facility;

(v) procedures for characterization and segregation of radioactive waste are applied;

(vi) incidents significant to safety are reported in a timely manner by the holder of the licence to the regulatory body;

(vii) programmes to collect and analyse relevant operating experience are established and that the results are acted upon, where appropriate;

(viii) decommissioning plans for a radioactive waste management facility other than a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility, and are reviewed by the regulatory body;

(ix) plans for the closure of a disposal facility are prepared and updated, as necessary, using information obtained during the operating lifetime of that facility and are reviewed by the regulatory body.

INPP SOLID RADIOACTIVE WASTE MANAGEMENT PRACTICES

Based on its activity level solid radioactive waste is sorted in SRW accumulation areas within the INPP controlled area. Waste of the respective group is loaded into the dedicated transport containers (for this group of waste) and is transported to the SRW storage facilities. Waste is also sorted according to physical form into combustible and non-combustible. A standard registration certificate is drawn for each container loaded with waste. Containers loaded with Group I and II waste are weighed prior to being unloaded in the storage facility. Data on waste loaded into each container are entered into the electronic database and registration certificate. The following data are entered:

- registration certificate number,
- accumulation point,
- date of dispatch,
- waste group,
- waste characteristic (combustible, non-combustible)
- container number,
- waste volume,
- waste weight;
- SRW dose rate,
- facility, canyon number for waste to be loaded,
- SRW nuclide composition.

For volume reduction combustible Group I waste is transported to INPP building 150 to compaction facility. The following waste is compacted: cotton waste, paper, personal protection means, overalls, rubber articles, filters with wooden casing, wood with the dimensions not exceeding 300x30 mm. Gamma-radiation dose rate of the compacted waste shall not exceed 0,3 mSv/h.

To be compacted waste is accumulated in plastic bags. Fully loaded bags are tied up to prevent waste scattering.

Waste sorting and bag labelling is performed at the places of their generation. Final inspection and, in case of need, additional sorting is performed prior to loading to be compacted waste into the transport containers.
Containers with to be compacted waste are transported to building 150 by motor vehicles. Compacted waste briquettes (volume of each ~ 1m^3, weight: 500 – 700 kg) are wrapped into the film, registered and transported to facility 157/1 by motor vehicles and unloaded by means of crane and loaded into dedicated compartments.
Waste is separately loaded into the storage facility according to activity groups. Combustible waste is loaded separately from non-combustible waste.
All waste is loaded into compartments in bulk (except compacted).
Following the unloading of SRW containers, special motor vehicles and containers are checked on radiometric installation in building 159. In case if radiation contamination level of motor vehicles and containers exceeds the set limits they are decontaminated in building 159 by Decontamination Department personnel. Special motor vehicles and containers dosimetric control could be performed by means of portable device at the point of their unloading at the facilities 157, 157/1, 155/1.
To monitor water presence and availability of water pumping each compartment is equipped with the device of 600 mm diameter pipe perforated into the lower part. Water from compartments is pumped into the special sewage system and later treated in the INPP liquid radioactive waste treatment facility.
Combustible waste storage compartments are equipped with automatic fire detection and extinguishing system.
SRW are transported in compliance with the procedures developed on the basis of the existing normative standards.
Since December 1988 INPP started accepting spent sealed sources for storage. Up to 20 December 2000 spent sealed sources were loaded into compartments of facilities 155/1, 157 and 157/1 together with other waste. Since October 2000 spent sealed sources loaded into protective casks are put into dedicated containers depending on dose rate and source type (α, β, γ) and later are stored in a dedicated compartment of building 157/1 separately from other radioactive waste.

ACCOUNTING OF SOLID RADIOACTIVE WASTE

Accounting of SRW stored in facilities 157, 157/1, 155, 155/1 is carried out individually for each facility and compartment in a special logbook and database according to the following indices:

- Activity groups,
- Waste volume m^3,
- Waste mass, kg,
- Waste type (combustible, non-combustible),
- Waste radionuclide composition.

Following transportation of SRW to the storage facility the registration certificate of each waste batch (containers) is registered in the electronic database and special logbook with the following data being filled in:

- Waste delivery date,
- Waste shipment point,
- Storage location (facility and compartment number),
- Waste volume (m^3),
- Waste mass (kg),
- Waste group,
- Waste radiation dose rate (mr/h),
- Registration certificate number,
- Waste type (combustible, non-combustible),

- Surname of an official handing in waste,
- Surname of health physicist,
- Surname and signature of an official accepting waste for storage.

Prior to unloading SRW into the storage facility waste nuclide composition is measured by gamma-spectrometer located in building 159 and waste is weighed on platform scales installed on the roof of facility 157/1. Data on waste radionuclide composition and weight are entered into the registration certificate and database.

Account of stored waste (volume, mass, total activity and each nuclide activity) in the electronic database is performed on a yearly, quarterly and monthly basis for each facility and compartment.

The amount of compacted waste (bales) is additionally accounted in the electronic database; also registration certificates of compacted bales are archived.

INPP Decontamination Department draws up a report on SRW being loaded into storage facilities with the indication of waste group, waste volume, and waste mass and total activity on a quarterly basis till 10th of the next month. Reports are submitted to INPP Production Engineering Division, Radiation Protection Department and VATESI. Besides, the report on stored RW is annually submitted to VATESI.

INPP LIQUID RADIOACTIVE WASTE MANAGEMENT PRACTICES

Liquid radioactive waste at Ignalina NPP is collected in special tanks, from where it is directed to evaporating facilities. The storage system for LRW, residual distillation of evaporation units, spent ion exchange resin and filter-perlite is located in building 151/154. LRW storage system includes: six tanks 1500 m^3 each, two tanks 5000 m^3 each, and ancillary equipment. Drainage waters (DW) and emergency drainage waters (EDW) are received from two units through common pipelines. DW are stored in two tanks 1500 m^3 each, EDW are stored in two tanks 5000 m^3 each. Sewage waters of the special laundry house and installation 159, due to presence of surface active material are received through a separate pipeline, stored in a 1500 m^3 tank and periodically are processed separately of the rest of drainage waters, delivering unconditioned condensate into DW and EDW collection tanks. The pulp of spent ion-exchange resin and perlite is received from both units through different pipelines and is stored in two 1500 m^3 tanks under a sheet of water. At present time one tank is full, the other is being filled. In 2001 Ignalina NPP and Framatom/Siemens company have concluded a contract for design and delivery of cement solidification facility. The construction of a facility for cemented waste storage and mounting of solidification facility have been completed. The facility operation is scheduled to the end of 2005.

Residual distillation from evaporation units is stored in a 1500 m^3 tank and is periodically processed on bituminization facilities. The bitumen compound then is pumped into a special storage (build. 158). Non-soluble admixtures, contained in DW and EDW, as well as in sewage waters of the special laundry house are accumulated in the tanks with time in the form of sediment.

(i). The licence for operation of the existing INPP solid radioactive waste and bituminised waste storage facilities granted by VATESI for the period of 10 years up to 2011. It is based on the safety assessments. By this time (projected in year 2009) a new INPP RWMSF is to be designed, constructed and granted with the licence for operation. The new Facility shall provide for implementation of a new waste management, conditioning and storage system, new radioactive waste classification compliant with the new laws and regulations of the Republic of Lithuania consistent with the European Union standards and IAEA recommendations. The design operating lifetime of the new Facility will be 30 years. The design operating lifetime of

the interim facilities for storage of radioactive waste packages will be not less than 50 years. Licence for the construction of Cement Solidification Facility and the Storage Building for the solidified waste granted in 2003 based on the Safety Assessment as required by legislation. Other existing management facilities at INPP and the whole waste management system are licensed under the operational licence of NPP Unit 2. Safety of the facilities has been justified within scope of Safety Analysis Report on NPP Unit 2.
Commissioning programme for the Cement Solidification Facility and the Storage Building have been developed and implemented. Prior to start-up of the new RWMSF the Operator (INPP) shall develop acceptance and commissioning programme in accordance with the established manner by laws and other legal documents that shall be approved by VATESI.
(ii). Operational limits and conditions shall be defined and, in case of need, shall be specified in the course of operation as based on tests and Facilities operational experience.

(iii). Operation, maintenance, monitoring and testing are established and conducted in compliance with the standards and rules, as well as internal operational manuals, procedures and instructions.

(iv). Safety of the facility shall be ensured and impact on the personnel, public and the environment shall be monitored in the course of the complete operating lifetime. Hence, personal to operate the facilities, having relevant knowledge and experience shall be ensured throughout the operating lifetime. A Group of handling of spent nuclear fuel and radioactive waste was established in 1995 within the structure of Ignalina NPP Engineering Support Department in order to provide an engineering and technical support in the field of spent nuclear fuel handling.

(v). Radioactive waste is sorted in compliance with the procedures currently existing at INPP, as described in Radioactive Waste Management Practices above.

(vi). All data on events significant to safety are timely and in due manner reported to VATESI, Ministry of Environment and Radiation Protection Centre under the Ministry of Health of the Republic of Lithuania. Reporting procedure is the same as for spent fuel management facilities and described on item (vi) of Article 9 in Section G.
(vii). Information on operating experience of RA Management and Storage Facility is analysed and applied for development of measures for upgrading operation within the overall INPP quality assurance system. More detailed description given on item (vii) of Article 9 in Section G
(viii). Operation of RA Management and Storage Facility as well as its decommissioning project are included into the overall Ignalina NPP Decommissioning Plan where issues related to quality assurance of activities and safety are considered in an integral manner and close interaction between all system elements.
(ix). Currently there are no disposal facilities operated. As mentioned on item (iii) of Article 14 a general description of the closure of the repository is one of the licensing submittals for the construction licence of the repository. Before commencing closure operations, the operational licence holder shall submit to VATESI, the Ministry of Environment and RPC a detailed closure plan and obtain an authorization for its execution. Such detailed closure plan shall include: an updated safety assessment based on available pertinent data; the proposed procedures for decontaminating, removing or sealing redundant structures, systems and equipment; details of the proposed closure method, including the materials and techniques to be used and its expected performance; a justification of the materials and techniques to be used, based on experience and analysis; types of the post-closure surveillance that should be put in place after closure has been completed and the ways of records keeping and management.

Article 17: Institutional Measures after Closure

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

(i) records of the location, design and inventory of that facility required by the regulatory body are preserved;

(ii) active or passive institutional controls such as monitoring or access restrictions are carried out, if required; and

(iii) if, during any period of active institutional control, an unplanned release of radioactive materials into the environment is detected, intervention measures are implemented, if necessary.

In Lithuania exists institutional radioactive waste disposal facility - Maišiagala repository (the description is provided in Section D).

The physical protection at current moment is significantly improved. In 2004 in the frame of USA assistance RATA installed modern physical protection system. Additional fence, video cameras has been installed around the repository. Special alarm network consisting of several intrusion detection systems allows the police department and RATA immediately response in case of intrusion or identify the false alarm. Inside repository site permanent guarding is also performed. All territory is ring-fenced, lightened as necessary.

Environmental monitoring at the site was started in 1993. The monitoring comprises of the following: dose rate measurements, monitoring of tritium activity concentration in groundwater, gamma spectrometry of soil samples, measurements of total beta-activity in groundwater samples. Samples for laboratory analysis are taken quarterly.

In 2005 in the frame of international support RATA prepared Safety Analysis Report and proposals for safety improvement, which are under review by State Nuclear Safety Inspectorate, Radiation Protection Centre and Ministry of Environment.

In 2004 a licence application was submitted to State Nuclear Power Safety Inspectorate. The licensing of the facility is directly linked to the public information. According to legal acts of Republic of Lithuania the licences for control of closed repository as well as for any other nuclear facility could be issued after coordination with local municipality. The local population are constantly informed about current radiological situation, future safety improvement plans.

SECTION I. TRANSBOUNDARY MOVEMENT

Article 27: Transboundary movement

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

i) a Contracting Party which is a State of origin shall take the appropriate steps to ensure that transboundary movement is authorized and takes place only with the prior notification and consent of the State of destination;

The Laws on the Management of Radioactive Waste and on Nuclear Energy establish the general provisions of export, transport within the country, transit of radioactive waste and spent nuclear fuel and the order of return of disused sealed sources. These laws prohibit transporting radioactive waste and spent nuclear fuel without the licence. The order of issuance of permits needed for transport of radioactive waste is established in the Regulations on Import, Export, Transit, Transport within the Country of Radioactive Materials and Waste (hereinafter – Regulations). Requirements of above-mentioned laws, IAEA Regulations for the Safe Transport of Radioactive Materials, TS-R-1 (1996), Council directive 92/3/Euratom, Council regulation 1493/93/Euratom, Commission decision 93/552/Euratom are transposed in the Regulations. After having the application from consignor for the authorization as regards the shipment, country competent authority send such application for approval to the competent authorities of the country of destination and of the country or countries of transit. If all transport conditions are met, the authorization is issued to the consignor of radioactive waste and the competent authorities of countries of destination and transit are notified by sending them the copy of the permit. State Border Guard Service and Customs Department control, that radioactive waste and spent fuel is not transported out or transported into country without appropriate authorization.
In 2004, there were three permits issued to transport the radioactive waste from the country (disused sealed sources were returned to supplier).

ii) transboundary movement through States of transit shall be subject to those international obligations which are relevant to the particular modes of transport utilized;

Having regard the provisions of the Laws on the Management of Radioactive Waste and on the Nuclear Energy, the radioactive waste shall be transported, exported or transported in transit in accordance with the provisions of the international agreements ratified by the Republic of Lithuania, laws of the Republic of Lithuania and other legal acts regulating transportation of radioactive waste and spent nuclear fuel. It is allowed to export and transport in transit the radioactive waste and spent nuclear fuel only after notification of country of destination, and having received the approval of that country according to established order. These provisions are implemented by the Regulations, which set forth, that radioactive waste can be transported by air, water, railways or road, if the legal acts, setting out the requirements of transport of dangerous goods via appropriate transport mode, allow this. During the issuance process of the licence for transport of radioactive waste, it is evaluated the compliance of shipment procedures with the Law on Carriage of Dangerous Goods by Car, Rail and Inland Waterway, IAEA

Regulations for the Safe Transport of Radioactive Materials, TS-R-1 (1996), IAEA TS-G-1.1 (2002) and other legislation, as well as:
1. during transport by road – A and B Technical Annexes of the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) (2003 Edition);
2. during transport by air – Annex 18 of the International Civil Aviation Convention of the International Civil Aviation Organization and DOC 9284-AN/905 „Technical Instructions for the Safe Transport of Dangerous Goods by Air";
3. during transport by sea – the requirements of the International Maritime Dangerous Goods (IMDG) Code of the International Maritime Organization (IMO);
4. during transport by railway – the requirements of the Convention concerning International Carriage by Rail (COTIF) and Annex 2 „Regulations for Transport of Dangerous Goods" of the Agreement for Transport of International Goods of the Organization for Railways Cooperation (OSZhD).

iii) a Contracting Party which is a State of destination shall consent to a transboundary movement only if it has the administrative and technical capacity, as well as the regulatory structure, needed to manage the spent fuel or the radioactive waste in a manner consistent with this Convention;

According to provisions of the Law on the Management of Radioactive Waste of the Republic of Lithuania, it is prohibited to import the radioactive waste and spent nuclear fuels into Lithuania, except the cases when radioactive waste is transported in transit or radioactive waste and spent nuclear fuel is returned to Lithuania as the country of origin. It is established in Lithuania the administrative and technical capacity needed to manage the spent fuel or the radioactive waste in a manner consistent with this Convention.

iv) a Contracting Party which is a State of origin shall authorize a transboundary movement only if it can satisfy itself in accordance with the consent of the State of destination that the requirements of subparagraph (iii) are met prior to transboundary movement;

According to provisions of the Law on the Management of Radioactive Waste of the Republic of Lithuania, radioactive waste may be transported only to such states that have the administrative and technical capacity to receive it, as well as the regulatory and other structures, needed to manage radioactive waste in accordance with the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management. It is ensured that radioactive waste and spent nuclear fuel is exported and transported in transit only after notification of the country of destination, and having received the approval of that country according to established order.

v) a Contracting Party which is a State of origin shall take the appropriate steps to permit re-entry into its territory, if a transboundary movement is not or cannot be completed in conformity with this Article, unless an alternative safe arrangement can be made.

It is foreseen in the legal acts of the country, that consignor of radioactive waste and spent nuclear fuel shall take back the waste, if the shipment cannot be finished or if the conditions for the shipment are not fulfilled. Appropriate state authorities control, that radioactive waste and spent nuclear fuel is returned to the holder in Lithuania, and in cases, if the radioactive waste is shipped from the non EU Member State to the Republic of Lithuania, it is controlled, that the consignee of the waste agrees with waste holder, who is in the country non EU Member State, on his responsibility to take back the waste, if it is not possible to carry out its shipment. Yet there were no such cases in the practice.

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

The provisions of the Law on the Management of Radioactive Waste foresee, that it is prohibited to export radioactive waste for disposal in sites lying south of 60 degrees latitude South.

SECTION J. DISUSED SEALED SOURCES

Article 28: Disused sealed sources

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

The basic requirements for management of disused sealed sources, as radioactive waste, are established in the Law on the Management of Radioactive Waste.
Detail requirements are set forth in Regulation on the Pre-disposal Management of Radioactive Waste at the Nuclear Power Plant (2002), in Lithuanian Hygiene Standard HN 89:2001 "Management of Radioactive Waste" (2001) and other normative documents.
According to requirements of Regulations of Licensing the Practices Involving Sources of Ionizing Radiation, before the licence for practice with sources of ionizing radiation is issued, the applicant for the licence shall submit to the regulatory authority the plan for radioactive waste management, in which it shall be indicated, how the licence holder plans to manage generated radioactive waste. The licence holder disposes disused or not suitable for the use sealed sources (also those, which after technical examination and evaluation of practices in which they are used, the Radiation Protection Centre requires to dispose). Before the radioactive waste will be transported for disposal to Ignalina NPP radioactive waste interim storage facility, it is stored in temporary storage facilities, located in special premises (HN 89:2001 „Management of Radioactive Waste"). Temporary storage facilities are in accordance with following requirements:
1. temporary storage facilities are divided in work areas and their boundaries are marked;
2. access to temporary storage facilities and exit from them is controlled;
3. the safety and security of temporary storage facilities is warranted by means of physical security (alarm), the doors of facility are marked with symbol of ionizing radiation;
4. the surface of walls and floor of temporary storage facilities is smooth, covered with materials, which can be easily decontaminated;
5. ventilation system is installed in temporary storage facilities;
6. it is prohibited to keep in temporary storage facilities objects and equipment, not related to radioactive waste management;
7. at exits from temporary storage facilities equipment for radiation contamination control of workers and individual protection means is installed.

Accordance of temporary storage facilities with the above set requirements is controlled during regular inspections. It is found, that licence holders follow these requirements.
With the aim to establish the actions of public institutions in case if illegal sources (including orphan sources) are found, determined or stopped, the Government of Lithuania approved Regulations on Management of Illegal (Orphan) Radioactive Sources and Facilities, Contaminated With Radionuclides (further – Regulations). The Regulations determine the actions and tasks in case, if it is reported that illegal source, or material contaminated with radionuclides, is kept, transported or radioactive material is manufactured, the facilities are contaminated with radionuclides.
The data on sealed radioactive sources, which were in use in Lithuania in period of 2000-2004, is given in Figure J-1. The number of disused sealed sources during this period increases, because many of users discontinue the practices with radioactive sources. Disused sealed sources are

transferred to RATA, which after appropriate treatment transport them to the Ignalina NPP radioactive waste storage facility for interim storage.

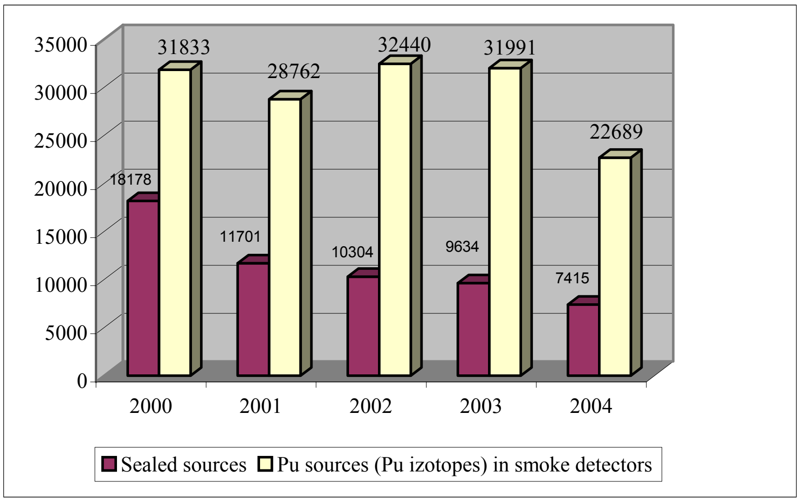

Figure J-1: Sealed radioactive sources, which were in use in Lithuania in period of 2000-2004

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

According to the Law on the Management of Radioactive Waste, a re-entry into Lithuania of disused sealed sources shall be permitted, in the manner prescribed by the Government or institutions authorized by it, if they are intended for the legal person who has manufactured them and who is authorized to receive and keep the disused sealed sources. Sealed sources may be carried into the Republic of Lithuania if after their use it is intended to return them to their supplier. When issuing licences for the activities involving sources of ionizing radiation, possibility of their final disposal or their return to the supplier is taken into account. It is required from the applicant acquiring the sources to submit the agreement with the supplier, that after disuse of the source, it will be sent back to supplier.

The state register of ionizing sources and doses of workers is established in Lithuania. The data about all sources that are in use, or are temporary stored by users in Lithuania, are collected and recorded in this register. The safety of sources is checked and controlled during regular inspections. Implementing the IAEA Code of Conduct on the Safety and Security of Radioactive Sources and requirements of Council Directive 2003/122/Euratom, the sources are assigned to 5 risk categories. The sources falling into I-III risk categories are considered as high activity sources and the special safety and security requirements are to them applied. System organized for movement of sources is as following. Licence holders, after they obtained sources, shall report to the Radiation Protection Centre in period of 10 day by order, established in legal acts. Also it is obligatory to perform the annual inventorization of the sources and the data of inventorization provide to radiation Protection Centre. The sealed sources can be eliminated from state register only when they are disposed to radioactive waste storage facility, or if they are returned to the country of origin.

There are no manufacturing or reprocessing practices in Lithuania and consequently disused sealed sources are not imported to Lithuania.

The data about disused sources disposed in the interim storage facility at the Ignalina NPP in 2002-2004 is given in Table J-1.

Table J-1: Disused sources disposed in the interim storage facility at the Ignalina NPP in 2002-2004

	2002		2003		2004	
Radionuclide	Number of sources	Activity, GBq	Number of sources	Activity, GBq	Number of sources	Activity, GBq
Co-60	2	1.5	8	0.0058	32	199.5
Cs-137	57	563	33	18.7	129	3654.5
Ni-63	2	0.9	-	-	3	3
Pu-239*	1241	186.2	180	29.6	1117	224.2
Pu-239**	518	9.9	9249	24	9302	4.5
Sr-90	1	0.18	1	0.18	-	-
Sr-90+Y-90	248	0.18	493	0.2	975	4.8
Am-241	-	-	5	0.0005	-	-
Cd-109	-	-	5	0.0003	-	-
Eu-152	-	-	12	0.0007	-	-
Mn-54	-	-	5	0.00045	-	-
Pm-147	-	-	12	7.5	23	16.5
Na-22	-	-	5	0.0006	-	-
Ra-226	-	-	7	0.00005	-	-
Ra-228	-	-	23	0.0013	-	-
Tl-204	-	-	3	0.005	4	5.92
Kr-85	-	-	-	-	11	47
Total	2069	761.85	10041	80.18	11596	4159.9

* Pu-239 in all equipments exept smoke detectors

** Pu-239 in smoke detectors

SECTION K. PLANNED ACTIVITIES TO IMPROVE SAFETY

Ignalina NPP

Ignalina NPP constantly implements activities on safety improvement of radioactive waste and spent fuel handling. Within the frames of bilateral co-operation with Sweden in March 2001 Safety Analysis Reports were issued for the existing storage facilities of solid radioactive waste and bitumen compound as interim storage facilities for the period of 10 years beginning from the moment of the Reports' issue. According to the recommendations of these Reports a number of measurements, aimed to safety improvement of radioactive waste storage at INPP, are or were implemented. Including:

- Interim SRW storage facilities equipping with the system of buildings' shrinkage survey;
- Temporary SRW storage facilities equipping with a drainage system for water removal from the compartments with solid radioactive waste;
- Commissioning of TV-system for the control of condition of temporary SRW storage facilities' compartments with high-level waste of group 3.
- Long-term measures are developed on transformation of the existing storage facility for the bitumen compound to the final waste disposal. Activities on the bitumen compound characterization and nuclide vector definition are performed within the frames of these measures. In 2006-2007 it is planned to perform an assessment of long-term safety of the bitumen storage facility as a final disposal and to make a final decision on possibility of its transformation to the final disposal.

Within the last 10 years modernization of all system of radioactive waste handling is carried on at INPP in order to bring in to compliance with international standards and new requirements on waste management. Within the frames of this modernization in 2003 a new system of solid radioactive waste accounting and registration was commissioned, it meets all modern requirements and is made taking into account the change for the new classification of waste in accordance with the new Lithuanian requirements.

It is supposed that all activities on modernization of the radioactive waste handling system will be performed until 2010. The modernization of the radioactive waste handling system includes change for a new classification, which complies with international standards, construction and commissioning of solid radioactive waste storage and processing facility in 2010. The Content of the Project for New Solid Radioactive Waste Storage and Management Facility: Solid radioactive waste retrieval facility (to retrieve waste from the existing storage) and the Solid radioactive waste treatment facility. The scope of supply includes the facilities for:

Reception of retrieved solid radioactive waste (SRW)
Sorting
Fragmentation
Compaction of combustible low level SRW
Combustion of combustible medium and low level waste
Supercompaction of medium and low level waste
Containerization
Cementation
Decontamination of transport containers
Measurement and accounting
Transport system
Interim storage for SRW bales

Modular design storage facility is planned to be constructed with the storage capacity of one module of 2500 m^3 for treated short-lived waste (in to be disposed containers) and 2000 m^3 for long-lived waste (in storage containers).

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

- Cement solidification facility for spent ion exchange resins, perlite and evaporator concentrate sediments and the storage facility for solidified waste. At present, the construction of a facility for cemented waste storage and mounting of solidification facility have been completed. The facility operation is scheduled to the end of 2005.
- Installation of free release facility at Ignalina NPP, for determination of waste with activity below the clearance levels, has started.

Concerning the spent nuclear fuel handling the following steps on safety improvement are planned:

- in 2007 the hot chambers of Units 1 and 2 will be provided with the equipment for collection and removal of nuclear fuel spillages;
- in the frames of Ignalina NPP decommissioning the project of all spent nuclear fuel transfer to the dry type storage is implemented, this fuel will be collected till the completion of operation. The project provides also implementation of safe technology on the handling of untight and damaged fuel and its removal for long term dry interim storage.

Maišiagala disposal facility

At current time it is planned to improve safety of Maišiagala repository in the fields of radiological and physical protection.
Proposed radiological safety improvements are based on the new capping system of the repository, which composed of a watertight double HDPE membrane barrier to be laid over the embedded vault. The first external membrane prevents the infiltration of any water, either rainfalls or melting snow, over the roof of the vault and above the five meters wide zone of soil outside the existing walls of the vault. The second internal membrane is disposed as a specific control barrier to catch any leakage that might have occurred through the first external membrane in case of eventual failure during the serviceable period. Also, the repository is to be protected by 1.20 metre thick soil layer. The works are dealing with modifications outside of the vault and there is no concern to direct contamination with the radioactive content of the vault.

Disposal Facilities

It is planed to construct a disposal facility for VLLW and a disposal facility short lived LILW.

SECTION L. ANNEXES

Annexe 1. Inventory of radioactive waste in Lithuania

The volume of the waste from small producers is only about 1-2 m^3 per year, so more than 99% of radioactive waste in Lithuania is produced at Ignalina NPP. Inventory of Maišiagala disposal facility is presented in Section F, *iv),* b). Inventory Ignalina NPP is presented in the tables below:

Table 1
Inventory of the waste at Ignalina NPP in volume (Spent fuel not included)

Solid radioactive waste, 2005 January 1 at Ignalina NPP						
Type of waste	1 group combustible	1 group non-combustible	2 group combustible	2 group non-combustible	3 group	Total volume
Volume of the waste (m^3)	10 941	7 459	1 944	2 498	761	23 605
Bituminized waste - 11 771 m^3						
Liquid radioactive waste, 2005 January 1 at Ignalina NPP						
Ion-exchange resins, filter aid, evaporator concentrate sediments - 3 610 m^3						

Inventory of radioactive waste in deferent storage facilities at Ignalina NPP

Table 2
Building 155: Group 1 Combustible Waste

Outer dimensions:	Width 22, length 37, height 4.45 m
Walls:	620 mm concrete + 4 mm carbon steel lining
Compartments:	1
Capacity:	2 400 m^3
Contents:	2 400 m^3 Group 1, combustible waste
Status:	Full, date of closure 6/1990
SSSs:	Yes
Remarks:	Sand (685 m^3, 960 tons)

Table 3
Building 155/1: Group 1 Combustible Waste

Outer dimensions:	Width 22, length 31, height 4.24 m
Walls:	720 mm concrete + 4 mm carbon steel lining
Compartments:	3
Capacity:	2 000 m^3

Contents:	2 000 m^3 Group 1, combustible waste
Status:	Full, date of closures:
	Compartment 1: 2/1991
	Compartment 2: 6/1993
	Compartment 3: 1/1999
SSSs:	In compartments 1 & 2
Remarks:	286 bales in comp. 3

Table 4
Building 157: Group 1, 2 & 3 Solid Waste (excl. comp. 1 & 4)

Outer dimensions:	width 28.6, length 32, height 9.7 m
Walls:	600 mm concrete
Compartments:	15
Capacity:	6 790 m^3
Contents:	Group 1 Combustible: 2 340 m^3
	Group 1 Non-combustible: 940 m^3
	Group 2 Combustible: 1 170 m^3
	Group 2 Non-combustible: 960 m^3
	Group 3 Non-combustible: 632 m^3
Status:	Full (excl. comp. 1 & 4), date of closures: 4/1987 – 9/1989
SSSs:	In compartments 1, 4, 5, 6, 8, 11, 13
Remarks:	Metallic waste is mixed with combustible waste in compartments 8 and 11 (see Chapter A4.5.2.1)

Compartments 1 & 4; Group 3 Waste

Outer dimensions:	Width 16, length 12, height 10.7 m
Walls:	1 m concrete (roof 1.4 m)
Capacity:	Compartment 1: 695 m^3
	Compartment 4: 685 m^3
Contents:	Compartment 1: 181 m^3
	Compartment 4: 451 m^3
Status:	In operation
SSSs:	In both compartments

Table 5
Building 157/1: Group 1 & 2 Solid Waste and SSS's

Outer dimensions:	Width 28.6, length 82, height 9.7 m
Walls:	700 mm concrete
Compartments:	Group 1 & 2 Solid Waste: 28
	Spent Sealed Sources: 1
Capacity:	17 340 m^3
Contents:	Group 1 Combustible: 3 420 m^3
	Group 1 Non-combustible: 5 800 m^3
	Group 2 Combustible: 640 m^3
	Group 2 Non-combustible: 1 070 m^3
	Spent Sealed Sources:
Status:	Full: Compartments 1 – 7, 9 – 13, 16 & 18/1, date of closure 6/1992 – 9/2000
	In operation: Compartments 8, 14, 17, 18/2, 18/3,

	19/1 & 21/1
	Empty: Compartments 15, 19/2, 19/3, 20/1, 20/2, 20/3, 21/2. 21/3
SSSs:	In compartments 9 – 14, 16 & 18/3

Compartment 18/3; Spent Sealed Sources

Outer dimensions:	Width 5.2, length 9.4, height 9.7 m
Walls:	700 mm concrete
Capacity:	380 m^3
Contents:	4 containers (see Chapter A4.8.6) with SSS's (17 451 pieces)
Status:	In operation

Quantity and characteristics of waste stored in building 155 at 31.12.2004
Table 6

FACILITY STATUS	Full (6/1990)		
AVERAGE	14.7 y		
WASTE CLASSIFICATION	**Radiological** Group 1	**Physical** Combustible	**Waste Form** In bulk
WASTE VOLUME	2 400 m^3		
WASTE MASS	708 tons		

PHYSICAL COMPOSITION (In % vol.)	**Cloth**	**Wood**	**Combustible Filters**	**PVC**	**Other**	**Metal**	**Construction Materials**	**Thermal Insulation**	**Graphite**	**Cables, Casings**	**Sediments**	**Other**
	40 – 50%	15 – 20%	15 – 20%	15 – 20%	No	No	No	No	No	No	Yes[1]	Yes[2]

GENERAL PROPERTIES	**Total Activity**	**Specific Activity**		**Surface Dose Rate [3]**
	3.11E13 Bq	4.40E10 Bq/t	1.30E10 Bq/m^3	< 0.3 mSv/h

RADIONUCLIDE COMPOSITION	^{60}Co [4]	^{137}	^{14}C	^{244}Cm	^{90}Sr	^{59}Ni	^{63}Ni	^{94}Nb	^{129}I	^{241}Am	^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu
	1.9E12	2.6E13	6.2E10	9.6E7	1.5E11	1.3E10	2.9E12	2.5E10	1.3E8	8.6E8	5.5E8	1.6E8	3.6E8	2.91E10

RELEVANT COMMENTS	[1] Sand used to extinguish fire. Amount 685 m^3 960 tons. Loaded in two stages, 345 m^3 during first stage and 340 m^3 during second. In between the storage was filled with additional waste. Sand is not included in the physical waste composition presented above. [2] Spent Sealed Sources: 92 sources in 20 packages (shielded containers, metal boxes, plastic box, drum) [3] At the time of waste production [4] Radionuclides used as scaling factor in evaluation of other nuclides

Table 7 Quantity and characteristics of waste stored in building 155/1 at 31.12.2004

FACILITY STATUS	**Comp. 1** Full (2/1991)	**Comp. 2** Full (6/1993)	**Comp. 3** Full (1/1999)
AVERAGE WASTE AGE	**Comp. 1** 11.5 y	**Comp. 2** 9.8 y	**Comp. 3** 4.9 y
WASTE CLASSIFICATION	**Radiological** Group 1	**Physical** Combustible	**Waste Form** In bulk, comp. 3 bales
	Comp. 1	**Comp. 2**	**Comp. 3**
WASTE VOLUME	800 m^3	800 m^3	400 m^3 (286 bales, 20 m^3 in bulk)
WASTE MASS	310 tons	310 tons	205 tons

PHYSICAL COMPOSITION (In % vol.)	**Combustible**					**Non-combustible**						
	Cloth	**Wood**	**Filters**	**PVC**	**Other**	**Metal**	**Construction Materials**	**Thermal Insulation**	**Graphite**	**Cables, Casings**	**Sediments**	**Other**
	40 – 50 %	15 – 20%	15 – 20 %	15 – 20 %	No	No	No	No	No	No	No	Yes[1]

GENERAL RADIOLOGICAL PROPERTIES		**Total Activity**	**Specific Activity**		**Surface Dose Rate [2]**
	Comp. 1	1.02E13 Bq	3.31E10 Bq/t	9.76E9 Bq/m^3	< 0.3 mSv/h
	Comp. 2	1.05E13 Bq	3.38E10 Bq/t	9.98E9 Bq/m^3	< 0.3 mSv/h
	Comp. 3	1.96E10 Bq	9.56E7 Bq/t	6.53E7 Bq/m^3	< 0.3 mSv/h

RADIONUCLIDE COMPOSITION	^{60}Co [3]	^{137}Cs [3]	^{14}C	^{244}Cm	^{90}Sr	^{59}Ni	^{63}Ni	^{94}Nb	^{129}I	^{241}Am	^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu
Comp. 1	7.2E11	8.7E12	1.5E10	3.4E7	5.2E10	3.2E9	7.2E11	6.1E9	4.0E7	2.7E8	1.8E8	5.0E7	1.1E8	1.0E10
Comp. 2	8.2E11	8.9E12	1.4E10	3.5E7	5.3E10	2.9E9	6.6E11	5.6E9	3.9E7	2.6E8	1.8E8	4.9E7	1.1E8	1.1E10
Comp. 3	1.6E9	1.7E10	1.4E7	7.3E4	1.0E8	3.0E6	6.9E8	5.6E6	6.7E4	4.6E5	3.2E5	8.5E4	1.9E5	2.4E7

RELEVANT COMMENTS

[1] Spent Sealed Sources: Compartment 1: >100 packages Compartment 2: 4 packages
[2] At the time of waste production
[3] Radionuclides used as scaling factor in evaluation of other nuclides

Table 8 Quantity and characteristics of waste stored in building 157, compartments 9 and 11 – 15 at 31.12.2004

FACILITY STATUS	Comp. 9	Comp. 11	Comp. 12	Comp. 13	Comp. 14	Comp. 15
	Full (8/1987)	Full (8/1988)	Full (9/1988)	Full (8/1989)	Full (7/1989)	Full (2/1988)

AVERAGE WASTE AGE	Comp. 9	Comp. 11	Comp. 12	Comp. 13	Comp. 14	Comp. 15
	14.6 y	13.5 y	13.5 y	12.9 y	12.9 y	14.3 y

WASTE CLASSIFICATION	Radiological	Physical	Waste Form
	Group 1	Combustible	In bulk

	Comp. 9	Comp. 11	Comp. 12	Comp. 13	Comp. 14	Comp. 15
WASTE VOLUME	390 m^3	390 m^3	390 m^3	390 m^3	390 m^3	390 m^3
WASTE MASS	117 tons	117 tons	118 tons	117 tons	118 tons	120 tons

PHYSICAL COMPOSITION (In % vol.)	Combustible					Non-combustible						
	Cloth	Wood	Filters	PVC	Other	Metal	Construction Materials	Thermal Insulation	Graphite	Cables, Casings	Sediments	Other
	40 – 50 %	15 – 20%	15 – 20 %	15 – 20 %	No	Yes[1]	No	No	No	No	No	Yes[2]

GENERAL RADIOLOGICAL PROPERTIES	Total Activity	Specific Activity		Surface Dose Rate [3]
Comp. 9	2.93E12 Bq	2.51E10 Bq/t	7.52E9 Bq/m^3	<0.3 mSv/h
Comp. 11	3.02E12 Bq	2.58E10 Bq/t	7.75E9 Bq/m^3	<0.3 mSv/h
Comp. 12	3.02E12 Bq	2.56E10 Bq/t	7.74E9 Bq/m^3	<0.3 mSv/h
Comp. 13	3.03E12 Bq	2.59E10 Bq/t	7.77E9 Bq/m^3	<0.3 mSv/h
Comp. 14	3.05E12 Bq	2.58E10 Bq/t	7.82E9 Bq/m^3	<0.3 mSv/h
Comp. 15	2.97E12 Bq	2.47E10 Bq/t	7.61E9 Bq/m^3	<0.3 mSv/h

RADIONUCLIDE COMPOSITION	^{60}Co [4]	^{137}Cs [4]	^{14}C	^{244}Cm	^{90}Sr	^{59}Ni	^{63}Ni	^{94}Nb	^{129}I	^{241}Am	^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu
Comp. 9	1.5E11	2.5E12	5.0E9	9.3E6	1.5E10	1.1E9	2.3E11	2.0E9	1.2E7	8.3E7	5.4E7	1.6E7	3.5E7	2.8E9
Comp. 11	1.8E11	2.6E12	4.9E9	9.7E6	1.5E10	1.0E9	2.3E11	2.0E9	1.2E7	8.3E7	5.4E7	1.6E7	3.5E7	2.9E9
Comp. 12	1.8E11	2.6E12	4.9E9	9.7E6	1.5E10	1.0E9	2.3E11	2.0E9	1.2E7	8.3E7	5.4E7	1.6E7	3.5E7	2.9E9
Comp. 13	1.9E11	2.6E12	4.8E9	9.8E6	1.5E10	1.0E9	2.3E11	2.0E9	1.2E7	8.2E7	5.3E7	1.5E7	3.4E7	3.0E9
Comp. 14	1.9E11	2.6E12	4.8E9	9.9E6	1.5E10	1.0E9	2.2E11	1.9E9	1.2E7	8.3E7	5.4E7	1.5E7	3.5E7	3.0E9
Comp. 15	1.6E11	2.5E12	5.0E9	9.4E6	1.5E10	1.1E9	2.3E11	2.0E9	1.2E7	8.3E7	5.4E7	1.6E7	3.5E7	2.8E9

RELEVANT COMMENTS	
	[1] Parts of decommissioned Emergency Cooling System: Compartment 11
	[2] Spent Sealed Sources: At least 2 packages in compartment 13
	[3] At the time of waste production
	[4] Radionuclides used as scaling factor in evaluation of other nuclides

Table 9 Quantity and characteristics of waste stored in building 157, compartments 7, 8 and 10 at 31.12.2004

	Comp. 7	**Comp. 8**	**Comp. 10**
FACILITY STATUS	Full (6/1989)	Full (3/1988)	Full (9/1989)
AVERAGE	**Comp. 7**	**Comp. 8**	**Comp. 10**
WASTE AGE	12.8 y	13.9 y	13.0 y
WASTE	**Radiological**	**Physical**	**Waste Form**
CLASSIFICATION	Group 2	Combustible	In bulk
	Comp. 7	**Comp. 8**	**Comp. 10**
WASTE VOLUME	390 m^3	390 m^3	390 m^3
WASTE MASS	98 tons	100 tons	98 tons

	Combustible					**Non-combustible**						
PHYSICAL COMPOSITION (In % vol.)	**Cloth**	**Wood**	**Filters**	**PVC**	**Other**	**Metal**	**Construction Materials**	**Thermal Insulation**	**Graphite**	**Cables, Casings**	**Sediments**	**Other**
	25 %	40 %	10 – 15 %	15 – 20 %	No	Yes[1]	No	No	No	No	Yes	Yes[2]

GENERAL RADIOLOGICAL PROPERTIES	**Total Activity**	**Specific Activity**		**Surface Dose Rate [3]**
Comp. 7	1.21E13 Bq	1.24E11 Bq/t	3.10E10 Bq/m^3	0.3 – 10 mSv/h
Comp. 8	1.16E13 Bq	1.16E11 Bq/t	2.98E10 Bq/m^3	0.3 – 10 mSv/h
Comp. 10	1.19E13 Bq	1.22E11 Bq/t	3.06E10 Bq/m^3	0.3 – 10 mSv/h

RADIONUCLIDE COMPOSITION	^{60}Co [4]	^{137}Cs [4]	^{14}C	^{244}Cm	^{90}Sr	^{59}Ni	^{63}Ni	^{94}Nb	^{129}I	^{241}Am	^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu
Comp. 7	1.4E12	8.9E12	3.6E10	3.4E7	5.3E10	7.6E9	1.7E12	1.4E10	4.2E7	2.8E8	1.8E8	5.3E7	1.2E8	1.0E10
Comp. 8	1.2E12	8.7E12	3.5E10	3.2E7	5.2E10	7.4E9	1.6E12	1.4E10	4.2E7	2.8E8	1.8E8	5.3E7	1.2E8	9.8E9
Comp. 10	1.3E12	8.8E12	3.5E10	3.3E7	5.2E10	7.5E9	1.6E12	1.4E10	4.2E7	2.8E8	1.8E8	5.2E7	1.2E8	1.0E10

RELEVANT COMMENTS	[1] Parts of decommissioned Emergency Cooling System in compartment 8 [2] Spent Sealed Sources: Compartment 8 one package with 2 Pu-238 sources (4.3E10 Bq) [3] At the time of waste production [4] Radionuclides used as scaling factor in evaluation of other nuclides

Table 10 Quantity and characteristics of waste stored in building 157 Compartments 3 and 6 at 31.12.2004

	Comp. 3	**Comp. 6**	
FACILITY STATUS	Full 6/1987	Full 4/1987	
AVERAGE WASTE AGE	**Comp. 3**	**Comp. 6**	
	14.7 y	15.9 y	
WASTE CLASSIFICATION	**Radiological**	**Physical**	**Waste Form**
	Group 1	Non-combustible	In bulk
	Comp. 3	**Comp. 6**	
WASTE VOLUME	470 m^3	470 m^3	
WASTE MASS	260 tons	259 tons	

PHYSICAL COMPOSITION (In % vol.)	**Combustible**					**Non-combustible**						
	Cloth	**Wood**	**Filters**	**PVC**	**Other**	**Metal**	**Construction Materials**	**Thermal Insulation**	**Graphite**	**Cables, Casings**	**Sediments**	**Other**
	No	No	No	No	No	20 – 35%	27 – 35%	15 – 20%	No	30%	2%	1%[1]

GENERAL RADIOLOGICAL PROPERTIES		**Total Activity**	**Specific Activity**		**Surface Dose Rate** [2]
	Comp. 3	3.53E12 Bq	1.36E10 Bq/t	7.50E9 Bq/m^3	< 0.3 mSv/h
	Comp. 6	3.44E12 Bq	1.32E10 Bq/t	7.32E9 Bq/m^3	< 0.3 mSv/h

RADIONUCLIDE COMPOSITION	^{60}Co [2]	^{137}Cs [2]	^{14}C	^{244}Cm	^{90}Sr	^{59}Ni	^{63}Ni	^{94}Nb	^{129}I	^{241}Am	^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu
Comp. 3	1.8E11	3.0E12	6.0E9	1.1E7	1.8E10	1.3E9	2.8E11	2.4E9	1.5E7	1.0E8	6.4E7	1.9E7	4.2E7	3.3E9
Comp. 6	1.6E11	3.0E12	6.2E9	1.1E7	1.8E10	1.3E9	2.8E11	2.5E9	1.5E7	1.0E8	6.4E7	1.9E7	4.3E7	3.2E9

RELEVANT COMMENTS	
	[1] Spent Sealed Sources: About 100 of packages (different types) in compartment 6
	[2] At the time of waste production
	[3] Radionuclides used as scaling factor in evaluation of other nuclides

Table 11 Quantity and characteristics of waste stored in building 157 Compartments 2 and 5 at 31.12.2004

	Comp. 2	Comp. 5	
FACILITY STATUS	Full (9/1987)	Full (12/1987)	
AVERAGE WASTE AGE	15.7 y	14.5 y	
WASTE CLASSIFICATION	**Radiological**: Group 2	**Physical**: Non-combustible	**Waste Form**: In bulk
WASTE VOLUME	480 m^3	480 m^3	
WASTE MASS	220 tons	240 tons	

PHYSICAL COMPOSITION (In % vol.)	**Combustible**					**Non-combustible**							
	Cloth	**Wood**	**Filters**	**PVC**	**Other**	**Metal**	**Construction Materials**	**Thermal Insulation**	**Graphite**	**Cables, Casings**	**Sediments**	**Other**
	No	No	No	No	No	50 – 70%	20%	20 – 25%	Yes [2]	No	Yes	Yes[1]

GENERAL RADIOLOGICAL PROPERTIES	**Total Activity**	**Specific Activity**		**Surface Dose Rate [3]**
Comp. 2	1.34E13 Bq	6.10E10 Bq/t	2.80E10 Bq/m^3	0.3 – 10 mSv/h
Comp. 5	1.43E13 Bq	5.94E10 Bq/t	2.97E10 Bq/m^3	0.3 – 10 mSv/h

RADIONUCLIDE COMPOSITION	^{60}Co [4]	^{137}Cs [4]	^{14}C	^{244}Cm	^{90}Sr	^{59}Ni	^{63}Ni	^{94}Nb	^{129}I	^{241}Am	^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu
Comp. 2	1.1E12	1.0E13	4.2E10	3.7E7	6.0E10	9.0E9	1.9E12	1.7E10	5.1E7	3.4E8	2.2E8	6.4E7	1.5E8	1.1E10
Comp. 5	1.4E12	1.1E13	4.5E10	3.9E7	6.3E10	9.5E9	2.1E12	1.8E10	5.2E7	3.5E8	2.2E8	6.5E7	1.5E8	1.2E10

RELEVANT COMMENTS

[1] Spent Sealed Sources: Compartment 5, one package (type ???) with 2 Co60 sources (2.6E9 Bq) and one package (type ???-?) with 5 Cs137 sources (9.8E8 Bq)
[2] For radionuclide properties of graphite, see Chapter 8.1
[3] At the time of waste production
[4] Radionuclides used as scaling factor in evaluation of other nuclides

Table 12 Quantity and characteristics of waste stored in building 157 Compartments 1 and 4 at 31.12.2004

FACILITY STATUS	**Comp. 1** In operation	**Comp. 4** In operation	
AVERAGE WASTE AGE	**Comp. 1** 11.0 y	**Comp. 4** 11.0 y	
WASTE CLASSIFICATION	**Radiological** Group 3	**Physical** Non-combustible	**Waste Form** In bulk

	Comp. 1		Comp. 4		Annual Arising (total)
	Zr-alloys	Other	Zr-alloys	**Other**	
WASTE VOLUME	23 m^3	158 m^3	52 m^3	399 m^3	32 m^3
WASTE MASS	20.5 tons	184.5 tons	46.7 tons	420.3 tons	~33 tons

PHYSICAL COMPOSITION (In % vol.)	**Combustible**					**Non-combustible**							
	Cloth	**Wood**	**Filters**	**PVC**	**Other**	**Metal**	**Construction Materials**	**Thermal Insulation**	**Graphite**	**Cables, Casings**	**Sediments**	**Other**
	No	No	Yes [1]	Yes [2]	No	90 %	No	No	No	No	No	Yes[3]

GENERAL RADIOLOGICAL PROPERTIES			**Total Activity**	**Specific Activity**		**Surface Dose Rate [4]**
	Comp. 1	**Zr-alloys**	2.71E14 Bq	1.32E13 Bq/t	1.19E13 Bq/m^3	> 10 mSv/h
		Other	1.24E15 Bq	6.70E12 Bq/t	7.81E12 Bq/m^3	> 10 mSv/h
	Comp. 4	**Zr-alloys**	1.22E15 Bq	2.61E13 Bq/t	2.35E13Bq/m^3	> 10 mSv/h
		Other	5.56E15 Bq	1.32E13 Bq/t	1.39E13 Bq/m^3	> 10 mSv/h

RADIONUCLIDE COMPOSITION [6]		^{60}Co [5]	^{3}H	^{14}C	^{55}Fe	^{59}Ni	^{63}Ni	^{94}Nb	^{93}Zr
Comp. 1	**Zr-alloys**	2.7E14	2.0E7	2.3E11	1.6E11	5.9E9	9.7E11	3.3E12	4.2E10
	Other	2.7E14	-	4.5E12	4.4E14	4.9E12	5.2E14	-	-
Comp. 4	**Zr-alloys**	1.2E15	9.0E7	1.0E12	7.2E11	2.6E10	4.4E12	1.5E13	1.9E11
	Other	1.2E15	-	2.0E13	2.0E15	2.2E13	2.4E15	-	-

RELEVANT COMMENTS	[1] Filters from Hot Cell ventilation system [2] PVC baskets used as a liner in transport casks [3] Spent Sealed Sources: Compartments 1: 13 packages Compartment 4: 7 packages [4] At the time of waste production [5] Radionuclide used as scaling factor in evaluation of other nuclides [6] Contamination by fission products and actinides not considered Other: It is estimated that 10 % (weight) of the waste consists of Zr-alloy (2.5 % Nb) and it contains 50% of ^{60}Co activity

Table 13 Quantity and characteristics of waste stored in building 157/1 compartments 1 – 4, 6, 7 and 9 at 31.12.2004

	Comp. 1	Comp. 2	Comp. 3	Comp. 4	Comp. 6	Comp. 7	Comp. 9
FACILITY STATUS	Full (12/1994)	Full (6/1992)	Full (3/1993)	Full (6/1992)	Full (1/1997)	Full (12/1993)	Full (3/1999)
AVERAGE WASTE AGE	7.5 y	10.1 y	9.2 y	9.8 y	6.0 y	8.5 y	3.9 y
WASTE VOLUME	380 m^3	380 m^3	380 m^3	380 m^3	380 m^3	380 m^3	380 m^3
WASTE MASS	114 tons	116 tons	118 tons	117 tons	108 tons	124 tons	96 tons

	Radiological	Physical	Waste Form
WASTE CLASSIFICATION	Group 1	Combustible	In bulk

	Combustible					Non-combustible						
PHYSICAL COMPOSITION (In % vol.)	**Cloth**	**Wood**	**Filters**	**PVC**	**Other**	**Metal**	**Construction Materials**	**Thermal Insulation**	**Graphite**	**Cables, Casings**	**Sediments**	**Other**
	40 – 50%	15 – 20%	15 – 20%	15 – 20%	No	No	No	No	No	No	No	Yes[1]

GENERAL RADIOLOGICAL PROPERTIES	**Total Activity**	**Specific Activity**		**Surface Dose Rate [2]**
Comp. 1	6.37E12Bq	5.59E10 Bq/t	1.68E10 Bq/m^3	< 0.3 mSv/h
Comp. 2	1.96E12Bq	1.69E10 Bq/t	5.15E9 Bq/m^3	< 0.3 mSv/h
Comp. 3	2.93E12Bq	2.48E10 Bq/t	7.71E9 Bq/m^3	< 0.3 mSv/h
Comp. 4	2.89E12Bq	2.47E10 Bq/t	7.62E9 Bq/m^3	< 0.3 mSv/h
Comp. 6	2.06E12Bq	1.91E10 Bq/t	5.41E9 Bq/m^3	< 0.3 mSv/h
Comp. 7	1.77E12Bq	1.43E10 Bq/t	4.66E9 Bq/m^3	< 0.3 mSv/h
Comp. 9	5.24E9 Bq	5.45E7 Bq/t	1.38E7 Bq/m^3	< 0.3 mSv/h

RADIONUCLIDE COMPOSITION	^{60}Co [3]	^{137}Cs [3]	^{14}C	^{244}Cm	^{90}Sr	^{59}Ni	^{63}Ni	^{94}Nb	^{129}I	^{241}Am	^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu
Comp. 1	2.8E12	1.8E12	3.5E10	7.6E6	1.1E10	7.4E9	1.7E12	1.4E10	7.7E6	5.2E7	3.5E7	9.7E6	2.2E7	2.4E9
Comp. 2	2.7E11	1.4E12	4.8E9	5.7E6	8.6E9	1.0E9	2.3E11	1.9E9	6.4E6	4.3E7	2.9E7	8.0E6	1.8E7	1.8E9
Comp. 3	3.1E11	2.4E12	4.8E9	9.4E6	1.4E10	1.0E9	2.3E11	2.0E9	1.0E7	6.9E7	4.6E7	1.3E7	2.9E7	3.0E9
Comp. 4	3.4E11	2.3E12	5.7E9	8.9E6	1.3E10	1.2E9	2.7E11	2.3E9	9.9E6	6.7E7	4.5E7	1.2E7	2.8E7	2.8E9
Comp. 6	8.3E11	7.8E11	8.7E9	3.3E6	4.7E9	1.8E9	4.2E11	3.5E9	3.1E6	2.1E7	1.5E7	3.9E6	8.9E6	1.1E9
Comp. 7	3.3E11	1.2E12	4.7E9	4.8E6	7.2E9	1.0E9	2.3E11	1.9E9	5.1E6	3.5E7	2.3E7	6.4E6	1.5E7	1.5E9
Comp. 9	8.9E8	4.0E9	7.0E6	1.7E4	2.4E7	1.5E6	3.5E8	2.8E6	1.5E4	1.0E5	7.1E4	1.9E4	4.3E4	5.7E6

RELEVANT COMMENTS	
	[1] Spent Sealed Sources: 4 packages in compartment 9
	[2] At the time of waste production
	[3] Radionuclides used as scaling factor in evaluation of other nuclides

Table 14 Quantity and characteristics of waste stored in building 157/1 compartments 5 and 8 at 31.12.2004

FACILITY STATUS	**Comp. 5** Full (4/1998)	**Comp. 8** In operation		
AVERAGE WASTE AGE	**Comp. 5** 6.6 y	**Comp. 8** -		
WASTE CLASSIFICATION	**Radiological** Group 2	**Physical** Combustible	**Waste Form** In bulk	
	Comp. 5	**Comp. 8**	**Annual Arising**	**Comments**
WASTE VOLUME	380 m^3	-	75 m^3	Note that also compartment 18/2 is in operation for storage of Group 2 combustible waste
WASTE MASS	95 tons	-	~20 tons	

PHYSICAL COMPOSITION (In % vol.)	**Combustible**					**Non-combustible**						
	Cloth	**Wood**	**Filters**	**PVC**	**Other**	**Metal**	**Construction Material**	**Thermal Insulation**	**Graphite**	**Cables, Casings**	**Sediments**	**Other**
	25 %	40 %	10 – 15 %	15 – 20 %	No	No	No	No	No	No	No	No

GENERAL RADIOLOGICAL PROPERTIES		**Total Activity**	**Specific Activity**		**Surface Dose Rate [1]**
	Comp. 5	8.25E12 Bq	8.68E10 Bq/t	2.17E10 Bq/m^3	0.3 – 10 mSv/h

RADIONUCLIDE COMPOSITION	^{60}Co [2]	^{137}Cs [2]	^{14}C	^{244}Cm	^{90}Sr	^{59}Ni	^{63}Ni	^{94}Nb	^{129}I	^{241}Am	^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu
Comp. 5	3.2E12	3.2E12	3.6E10	1.3E7	1.9E10	7.7E9	1.8E12	1.5E10	1.3E7	8.8E7	6.0E7	1.6E7	3.7E7	4.3E9

RELEVANT COMMENTS

[1] At the time of waste production
[2] Radionuclides used as scaling factor in evaluation of other nuclides

Table 15 Quantity and characteristics of waste stored in building 157/1 compartments 10 – 15 at 31.12.2004

FACILITY STATUS	Comp. 10	Comp. 11	Comp. 12	Comp. 13	Comp. 14	Comp. 15	
	Full (10/1995)	Full (9/1994)	Full (3/1997)	Full (4/1999)	In operation	Empty	
AVERAGE WASTE AGE	**Comp. 10**	**Comp. 11**	**Comp. 12**	**Comp. 13**	**Comp. 14**	**Comp. 15**	
	8.4 y	7.9 y	5.5 y	3.7 y	-	-	
WASTE CLASSIFICATION	**Radiological**	**Physical**	**Waste Form**				
	Group 1	Non-combustible	In bulk				
	Comp. 10	**Comp. 11**	**Comp. 12**	**Comp. 13**	**Comp. 14**	**Comp. 15**	**Annual Arising**
WASTE VOLUME	1160 m^3	1160 m^3	1160 m^3	1160 m^3	1060 m^3	-	350 m^3
WASTE MASS	654 tons	658 tons	804 tons	837 tons	770 tons	-	~210 tons

PHYSICAL COMPOSITION (In % vol.)	Combustible					Non-combustible						
	Cloth	**Wood**	**Filters**	**PVC**	**Other**	**Metal**	**Construction Materials**	**Thermal Insulation**	**Graphite**	**Cables, Casings**	**Sediments**	**Other**
	No	No	No	No	No	20 – 35%	27 – 35%	15 – 20%	No	30%	2%	1%[1]

GENERAL RADIOLOGICAL PROPERTIES		Total Activity	Specific Activity		Surface Dose Rate [2]
	Comp. 10	7.99E12Bq	1.22E10 Bq/t	6.89E9 Bq/m^3	<0.3 mSv/h
	Comp. 11	9.07E12Bq	1.38E10 Bq/t	7.82E9 Bq/m^3	<0.3 mSv/h
	Comp. 12	3.58E10Bq	4.45E7 Bq/t	3.08E7 Bq/m^3	<0.3 mSv/h
	Comp. 13	5.44E10 Bq	6.50E7 Bq/t	4.69E7 Bq/m^3	<0.3 mSv/h

RADIONUCLIDE COMPOSITION	^{60}Co [3]	^{137}Cs [3]	^{14}C	^{244}Cm	^{90}Sr	^{59}Ni	^{63}Ni	^{94}Nb	^{129}I	^{241}Am	^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu
Comp. 10	2.2E12	4.2E12	3.2E10	1.7E7	2.5E10	6.7E9	1.5E12	1.3E10	1.8E7	1.2E8	8.0E7	2.2E7	5.0E7	5.4E9
Comp. 11	3.0E12	4.1E12	3.9E10	1.7E7	2.4E10	8.4E9	1.9E12	1.6E10	1.7E7	1.2E8	7.9E7	2.2E7	4.9E7	5.4E9
Comp. 12	2.0E9	3.2E10	2.0E7	1.8E5	1.9E8	4.2E6	9.7E8	8.0E6	1.3E5	8.8E5	6.0E5	1.6E5	3.7E5	4.5E7
Comp. 13	8.9E9	4.2E10	6.8E7	1.8E5	2.5E8	1.4E7	3.4E9	2.7E7	1.6E5	1.1E6	7.5E5	2.0E5	4.5E5	6.1E7

RELEVANT COMMENTS	
	[1] Spent Sealed Sources: Compartments 10 – 14
	[2] At the time of waste production
	[3] Radionuclides used as scaling factor in evaluation of other nuclides

Table 16 Quantity and characteristics of waste stored in building 157/1, compartments 16 and 17 at 31.12.2004

FACILITY STATUS	**Comp. 16** Full 8/1999	**Comp. 17** In operation	
AVERAGE WASTE AGE	**Comp. 16** 6.4 y	**Comp. 17** -	
WASTE CLASSIFICATION	**Radiological** Group 2	**Physical** Non-combustible	**Waste Form** In bulk
	Comp. 16	**Comp. 17**	**Annual Arising**
WASTE VOLUME	898 m^3	169 m^3	56 m^3
WASTE MASS	462 tons	92 tons	~30 tons

PHYSICAL COMPOSITION (In % vol.)	**Combustible**					**Non-combustible**						
	Cloth	**Wood**	**Filters**	**PVC**	**Other**	**Metal**	**Construction Materials**	**Thermal Insulation**	**Graphite**	**Cables, Casings**	**Sediments**	**Other**
	No	No	No	No	No	50 – 70%	20%	20 – 25%	Yes [2]	No	No	Yes[1]

GENERAL RADIOLOGICAL PROPERTIES		**Total Activity**	**Specific Activity**		**Surface Dose Rate** [3]
	Comp. 16	2.58E12 Bq	5.59E9 Bq/t	2.88E9 Bq/m^3	0.3 – 10 mSv/h
	Comp. 17	-	-	-	0.3 – 10 mSv/h

RADIONUCLIDE COMPOSITION	^{60}Co [4]	^{137}Cs [4]	^{14}C	^{244}Cm	^{90}Sr	^{59}Ni	^{63}Ni	^{94}Nb	^{129}I	^{241}Am	^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu
Comp. 16	2.3E11	2.2E12	2.5E9	9.2E6	1.3E10	5.4E8	1.2E11	1.0E9	8.9E6	6.1E7	4.1E7	1.1E7	2.5E7	3.0E9

RELEVANT COMMENTS	
	[1] Spent Sealed Sources: Compartment 16
	[2] For radionuclide properties of graphite, see Chapter 8.1
	[3] At the time of waste production
	[4] Radionuclides used as scaling factor in evaluation of other nuclides

Table 17 Quantity and characteristics of waste stored in building 157/1 Compartments 18 – 21/2 at 31.12.2004

FACILITY STATUS	Comp. 18/2	Comp. 19/2	Comp. 20/2	Comp. 21/2
	In operation	Empty	Empty	Empty

AVERAGE WASTE AGE	Comp. 18/2	Comp. 19/2	Comp. 20/2	Comp. 21/2
	1.8 y	-	-	-

WASTE CLASSIFICATION	Radiological	Physical	Waste Form
	Group 2	Combustible	In bulk

	Comp. 18/2	Comp. 19/2	Comp. 20/2	Comp. 21/1	Annual Arising	Comments
WASTE VOLUME	256 m^3	-	-	-	75 m^3	Note that also compartment 8 is in operation
WASTE MASS	61 tons	-	-	-	~20 tons	for storage of Group 2 combustible waste

PHYSICAL COMPOSITION (In % vol.)	Combustible					Non-combustible						
	Cloth	Wood	Filters	PVC	Other	Metal	Construction Materials	Thermal Insulation	Graphite	Cables, Casings	Sediments	Other
	25 %	40 %	10 – 15 %	15 – 20 %	No	No	No	No	No	No	No	No

GENERAL RADIOLOGICAL PROPERTIES	Total Activity	Specific Activity		Surface Dose Rate [1]
	1.53E12 Bq	2.49E10 Bq/t	5.98E9 Bq/m^3	0.3 – 10 mSv/h

RADIONUCLIDE COMPOSITION	^{60}Co [2]	^{137}Cs [2]	^{14}C	^{244}Cm	^{90}Sr	^{59}Ni	^{63}Ni	^{94}Nb	^{129}I	^{241}Am	^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu
Comp. 18/2	1.1E12	6.4E10	6.7E9	2.9E5	3.8E8	1.4E9	3.4E11	2.7E9	2.3E5	1.6E6	1.1E6	2.9E5	6.7E5	9.8E7

RELEVANT COMMENTS	
	[1] At the time of waste production
	[2] Radionuclides used as scaling factor in evaluation of other nuclides

Table 18 Quantity and characteristics of waste stored in building 157/1, compartments 18 – 21/1 and 19 – 21/3 at 31.12.2004

FACILITY STATUS	Comp. 18/1	Comp. 19/1	Comp. 20/1	Comp. 21/1	Comp. 19/3	Comp. 20/3	Comp. 21/3	
	Full 9/2000	In operation	Empty	In operation	Empty	Empty	Empty	
AVERAGE WASTE AGE	**Comp. 18/1**	**Comp. 19/1**	**Comp. 20/1**	**Comp. 21/1**	**Comp. 19/3**	**Comp. 20/3**	**Comp. 21/3**	
	2.1 y	-	-	1.7 y	-	-	-	
WASTE CLASSIFICATION	**Radiological**	**Physical**	**Waste Form**					
	Group 1	Combustible	**Bulk in plastic bags, in comp. 21/1 bales [1]**					
	Comp. 18/1	**Comp. 19/1**	**Comp. 20/1**	**Comp. 21/1**	**Comp. 19/3**	**Comp. 20/3**	**Comp. 21/3**	**Annual Arising**
WASTE VOLUME	380 m^3	256 m^3	-	125 m^3	-	-	-	250 m^3
WASTE MASS	93 tons	66 tons	-	75 tons	-	-	-	~80 tons

PHYSICAL COMPOSITION (In % vol.)	Combustible					Non-combustible						
	Cloth	**Wood**	**Filters**	**PVC**	**Other**	**Metal**	**Construction Materials**	**Thermal Insulation**	**Graphite**	**Cables, Casings**	**Sediments**	**Other**
	40 – 50%	15 – 20%	15 – 20%	15 – 20%	No	No	No	No	No	No	No	No

GENERAL RADIOLOGICAL PROPERTIES		Total Activity	Specific Activity		Surface Dose Rate [2]
	Comp. 18/1	5.55E9 Bq	5.96E7 Bq/t	1.46E7 Bq/m^3	<0.3 mSv/h
	Comp. 19/1	-	-	-	<0.3 mSv/h
	Comp. 21/1	1.89E10 Bq	2.58E8 Bq/t	1.51E8 Bq/m^3	<0.3 mSv/h

RADIONUCLIDE COMPOSITION	^{60}Co [3]	^{137}Cs [3]	^{14}C	^{244}Cm	^{90}Sr	^{59}Ni	^{63}Ni	^{94}Nb	^{129}I	^{241}Am	^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu
Comp. 18/1	4.0E9	2.1E8	2.5E7	9.4E2	1.3E6	5.3E6	1.3E9	1.0E7	7.8E2	5.3 E3	3.7E3	9.7E2	2.2E3	3.2E5
Comp. 19/1	-	-	-	-	-	-	-	-	-		-		-	-
Comp. 21/1	1.3E10	1.3E9	7.9E7	6.4E3	8.3E6	1.7E7	4.0E9	3.2E7	4.8E3	3.3E4	2.3E4	6.1E3	1.4E4	2.2E6

RELEVANT COMMENTS	
	[1] 126 pieces of bales and 30 m^3 of bulk waste (bulk waste not included in radiological inventory)
	[2] At the time of waste production
	[3] Radionuclides used as scaling factor in evaluation of other nuclides

Table 19, Characteristics of the waste in building 158 (Bituminised waste)

Canyon	UF44B01		UF44B02		UF59B01	
Group of waste						
Type of waste	combustible		combustible		combustible	
Waste form	bitumen compound		bitumen compound		bitumen compound	
Compartment's volume, m^3	2500.0		2500.0		1000.0	
Waste volume, m^3	1957.7		2050.8		784.3	
Canyon's occupation, %	78.3		82.0		78.4	
Waste mass, kg	2349000		2461000		941000	
Mass of salts in bitumen compound, kg	824000		912000		324000	
Date of the first waste load	Aug-1987		Apr-1989		May-1991	
Date of the last waste load	Mar-1989		Oct-1990		Dec-1991	
Compartment status	closed		closed		closed	
Date for presented activity data	01-Nov-1999		01-Nov-1999		01-Nov-1999	
	Accumulated activity, Ci	Remain activity, Ci	Accumulated activity, Ci	Remain activity, Ci	Accumulated activity, Ci	Remain activity, Ci
Cr - 51	0	0	0	0	0	0
Mn - 54	0	0	0	0	0.03	$6 \cdot 10^{-5}$
Fe - 59	0.05	$4 \cdot 10^{-29}$	1.85	$1 \cdot 10^{-23}$	0.07	$1 \cdot 10^{-21}$
Co - 60	7.40	1.67	6.63	1.90	4.28	1.45
I - 131	0	0	0	0	0	0
Cs - 134	127.2	2.92	165.9	6.39	47.2	3.12
Cs - 137	111.2	85.5	78.4	62.5	44.5	36.9
Total activity, Ci	245.8	90.0	252.8	70.8	96.1	41.5

Continuation of 19, Characteristics of the waste in building 158

Canyon	UF44B03		UF44B04		UF45B01	
Group of waste						
Type of waste	combustible		combustible		combustible	
Waste form	bitumen compound		bitumen compound		bitumen compound	
Compartment's volume, m^3	2500.0		2500.0		2500.0	
Waste volume, m^3	1963.8		1743.5		1667.8	
Canyon's occupation, %	78.6		69.7		66.7	
Waste mass, kg	2357000		2092000		2001000	
Mass of salts in bitumen compound, kg	825000		711000		801000	
Date of the first waste load	Jan-1992		Jul-1994		Sep-1996	
Date of the last waste load	Jun-1994		Jul-1996			
Compartment status	closed		closed		in operation	
Date for presented activity data	01-Nov-1999		01-Nov-1999		01-Nov-1999	
	Accumulated activity, Ci	Remain activity, Ci	Accumulated activity, Ci	Remain activity, Ci	Accumulated activity, Ci	Remain activity, Ci
Cr - 51	0	0	0	0	10.0	9.42
Mn - 54	0.096	$7.3 \cdot 10^{-4}$	0.246	0.011	1.72	0.71
Fe - 59	0	0	0	0	0	0
Co - 60	12.2	5.47	6.18	3.54	4.31	3.83
I - 131	0	0	0	0	17.4	14.2
Cs - 134	87.5	11.0	74.4	18.5	72.0	54.0
Cs - 137	168.0	144.5	174.1	158.1	186.3	182.3
Total activity, Ci	267.9	161.0	254.9	180.2	291.7	264.4

Table 20, Activity of the waste in building 158 for the date of 01-Jan-2010

Canyon	UF44B01	UF44B02	UF59B01	UF44B03	UF44B04	UF45B01
	Remain activity, Ci					
Cr - 51	0	0	0	0	0	$4 \cdot 10^{-40}$
Mn - 54	0	0	$1.5 \cdot 10^{-8}$	$1.9 \cdot 10^{-7}$	$3.0 \cdot 10^{-6}$	$1.9 \cdot 10^{-4}$
Fe - 59	$3 \cdot 10^{-54}$	$1 \cdot 10^{-48}$	$1 \cdot 10^{-46}$	0	0	0
Co - 60	0.44	0.50	0.38	1.43	0.93	1.01
I - 131	0	0	0	0	0	0
Cs - 134	0.10	0.21	0.10	0.36	0.61	1.77
Cs - 137	67.6	49.5	29.2	114.3	125.1	144.1
Total activity, Ci	68.1	50.2	29.7	116.1	126.6	146.9

Table 21
Radioactive waste composition of the liquid waste range of nuclide specific activity concentration in the tanks TW18B01, TW18B02, TW11B03

Nuclide	Activity Concentration (Bq / kg)			
	TW18 B01/TW11B03		TW18 B02	
	Dry	Wet	Dry	Wet
Mn-54	1.8E+8 - 1.9E+8	4.8E+7 - 5.9E+7	8.1E+6 - 1.3E+7	4.1E+6 - 5.6E+6

Co-58	1.5E+6 - 2.1E+6	4.8E+5 - 5.2E+5	1.3E+6	5.9E+5
Fe-59	6.7E+6 - 1.8E+7	5.9E+6 - 2.3E+6	4.4E+5	2.3E+5 - 3.3E+5
Co-60	2.8E+7 - 2.7E+8	8.5E+8 - 7.0E+7	1.1E+7	5.2E+6
Nb-95	5.6E+5 - 2.6E+6	4.8E+5 - 2.3E+6	5.6E+4 - 1.2E+5	2.8E+4 - 5.2E+4
Zr-95	2.8E+6	9.3E+5		
Cs-134	2.0E+7 - 2.1E+7	5.6E+6 - 6.3E+6	4.8E+5	2.2E+6
Cs-137	7.0E+7	1.9E+7 - 2.3E+7	3.4E+6	1.7E+6
Total activity	5.6E+8 - 5.8E+8	1.4E+8 - 1.8E+8	2.8E+7	1.3E+7

Table 22
Activity inventory in drums and storage containers for cemented waste - design values

Container	200 l Drum		Storage Container, Transport Container	
Nuclide	Activity Inventory (Bq)			
	Maximum	Average	Maximum	Average
Mn-54	**6.36E+08**	**4.15E+08**	**5.09E+09**	**3.32E+09**
Co-60	**1.01E+10**	**6.76E+09**	**8.12E+10**	**5.41E+10**
Cs-134	**1.35E+09**	**6.85E+08**	**1.08E+10**	**5.48E+09**
Cs-137	**4.21E+09**	**3.84E+09**	**3.37E+10**	**3.07E+10**
Total	**1.63E+10**	**1.17E+10**	**1.31E+11**	**9.36E+10**