IMPLEMENTATION OF THE OBLIGATIONS OF THE CONVENTION ON NUCLEAR SAFETY IN LITHUANIA

THE FOURTH LITHUANIAN REPORT IN ACCORDANCE WITH ARTICLE 5 OF THE CONVENTION

2007

Vilnius

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Introductory remarks

This report provides updated information as compared to the Lithuanian National Report issued in 2004. While reading this report the following aspects have to be taken into account:

1. At the end of each section, where appropriate, brief information identifying new issues, which are included into this particular article of the report, is presented.

2. Information, taken from the Third Review Meeting recommendations, in the report is also presented, i.e.,

- Safety measures following the shutdown of Unit 1 (in article 6);
- General Overview of INPP Safety Improvement Program during the Period of 2005-2007 (SIP-3) (in article 6);
- International arrangements, including those with neighboring countries (in article 16)
- Safety Assurance during the Operation of Unit 2 (with personnel motivation assessment), (in article 6);

Information, indicated in item 2 above is also separately presented in the Appendix.

Article 6: EXISTING NUCLEAR INSTALLATIONS

Each Contracting Party shall undertake appropriate steps to ensure that the safety of nuclear installations existing at the time the Convention enters into force for that Contracting Party is reviewed as soon as possible. When necessary in the context of this Convention, the Contracting Party shall ensure that all reasonably practicable improvements are made as a matter of urgency to upgrade the safety of the nuclear installation. If such upgrading cannot be achieved, plans should be implemented to shut down the nuclear installation as soon as practically possible. The timing of the shut-down may take into account the whole energy context and possible alternatives as well as the social, environmental and economic impact.

6.1. List of existing Nuclear Installations as defined in Article 2 of the Convention

Ignalina NPP is the only nuclear installation in Lithuania. It contains two RBMK-1500 reactors (Russian acronym for "Channel-type Large Power Reactor"). RBMK-1500 reactors of INPP have their own design peculiarities. Fifteen RBMK reactors of three generation are currently in operation in Russia, Lithuania and the Ukraine. INPP owns a number of unique features, which place it between 2nd and 3rd generations of reactors.

Both reactors have one circuit, two cooling loops; fuel clusters are loaded into individual channels. The neutron spectrum is thermalized by a massive graphite moderator block. The plant can be refueled on line and uses slightly enriched nuclear fuel. Refueling is performed during reactor operation.

The power plants were built as part of the Soviet Union's North-West Unified Power System. The first unit of INPP was put into commission at the end of 1983, the second unit in August 1987. Their design lifetime is projected out to 2014-2017 accordingly. A total of four units were originally planned on this site. Construction of the third unit was terminated in 1988 because of political pressure, and construction of the forth one had never been started.
Ignalina NPP is located in the north-eastern part of Lithuania, near the borders of Latvia and Belarus.

Ignalina NPP belongs the category of "boiling water" channel-type reactors. The reactor cooling water, as it passes through the core, is subjected to boiling and is partially evaporated. The steam-water mixture then continues to the drum-separators, the elevation of which is greater than that of the reactor. Here the water settles, while the steam proceeds to the turbines. The remaining steam beyond the turbines is condensed in the condenser, and the condensate is returned via the deaerator by the feedwater pumps to the water of the same drum-separators. The coolant is returned by main circulation pumps to the core, where part of it is again converted to steam.

This fundamental heat cycle is identical to the Boiling Water Reactor (BWR) cycle widely used throughout the world, and is similar to the thermal cycle of the power plant using the carbon-hydrogen fuel. However, compared to BWRs used in Western power plants, INPP and other plants with the RBMK-type reactors have a number of unique features.

In the Table below presents the most important plant parameters.

Coolant	water (steam-water mixture)
Heat cycle configuration	single circuit
Power, MW:	
• Thermal (design)	4800

• Thermal (actual)	4200
• Electrical (design)	1500
• Electrical (actual)	1300
Core dimensions, m:	
• height	7
• diameter	12
Thickness of reactor's graphite reflector, m:	
• end	0.5
• side	0.88
Lattice pitch, m	0.25 x 0.25
Number of channels:	
• fuel	1661
• control and protect system	235
• reflector-cooling	156
Fuel	uranium dioxide, uranium dioxide with erbium oxide
Initial fuel enrichment for ^{235}U, %	2.0
Enrichment for ^{235}U, % with 0.41% of erbium used since 1995	2.4
Fuel enrichment for ^{235}U, % with 0.5% of erbium, used since 2001	2.6
Fuel enrichment for ^{235}U, % with 0.6% of erbium, used since 2005	2.8
Nuclear fuel burn up, MWday/kg	22.5
Uranium-erbium fuel with 0.41% of erbium addition burn-up, MWday/kg	25.2
Nuclear fuel with 0.5% of erbium addition burn up, MWday/kg	25.2
Nuclear fuel with 0.6% of erbium addition burn up, MWday/kg	27.0
Temperatures, ^{o}C:	
• maximum temperature in centre of fuel pellet	2100
• maximum graphite stack temperature	760
• maximum fuel channel temperature	360
• coolant temperature at fuel channel inlet	260...266
• coolant temperature at fuel channel outlet	284
• feedwater temperature	177...190
Excessive pressure, Mpa:	
• steam pressure at separators	6.38...6.87
• pressure in MCP pressure header	8.6 (8.54)
Coolant flow rate through reactor at normal power, kg/s	8700...10550 11111….13333 (at 4800 MW)
Steam produced in reactor at normal power, kg/s	2361...2444
Void fraction at reactor outlet, %	23...29
Maximum fuel channel parameters:	
• fuel channel power, kW	4250
• coolant flow rate through fuel channel, kg/s	8.7 (11,1)
• void fraction at fuel channel outlet, %	36.1
Number of main circulation pumps	8
Capacity of main circulation pumps, kg/s	1944...3056

INPP belongs to the RBMK-type of reactors designed and constructed by the former USSR's Ministry of Nuclear Power Industry. The development of the INPP design was implemented by the

All-Union Research and Development Institute for Energy Technology (Russian abbreviation - VNIPIET), St. Petersburg, Russia, which was the principal designer. Metal structures of the main building were designed by the Main Design Office "Leningrad Steel Design" (Russian translation - "Leningradstalkonstrukcya"), St. Petersburg, Russia. The turbine hall and the open switch-yard were developed by the Kiev branch of the Atomic Energy Design Institute (Russian abbreviation - "Atomenergoproekt"), Kiev, Ukraine. It had been proposed, that INPP would be the pilot nuclear power plant with the RBMK-1500 type reactors. The scientific supervisor of the RBMK-1500 project was the Kurchatov Atomic Energy Institute (often referred to as the Russian Research Centre "Kurchatov Institute"), Moscow, Russia. The principal designer of the nuclear steam supply system was the Research and Development Institute of Power Engineering (Russian abbreviation - NIKIET), Moscow, Russia.

6.2. List of existing Nuclear Installations where significant corrective actions are found necessary by assessment, as relevant, under Articles 10 through 19.

Similar to an item 6.1. No additional information is needed.

6.3. Overview of safety assessments performed for INPP and the major results of those assessments for existing nuclear installations

In the previous report the main activities of State enterprise Ignalina Nuclear Power Plant (below refer to as INPP) in 2001-2004 for safety assessment and improvement were considered.

Safety requirements to nuclear facilities are continuously increasing. These requirements cover reliability of all normal operation systems and safety systems, procedures and instructions of all levels, administrative management of the plant, personnel qualification improvement, emergency planning. Quality Assurance shall make integral part of any safety related activity. Given these requirements the safety improvement activities are always in progress at INPP.

INPP activity for safety improvement is based upon priorities to meet the modern requirements of national and international safety standards, upon results of the analysis, carried out in SAR-1, SAR-2 and RSR scope, also it includes additional calculations, implementation of VATESI guidelines, modifications, which improve the system reliability, thus providing the INPP safety. Managerially this activity has been already and is fulfilled within the framework of Safety Improvement Program SIP-1 (1993-1996), SIP-2 (1997-2005) and SIP-3 (2005 – till the Present time).

In 2004 INPP Unit 1 Safety Analysis Report (SAR-1) was upgraded. SAR-1 was upgraded on the basis of available information received in result of completed modifications, analyses and updates of INPP safety management system carried out during the period from 1996 to the beginning of 2004.
The operating license was renewed in July 2004 without restriction of its validity period.

According to the National Energy Strategy of Lithuanian Republic adopted in 1999, it was scheduled to finally shut down INPP Unit 1 till 2005. According to the Law on Ignalina NPP Unit 1 decommissioning (2 May 2000, No. VIII-1661) Lithuania shall shutdown Unit 1 of Ignalina NPP by 2005 taking into account thee long-term support from the European Union, G7 countries, other countries and international support. According to the Decree of the Government of the LR No. 1491 dated 2004-11-25, INPP Unit 1 was shut down on 31 December 2004. In December 2006 INPP

Unit 1 received the status of finally shutdown unit. Also, in December 2006 conditions of the license were revised.

On 02 February 2005 the Government of the Republic of Lithuania approved INPP Decommissioning Programme.

Technical aspects of INPP Unit 1 decommissioning are settled within the frames of INPP Unit 1 Decommissioning Fund and other individual technical projects executed under the Decommissioning Program for Unit 1 of State Enterprise Ignalina Nuclear Power Plant.

One of the primary documents to obtain the license is the Safety Analysis Report for Unit 2 – SAR-2.

SAR-2 was performed for Unit 2 as per Unit condition at the end of 2000 (in particular, the following was taken into account: implementation of DAZ, additional reactor scram systems in the event of low flow rate in one of the GDH, low reactivity margin, depressurization rate dP/dt in the drum separators, new algorithm for ECCS, etc). Final SAR-2 meeting the comments of RSR experts was submitted to VATESI in May 2004.

Safety analysis was purposed to define the actual status of Unit 2 safety taking into account all implemented modifications and results of the previous analysis, identification of possible deviations from the current regulation requirements and justification of adequacy and efficiency of undertaken compensating measures.

SAR-2 was performed in format developed during SAR-1 project implementation, this format meets VATESI requirements set forth for the safety analysis reports submitted for licensing purposes. Scope of safety issues covered by the report is demonstrated via application of systematic safety analysis techniques, such as deterministic, probabilistic, defence in-depth protection method and other world practice techniques.

Accident analysis covers emergency situations in case of design initiating events. Initiating events are grouped in compliance with the requirements of USA Nuclear Energy Committee Regulatory Guide 1.70 and IAEA recommendations "Accident Analysis of RBMK Nuclear Power Plants" RBMK-SC-52 with respect to potential effect on the main safety functions or parameters. Within the scope of accident analysis the initiating events are considered for complete reactor power range, including reactor start-up (entering to MCL or at MCL). Accidents during shutdown and on shutdown reactor are reviewed as a separate part. Transients without ATWS are classified separately. It includes a number of initiating failures accompanied with complete loss of functions of emergency shutdown system AZRT. Within the frames of thermo-hydraulic analysis of postulated accidents the transients were defined which may impact the integrity of the primary circuit. Analysis of radiological consequences and irradiation dose rates are provided for such accidents.

On the basis of SAR-2 recommendations a list of 126 safety improvement activities for INPP Uni2, which have been included into INPP Safety Improvement Program (SIP-3), was prepared.

Results and conclusions of the Safety Analysis Report have provided the basis for decision-making by VATESI on issuance of Operation License for INPP Unit 2 and for decision-making with respect to investment priority for equipment upgrades, safety improvement and implementation of current national and international regulations.

At present, the Safety Analysis Report for INPP Unit 2 (SAR-2) is being supplemented. This is done on the basis of the available data, which has been gained as a result of a number of activities that have been implemented during the period of 2001 – beginning of 2007. These activities include: accomplished modifications, implemented analytical works and changes in the INPP safety management system.

In September 2004, Ignalina NPP received a license for Unit 2 operation. The term of the license validity is unrestricted.

According to VATESI requirements, in order to continue Unit 2 operation after the final shutdown of Unit 1, INPP has prepared a Safety Justification for the only operating Unit 2.

The Safety Justification for the only operating Unit 2 was developed on the basis of Unit 2 condition at the end of December 2004, i.e. when the Unit 1 final shutdown was scheduled.

The Safety Justification is based on SAR-2 and RSR-2, it covers the safety issues related to changes of operation conditions for Unit 2 process systems and common plant process systems and changes of administrative structure of INPP following the Unit 1 final shutdown.

The Safety Justification also considers planned modifications of Unit 2 systems, which are affected by the Unit 1 final shutdown, configurations of Unit 1 process systems during the decommissioning of Unit 1.

The Safety Justification for the only operating Ignalina NPP Unit 2 has determined the high level of INPP safety and demonstrated that Unit 2 will be safe enough after the decommissioning of Unit 1.

The following safety related recommendation of the Safety Justification for the only operating INPP Unit 2 have been implemented:

- New powerful and secure Heat Only Boiler Station has been constructed and put into operation.
- New powerful and secure Steam Power Plant has been constructed and put into operation.
- 10 regulating valves set in the Heat-supply Header have been replaced for the new ones; also Pressure Drop regulator has been installed.
- The section of the pipeline, which is used to return Conditionally Clean Steam (CCS) Condensate to the Condensate Drainage Tank (CDT) of the Turbo-installation - 2, has been dismantled and the regulating valve has been installed in order to eliminate the possibility of wrong CCS Condensate supply to the CDT of the Turbo-installation - 2. Also in order to eliminate the possibility of wrong ICC Steam-generator drain supply to the CDT of the Turbo-installation – 2, the section of the drain header has been dismantled from the ICC and the regulating valve has been installed.
- Service Water supply to the Cooler of Steam Generator ICC water blow-down has been assured in view of the decommissioning of Unit 1 Circulation Pumps.
- Drain discharge from Unit 1 CCS Header has been directed to the CDT of the Turbo-installation - 1 after the Drainage Expansion of the Turbo-installation – 2 was removed from operation.
- The algorithm of the Unit 1 service water pump, which is set at automatic start up and standby mode, activation has been changed. Reliable power supply of Unit 1 Service Water Pumps, which are kept in stand-by mode, by means of Unit 1 Diesel Generators has been preserved.
- Modifications of INPP Emergency Warning System have been implemented. The possibility to control the Emergency Warning System from the Main Control Room – 2 has been created.

- The requirements (i.e. those that are established in the Safety Justification of the only INPP operating Unit 2) for the operation of Unit 1 systems and equipment that had been left in operation for Unit 2 safety assurance have been considered in the Unit 1 Decommissioning Project.
- The requirements (i.e. those that are established in the Safety Justification of the only INPP operating Unit 2) for ensuring of the operating conditions of the Unit 1 premises that had been left in operation for Unit 2 safety assurance have been considered in the Unit 1 Decommissioning Project.
- New Technical Specification on INPP Unit 1 operation at the stage of fuel unloading from the reactor has been developed.
- New Technical Specification on operation of INPP Unit 2 with RBMK – 1500 reactor has been developed.
- The required changes have been made to Unit 2 operational documentation.

In 2004 October the Diverse Shutdown System (DSS) has been put into trial-industrial operation. The requirement of the Regulations on the availability of two independent Shutdown Systems has been implemented. Each system is aimed at ensuring the transfer of the reactor core into sub-critical condition as well as maintaining the reactor core in sub-critical condition taking into account the principle of single failure or the failure caused by personnel actions. Within the frames of the DSS Project the safety justification of the DSS has been implemented with the usage of full-scope model of the Probabilistic Safety Assessment (PSA). The model of Unit 2 PSA has been adjusted taking into account the PSA full-scope model of the Diverse Shutdown System.

In order to prevent the evolution of the design accidents into the beyond design accidents and to mitigate the consequences of the beyond design accidents the following Guidelines on the management of the beyond design accidents (RUZA) have been developed at INPP:

- “RUZA -P1. Assurance of the heat removal from the reactor. Power Unit 2.”
- “RUZA -P2. Pressure reduction in the reactor space. Power Unit 2.”
- “RUZA -P3. The ALS condition management. Power Unit 2.”
- “RUZA -РБ. Reduction of the Fission Products’ release. Power Unit 2.”
- “RUZA -P. The Storage Pools’ condition management. Power Unit 2.”

For all above-mentioned Guidelines the appropriate Justifications, which have been developed by the Lithuanian Energy Institute, are available. In 2007 it is planned to complete the implementation of modifications related to the realization of RUZA strategies, also it is planned to coordinate RUZA.

In 2007 the LBB concept has been introduced at INPP. This has assured the implementation of the requirement set out by the appropriate Regulations.

The following Coolant Leakage Detection Systems have been introduced at INPP:

- Leakage detection in the premises of the lower water communication lines.
- Leakage detection in the premises of the ALS leek-tight confinements.
- Coolant leakage detection in the steam pipelines of the TG-3 and TG-4 vaults.

The introduction of the above-mentioned systems helps to improve the safety of the Unit since it allows detecting small coolant leakages at the early stage of the equipment leak-tightness loss.

The Safety Justification for the only operating Unit 2 has demonstrated possibilities for Unit 2 operation continuation after the shutdown of Unit 1.

Thus, conditions of the license for operation of Unit 1 and 2 define the amount as well as the implementation time of all activities necessary to assure INPP safety as based on the results of Safety Analysis Reports.

From the organizational point of view, activities for INPP safety assurance are implemented within the framework of Safety Improvement Program SIP-3.

6.4. Overview of INPP safety improvements programs

INPP activity for safety improvement is based upon priorities to meet the modern requirements of national and international safety standards, upon results of the analysis, carried out in SAR-1, SAR-2 and RSR scope, also it includes additional calculations, implementation of VATESI guidelines, modifications, which improve the system reliability, thus providing the INPP safety. Managerially this activity is fulfilled within the framework of Safety Improvement Program SIP-1 (1993-1996), SIP-2 (1997-2004) and SIP-3 (2005 – 2009).

SAR-2, RSR-2 and Unit 2 safety justification report recommendations became the basis for the new Safety Improvement Program (SIP-3) for the period of 2005-2009.

6.4.1. INPP Safety Improvement in 2004 (SIP-2/2004)

Ignalina NPP Safety Improvement Program No.2 (SIP-2/2004) comprised 81 activities to be implemented during the period from 2004 to 2009.

In 2004, 26 activities of Ignalina NPP Safety Improvement Program No.2 (SIP-2/2004) were implemented:

- Safety Analysis Report for Unit 2 (SAR-2).
- Replacement of 6kV switches at Unit 2.
- Additional PC safety case on assessment of loads on components of GDH and/or pipeline of water supply from ECCS to GDH when cold water is supplied to GDH.
- Assessment of feeding pipeline vibration with determination of defect fatigue growth.
- Modernization of the full-scope MCR simulator.
- Implementation of the project on video camera installation to inspect condition of group 3 wastes in building 157 compartments.
- Updating of SAR for constructions 155, 157, 158 according to comments of IAEA experts.
- Application of the flame-retardant coating on the load-carrying metal structures.
- Repair of drainage system in cable compartments of building 101/1, block. D1.2 compartments 04, 05, 09, 010.
- Development of US-inspection technique for the branch pipes of discharge and pressure headers of PC.
- Replacement of metal gates with a new design gates at buildings 101, blocks A-1,2, B-1,2, V-1,2, G-1,2; D-0,1,2, bldg. 119.
- Arrangement of a protective covering for the slopes of process water discharge channel and repair of the slopes' covering and of the invert of process water discharge channel of the end structure with the help of INKOMAT materials.
- Modernization of CH-2 cranes Q=50/12.5 t.
- Implementation of the alarm and video surveillance system in very significant and significant compartments of INPP inner zone.
- Repair of external wall joints of buildings 157.
- Repair of the asphalt covering on SRW reloading area.

- Equipment of a temporary storing place of contaminated oil and rags.
- Building 157 roof repair.
- Installation of automatic fire alarm in compartments, indicated in FHA 1,2.
- Reinforcement of hipped roof's metal structures in Central Hall and Fuel Storage Pools Hall of r Unit 2 in order to provide required seismic stability.
- Applying of protective layer to condenser pipes of Unit 2 turbines.
- Installation of fire retarding valves in rooms 330,336 block D-2 bldg.101/2.
- Equipment of INPP waste registration and documentation system with additional functions.
- Replacement of cable lines of power supply of electric motors 2YD22D01, OUJ21D01, 2UJ90D04.
- Development of a procedure on preparation, safety review and modification of the Operational Regulations.
- Development of procedures and performance of an independent safety review of operating procedures and their modifications.

Funding of SIP-2/2004

Safety Improvement Program is funded by different sources (see TABLE 2).

TABLE 2

Total expenditures (MLt)	Including:				
	Own sources	National budget/ privatizations fund/ public concerns	Loan	EBRD/ PHARE	Foreign assistance
2004					
129.493	26.397	49.157	15.349	36.98	1.592

6.4.2. General Overview of INPP Safety Improvement Program during the Period of 2005-2007 (SIP-3)

6.4.2.1. INPP Safety Improvement in 2005 (SIP-3/2005)

Ignalina NPP Safety Improvement Program No.3 (SIP-3/2005) comprised 115 activities to be implemented during the period from 2005 to 2009.

In 2005, 43 activities of Ignalina NPP Safety Improvement Program No.3 (SIP-3/2005) were implemented. The most significant activities are the following:

- Commissioning of the Safety Parameter Display System at Unit 2.
- Replacement of doors in the rooms containing the components of safety-related systems with more than 1-hour fire resistant doors.
- Purchase of a new hauling unit for transportation of radioactive waste.
- Improvement of physical protection system of INPP perimeter.
- Implementation at Information computing System (ICS) of a program for diagnostics of emergency protection ORM system.
- Implementation of control means of cars' concealed cavities and difficult of access places at the checkpoints.
- Re-equipping of checkpoint for oversized motor transport.
- Implementation of stationary means for explosives and drugs detection.
- Procurement of a new set of automatic equipment for welding under welding flux of CONSTOR casks lids, containing spent fuel.
- Safety analysis of compacting device (bldg. 150 room 162).

- Performance of analysis of 1346.00.00.000 container drop to the lid of the transfer canyon in Reactor Hall.
- Performance of additional analysis of computer codes of ALS thermal-hydraulic behaviour during accident.
- Additional analysis of calculation codes on the basis of calculation of heat conductivity of ALS building units.

Total expenditures under SIP-3/2005 program amounted to 82 352 000 LT (or about 23.87 M€).

6.4.2.2. INPP Safety Improvement in 2006 (SIP-3/2006)

Ignalina NPP Safety Improvement Program No.3 (SIP-3/2006) comprised 86 activities to be implemented during the period from 2006 to 2009.

In 2006, 28 activities of Ignalina NPP Safety Improvement Program No. 3 (SIP-3/2006) were implemented. The most significant activities are the following:

- Implementation of facility of Unit 1 fuel afterburning in the reactor of Unit 2.
- Implementation of Leak before break (LBB) concept at INPP. Additional installation of small leak detection systems in rooms where PC, feed water and direct steam lines are located.
- Design, equipment purchase and installation of Cementation Facility for ion exchange resins and slurry.
- Upgrading of Unit 2 radiation safety automatic control system.
- Implementation of the Second Diverse Shutdown System at Unit 2.
- Upgrading of factory waste segregation and measurement system for separation of radioactive wastes.
- Implementation of protection signal on decreasing of flow rate in GDH in AZ-1.
- Development of the Program and Safety Justification of INPP Unit 1 reactor during SFA unloading after the reactor decommissioning.
- Development and implementation of a new Technical Specification on Unit 1 operation.
- Development of Guidance on the management of beyond design accidents.
- Performances of calculations of ALS condense capacity during design basis accidents when modelling ALT scheme with more than one condensation pool.
- Development, delivery and mounting of the SFA fuel element cladding integrity system at Unit 1 and 2.
- Modernization of the compartment Nr. 8 in SRWS (build. 157/1) for its usage for interim storage of SRW.

Total expenditures under SIP-3/2006 program amounted to 60 893 000 LT (or about 17.65 M€).

6.4.2.3. INPP Safety Improvement in 2007 (SIP-3/2007)

Ignalina NPP Safety Improvement Program No. 3 (SIP-3/2007) comprised 90 activities to be implemented during the period from 2007 to 2009.

Total expenditures under SIP-3/2007 program is planned to amount to 33 929 000 LT (or about 9.83 MEURO).

Funding of SIP-3

Safety Improvement Program is funded by different sources (see TABLE 3).

TABLE 3

Total expenditures (MLt)	Including:			
	Own sources	Public Interests	Loan	Unit 1 Decommissioning Fund
2005				
82.352	**32.592**	**42.597**	**7.163**	
2006				
60.893	**31.056**	**29.419**	**0**	**0.418**
2007				
33.929 (planned)	**21.091 (planned)**	**12.28 (planned)**	**0**	**0.558 (planned)**

6.5. Decommissioning of INPP

6.5.1. The key events related to the decommissioning of the INPP

On 5 October 1999 the Seimas approved the National Energy Strategy in accordance with which Unit 1 at INPP is to be shut down by 2005, given the long-term substantial financial support conditions of the European Union, G-7 and other countries and international financial institutions. On 31 December 2004 Unit 1 was shut down and Unit 2 is to be operated until the end of 2009.

On 19 February 2001 the Government of the Republic of Lithuania approved the Decommissioning Program of INPP Unit 1 envisaging the measures for 2001-2004. On 2 February 2005 the Government of the Republic of Lithuania approved the new Decommissioning Programme for both Units of INPP. The main objectives of the Programme are:

- to ensure safe operation of Ignalina NPP during preparatory decommissioning phase and during actual decommissioning activities;
- develop, modify and add to the legal acts related to Ignalina NPP decommissioning;
- ensure the work of Ignalina NPP Decommissioning Service and Unit 1 Surveillance Service;
- in the order defined by the legal acts, evaluate both the preparatory decommissioning projects and the decommissioning projects in respect to nuclear and radiation safety as well as license them;
- to mitigate negative social and economic effects.

It also specifies necessary organizational, technical, economical and social measures to achieve the above mentioned objectives.

Furthermore, on 25 February 2005 the plan was approved by the order of the Minister of Economy on implementation of measures of the decommissioning program of INPP Units 1 and 2 envisaging the measures for addressing environmental, social and economic problems, as well as the consequences of premature decommissioning. The document is reissued once a year.

6.5.2. Documents and projects of the INPP Decommissioning

The Final Decommissioning Plan

Preparing for decommissioning and implementing the *General requirements for decommissioning the Ignalina Nuclear Power Plant*, approved by the Head of VATESI in 1999 and supplemented in 2003, Ignalina NPP prepared the Final Decommissioning Plan (FDP). In 2005 this plan was approved by the Ministry of Economy.

The plan includes the whole period of INPP decommissioning (both Units, auxiliary equipment and interim storage facilities for spent fuel and waste). On basis of proposed strategy decommissioning activities and projects are being planned. FDP describes principles, methods and technologies, as well as general schedule, which will be necessary for ensuring safe, in respect to radiation, ecological and efficient decommissioning process. The following information is presented in INPP FDP:

- Applied base of normative documents;
- Accepted dismantling strategy;
- Decommissioning plan and schedule;
- Description of radioactive and hazardous materials;
- Decommissioning activities;
- Decontamination activities;
- Dismantling methods and technologies;
- INPP waste management strategy;
- Safety and environmental impact evaluation;
- Radiation safety program;
- Organizational chart of INPP decommissioning;
- Decommissioning expenses and financing;
- Quality assurance;
- Final radiological exploration and territory recultivation.

In respect to nuclear safety the activities connected with possible risk will be carried out for the first ten years after final shutdown of the reactors (spent fuel treatment, decontamination, modification and isolation of systems). The works will be prepared and performed by INPP qualified staff.

FDP describes the volumes of waste which are not finally treated and which shall be taken into account while decommissioning preparation and realization. In order to summarize it can be affirmed that as a result of INPP operation and decommissioning about 5900 m^3 of spent resins, perlite and sediments, as well as 130000 m^3 of solid radioactive waste will be generated. This waste shall be treated in the new cementation facility and in the future Solid Waste Management and Storage Facility. After that waste, depending on the category, can be sent for free release (if contamination levels are less than controlled), disposed in the near surface repository for very low active short-lived waste or temporarily stored on the power plant site until the appropriate repositories will be constructed (near surface or deep geological). Taking into account the envisaged volumes of waste it is recommended to construct near surface repository for very low active short-lived waste with capacity 60000 m^3 and near surface repository with capacity 100000 m^3. The volume of bituminized waste will be more than 24000 m^3. After INPP empty buildings dismantling and disassembling of their constructions 965000 m^3 of concrete and 190000 tons of steel will be generated additionally, and their level of contamination by radionuclides will be less than controlled.

As the salary size will impact on the general decommissioning expenses, FDP considers two scenarios of salary evolution. The first scenario is substantiated by evolution of the payment used for modelling of pensions of the Ministry of social maintenance and labour: factual rate of growth (i.e., excluding inflation) changes from 1,8 to 2,6 % taking into account the reviewed year. In this case decommissioning expenses are 1337 M€. The second scenario envisages that after joining EU

labour force expenses in Lithuania for enduring period shall reach the European level, i.e., progressively rise from today's average value 6 €/hour at INPP to the average value 40 €/hour in 2026. According to this scenario estimated expenses are 2019 M€. Expenses estimated in FDP do not cover the storage of the future possible waste (spent fuel, graphite, other radioactive waste not applicable for near surface disposal) on INPP site after expenses of 2029, as well as expenses related to disposal of this waste. It should be added that expenses related to maintenance and control of repositories, which will remain on the INPP site after decommissioning, were also not taken into account, however expenses on construction of repositories have been estimated. All these decommissioning expenses will be allocated in time, beginning with 2003 and finishing with 2029, when the power plant will be finally decommissioned.

Since INPP decommissioning is such economical activity for which the process of Environmental Impact Assessment (EIA) is obligatory, in parallel with FDP the Program of Assessment of the Planned Economical Activity Impact on the Environment was developed and approved. It is specified in EIA programme what issues will be reviewed in EIA reports, as well as INPP environment is described, since according to it the impact of decommissioning on the environment will be evaluated later.

Decommissioning Project for INPP Unit 1 Final Shutdown and Defuelling Phase

Decommissioning Project for INPP Unit 1 Final Shutdown and Defuelling Phase including Safety Justification (SAR) and Report on Environment Impact Assessment (EIA) was prepared in August 2004. Project and its SAR and EIA were accepted by State competent authorities.

In June 2006 VATESI approved the Decommissioning Project for INPP Unit 1 Final Shutdown and Defuelling Phase and its safety analysis report. VATESI also arranged nuclear safety review of the project and review's conclusion submitted to the Ministry of Environment that arranged the State Complex Expertise of the project. The conclusions of State Complex Expertise were issued in October 2006.

Decommissioning Project covers works which will be performed within the frames of prolonged operational license for INPP Unit 1. It is one of the documents substantiating the permission for reactor final shutdown. The project has double purpose:

A) Process regulations, in which:
   - The systems (their parts) which are not needed any more are indicated, their further isolation/modification is described, that allow reducing costs for the shutdown Unit maintenance;
   - In-line decontamination of MCC and refuelling machine is described (with the aim to reduce personnel irradiation during further dismantling works performance).

B) Guide on planning in which all expenses of the described period are estimated (related not only to process activities, but to operation of remained systems, treatment of fuel and radioactive waste, as well as other preparatory works), need in man power, personnel irradiation, discharges into environment and radiation impact on the population.

The Project does not cover dismantling works, since they will be performed within the frames of other dismantling and decontamination projects.

In 2004 VATESI and the INPP agreed as to what documents would have to be analyzed in order to grant Unit 1 the status of a finally shutdown facility. In late 2006 having analyzed the last of the submitted documents, VATESI granted this status to the INPP unit 1 and gave permission to carry out operations envisaged in Decommissioning Project for INPP Unit 1 Final Shutdown and Defuelling Phase.

In June 2007 VATESI and the INPP agreed as to what documents would have to be analyzed in order to grant Unit 2 the status of a finally shutdown facility.

Environmental impact is analyzed in EIA report, on basis of which Ministry of Environment has accepted affirmative solution regarding final shutdown of Ignalina NPP and possibilities of nuclear defuelling in respect to environmental impact. In accordance with Espoo Convention EIA report is a subject of consultations (see 17.1.3).

Project B1 "Interim Spent Fuel Storage Facility for INPP "

The project envisages construction and delivery of equipment for management of fuel assemblies whose integrity has been damaged, removal of spent nuclear fuel (about 18000 fuel assemblies) from INPP power Units 1 and 2, its transportation to a new storage facility and its temporary storage for the period not less than 50 years.

On 12 January 2005 the Contract on the Project realization was signed. At present design documentation is being developed and approved. The commissioning of the first line of storage facility is planned by the end of 2008

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The Project, its SAR and EIA should be accepted by State Competent Authorities. Appropriate activities should bee licensed by VATESI. On April 2007 the licence for constructing the INPP Interim Spent Fuel Storage Facility was issued by VATESI.

Project B2, 3, 4 "Solid Waste Management and Storage Facility"

Solid Waste Management and Storage Facility is a modern system of operational waste and decommissioning waste management.

The Facility is intended for extraction, transport, preliminary classification, classification, treatment (correspondingly), characterization and storage of:

- Long-lived and short-lived solid radioactive waste which are stored at present on INPP site;
- Operational solid and combustible liquid radioactive waste which will be generated prior to Unit 2 operation completion;
- Solid radioactive waste which will be generated during INPP decommissioning.

The Contract on Project B2,3,4 realization was signed on 30 November 2005. At present design documentation is being developed. The planned completion of Contract works is November 2009. The Project, its SAR and EIA should be accepted by State competent authorities. Licences for appropriate activities should bee granted by VATESI.

Project B5 "Reliable Heat and Steam Source for INPP and Visaginas"

Contracts for construction of Steam Boiler Station and Heat Only Boiler Station were signed on 2 July 2003.

Steam Boiler Station was put in commission on 9 September 2005, Heat Only Boiler Station was put in commission on 10 May 2006. At present Boiler Stations operate according to the projects.

On 27 October 2003 the contract for rehabilitation of supply pipeline from Heat Only Boiler Station to INPP (about 7000 m) and for industrial pipeline and internal installations inside INPP was signed within the frames of the same B5 project. The works related to rehabilitation of pipeline from Heat

Only Boiler Station to INPP were completed in July 2005. Works related to rehabilitation of industrial pipelines inside INPP were completed in October 2005.

The works on rehabilitation of INPP buildings heat substations were singled out into a separate Project B5-5. Signing of Project B5-5 Contract is planned for 30 June 2007. Completion of works is planned for late December 2008. At present evaluation of Tender proposals is carried on.

Project B6 "Modernisation of the Technical Documentation Archive at Ignalina NPP"

Two Contracts were awarded within the frames of this project. The contract for design and construction of archive building was signed on 29 August 2003. The construction was completed and the archive building was put in commission on 25 August 2004. The contract for design and installation of archive system was signed on 21 January 2004. Installation of the System was put in commission on 7 September 2005.

At present the archive operates according to the project.

Project B16 "Controlled Shunt Reactor at INPP 330kV Switchyard"

After closure of INPP Unit 1 and when INPP Unit 2 will be in outage due to reactive power that is being generated by the energy system, excess, voltage in INPP AtS-330 kV buses can increase to 366-370 kV. This will exceed the maximum allowed voltage of 362 kV and might cause INPP's 330 kV equipment, as well as other adjacent energy system substation equipment failure. When Unit 2 generators will be connected to the power grid, they will be used to compensate when operating in the reactor power utilization mode. However this will increase wear out and reduce their reliability. Therefore one compensating reactor AtS-330 kV at INPP of 180 MVar need to be installed at INPP's substation as a measure consequential to the closure of INPP.

On 19 October 2006 the Contract was concluded for design, construction, equipment delivery, installation and fettling of shunt reactor at INPP 330 kV switchyard. Main activities on preparation of construction site for works execution have been completed by now, the stage of designing is in its completion phase, the orders for manufacturing of high-voltage equipment, metal constructions and relay protection devices have been located, manufacture of the reactor and its control system has been started. According to the contract the object shall be put in commission in January 2008.

Project B17 "Decommissioning Management System and Database"

The solution of such tasks as inventory of decommissioning objects, forming of projects scopes and schedules, assessment and planning of expenditures, as well as multilevel planning of works, taking into account efficiency and amount of resources, and evaluation of technical, time and commercial risks is required for effective decommissioning processes management. Strict requirements to effective realization within the frames of planned budgets and terms dictate the necessity of up-to-the-minute control automation technologies application.

INPP Decommissioning Management System (B17) shall connect all sides of decommissioning management process, including waste management, human resources planning, projects management, material expenditures planning, documentation and submit unified interface of INPP decommissioning processes, dismantling, decontamination management.

On October 2006 the services Supplier was selected. Financial proposal of the winner has exceeded planned budget of Project B17. Additional evaluation of project budget was performed, which confirmed financial proposal of the Tender winner. The letter about additional financing of Project B17 from the saved money of Ignalina Programme was sent to the LR Ministry of Economy and

EU Committee. On May 2007 the Contract on Project realization to the winner of Tender was awarded.

Project B19 "Landfill Facility for Short-Lived Very Low Level Waste"

Segregation and disposal of Short-Lived Very Low Level activity (group A) waste in the Landfill will reduce the volume of the near surface repository, and hence, the overall waste disposal costs. Landfill availability will enable to dedicate the near-surface repository only for the disposal of Low and Intermediate Level Waste (group B and C waste).

The availability of a Landfill disposal is a key pre-requisite to start the dismantling of the low contaminated system. Timely availability of the Landfill facility is also an important interface for cost-effective implementation of the solid waste management and storage facility.

On 13 December 2006 the Government of the Republic of Lithuania approved the Order On the Designing of the INPP Buffer Storage and Disposal Facilities for Short-Lived Very Low Level Waste.

At present the documents have been prepared (Procurement documents and Technical Specification) and the Tender has been announced for design of the whole Landfill complex and construction of the buffer storage. Conclusion of contract is expected in September 2007.

Buffer storage commissioning is planned for September 2009. As long as buffer storage shall ensure waste accumulation for loading campaign realization during 2 years, construction of disposal module (modules) is planned for the period 2009 – 2010. The facilities could be commissioned after its safeties have been assessed and VATESI licenses have been granted.

Project B25 "Near Surface Repository (NSR)"

The Facility provides final disposal of conditioned Short Lived Low and Intermediate Level radioactive waste (RAW). A 100000 m^3 storage capacity is needed for the disposal of both the operational and decommissioning waste.

In 2002-2004 RATA worked out the concept of radioactive waste disposal in a near surface repository, and conducted a study on selection of sites suitable for a near surface repository. Lithuanian scientists studied the geological structure of the proposed Galilauke and Apvardai sites and assessed the environmental impacts of the repository. The sites are in the vicinity of the Ignalina NPP, a short distance away from Lithuania's border with Belarus and Latvia. Therefore the issue gained considerable attention from the public of Lithuania and the two neighbouring countries. In 2005, the decision was taken to study Stabatiške site, too. In 2006 the competent authorities reviewed and assessed the environmental impact assessment study. On June 2007 the Ministry of Environment took the decision regarding the sites on that the repository is to be constructed.

At present Technical Specification and Tender documents are being developed. Conclusion of contract is planned for 2009.

The facility could be commissioned around 2012, after its safety has been assessed and VATESI license has been granted.

Project B20 "Upgrade of Bituminised Waste Vaults"

The objective of the project is safe and reliable storage of bitumen compound (resulting from treatment of liquid radioactive waste).

With this aim the development of feasibility study of the possibility of existing storage utilization as a long-term one has been started.

Project B21 "Modernization of Training Centre for Personnel Training on Performance of INPP Decommissioning Activities"

Decommissioning activities require new skills of the current operating INPP personnel. Consequently retraining is needed. Also ensuring of high safety awareness and efficiency of plant personnel utilization during decommissioning is mandatory.

At present project fiche has been prepared for financing of preparatory works on creation of Training Centre at INPP for training of personnel on decommissioning issues. These works include preparation of training programmes and materials, training of instructors, creation of projects for existing Training Centre training infrastructure expansion. Preparatory stage includes the works that will be carried out during the interval from 2007 to 2009.

B10 "Free Release Measurement Facility"

The decommissioning of nuclear power plants results in the production of great amount of materials and equipment which contamination levels are below clearance levels. A significant part of these materials and equipment could be reused, recycled or otherwise disposed without further regulatory control. Final Decommissioning Plan of INPP gives quantity of such type waste as 17000 tons.

Huge quantity of building concrete debris to be produced during decommissioning should be also noted.

Project B10 has been initiated for reduction of the amount of disposed waste as radioactive and possibility of its further use at INPP.

In December 2006 the process of Tenderers proposals evaluation was completed. The Contract has been awarded to the winner of Tender - Consortium of companies VF and ENVINET (Czech).

The planned date of facility commissioning is spring 2008.

B10-1 "Relocation of INPP Physical Protection Perimeter Section"

This project is necessary in order to include new objects into INPP controlled area such as Free Release Measurement Facility and buffer storage facility, which are planned to be built for the possibility of decommissioning process realization. According to this project it will be necessary to change the existing Physical Protection Perimeter in the dismantled Unit 3 area. The project is being financed from International Ignalina Decommissioning Support Fund. It is Tender period at present. The completion of Project is planned in July 2008.

B11 "Supply and Installation of Tools and Equipment for Radiological Characterization of INPP"

Equipment for radiological characterization of INPP is necessary for radiological characterization of INPP equipment and getting necessary data about radionuclides content in the waste, which will appear as a result of nuclear object decommissioning. These data are necessary for evaluation of the

future expenses and potential risk, connected with waste treatment, storage and especially disposal, reduction of ionizing radiation impact on the personnel, as well as effective decommissioning planning.

These tools and equipment also enable to pre-characterize the decommissioning waste (dismantled components) at the place of the ware production, i.e. prior to its transportation to the conditioning unit.

The Contract was awarded to the winner of Tender Company ENVINET (Czech) and was completed in November 2006.

Equipment Dismantling & Decontamination Designs Development

After INPP Units 1 and 2 shutdown most of the systems and equipment of the shutdown power units, which do not relate to the provision of fuel cooling, defuelling, transfer and safe storage at the Units, can be dismantled. Only the systems having process connections with the systems, which provide safe treatment of the fuel, remain in operation, as well as the systems providing normal conditions of the systems remaining in operation and the building maintenance (systems of heating and ventilation, lighting, fire-fighting, drainage system, etc.)

B9-0 "INPP Building 117/1 Equipment Decontamination and Dismantling Project Development"

The objective of Project B9-0 is the development of engineering documentation (Basic Design and Detailed Design) and licensing documentation that will allow INPP personnel dismantling of Building 117/1 (ECCS) decommissioning equipment.

The Project Tender proposals were evaluated, and in August 2007 – the Contract awarded. The execution of the dismantling and decontamination works is set for summer 2008.

B9-1 "INPP Unit 1 Turbine Hall Equipment Decontamination and Dismantling Project Development"

The objective of Project B9-1 is the development of engineering documentation (Basic Design and Detailed Design) and licensing documentation that will allow INPP personnel dismantling of INPP Unit 1 Turbine hall decommissioning equipment.

Tender proposals evaluation and Project Contractor designation have been performed on September 2007. The planned date of Contract completion is the second half of 2009.

The objective of Projects B9-2,5,6,7,8 is the development of engineering documentation (Basic Design and Detailed Design) and licensing documentation, that will allow INPP personnel dismantling of INPP Units 1 and 2 decommissioning equipment.

At present PIS prepared on these projects are being reviewed in accordance with the comments received from EBRD experts. The planned time for submission of these documents to EBRD for approval is May 2007.

The package of these projects includes:

B9-2 "INPP Building V1 Equipment Dismantling & Decontamination Design Development";

B9-5 “INPP Boiler House Equipment Dismantling & Decontamination Design Development”;

B9-6 “INPP Building 117/2 Equipment Dismantling & Decontamination Design Development”;

B9-7 “INPP Building G2 Equipment Dismantling & Decontamination Design Development”;

B9-8 “INPP Building V2 Equipment Dismantling & Decontamination Design Development”.

INPP Units 1 and 2 Reactors Dismantling & Decontamination Design Development.

After INPP Units 1 and 2 shutdown, Units 1 and 2 reactors cores defuelling and execution of PC in-line decontamination Units 1 and 2 reactors become the candidates for dismantling. Dismantling of reactors can be started only on condition that the equipment for radioactive waste treatment is prepared and the license of appropriate state institutions is received. Taking into account that dismantling of such type of the reactor has not been performed in the world, this project will start with the study of reactor RBMK dismantling possibility – package of Projects B9-4.

B9-4/1 “INPP Units 1 and 2 Reactors Dismantling & Decontamination. Feasibility Study”

The objective of the project is the development of the possible reactor dismantling strategy, development of waste, produced during reactor dismantling, management strategy, determination of equipment for dismantling, preliminary evaluation of dismantling works cost. These data will be initial ones for development of the Basic Design for reactor dismantling.

At present PIS prepared on this project is being reviewed in accordance with the comments received from EBRD experts. The planned time for submission of this document to EBRD for approval is May 2007.

Tools and Equipment for Dismantling & Decontamination of Systems/Equipment Components

Tools and equipment for dismantling of systems/equipment components shall ensure safe dismantling of this INPP equipment (turbines, steam generators, drum separators, etc.) and preparation for the further treatment/storage.

Tools/equipment for decontamination of systems/equipment components shall ensure acceptable level of contamination for further treatment and disposal, to reduce the impact on the personnel and to assure that the release of radioactive contaminants to the environment will be maintained within authorised limits during dismantling activities.

These projects will be initiated in the process of appropriate Projects B9-2,5,6,7,8, realization, in which it will be specified what tools and equipment will be applied for dismantling in INPP Units 1 and 2 buildings.

The package of these projects includes**:**

B13 “Provision of Dismantling & Decontamination Tools for INPP Building 117/1”;

B14 “Provision of Dismantling Tools for INPP Building G1”;

B22 “Provision of Dismantling Tools for INPP Building V1”;

B29 "Provision of Dismantling & Decontamination Tools for INPP Buildings A1, B1, Boiler House, 117/2, G2, V2";

B30 "Tools for Project B9-4 (Unit 1 Reactor Decontamination and Dismantling)";

B15 "Provision of Decontamination Tools for INPP Building G1";

B23 "Provision of Decontamination Tools for INPP Building V1";

B24 "Equipment and Consumables for In-line Decontamination at Unit 2".

Presentation of the future equipment dismantling & decontamination projects package (PIS), as well as decommissioning support projects, took place in February 2007 with participation of international experts and EBRD representatives. It is planned that the solution apropos of the submitted projects financing will be accepted during the next Assembly of Donors set for July 2007.

6.6. Safety measures following the shutdown of Unit 1

As long as nuclear fuel is still in the reactor or spent fuel storage pool (SFSP), Unit 1 is classified as nuclear facility. All decommissioning activities during this stage shall be performed in accordance with the design requirements, safe operation limits and conditions.

The safety case of Unit 1 decommissioning during the reactor and SFSP defuelling stages is provided in ,,INPP Unit 1 Decommissioning Safety Analysis Report (DSAR) for Defuelling Stages 1 and 2", which was developed by the Decommissioning Service and agreed with the Regulatory Authority of the Republic of Lithuania in 2005. The 1st defuelling stage can be characterized as a stage of fuel unloading from the reactor and the subsequent storage of spent fuel assemblies (SFA) in SFSP or their transportation to Unit 2 for complete burn up. This stage started after the final shutdown of Unit 1 (FRS) and covers all activities related to defuelling process until no fuel elements are left in the reactor core. When this task is accomplished, some of the systems that were necessary for the reactor defuelling, can be put out. The second stage – unloading of spent fuel elements from SFSP - is performed after accomplishing of the 1st stage. The 2nd stage continues until all fuel elements are transferred to the off-site interim storage facility and there is no fuel left in Unit 1.

DSAR defined the safety systems and equipment that shall remain in operation during the Unit 1 decommissioning process.

,,Technological Regulation for Operation of INPP Unit 1 during the Reactor Defuelling Stage" is the main guiding document defining safe maintenance of Unit 1 and safe operation limits and conditions. The Technological Regulation is developed for defuelling stage and is approved by Regulatory Authority of the Republic of Lithuania. All procedures related to operation and maintenance of systems and equipment of Unit 1 have been reviewed.

Safe maintenance of Unit 1 is financed from the Ignalina Program. Since 2005 January 1 Salaries for main personnel involved in servising Unit 1 have been paid from the funds of European Commission. Technical maintenance of Unit 1 is financed from the national fund.

New information

Section 6.3. Added information about recently performed safety assessments and implemented safety measures.
Section 6.4. Included overview of INPP Safety Improvement Program during 2005-2007 (section 6.4.2).
Section 6.5. Presented recent information on INPP Unit 1 decommissioning issues.
Section 6.6. Added information about Safety measures following the shutdown INPP Unit 1.

Article 7: LEGISLATIVE AND REGULATORY FRAMEWORK

1. Each Contracting Party shall establish and maintain a legislative and regulatory framework to govern the safety of nuclear installations.

2. The legislative and regulatory framework shall provide for:

i. the establishment of applicable national safety requirements and regulations;

ii. a system of licensing with regard to nuclear installations and the prohibition of the operation of a nuclear installation without a license;

iii. a system of regulatory inspection and assessment of nuclear installations to ascertain compliance with applicable regulations and the terms of licenses;

iv. the enforcement of applicable regulations and of the terms of licenses, including suspension, modification or revocation.

7.1. State Regulation of Nuclear Power utilization

Chart of interaction between regulatory bodies and operators as well as competence of national authorities are presented in Annex to 7.1.

7.2. Summary of Laws, Regulations, Licensing System and the Inspection, Assessment and Enforcement Process governing the safety of Nuclear Installations

7.2.1. National legislative framework for nuclear safety regulations

Current legislation in nuclear field is based on *the Law on Nuclear Energy from 1996*. The Law defines the principal objectives of state regulation of nuclear energy safety as well establishes basic principles as following:

- the basic conditions and criteria for the safe use of nuclear energy including the possession, transfer, handling, use, storage, transport of nuclear and radioactive materials and radioactive wastes used in nuclear energy field, operation and decommissioning (including its financing) of nuclear energy facilities, as well as export and import of nuclear materials and equipment.
- the special conditions for the design and construction of nuclear facilities;
- basic requirements for the physical protection of nuclear facilities and nuclear materials;
- basic requirements for accounting and control of nuclear materials;
- basic requirements for the prevention of and response to nuclear and radiological accidents;
- the control and supervision the procedure of observance of these conditions and criteria;
- the base for sanctions for persons who violate the requirements for nuclear safety, radiation protection, accounting and control of nuclear materials;
- the principles of liability for nuclear damage;
- legal basis for activities of legal entities and natural persons in the field of nuclear energy
- the specific features of labour relations in the sphere of nuclear energy;
- designates the competent authorities in the field of nuclear energy and outlines their responsibilities.

More detailed conditions in the fields of radiation protection, of radioactive waste management and of the NPP's decommissioning are provided by specific laws on these issues, as following:

The Law on Radiation Protection establishes the legal basis for protection of people and the environment from the harmful effects of ionizing radiation. It also establishes a licensing system for the use of radioactive materials and radiation-emitting devices, and prescribes general rules for their use. The powers and responsibilities of the authorities are described in more detail in the Article 15.

Law on Radioactive Waste Management establishes the rights, duties and functions of the state executive and supervisory authorities and of persons and legal entities involved in radioactive waste management, including its export and transit. The Law is divided into ten chapters governing, inter alia, licensing, responsibilities of waste generators, establishment of the Radioactive Waste Management Agency and requirements concerning radioactive waste management facilities, including their sitting, design, construction, commissioning, operation, decommissioning and control after closure. The Law stipulates that the principal objective of the Radioactive Waste Management Agency is to manage and dispose all radioactive waste transferred to it, assuring nuclear and radiation protection and to act as the operator of storage facilities and repositories assigned to it.

The Law on Environmental Protection in conjunction with the law on Environmental Impact Assessment stipulates that installation of any nuclear facility must be accompanied by an environmental impact assessment. The Law on Environmental Protection regulates all environmental issues, whereas the Law on Nuclear Energy regulates only nuclear facilities safety issues.

Law Regulating the Import, Export and Transport of Strategic Goods and Technology regulates the import, export and transport of strategic goods and technologies that are considered as the activities that could contribute to the proliferation of nuclear weapons, thus ensuring the implementation of international agreements that prohibit such proliferation. The Law establishes lists of goods subject to control as well as lists of countries with which all import or export of goods subject to control is prohibited. Licenses are necessary for all goods subject to control, and are issued by the Ministry of Economy. The Ministries of the Environment, Defense, Finance and various other state entities whose activities involve goods subject to control, must consult the Ministry of Economy on any decisions concerning such goods.

The Law on the Nuclear Power Plant. The purpose and objective of this Law shall be to lay down provisions and to create legal, financial and organizational preconditions for the implementation of a new nuclear power plant project. A project implementing company shall be established, registered and operated to implement this project. The project implementing company shall be responsible for carrying out project implementation activities in compliance with the safety requirements imposed on nuclear activities. Having fulfilled the requirements laid down in legal acts and having received authorizations and licenses, the project implementing company shall become the operator of the nuclear power plant

The Annex to 7.2 provides for laws, main regulations and international agreements aplicable in nuclear energy sector. Other regulations in the respective fields are described in more detailed in relevant articles.

Basic Licensing Conditions in Nuclear Energy of the Republic of Lithuania

The Republic of Lithuania Law on Nuclear Energy defines basic licensing conditions in nuclear energy sector. Without a license issued in prescribed manner of the Government of the Republic of Lithuania, it is prohibited:

1. to design, construct and reconstruct nuclear facilities, installations and equipment;
2. to operate nuclear facilities;
3. to store nuclear and radioactive materials and their waste;
4. to decommission a nuclear facility;
5. to dispose nuclear and radioactive materials and their waste;
6. to acquire, possess and transport nuclear materials;
7. to acquire, possess and transport radioactive materials;
8. 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.

Licensing institutions:

- Licenses for the activities referred to in the item 1 of above paragraph are issued by VATESI after co-ordination with the Ministry of the Environment, Radiation Protection Centre and a local authority whose territory or its part is within the sanitary protection zone of a nuclear facility.
- Licenses for the activities referred to in the items 2-5 of above paragraph are issued by VATESI after co-ordination with the Ministry of the Environment and Radiation Protection Centre. Licenses for the activities referred to in the item 6 of above paragraph are issued by VATESI after co-ordination with Radiation Protection Center.
- Licenses for the activities referred to in the item 7 of above paragraph are issued by Radiation Protection Centre after co-ordination with VATESI.
- Licenses for the activities referred to in the item 8 of above paragraph are issued by the Ministry of Economy after co-ordination with VATESI and Radiation Protection Centre.

7.2.2. Developments of national legislative and regulatory framework (2005-2007)

National legislative framework in nuclear sector was amended mainly for the following:

- to take into account requirements from regulations of the European Union;
- to establish legal framework for construction of a new nuclear power plant in Lithuania;
- to improve framework for the decommissioning in order to facilitate the decommissioning process.

Amongst several amendments that were performed in 2005-2007, some more significant peaces of legislation could be mentioned as follows:

Safeguards application

The Trilateral Agreement on Safeguards Application between EU Member States which do not possess nuclear weapons, Euratom and IAEA concluded pursuant to the Nuclear Non-Proliferation Treaty as well the Additional Protocol to the Agreement came into force in Lithuania in April 2007 by the Law on its ratification in the Parliament. The Law empowered VATESI to all the issues related to this Agreement and the Protocol within the scope and responsibility of the State.

Radioactive waste management and radiation protection

Amendment to the law on Radioactive Waste Management was approved in 2005. The Law was particularly amended in connection with the requirements of the Council Directive on the Control of High Activity Sealed Radioactive Sources (2003/122/Euratom) as well for extending the competence of Radioactive Waste Management Agency in sitting of near surface repository of short and intermediate radioactive waste.

As a consequence, the Government approved the Regulations on the Management of Illegal Sources of Ionising Radiation and Objects Polluted with Radionuclide implementing the Directive (2005, Nr. 36-1170).

The Regulations on Export, Import, Transit and Transportation within Lithuania of Radioactive Material and Waste were developed to implement the EU legislation on the supervision and control of shipments of radioactive waste (Council Directive on the supervision and control of shipments of radioactive waste between Member States and into and out of the Community (92/3 Euratom), Council Regulation on shipments of radioactive substances between Member States (1493/93/Euratom) and Commission Decision establishing the standard documents for the supervision and control of shipments of radioactive waste referred to in Council Directive 92/3/ Euratom (93/552/Euratom)) and approved by the Minister of Health (26 Nov 2004, No V-834).
The Radiation Protection Centre is the main institution responsible for the implementation of the Regulations.

Decommissioning and its financing issues
Main decommissioning trends for implementation of the decommissioning of the Ignalina NPP were established by Decommissioning Programme for Ignalina Nuclear Power Plant Units 1 and 2 approved by the Government in 2005 (Government Resolution No117 of 2 February 2005). The Programme was prepared to implement the provision contained in the Government Resolution No 573 on Approval of Directions of Addressing the Consequences of the Closure of Ignalina NPP adopted on 8 May 2003 and the Law on Decommissioning of the First Unit 1 of Ignalina NPP. The Programme is designed for the purpose of laying down measures for preparation for the dismantling of the first unit and preparation for the decommissioning of the second unit, which are to be implemented within four years (2005-2009). The implementation of the Programme is delegated to the responsibility of the Ministry of Economy together with the Commission established under a Resolution of the Government in 2000 for the purpose of coordinating the implementation of Ignalina NPP-related provisions of the National Energy Strategy. The Ministry of Economy and the aforesaid Commission coordinate the activities of institutions which take part in the Programme implementation, assess the impact of the Programme implementation and duly inform the Government on the progress of the Programme.

In accordance with the Treaty of Accession to EU, which establishes the Ignalina Programme as the instrument for the EU financial assistance to INPP decommissioning activities, and following procedures set up in relevant Commission decisions, the Government of the Republic of Lithuania approved a Resolution on the Programme Administration in Lithuania (Government Resolution No 980 of 7 September 2005, as amended on 15 January 2007). Pursuant to this Resolution, the Ministry of Economy was appointed the main institution responsible for the implementation of the Ignalina Programme in Lithuania; the resolution establishes competences on this matter of the Ministry of Finance and the Central Project Management Agency.

Developments regarding subordinate legislation are provided in relevant articles of the report.

International conventions
Lithuania joined the International Convention for the Suppression of Acts of Nuclear Terrorism by the law of its ratification (17 May 2007, Nr.X-1143). The State Security Department appointed the responsible institution in Lithuania under article 7 of the Convention.

Governmental institutions of Lithuania approved the possibility to join the revised Convention on Physical Protection. Draft documents for the ratification of the conventions are scheduled to be adopted in 2007.

Continuity and development of safe nuclear power generation in nuclear power plants

One of the main working trends covering the developments of the nuclear energy sector in Lithuania constitutes consideration of possibilities for construction of a new nuclear power plant.

To the main legal acts of the Republic of Lithuania, establishing the strategy of the development of the nuclear energy in Lithuania and other documents relevant to the development of the nuclear energy, the following documents could be attributed:

- *Resolution on the Republic of Lithuania on the Continuity of Nuclear Energy and updating of the National Energy Strategy* adopted by the Parliament on 29 September 2005

In *the* Resolution on the Continuity of Nuclear Energy and updating of the National Energy Strategy, the Parliament stressed that recognizing the necessity of primary energy resources, including nuclear energy, the Parliament of the Republic of Lithuania will seek that Lithuania would remain a nuclear power state and continue generating electricity in a nuclear power plant which meets all modern requirements. In case of building a new reactor on the territory of the Ignalina NPP, negative social and economic consequences of the final shut-down of the reactors with regard to the development of the Ignalina NPP region and the competitiveness of Lithuanian economy would be avoided.

- *Communiqué signed by the Prime Ministers of the Baltic States at their meeting in Trakai on 27 of February 2006*

The above-mentioned Communiqué raised the initiative for construction of a new power plant in Lithuania and invited Baltic energy companies as the participating parties to invest in the preparation and construction of the plant. On March 8, 2006, the chief executive officers of the three national power utilities of Latvia, Lithuania and Estonia signed a Memorandum of Understanding on Preparation to Develop a New Nuclear Power Plant in Ignalina. As a first step the preparation of a detailed and practical feasibility study was agreed upon. The said feasibility study was finished in November 2006.

- *Revised National Energy Strategy adopted by the Parliament* (18 January 2007, No. X-1046).

Revised National Energy Strategy provides strategic development objectives in energy sector by 2025. Among the main objectives and state action trends, the Strategy contains the following: without reducing attention focused on the other energy resources, on the basis of the existing infrastructure, the strategy for the development of the Lithuanian power sector is based, inter alia, on the continuity and development of the safe nuclear energy.

The Strategy highlights serious problems related to energy security, which would be difficult or practically impossible to solve for Lithuania by itself – among them, the construction of a new nuclear power plant. It is possible to solve the foregoing strategic task only in close cooperation with the other states.

The Strategy raises the following issue – no later than in 2015 to start the operation of a new nuclear power plant intended to satisfy the needs of the Baltic and other states.

- *Communiqué On Cooperation in the Energy Field signed by the Prime Minister of the Republic of Lithuania and the Prime Minister of the Republic of Poland in Warsaw on 2 March in 2007*

The Communiqué stresses, inter alia, that Lithuania and Poland, together with strategic partners - Estonia and Latvia - would continue their constructive cooperation for the construction of a new nuclear power plant in Lithuania. PSE SA as an energy company invited by the Government of

Poland would participate in the project along with incumbent energy companies of Estonia, Latvia and Lithuania on equal terms.

- *Law of the Republic of Lithuania on New Nuclear Plant adopted by the Parliament* (28 June 2007 No X-1231)

The law enables to fulfil the following goals, which are necessary for construction of a new NPP:

- to establish a Project Implementing Company and the main requirements for participants in the Project Implementing Company;
- to establish the main requirements for National Investor and the management of National Investor;
- sitting of the new NPP;
- allotment of Land for the Construction of the New Nuclear Power Plant;
- provisions for decommissioning funding that shall be established by a separate law, and other necessary provisions.

Expected changes in legislation

After enforcement of the Law on new NPP, some significant developments of the current legislation will be required in Lithuania for a number of purposes. It is needed to authorise the construction of the NPP at the relevant site, to clarify of the current regime for carrying out environmental assessments, obtaining licences and revoking them, to establish the operation of the decommissioning fund and the implementation of the decommissioning process, to establish a specialist qualification programme, to provide for specific security measures in order to ensure that national security interests are in place., and etc.

The new law allows the government to determine some of these more detailed matters and the precise changes may not all be finalized at the same time.

International relations

Lithuania will seek understanding of the neighbouring countries regarding the decision to construct a new nuclear power plant. According to the Governmental agreements with the said countries, Lithuania has already been exchanging information in the field of nuclear energy with Poland and Latvia for several years. In autumn 2006, the Governmental permanent working group for cooperation and exchange of information with Byelorussia on nuclear energy issues was founded.

Lithuania has initiated the agreement between the Government of the Republic of Lithuania and the Government of the Republic of Belarus on early notification of nuclear accidents, exchange of information and co-operation in the field of nuclear safety and radiation protection. Draft agreement was proposed to the Republic of Belarus.

New information

Section 7.2. Added information on Developments of national legislative and regulatory framework (2005-2007)

National legislative framework in nuclear sector was amended mainly for the following:

- to take into account requirements from regulations of the European Union;
- to establish legal framework for construction of a new nuclear power plant in Lithuania;
- to improve framework for the decommissioning in order to facilitate the decommissioning process.

Article 8: 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 7, and provided with adequate authority, competence and financial and human resources to fulfil its assigned responsibilities.

2. Each Contracting Party shall take the appropriate steps to ensure an effective separation between the functions of the regulatory body and those of any other body or organization concerned with the promotion or utilization of nuclear energy.

8.1. Description of the mandate and duties of the Regulatory Body

In accordance with its national legislation, the Nuclear Safety Convention, other international conventions and treaties the Republic of Lithuania undertakes appropriate measures to ensure the safety of nuclear installations under its jurisdiction through the establishment of legal framework and infrastructure necessary to maintain the effective nuclear safety regulatory system.

VATESI - State Nuclear Power Safety Inspectorate - was established by the Decree of Government on 18 October 1991 to regulate and supervise the safety of nuclear power facilities within the territory of Lithuania. On 21 October 1992, the Government of the Republic of Lithuania approved the Statute of VATESI assigning its main duties, functions and rights. The Statute was amended in 1997 with provisions that established the Board of VATESI to advise the Government and the Regulatory Body on matters related to the effective functioning of nuclear safety regulatory infrastructure.

Since its establishment in 1991 VATESI has been acting as an independent governmental institution subordinated directly to the Government. The Head of VATESI is appointed and dismissed by the Prime Minister, he reports to the Office of Prime Minister on essential matters related to the effective implementation of mission and mandate of VATESI. The new Head of VATESI was appointed on 2 November 2006 succeeding the retired Head of VATESI.

According to its mission VATESI regulates and controls the nuclear safety and radiation protection in nuclear facilities with the main objective to prevent incidents or accidents in nuclear facilities and protect the population and environment from possible harmful effects in case of nuclear or radioactive incident or accident. The mandate of VATESI stipulates following activities:

- Development of national legislation in nuclear safety;
- Licensing of nuclear installations, granting of necessary authorizations and applying of enforcement measures to ensure compliance with regulations and licensing conditions;
- Analysis and assessment of nuclear safety in nuclear facilities;
- Regulatory control of nuclear safety, radiation protection and radioactive waste management in nuclear facilities;
- State control of safeguards implementation;
- Regulatory control of physical protection of nuclear facilities and nuclear materials as well as of radioactive materials located in nuclear facilities;
- Operating of VATESI Emergency Preparedness Centre with 24-Hour on duty officer;
- International cooperation on nuclear safety, radiation protection and radioactive waste management within the competence of VATESI.

In performing its functions VATESI acts independently in accordance with the national legislation, international conventions and treaties that are in force in Lithuania. According to its mandate VATESI issues regulations and other legal acts, undertakes necessary enforcement measures to avoid possible deterioration of safety at nuclear facilities and prevent nuclear incident or accident. VATESI may apply necessary preventive measures within its competence, including a temporary shutdown of a nuclear facility.

Seimas, the Parliament of the Republic of Lithuania, approved by its resolution of 18 January 2007 the new National Energy Strategy and adopted the Law on Nuclear Power Plant on 28 June 2007. These legal acts envisage development of nuclear energy in Lithuania and construction of a new nuclear power plant in partnership with Latvia, Estonia and Poland. Taking into account the tasks stipulated in the new National Energy Strategy, VATESI undertakes necessary preparatory steps for the licensing of new nuclear power plant. VATESI foresees following activities:

- Review and enhancement of national legislation;
- Reorganization of VATESI's administrative structure;
- Recruitment of 30 additional staff over the period of years 2008-2011;
- Relocation of VATESI to the new premises with sufficient office space to accommodate increased number of staff, emergency centre, training facilities, library and public information centre and other necessary facilities;
- Allocation of adequate financial resources;
- Enhanced cooperation with Technical Support Organizations for assessment and planning of necessary resources.

8.2. Basic document describing the authority and responsibilities of Regulatory Body

The Law on Nuclear Energy (last amendment on 26 October 2006) provides for main legal authority and responsibilities of Regulatory Body. Furthermore, the duties and responsibilities of VATESI are stated in the Statute of VATESI - Regulations of the State Nuclear Power Safety Inspectorate amended by the Government resolution No. 1014 of 1 July 2002.

VATESI is obliged to ensure the state regulation and supervision of nuclear safety and control radiation protection at nuclear installations and other related organizations. VATESI's activities could be grouped as follows:

- VATESI formulates the norms, principles and criteria for safe operation of nuclear facilities, safe utilisation, transportation and storage of radioactive and nuclear materials, establishes or participates, within its competence, in drafting of other safety norms and regulations;
- VATESI issues licenses for the operators of nuclear facilities and carriers of nuclear materials, performs regulatory inspections and applies necessary enforcement measures;
- VATESI prepares necessary legal acts and makes its proposals for development or amendment of the IAEA safety standards, European Union and national legislation, normative acts and other nuclear safety documentation in facilities under its control;
- VATESI supervises the accounting of nuclear materials and physical protection of nuclear materials and radioactive materials within its competence.

8.3. Structure of the Regulatory Body; its technical and support experts and organizations if appropriate, and its human and financial resources

Since the last report the structure of VATESI has been revised as shown in Annex to 8.3, however, the number and main functions of divisions remain unchanged.

Licensing Division (LD) is responsible for overall coordination of VATESI activities during licensing activities. LD coordinates VATESI activities before it authorises the start up of unit after annual maintenance outage. This division maintains licensing data, prepares necessary licensing documents, drafts regulations and procedures for the licensing. LD makes necessary reviews before VATESI gives its consent for transportation of radioactive materials. In addition, this division performs overall coordination of VATESI's inspection program and monitors its implementation. LD inspectors perform necessary inspections and take part in safety assessment work as regards reactor cooling, emergency core cooling and accident localisation systems, in-service inspection, external event impact assessment, aging management, fire protection, reliability assessment and other tasks.

Nuclear Material Control Division (NMCD) executes the regulatory supervision of nuclear materials accounting and physical protection of nuclear facilities and nuclear materials. This division maintains illicit trafficking and nuclear materials accounting data, drafts necessary regulations on physical protection and accounting of nuclear materials. NMCD inspectors perform inspections of physical protection of nuclear materials and nuclear facilities. Head of this division represents VATESI in interdepartmental committee on export control as regards export, import, and transit of commodities used in nuclear activities. This division maintains cooperation with the IAEA, other international organizations and institutions on accounting and control of nuclear materials. NMCD retains contacts with the Comprehensive Nuclear-Test-Ban Treaty Organisation.

Division of Decommissioning and Radiation Protection (DDRP) supervises the safety of radioactive waste management and decommissioning of nuclear facilities. DDRP monitors the implementation of emergency preparedness and radiation protection management at nuclear facilities. DDRP inspectors take part in safety assessment of safe radioactive waste management and safety of spent fuel, decommissioning, radiation protection, emergency preparedness and environmental protection. DDRP inspectors carry out inspections at nuclear facilities, they draft safety regulations and coordinate licensing of activities within the competence of division. Moreover, this division maintains daily operation of VATESI Emergency Centre and coordinates the international cooperation on emergency preparedness and environmental impact assessment.

Safety Assessment Division coordinates VATESI activities during safety assessment – its organizes and performs the review of safety analysis reports, operational specifications, safety justifications as regards to reactor and fuel safety, transient and accident analysis, operational safety and experience feedback, instrumentation and control systems and probabilistic safety analysis. In addition, this division assesses and maintains data on operational experience feedback and accommodates VATESI's Commission on analysis and assessment of operational events. Inspectors of this division, within their competence, draft relevant safety regulations and perform inspections in nuclear facilities.

On-site Division of VATESI at Ignalina NPP daily monitors the operation of nuclear power plant through the direct supervision of operational compliance with approved technical specifications, regulations and norms. Within the scope of their mandate, inspectors of this division issue authorisations to operate equipment and implement certain technical decisions, when required in accordance with regulations, they inspect safety systems and control technological processes during

operation and technical outages. Inspectors of this division represent VATESI during qualification examination of operational staff.

Over reported period the maximum permissible number of VATESI staff remained unchanged and agreeably is comprised of 59 positions. Currently VATESI has 52 employees and 3 employees are on a maternity leave. However, in view of forthcoming licensing of new nuclear plant VATESI foresees to recruit more staff, *see* Article 8.1. The budget of VATESI is approved annually within the State Budget that is adopted by the Seimas, the Parliament of Lithuania. Over the reported period VATESI budget was adequate to its needs.

VATESI cooperates with more than 10 departments, centres and laboratories of 8 Technical Support Organisations - Institute of Physics, Lithuanian Energy Institute, Institute of Energy Technologies, Kaunas University of Technology, Vilnius Gediminas Technical University, State Institute of Information Technologies (SIIT), ITECHA Company and Institute of Chemistry. Technical Support Organisations (TSOs) provide VATESI with expertise and necessary technical-scientific support during safety reviews, verification of safety justifications, drafting of norms and regulations. Some TSOs of VATESI are involved in international projects implemented through international and bilateral cooperation, coordinated by VATESI.

8.4. Position of the Regulatory Body in the governmental structure, including its reporting obligations

Over reported period was no change of VATESI's position in Governmental structure as shown in Annex to 8.4.

VATESI reports its activities to the Government and accordingly informs other national and international bodies. In accordance with national legislation, VATESI coordinates its activities with other state bodies and institutions responsible for radiation protection and health care, emergency preparedness, civil protection, environmental protection, industrial safety and supervision of potentially dangerous industrial facilities.

National legislation provides for clear separation of competences between VATESI and other regulatory bodies while implementing and supervising nuclear safety regulations. Supplementary to the Law on Nuclear Energy, other laws and legislative acts state the duties and competence of other state institutions and regulatory bodies, which provide VATESI with their respective statements before the regulatory authorisation is granted by VATESI.

8.5. Relationship of the Regulatory Body to bodies responsible for the promotion and utilization of Nuclear Energy

In accordance with the Law on Nuclear Energy the Ministry of Economy is the competent authority responsible for the implementation of the Energy Policy. Article 9 of the said Law obliges the Ministry of Economy to arrange means for development of nuclear energy infrastructure and, in cooperation with the Ministry of Science and Education, to establish necessary scientific and technical bodies to accommodate the needs of utilities operating nuclear power plants. The Article 4 of the said Law states that operating organizations bear responsibility for safety of nuclear facilities they operate.

National legislation provides clear division between the responsibilities and functions of VATESI and those organizations or bodies that are charged with the promotion or use of nuclear installations or activities.

As indicated in Article 8.1., VATESI acts as independent governmental institution subordinated directly to the Government. In accordance with Article 14 of the Law on Nuclear Energy, VATESI acts independently while executing its mandated duties in accordance with national legislation, its statute and other legislative acts. The Law authorises VATESI to apply any preventive measure it considers necessary to preclude the nuclear accident, including ordering of temporary shut down of nuclear facility operations.

New information

Section 8.1. The Parliament of the Republic of Lithuania approved the new National Energy Strategy and adopted the Law on Nuclear Power Plant. These legal acts envisage development of nuclear energy in Lithuania and construction of a new nuclear power plant in partnership with Latvia, Estonia and Poland.
Section 8.2. The Law on Nuclear Energy has been amendment.
Section 8.3. The structure of VATESI has been revised.

Article 9: RESPONSIBILITY OF THE LICENSE HOLDER

Each Contracting Party shall ensure that prime responsibility for the safety of a nuclear installation rests with the holder of the relevant license and shall take the appropriate step to ensure that each such holder meets its responsibility.

In accordance with the Law on Nuclear Energy of the Republic of Lithuania licences are issued for those activities:

- to design, construct and reconstruct nuclear facilities, installations and equipment;
- to operate nuclear facilities;
- to store nuclear and radioactive materials and their waste;
- to retire a nuclear facility from service;
- to dispose nuclear and radioactive materials and their waste;
- to acquire, possess and transport nuclear materials;
- 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.

9.1. Description of the main responsibilities of the license holder

According to the amendments stated in the Law on Nuclear Energy of the Republic of Lithuania it is prepared the new draft of Regulations for Licensing of Nuclear Power Related Activities. The document is under approval by the Government of the Republic of Lithuania. The Regulations for Licensing of Nuclear Power Related Activities determine these duties and responsibilities of license holders.

The licensee:

- is responsible for the safety of the nuclear facility;
- must ensure radiation protection of staff and inhabitants during normal operation, and for design basis and beyond design basis accidents not to exceed the allowed levels of exposure for staff and inhabitants;
- must develop and maintain efficient measures to prevent and control accidents in nuclear facilities;
- must unconditionally follow the conditions of licence validity;
- must promptly inform the licensing authority and other institutions of regulatory authority about all deviations from the conditions of license validity;
- must prepare the annual safety assessment report for the nuclear facility in accordance with the requirements of the nuclear safety regulations and submit it to the licensing authority;
- must follow the requirements of the legislation of The Republic of Lithuania, regulations of nuclear power safety and general industrial regulations which are legalized in the established order in nuclear energetic;
- must inform the licensing authority about the deviations from limits of the safe operation, other safety relevant incidents related with its activity;
- must promptly inform the institution of regulatory authority and mass media about the incidents which could cause the increased interest of society;
- is responsible for the quality of the licensed activity, proper management of documentation, its storage during all time of nuclear facility activity, renewal in time and approval by licensing authority when it is necessary;

- must ensure a high level of safety culture in its activity, with safety the priority in decisions;
- must establish and maintain effective integrated management system of its activity;
- must inform the institutions of regulatory authority about existing (possible) hazard for the safety of the nuclear facility, incidents, accidents;
- is responsible for the safety of the nuclear facility even if the validity of the license is suspended or it is revoked;
- must monitor the emission of radio nuclides into the environment in a systematic manner;
- must monitor and investigate the contamination of the facility/site and environment in a systematic manner;
- present to the institutions of regulatory authority the data about emission of radio nuclides, contamination of the facility/site and the environment in a systematic manner;
- must follow the principle of ALARA, in accordance with which during the design and usage of ionising radiation sources, as well as during the performance of related activities, the exposure must be kept as low as is reasonably achievable, taking into account economical and social factors.

The license validity conditions are established based on the following requirements to licensee:

- to perform only the activity for which the license is issued;
- to follow the requirements of safety regulations;
- to implement established integrated management programs;
- to inform promptly the institutions of regulatory authority about all changes made in integrated management programs;
- to co-operate continuously with each contractor in order to get adequate information about possible deficiencies of works performed or errors and(or) important events (accidents, incidents, falls etc.) caused by the contractors activity;
- constantly and promptly to inform institutions of regulatory authority concerning all incidents, accidents or similar events, indicated deficiencies of licensed activity and preventive measures;
- to maintain the system of technical documentation to ensure appropriate storage of all permissions, directives, acts, conclusions during all period of activities in nuclear energetic;
- to maintain the system of accounting and reporting documentation;
- to submit to the competent institution of regulatory authority all the required documentation of licensee;
- to prevent unauthorized usage of nuclear technologies;
- to submit the annual reports on licensee activity to the licensing authority, indicating the works that have been performed or are being performed, results of authors works, recommendations presented concerning the progress of mentioned works;
- licensee must ensure the free entrance into the territory and premises of the licensee for the representatives of the licensing authority during supervision of licence conditions fulfilment;
- to present the information to the licensee concerning scientific, technical and other meetings aimed to discuss main safety issues of nuclear facility;
- to inform promptly the licensing authority about all changes of application documents.

The main responsibilities of the Nuclear Facility Operating Organization are also described (in general) in the Law of Nuclear Energy of the Republic of Lithuania. The operator of a nuclear facility is responsible for conducting nuclear activities in compliance with the provisions of this Law and regulatory acts of the Republic of Lithuania. The safe operation of individual nuclear facilities is the responsibility of their operators. The operator of the nuclear facility is fully

responsible for the adequate and safe operation of the facility in accordance with the requirements stipulated in the laws and subordinate legislation of the Republic of Lithuania, in the norms and regulations of nuclear safety and radiation protection, also in the regulations of the facility operator, the rules of labour discipline and organization, and in the operation licence.

The Law states that the Nuclear Facility Operating Organization is obliged:

- to manage the accounting for nuclear materials belonging to the facility and exercise their control in accordance with the requirements laid down in the safeguards agreement with the IAEA;
- to analyze nuclear accidents and incidents in the manner prescribed by statutory acts;
- to notify VATESI and other interested bodies about all the violations of conditions and requirements of operational safety and all failures of the facility safety systems and their components;
- to ensure preparedness for the elimination of the consequences of a radiological accident.

The principal rights, duties and functions of the nuclear facility operator in the event of a nuclear accident are set out in the incorporation documents and the facility operation license. The implementing measures are established and specified in the plan of nuclear accident prevention and of the response to the accident and mitigation of its consequences drafted by the operator and approved by VATESI. Among other things, the plan indicates:

- the notification procedure of the Governmental Emergency Commission and other competent authorities about the occurrence of the nuclear accident and the progress of response to it;
- the organizational and technical measures for checking or reducing emission of radioactive materials into the environment;
- procedure of co-ordination of actions with other institutions and services participating in the response to the accident and mitigation of its consequences.

The operator of the facility is liable for the damage caused by radioactive effluent discharges from the facility to the natural and legal persons, their property or to the natural environment. The operator of the nuclear facility must insure the facility it is operating or procure in some other way the funds necessary for the compensation of the nuclear damage. If the insurance and other funds are not sufficient for the compensation of the damage, the payment of the balance is guaranteed by the Government pursuant to the obligations assumed by the Republic of Lithuania according to the Vienna Convention.

The Operating Organization is responsible for developing and implementing integrated management system and implementing appropriate measures at all stages in the life of a nuclear plant. To this end the Operating Organization prepares integrated management programme and control the activities of companies (organizations) performing work or providing services for the nuclear plant (research workers, designers, suppliers of systems and components, firms responsible for the installation of equipment, assembly workers, builders, engineers responsible for final adjustments and so on).

The Operating Organization is responsible for ensuring the safety of the nuclear plant and bears full responsibility for that safety, including measures designed to prevent and/or mitigate the consequences of accidents, the accounting for and storage of nuclear materials and radioactive substances, protection of the environment and monitoring of the state of the environment in the sanitary-protection zone and in the observation zone, and also such controls as are required to ensure that the nuclear plant is used only for the purposes for which it was designed and built. The overall responsibility of the Operating Organization remains intact despite the independent activities and responsibilities of companies, institutions, organizations and their unions, managing staff or other persons performing work or providing services for the plant (designers, suppliers, firms responsible

for the installation of equipment, assembly workers, builders, engineers responsible for final adjustments and so on) and despite the functions and responsibilities of the State Control and Supervision Institutions.

Before a construction permit for plant or systems (components) of an NP is issued, the Operating Organization creates the infrastructure (subdivisions) required for safe operation of the nuclear plant, endowing those subdivisions with the necessary rights as well as financial, material and human resources, imposing on them full responsibility for their activities, and monitoring the correct implementation thereof.

The requisite quality of plant construction is ensured through the use of well-proven technology in conjunction with quality assurance measures. Direct responsibility for quality assurance is borne by the General Contractor for nuclear plant construction; final responsibility for quality of the complete construction is borne by the Operating Organization.

The Operating Organization bears responsibility for creating the necessary organizational structures for safe nuclear plant operation. It ensures that the plant has the necessary financial, material and technical resources, norms and technical requirements, scientific support, quality assurance in the all stages of lifetime of the NP. It also likewise organizes physical protection and fire protection of the plant, as well as recruitment and training of operating personnel, safety culture and must provide continuous monitoring of plant safety. The Operating Organization ensures continuous monitoring and own supervision of all activities which have a bearing on plant safety. The results of safety inspections and periodic reports on plant safety are to be submitted by the Operating Organization to the State Control and Supervision Institutions.

Operating Organization is responsible for developing the technological reglament. Before the Operating Organization will approve it the technological reglament is agreed with the organizations that developed it and the State Control and Supervision Institutions. Any changes introduced in the technological reglament must be approved in due form by the organizations that have taken part in their drafting, acceptance and approving.

Accident situations and actual accidents which have taken place at a nuclear plant are carefully investigated by commissions appointed in accordance with the norms and technical requirements in force. The Operating Organization is responsible for ensuring that the investigations are performed satisfactorily and in full, for reporting the results in good time to the State Control and Supervision Institutions and other interested organizations for analyzing accidents with the operating personnel of existing nuclear plants. Also, the Operating Organization is responsible for developing and implementing measures designed to prevent any further infringement of normal operation or any further accidents due to the same causes.

Information on equipment failures and personnel errors is routinely collected, processed, analyzed and filed during plant operation. The Operating Organization is responsible for timely collection and qualitative analysis of the information received as well as for its systematization and timely transfer to the State Control and Supervision Institutions and other interested organizations.

The Operating Organization is responsible for developing and implementing a commissioning programme, and this programme is agreed with the State Control and Supervision Institutions.
The plant administration is responsible for preparing the commissioning programmes and procedures for physical and power start-up. These programmes are to be approved by the state regulatory body and supervision institution and confirmed by the Operating Organization.

A "Plan containing measures to protect personnel in the event of an NP accident" is devised by the Operating Organization. The "Plan containing measures to protect personnel in the event of an NP accident" provides for coordination of effort between the plant and external organizations (such as the local fire department, civil security department, medical institutions, local authority institution, etc.) within the limits of the site and in the sanitary protection zone. It also reflects the links with State Control and Supervision Institutions. The plant administration is responsible for maintaining constant readiness and for implementing the plan should the occasion arise.

9.2. Description of the mechanism by which the regulatory body will ensure that the licence holder meets its primary responsibility for safety

The institutions issuing licences for a certain type of activity in the nuclear energy sector are obliged to ensure that enterprises which have been issued licences guarantees:

- adequate standards of nuclear safety for the licensed activity;
- responsibility for nuclear safety;
- the system of internal control that would ensure the use of licensed nuclear materials and wastes and would guarantee the implementation of the provisions of the Treaty on the Non-Proliferation of Nuclear Weapons;
- high professional qualifications of the executive personnel engaged in the licensed activity.

Competent authorities issuing licences for a specified activity in the sphere of nuclear energy develop a system of requirements guaranteeing nuclear safety, non-proliferation of nuclear weapons and lawful usage of nuclear materials and waste handling. The licensing authority may establish additional duties for the licensee, indicating that in the conditions of licence validity. By request of the regulatory authority, the licensee and its contractors must provide all necessary information relating to the licensed activity.

The State Nuclear Power Safety Inspectorate (VATESI) is the institution of the Government of the Republic of Lithuania, responsible for regulation of nuclear safety. The most important tasks of VATESI are:

- state regulation of nuclear safety at the Ignalina Nuclear Power Plant State Company and other nuclear facilities;
- state regulation of the safety of radioactive waste management in nuclear facilities;
- state regulation of the safe use of nuclear materials;
- state regulation of the physical protection of nuclear facilities, nuclear and radioactive materials used in nuclear energy;
- state regulation of radiation protection within its competence in the Ignalina Nuclear Power Plant and other nuclear facilities.

In performing tasks delegated upon VATESI, it shall:

- draft laws, resolutions of the Government of the Republic of Lithuania and other legal acts on the issues of the safe use of nuclear energy, the use of nuclear materials, their transportation, their accounting and control, as well as nuclear, radioactive materials used in nuclear energy, as well as waste storage and disposal, within its competence co-ordinate draft legal acts of the ministries, governmental institutions, county governors' administrations, municipalities and other institutions, which may have an effect on the safe use of nuclear energy;
- establish the principles, criteria, requirements and recommendations for safe operation of nuclear facilities and their decommissioning, and monitor compliance with them;

- establish the principles, criteria, requirements and recommendations for safe use, storage of nuclear materials, disposal of their waste, and monitor compliance with them;
- establish the principles, criteria, requirements and recommendations for storage of radioactive materials used in nuclear energy, disposal of their waste, and monitor compliance with them;
- establish procedures for accounting for and control of nuclear materials, control their compliance during import, export, reexport, transportation, use, storage and burying of those materials;
- establish physical protection principles, criteria, requirements and recommendations of nuclear facilities, nuclear as well as radioactive materials existing in nuclear facilities, and monitor compliance with them;
- establish requirements for staff qualifications of nuclear facilities, regulate the organization of the staff preparation, certification and requalification;
- within its competence control the fulfilment of radiation protection requirements for nuclear facilities;
- within its competence control the fulfilment of nuclear safety requirements when transporting nuclear materials;
- issue licences for activities, which are prescribed in the Law on Nuclear Energy of the Republic of Lithuania, establish conditions for validity of licences and monitor compliance with them;
- within its competence prepare inspection programmes and implement them;
- on the basis of the submitted safety analysis results, inspection conclusions and (or) independent research, evaluate the condition of safety in nuclear facilities, prepare surveys on the safety of nuclear facilities and submit them to the Government of the Republic of Lithuania, local authorities and other bodies concerned;
- in the prescribed procedure organize and support expert examination work on nuclear safety and radiation protection;
- participate in the work of commissions carrying out analysis of incidents or occurrences in the facilities under VATESI control or perform independent research;
- co-ordinate measures for safety improvement of nuclear facilities and monitor their implementation;
- assess the projects of nuclear facilities in terms of nuclear safety;
- co-ordinate and control preventive measures for the staff of nuclear facilities and the population in the event of a nuclear facility accident, monitor the condition of accident preparedness of the nuclear facility;
- in the event of a nuclear facility accident, evaluate the situation in the established procedure and forecast the course of the nuclear accident, provide information on the existing situation to the public and state institutions.

In implementing tasks delegated upon VATESI, it shall be entitled to:

- inspect at any time the state of safety of nuclear facilities and other facilities under VATESI control, the compliance with the requirements of accounting and control of nuclear materials;
- demand that the administration of nuclear facilities would eliminate the violations of nuclear safety norms, suspend works, reduce power or stop the block (power plant) if the safety norms are neglected, equipment defects are identified, the qualifications of the specialists (staff) is insufficient or if the safe operation of nuclear facilities is endangered;
- require that persons disposing of nuclear materials would eliminate the violations of accounting and control norms of the said materials;
- propose to the Government of the Republic of Lithuania in the procedure prescribed by laws to suspend (stop) the operation of nuclear facilities prior to the time limit of their operation, in the case of failing to ensure the safety of the said facilities;

- demand that the administration of nuclear facilities and other facilities under VATESI control would perform control tests of equipment and materials, operating medium analysis, calculations for justification of the safety of nuclear facilities, reliability and technical checking of equipment and systems;
- control how investigation of violations of nuclear facilities is organized, obtain material of the said investigation from the administration of nuclear facilities;
- submit proposals to the Ministry of Economy or the administration of nuclear facilities concerning the dismissal in the prescribed procedure of persons who have committed the violations
- prohibit preparation and execution of designing and construction documents of nuclear facilities and equipment, after noticing violations of nuclear energy safety rules and norms therein;
- examine the heads of nuclear facilities in the issues of nuclear safety rules and norms, control the procedure of verification of the knowledge of the staff of the indicated facilities on these issues, participate in checking the knowledge of the heads of divisions, engineering and technical staff, appoint extraordinary checking of knowledge;
- control preparation of the staff of nuclear facilities and execution of permission for them to work in the said facilities;
- familiarize with operational and technical documents in-place, attend the meetings on the issues of operation of the facilities organized by the administration of nuclear facilities, obtain immediate information on the violations of the operation of nuclear facilities;
- At the demand of VATESI, the administration of a nuclear facility must:
- submit necessary documents (technical specifications, operating instructions, drawings, diagrams, standards and other documents);
- provide control measuring devices and appoint staff for performance of tests and works related to the execution of supervision, as well as provide necessary laboratory analysis and research data;
- supply with special clothes, special footwear and other personal protection devices;
- provide official premises, international and interurban telephone, facsimile communication measures;
- provide necessary scientific technical information and literature.

Article 10: SAFETY PRIORITY

Each Contracting Party shall take appropriate steps to ensure that all organizations engaged in activities directly related to nuclear installations shall establish policies that give due priority to nuclear safety.

10.1. Safety Policies

10.1.1. VATESI Policy Statement

VATESI Policy Statement was issued in May 2003 in the document called "VATESI Mission". In the said document VATESI competence, responsibility, principles of operations, policy and functions are described.

VATESI mission reads as follows: "Taking into account risk of nuclear energy use as well as wish of the society to avoid nuclear and radiological accidents and incidents, and understanding its responsibility to society of Lithuania and worldwide, VATESI performs regulation and state oversight of nuclear and radiation safety at nuclear power facilities with the aim to protect the society and the environment against harmful impact of nuclear and radiological events and accidents."

Due to the set policy, VATESI activities must be strictly planned. Decisions must be based on the documents and facts. State nuclear safety oversight has to be performed based on the specific, clearly defined requirements. Every VATESI employee has to perform his (her) duties with responsibility, using his (her) professional knowledge and experience, raising his (her) qualification and sharing the knowledge with the colleagues. Systematic Approach to Training is used to raise employees' professional knowledge and skills.

VATESI seeks constructive dialogue and cooperation with other institutions. VATESI bases its activities on the gained experience and international practice. VATESI management formulates and apply principles, which integrate the quality assurance requirements into the everyday work, ensure that the employees would receive the necessary information, assistance and help, would have working tools to perform their tasks properly.

Heads of the divisions are responsible for the quality of work performed and services done by their divisions. Each employee is responsible for the quality of work performed by him (her). VATESI activities are based on the principals of honesty, openness and clarity. Only reliable and correct information on nuclear safety in Lithuania shall be given to the society. This information should be presented timely and in the proactive manner.

VATESI structure and number of stuff must correspond to the set goals and tasks. VATESI performs safety review and assessment as well as inspection program to define if safety level of nuclear power facilities corresponds to the set requirements. When needed, VATESI use assistance of Technical Safety Organizations for independent safety assessment.

VATESI grants the licensees, formulates and check fulfillment of their conditions. VATESI takes part in the emergency preparedness activities. Corporative and individual activities of VATESI employees are subject of continuous self-assessment process. VATESI quality assurance system is being improved using results of this process.

10.1.2. Ignalina NPP Policy Statement

Ignalina NPP, being the Operating Organization is responsible for nuclear facility safety assurance, in accordance with international practice undertakes fully responsibility for the plant safety and establishes policy that gives the top priority to the plant safety.

10.2. Safety culture and its development

General

Activities on Safety Culture development are performed in order to increase constantly nuclear safety by means of improvement of management and personnel attitude to safety, what provides safe and correct execution of works and creation of atmosphere of openness and mutual respect.

According to the Law on Nuclear Energy of the Republic of Lithuania, article 27, the following requirement is set forth: organization granted with the license on NPP operation must guarantee to the regulating authority the high level of safety culture in the organization.
Similar requirement is defined also in Conditions of VATESI issued operating licenses for Unit 1 and 2.

The State Nuclear Power Safety Inspectorate of the Republic of Lithuania (VATESI) devotes specific attention to the safety culture issues.

In November 2004 VATESI inspection on Safety Culture in light of Unit 1 decommissioning was held at INPP. The main objective of the inspection was to evaluate the preparation of the plant for management of Safety Culture related issues during the transition period from operation to decommissioning of INPP.

Specific attention to the Safety Culture issues was devoted by VATESI during Quality Management inspections held at Ignalina NPP in 2003 and 2006 years.

In October 2005 a meeting with representatives of Ignalina NPP was organized at VATESI in order to discuss the Safety Culture and Organizational Issues specific during the transitional phase from operation to decommissioning.

Currently, VATESI is in the stage of preparation of Guide for management of safety culture issues specific to the pre-decommissioning phase of the Ignalina nuclear power plant.

Safety Culture Management Procedure and Procedure for collection and processing of data required for calculation of Safety Culture indicators were implemented at Ignalina NPP within the frames of Quality Assurance System.

Coordinators were appointed at Ignalina NPP officially in divisions in order to plan and coordinate activities on Safety Culture.

General Director of Ignalina NPP annually approves Plan of activities on Safety Culture development at INPP, where the specific measures on implementation of the INPP Safety Culture development programme are determined.

The main objective of the Programme is to orientate behaviour of personnel of the plant and contractors, also plant management methods to the achievement of the highest priority – SAFETY.

Priority tasks on Safety Culture improvement at Ignalina NPP:

- The Safety Policy shall obtain support of the plant management and a commitment to this Policy shall be demonstrated.
- Safety Culture shall become the key element of the plant activity management.
- To improve attitude of the plant employees to their work, to improve mentality and inner critical position of the plant personnel, which would prevent negligence, develop self-regulation with regard to the safety matters.
- To provide the plant personnel with open and effective information about all works performed at INPP in order to ensure understating of the common tasks and plant operation perspectives by each employee of INPP, as well as to inform the plant personnel about activities related to the decommissioning of both Units.
- Training of personnel on the Safety Culture principles using the examples of good practice, operational experience in order to learn lessons.
- Performance of Safety Culture audits with further corrective actions and improvements.

At INPP monthly meetings are held on the initiative of the Director General and in light of the suggestions provided by the representatives of the plant personnel. The aim of these meetings is to exchange information about the status of the current affairs at the plant, to discuss the important safety and organizational issues.

Programme of Safety Culture Development

Programme of Safety Culture development at INPP was implemented in accordance with measures approved by INPP Director General. During the last three years the following measures were foreseen and implemented:

10.2.1. Training of the personnel

The matters of Safety Culture concept, matters of the own and industrial experience and examples from practice of performance of works related to Safety Culture were included into the training process.

Within the last three years the specific work was performed concerning the conduction of the Safety Culture seminars for plant employees. In order to conduct the seminars the monthly schedules were developed, coordinators for each plant department were appointed, special training tools were used.

During these seminars the problems in the Safety Culture area and their possible solutions were discussed. The participants of the Seminars reviewed the reports on events at INPP related to the disadvantages of Safety Culture.

Updated version of the Safety Culture Training Manual was issued.

During the period of 2004 - 2006 international IAEA and WANO seminars on safety of nuclear plants operating RBMK type reactors were held at INPP.

In September 2004 the managers of INPP departments and representatives of the consolidated trade unions participated in the VATESI initiated international conference on Safety Culture and organizational issues *specific during the pre-decommissioning phase of NPP.*

In March 2004 the seminar on Safety Culture was conducted for managers of contracting organizations. The seminar was opened by the INPP Director General. 28 managers and 47 specialists of the contracting organizations attended three seminars. The seminar covered the following issues:

1. Order and conditions for granting of 1st type permissions on execution of works;
2. Objectives of Safety Culture development at INPP;
3. IAEA report № 75-INSAG-4:
   - Definition of Safety Culture;
   - Universal features and elements of Safety Culture;
4. Implementation of Safety Culture management procedure QA-2-001,
5. Practical examples which are related to Safety Culture and operational experience gained in the area of maintenance works and preparation of design documentation:
   - Order and organization of repair works at INPP
   - Application of STARK method.

10.2.2. Participation and input of the personnel in Safety improvement

Proposals of employees.

Guidelines on work with proposals on improvements was developed and implemented. In accordance with these Guidelines the INPP employees have an opportunity to submit their proposals to the divisions' managers. For this purpose there are special Logs for submission of proposals in the plant divisions and post boxes with proposals-forms for submission of proposal to the Director General, managers of the Directorates and Services. These boxes are equipped at the plant checkpoint and in rooms for changing of clothes.

Posters “Examples of good standards” at INPP have been prepared and distributed to workplaces of the personnel.

10.2.3. Independent Reviews, inspections and audits

World Association of Nuclear Operators (WANO) partnership check-up

In August 2002 WANO partnership check-up was performed at Ignalina NPP. Experts from eight countries took part in the check-up. According to the results of the check-up the experts marked positive practice in the development of Safety Culture at INPP and suggested WANO Moscow Centre to distribute INPP experience to other Nuclear Power Plants.
In April 2007 a second check-up of measures on the results of recommendations obtained from the WANO partnership check-up experts was held. A second check-up at INPP is planned in June 2007.

Operational Safety Review Team (OSART) mission

In June 2006, based on the request of the Government of the Republic of Lithuanian, IAEA mission within the framework of OSART program was held at INPP. All in all, international experts have highly evaluated safety and management of Unit 2 operation.

OSART team have concluded that both Ignalina NPP management and personnel aspire to execute safe operation of the plant and to use safety related programs, accepted methods and personnel attitude to safety at the stage of INPP decommissioning.

IAEA experts have appreciated works which were done in the area of Safety Culture: at INPP 2 Safety Culture monitoring and analysis systems have been developed and implemented.
Both systems function as effective management means during realization of safe operation and Safety Culture indicators' monitoring. This practice is recommended for other nuclear plants.

During the mission the team of experts has paid their attention to the areas, which have to be improved, all remarks were registered in the form of recommendations and suggestions. A plan of corrective measures has been prepared at INPP. Currently, work on implementation of the corrective measures is in the progress.

Audit of the implementation process for management procedure QA-2-001 "Safety Culture"

The audit was performed in October 2004. The purpose of the audit was to assess the implementation of management procedure QA-2-001 and the progress of safety culture development in the main three departments under Technical Directorate. One of the main tasks was to determine the influence of the forthcoming shutdown of Unit 1 on safety culture.

Conclusions of the audit:

The competence of managers and employees in the audited departments in the area of safety culture has improved significantly. Apparently, the measures taken by the INPP during the previous years, as well as developed and implemented management procedure QA-2-001, Safety Culture, allowed achieving positive results in improvement of the INPP safety.

The second audit was performed in March 2006. Based on the results of the audit the management procedure QA-2-001 "Safety Culture" was updated.

Safety indicators

A separate procedure for determining and evaluating of safety indicators was developed. During the period from May till December 2004 a phase of this Procedure implementation was executed, a working group consisting from INPP departments' specialists was formed in order to perform this work. A procedure for processing of data required for measurement of safety culture indicators was prepared.

Till August 2006 a trial operation of safety indicators calculation system has been conducted. At present, the procedure has been amended. Calculations of safety indicators are performed on a monthly basis. The reports are submitted to VATESI and managers of INPP departments.

INPP Safety Committee

The Safety Committee performs an independent assessment of decisions, important from the safety point of view.

The results of Safety Culture development programme were reviewed at INPP Safety Committee Meetings as well; members of the Safety Committee recommended to INPP management staff to pay attention to the personnel work motivation issues.

10.2.4. Motivation of personnel

INPP Director General developed INPP Policy in the area of personnel motivation. At the meeting of INPP Safety Committee the Policy was approved by the Members of the Committee. Text of the Policy is presented below:

INPP policy in the field of motivation of personnel

Adhering INPP policy in the field of safety and quality assurance, INPP management staff under the leadership of Director General declares:

1. We have to motivate the personnel for good work, for making the contribution to the plant safety improvement. The tendency to note well performed work has to become a priority element of management. The work is considered to be well executed, when it is executed safely and to high quality level.
2. Every manager has to create an atmosphere of such kind when the personnel avow problems and own errors. The personnel mistakes are considered only as a possibility to refrain from their repetition, not with the purpose to impose a penalty. It is necessary to learn lessons from each error and thereby to help itself and others not to make this error again.
3. However, we must be intolerant to violation of safety, of internal regulations and hiding of errors. Moreover, we have to make a decision on each penalty recovery applying weighted approach in order not to impair atmosphere of openness.
   Ignalina NPP management staff declares its adherence to the Policy in the field of personnel motivation.

In accordance with the results of the performed outages of power units and for works related to safety improvement many plant employees obtained honourable mentions from the plant Management Staff. According to the results of the year an incentive was paid out. Every month INPP employees get an incentive of 20-30 per cent of a monthly salary.

10.2.5. External and Internal information

In October 2003 Management Procedure "External and Internal information" was approved. Activity on external and internal information is performed in order to timely inform the plant personnel, public, mass media and state institutions by means of preparation and transmission of information about INPP. Information about INPP operation, information about implementation of important projects, information about organizational changes at INPP including those related to the decommissioning process of INPP power units is presented by Information Center personnel placing the constantly updated information at INPP outside web-site www.iae.lt.
Internal information includes regular editions of Information bulletins, broadcasting of weekly news by the plant radio and placing of relevant information to the internal web-site.

10.2.6. Support to the personnel during the INPP transitional phase from operation to decommissioning

In November 2003 INPP Director General and INPP Joint Trade Unions adopted Strategy of INPP personnel social support for the period of INPP decommissioning. The Strategy was published in INPP information bulletin. The Strategy will act till 2010 and will cover all employees of the plant. Fulfilment of the Strategy will allow:

- to provide support to personnel in solving the social problems which can arise during this period,
- to ensure safe operation of the plant,
- to maintain high level of Safety Culture during the operation of units and preparation to decommissioning.

10.2.7. Analysis of the root causes of events

The Human Factor Management Program has been developed by the Training Center. The Program has been put into operation since 2007.

In May 2005 a seminar on "Human Factor" was organized by VATESI. The representatives of the Training Center and Engineering Support Department took part in the seminar.
In 2006 "Procedure for additional analysis of events caused by the incorrect personnel actions during unusual events" was issued.

Analysis of the root causes considering human factor influence to safety is performed in order to increase INPP safety and reliability level. Analysis of the events related to the human factor provides prevention of events in future by means of detection of direct root causes of the events, development and realization of corrective measures directed to elimination of causes and prevention of events.

10.2.8. Assessment of Safety Culture

Assessment of Safety Culture is based upon the plant personnel questioning and Safety Culture indicators.

Assessments of Safety Culture at INPP were performed in 1998, 2000 and 2004. Assessment method is based on the interview sheets – questionnaires which were developed considering the Safety Culture features which are applied in world nuclear power production industry. The results of Safety Culture assessment were developed on the basis of information presented in questionnaires which were filled by key personnel of INPP seven divisions. The next assessment of Safety Culture is planned for the end of 2007.

In 2005 the psychologist of the Training Center conducted an examination of the questions, which are included in the questionnaire for assessment of INPP Safety Culture. Questionnaires and the DB of the computer program were adjusted.

Since 2004 INPP has performed activities related to identification and application of safety culture indicators. These indicators are necessary for in-depth assessment of the safety culture within the enterprise and timely prevention of latent weaknesses in the area of operational safety, human behaviour and organizational structure, as well as in cases of appearance of positive trends within the organization. In 2004 a procedure for collection and processing of data required for measurement of safety culture indicators was approved. At the beginning of 2007 additional information has been added to the procedure based on the gained experience at INPP. Results of safety indicators' calculations are registered on a monthly basis. These results are presented in reports, which were submitted to INPP departments and VATESI. Numerical values of safety culture indicators are presented on the internal INPP web-site for notification of all INPP employees

Safety culture and its development

In 2006 "Procedure for additional analysis of events caused by the incorrect personnel actions during unusual events" was issued. Analysis of the root causes considering human factor influence to safety is performed in order to increase INPP safety and reliability level. Analysis of the events related to the human factor provides prevention of events in future by means of detection of direct root causes of the events, development and realization of corrective measures directed to elimination of causes and prevention of events.

10.3. Safety Commitment

INPP policy in the field of safety and quality assurance was adopted in 1988 and in 2000 and 2005 it was reissued. In accordance with this document the INPP management headed by Director General bears full responsibility for the safety of the operating Unit 2 as well as Unit 1, which undergoes the decommissioning procedure, and states that:

The main goal of INPP is to become the safest RBMK nuclear power plant and a competitive performer in the nuclear industry in Lithuania. This also means that the decommissioning projects will be implemented in a safe and effective manner.

To meet the above objectives, it is necessary to assure that:

- **Activities at all levels are performed safely, with high level of quality, and plant safety is considered an overriding priority.** Good quality is achieved when INPP personnel meet the requirements of the Owner and VATESI as well as expectations of the people, and the people of Lithuania feel confident about the safety of INPP.
- **All employees take an active part in safety and quality improvements.** To ensure such participation every employee must know the INPP objectives, his own functions and be continuously informed about the results of activities performed at INPP.
- **All INPP employees are properly qualified to perform their functions in accordance with plant objectives.** A level of every employee's competence shall be improved to strengthen both INPP and the individual.
- **All INPP managers exhibit personal activity and leadership.** The main task of every manager is to formulate tasks and requirements facing his department, put them into an assessable form, communicate to all employees, and to provide every employee with a working environment consistent with the tasks to be accomplished.
- **During the decommissioning of Unit 1 efficient cooperation between INPP managers and employees was provided.** It is important that cooperation between managers and employees during the decommissioning of the plant should be as efficient as during its operation. It is significant to show that we can not only provide safe operation of the plant but also carry out the safe decommissioning of the Unit.
- **Social protection is provided to INPP personnel.** During the decommissioning process the key personnel should be retained and the implementation of the Personnel Social Support Strategy should be ensured.
- **All INPP activities are continuously evaluated to improve their quality and efficiency.** The INPP and its personnel must make the use of their experience and that of others to improve the organisation, operations and their competence.
- **Each of INPP employees is responsible to society.** All laws must be abided by and the safety requirements must be met with a sufficient safety margin.
- **Efficient and integrated quality assurance System was implemented at INPP.**

If the INPP Director General can answer «YES» to all these items, the plant will implement all activities at the required quality and safety level. If every employee can answer «YES» to all these items, he performs **his job to the required quality level**.

To accomplish these tasks, the Safety and QA Department performs maintenance and improvement of the INPP quality assurance system, evaluates its effectiveness and provides the necessary quality training for personnel.

10.4. Safety Assurance during the Operation of Unit 2 (with personnel motivation assessment)

According to VATESI requirements in order to continue Unit 2 operation after Unit 1 final shutdown, INPP has prepared a Safety Justification for the only operating Unit 2 (SJ).

The Safety Justification for the only operating Unit 2 was developed on the basis of Unit 2 condition at the end of December 2004 (the scheduled date of the Unit 1 final shutdown).

The Safety Justification is based on SAR-2 and RSR-2, it covers the safety issues related to changes of operation conditions for Unit 2 process systems and common plant process systems and changes of administrative structure of INPP following the Unit 1 final shutdown.

The Safety Justification for the only operating Unit 2 has been developed to cover two stages of the Unit 1 decommissioning:

- From the Unit 1 final shutdown until the beginning of the fuel unloading from the reactor;
- From the start of the fuel unloading from the reactor of Unit 1 until the competition of the fuel unloading procedure.

The Safety Justification also considers planned modifications of Unit 2 systems, which are affected by the Unit 1 final shutdown, configurations of Unit 1 process systems during the decommissioning of Unit 1.

A list of all Unit 2 systems as well as common plant systems was compiled in order to evaluate the effect of the Unit 1 final shutdown on the safety of Unit 2 operation. After the analysis of all Unit 2 systems had been conducted, a list of Unit 2 systems, which have connections with Unit 1 and common plant systems, was defined. Also, a list of Unit 2 systems with transit communications going through Unit 1 premises to common plant facilities was made. Analysis of the Unit 1 final shutdown effect on the safety of Unit 2 operation was conducted for all systems included into above-mentioned lists. The Safety Justification for the only operating Unit 2 includes four Parts:

- Part 1 – Peculiarities of INPP operation with two and only one (Unit 2) units.
- Part 2 – Analysis of systems, which have technological communications with Unit 1 systems.
- Part 3 – List of failures.
- Part 4 – Analysis of failures and external events.

The effect of Unit 1 final shutdown on human factor (Safety Justification, Part 5) and INPP physical protection (Safety Justification, Part 6) was considered.

As a result of the analysis, which had been conducted in Parts 1-4, a list of Unit 1 Safety Related systems and elements was defined. This list also includes elements of common plant systems, which are located at Unit 1 and the efficiency of which should be preserved after the Unit 1 final shutdown in order to assure safe operation of Unit 2.

In addition, a list of systems and element, which are required for normal operation and which do not affect the safety of Unit 1, was defined. The latter list also includes elements of common plant systems, which are located at Unit 1 and which should be left in operation after the Unit 1 final shutdown.

The amount of common plant systems' equipment, which should be left in operation after the Unit 1 final shutdown, was assessed.

Lists of Unit 1 premises where normal operation conditions should be assured after the Unit 1 final shutdown were compiled with regard to each system. In addition, a list of operational documentation, which should include all changes made after the Unit 1 final shutdown, was defined.

Analysis of all initiating events, which had been considered in SAR-2 (Task 12, Part 4), was conducted in order to determine the effect of Unit 1 and 2 communications on the consequences of these events. Unit 1 systems are included into the analysis of the effect on Unit 2 safety under one initiating event only – "loss of the Service Water Supply System". In the Safety Justification of the only operating Unit 2 Report (Part 1-4 "Service Water Supply System") it is shown that the Service Water Supply System, which will be left in operation at Unit 1, will provide the required amount of service water to Unit 2 provided that the loss of Service Water Supply System at Unit 2 has occurred. The consequences of other initiating events do not depend on the operation of Unit 1 systems.

The Safety Justification of the only operating INPP Unit 2 provides evidence that the continuation of Unit 2 operation after the Unit 1 final shutdown is possible. Results and conclusions of the Safety Justification of the only operating Unit 2 have provided the basis for decision-making by VATESI on issuance of Operation License for INPP Unit 2 after the Unit 1 final shutdown.

Permission for the Unit 1 final shutdown was received from VATESI at the end of 2006 after the completion of the following works:

- Construction of new Heat Only Boiler Station and Steam Boiler Station;
- Issuance of the "INPP Unit 1 Decommissioning Project for the 1st and 2nd stages of fuel unloading;
- Issuance of new "Technological Regulations on the operation of Unit 1", PTOed-0905-1;
- Preparation of Technical Order on "Joint operation of On-site Central Heating Plant (OCHP) and Boiler Station" TTRP-0931-1932;
- Conducting of personnel emergency training on assurance of safe operation of both units during the only operating Unit 2 outage or OCHP failure;
- Implementation of Safety Justification of the only operating Unit 2 basic recommendations.

10.5. Regulatory Control

General Regulations for Nuclear Power Plant Safety VD-B-001-0-97 and Nuclear Safety Regulations for Reactors of Nuclear Power Plants VD-T-001-0-97 provide the main principles emphasizing overriding priority of safety and main issues to be implemented in that respect. In accordance with above regulations safety culture is practical and psychological training of individuals in which the assurance of nuclear plant safety is a priority goal and an inherent requirement leading to individual awareness of responsibility and self-monitoring in the implementation of all tasks which can affect safety.

The safety of a nuclear plant shall be guaranteed by applying the principle of "defence-in-depth", i.e. by the sequential implementation of protection measures based on a system of barriers to prevent the spread of ionising radiation and radioactive materials to the environment and a system of technical and organizational measures to protect these barriers and retain their effectiveness, and to provide direct protection for the population.

The system of barriers includes the fuel matrix, the fuel element cladding, the boundary of the primary coolant circuit, and a hermetically sealed protective enclosure surrounding local safety

systems. The system of technical and organizational measures among other includes implementation of safety culture at nuclear facilities.

Safety culture shall be inculcated to all personnel and organizations employed in the nuclear power field through:

- Appropriate selection and training of personnel in each sphere of safety related activity;
- Creation and maintenance of a strict discipline with a clear distribution of personal responsibility among managers and executives;
- Instructions preparation and strict observation the work performance, as well as their periodical updating with consideration of experience.

All personnel involved in safety-related activities should fully understand the nature of their work and the manner and degree in which it affects safety. They should be fully aware of the consequences, which might follow the violation of rules or any deficient application of the prevailing norms and technical requirements.

Ignalina NPP, being the Operating Organization is responsible for nuclear facility safety assurance and bear full responsibility for safety including measures intended for prevention and/or mitigation of incidents consequences during usage and storage of nuclear materials and radioactive substances, environment protection and environmental condition control providing in controlled area and in radiation-control area, and means of control necessary to ensure that the nuclear facility is used only for purposes for which it was intended and constructed.

The Operating Organization bears responsibility for establishing the necessary organizational structures for safe operation of nuclear installation of both Unit 2, which is currently operating, and Unit 1, which was shutdown in 2004 and which is currently being decommissioned. The Operating Organization ensures that the plant has the necessary financial, material and technical resources, norms and technical requirements, scientific support, quality assurance in the all stages of lifetime. The Operating Organization also has to organize the physical protection and the fire protection of the plant, as well as recruitment and training of operating personnel, maintain safety culture and must perform continuous monitoring of plant safety.

The Operating Organization ensures continuous monitoring and supervision of all activities related to the plant safety. The results of safety inspections and periodic reports on plant safety are to be submitted by the Operating Organization to the State Regulatory Institutions.

To perform above indicated requirements, the Division for Safety Supervision is established at INPP as part of the Safety and Quality Assurance Department. It carries out safety inspections, which audit the adherence to the requirements of the safety rules in accordance with the Annual Plan, daily inspections of safety conditions, and inspections of work and modification implementation. Inspection findings are recorded in reports. Annually INPP prepares an INPP Safety Report. The Report is submitted to VATESI and to other interested organizations. In accordance with national regulations, VATESI carry out the independent regulatory inspections of Ignalina NPP, which cover an assessment of safety culture.

10.6. Voluntary activities and good practices

Adhering INPP policy in the field of safety and quality assurance, INPP management staff under the leadership of Director General declares:

- We have to motivate the personnel for good work, for making the contribution to the plant safety improvement. The tendency to note well performed work has to become a priority

element of management. The work is considered to be well executed, when it is executed safely and to high quality level.

- Every manager has to create an atmosphere of such kind when the personnel avow problems and own errors. The personnel mistakes are considered only as a possibility to refrain from their repetition, not with the purpose to impose a penalty. It is necessary to learn lessons from each error and thereby to help itself and others not to make this error again.
- However we must be intolerant to violation of safety, of internal regulations and hiding of errors. Moreover, we have to make a decision on each penalty recovery applying weighted approach in order not to impair atmosphere of openness.

Ignalina NPP management staff declares its adherence to the Policy in the field of personnel motivation.

New information

Section 10.2. Presented information about WANO and OSART missions.
Section 10.4. Presented information on Safety Assurance during the operation of Unit 2 (including personnel motivation assessment).

Article 11: FINANCIAL AND HUMAN RESOURCES

i. Each Contracting Party shall take the appropriate steps to ensure that adequate financial resources are available to support the safety of each nuclear installation throughout its life.

ii. Each Contracting Party shall take the appropriate steps to ensure that sufficient numbers of qualified staff with appropriate education, training and retraining are available for all safety-related activities in or for each nuclear installation, throughout its life.

11.1. Financing sources

State Enterprise Ignalina Nuclear Power Plant (below referred to as INPP) is the main energy generator in Lithuania. In compliance with the requirements of the European Union, Lithuania took the obligation to end the plant operation in 2009. Unit 1 was shutdown in 2004 December 31, nevertheless, the INPP is leading on the energy market of Lithuania by selling 70% of generated electricity.

Up to the year 2002 all energy generated by INPP was supplied to “Lietuvos energija” JSC.

After Electricity Law came into force in 2002, the state controlled electricity monopoly was reorganised to market relations, so since April 1, 2002 INPP has started electricity trade with public and independent suppliers. Starting from 2003 INPP made electricity purchase and sale contracts and sells electricity to the following companies: ,,Achema“ JSC, ,,Prekybos namai Giro“ CJSC, ,,Mazeikiu elektrine“ JSC (at present ,,Mazeikiu Nafta“ JSC), ,,Akmenes cementas“ JSC, ,,Visagino energija“ SE, ,,Korelita“ CJSC. About 70% of INPP electricity, sold to domestic market, is purchased by public suppliers ,,Rytu skirstomieji tinklai“ JSC and ,,BCT“ JSC, about 20% is sold to ,,Lietuvos energija“ JSC, which acts as electricity market operator. ,,Lietuvos energija“ JSC as well exports electricity to other countries.

Moreover, since 2003 to 2005, INPP as an enterprise holding the independent supplier licence, was trading with the independent customers: “Lifosa” JSC and “Dirbtinis pluostas” JSC (nowadays after reorganisation “Korelita” CJSC). On average about 65 mln. KWh was sold to these customers per annum. At present INPP has not got any contracts signed with independent consumers, however considers dealing with them in the future.

No.	Years	Sold electrical energy M/kWh	Income (K Lt)	Rate ct/ kWh (according to report)	Profit, loss (KLt)
1.	2004	14 039	716 766	5,106	22 799
2.	2005	9 624	564 470	5,865	13 585
3.	2006	7 977	507 850	6,366	19 090

At present the operation of Unit 1 is financed in the frame of the Ignalina Program from the funds of European Union and National Fund.

11.2. Personnel employment and training for performance of safety-related activities at Nuclear Facilities

INPP has a quantitatively high number of personnel in comparison with the other NNPs in the world (except for the former Soviet plants). Firstly, operation and maintenance of INPP demands a lot of efforts and manpower. Secondly, after Lithuania gained its independence, the restructuring of then existing organizations dealing with the maintenance and repair of the nuclear installations on nuclear facilities started. In order to preserve the experienced personnel recruited to perform outage works and other activities, INPP had to incorporate all these external organizations into its structure.

When INPP became property of Lithuania, a huge work was commenced on nuclear facilities targeted to the plant upgrade and safety improvement by applying nuclear experience gained by Sweden, Germany, USA, Japan and other countries. Supported by the above countries, INPP safety and reliability were upgraded sufficiently and the works are still ongoing. The relevant activities are in progress in order to implement procedures, manuals, guidelines performed meeting the IAEA standards.

It is because of the above-mentioned activities the INPP can be referred as the safest RBMK Nuclear Power Plant.

Many INPP experts have been trained at the nuclear power plants of Sweden, USA, Canada, Japan and other countries. Such training provides efficient tool to adopt the safety improvement experience.

INPP personnel is very well educated and properly trained. More than 38% of personnel have higher education, 26% – college education, 20% - vocational schools and the others have the general secondary education.

The faculty of Nuclear Power and Thermal Engineering was established in Kaunas Technological University to educate nuclear specialists.

Taking into consideration the peculiarities of the RBMK reactor, INPP placed an agreement with the Obninsk Nuclear Power Energy Institute (Russia). 5-7 nuclear engineers per year sponsored by INPP are trained there to operate nuclear facilities.

In the town, where INPP employees live, there is a Vocational School which trains qualified workers to satisfy the INPP needs in electricians, welders, I&C and tool-makers.

Procedures on INPP Safety Culture development have been generated. They undergo continuous upgrading in order to increase individual responsibility of the personnel in terms of work implementation and to ensure reliable and safe operation of the plant.

In 1999 the National Energy Strategy was approved according to which closure of INPP Unit 1 is due in 2005. Currently the technical designs of Unit 1 decommissioning and its dismantling are being developed. A new Law of LR on additional social warranties and employment warranties for INPP personnel was adopted on 29 April 2003. The Law provides additional employment warranties, life insurance of personnel responsible for nuclear safety, whose work is significant to ensure safe and uninterruptible operation of INPP, procedures on discharge payments, retirement payment, and migration payment.

Within the frames of Unit 1 forthcoming decommissioning and in accordance with the decree of the Government of LR five (5) departments of INPP, which are not involved in energy generation,

received the status of independent State Enterprises. Given these departments separation the number of INPP personnel reduced for 808 employees.

The Power Unit 1 of Ignalina NPP was shutdown on 31 December 2004 in compliance with the decree adopted by the Government of LR on 25 November 2004 on the date of Unit 1 shutdown. After the shutdown of Unit 1 the Law on social warranties has been put in force.

The shutdown of Unit 1 resulted in the redundancy of personnel on the plant. In accordance with the above-mentioned Law, lists of positions and employees to be released are approved annually. These measures have allowed reducing the amount of personnel to 3230 employees by 1 April 2007 (by 1 January 2001 – 4680 employees). It is planned to continue the reduction of personnel amount taking into account the optimal number of employees needed for the safe maintenance of Unit 2.

In view of Unit 2 shutdown on 31 December 2009, there are no persons left wishing to study nuclear engineering specialities in Kaunas Technological University.
Currently a political decision on construction of a new nuclear power plant has been adopted. This will give an opportunity for a definite number of INPP specialists to apply their knowledge and experience for the construction and operation of the new NPP. Also this will motivate young people to study specialities needed in the area of nuclear engineering.

11.3. Organization and structure of training at INPP

11.3.1. General Provisions

The Training Centre was founded on 1 August 1996 on the basis of the training unit.

The Training Centre is the structural department of the state enterprise Ignalina Nuclear Power Plant and is located at the same address – Druksiniu k., Visagino sav., Lithuanian Republic.

Activity of the Training Centre is regulated by the:

Laws of the Lithuanian Republic:

- Law of the Lithuanian Republic on nuclear energy № IX-586;
- General rules for nuclear plants safety provision, VD-B-001-0-97;
- Regulations on nuclear safety of reactor facilities of nuclear power plants, VD-T-001-0-97;
- General requirements for staff management of institutions operating nuclear energy installations and companies rendering them services, VD-E-11-2001;
- Requirements to quality assurance system of nuclear power plants and other nuclear energy installations, VD-KS-02-99;
- "Uniform regulations on employees training and qualification on safety and health issues" approved by the Order No. A1-223/V-792 dated 2003-12-31 of the Minister of social insurance and labor and Minister of public health;
- List of main laws regulating nuclear energy safety in the Lithuanian Republic, VD-VP-01, section XIII.

IAEA documents:

- Basic safety principles for nuclear power plants, IAEA INSAG-3;
- Nuclear power plant personnel employment and selection, professional training and access to work of the operation staff, IAEA 50-SG-01;
- Safety Guidelines "Personnel recruitment, qualification and training for NPPs", 2005, IAEA NS-G-2.8;
- Quality assurance at operation, IAEA 50-C/SG-Q13;

- NPP personnel training and its evaluation: IAEA-TECDOC-380;
- Safety of Nuclear Power Plants: Operation, No. NS-R-2.

INPP procedures:

- Training and qualification of the personnel. General requirements, QA-1-009, PTOed-0108-13;
- Personnel. Management procedure QA-2-014, PTOed-01411-1;
- Regulation on operation personnel training, PTOed-1409-4;
- Guidelines for work arrangement with INPP operation personnel, PTOed-1408-1;
- Regulation on qualification of the operation personnel. PTOed-1409-3;
- Regulation on Training Centre, PTOed-0109-27.

11.3.2. Activity of training center (TC)

Rights of TC

TC has the following rights purposed to performance of its activity within its competence frames:

- To represent the plant on personnel training issues beyond its bounds;
- To submit proposals of improvements in personnel training process to INPP Top Management, in the written form and orally;
- To manage the general process of assessment and feedback in course of training when permanently supported by the plant departments (workshops) that the training is conducted for and tightly interconnected with.

Responsibilities of TC

The Training Centre undertakes:

- To arrange training of INPP employees, check their knowledge and skills;
- To provide high technical and pedagogical competence of TC instructors, proper qualification of other employees of TC;
- To use training and methodological documentation and techniques purposed to effective training conduction;
- To ensure operative and proper condition of the full-scope simulator and other equipment of TC;
- To develop programmes of training, continuing and requalification training of INPP personnel in tight co-operation with the plant departments involved;
- To develop perspective and annual plans of INPP personnel training;
- To develop training materials for training conduction for the plant personnel, to provide monitoring of such training conduction.

11.3.3. Sequence of personnel training

All categories of operation personnel are trained in the Training Centre (irrespective of their age and education), job positions of which are included in the “Position List of managers, experts and qualified workers subject to the compulsory training at TC”, code PTOed-1416-1, as well as employees servicing potentially dangerous equipment.

The basis for training of a specific employee shall be the order by the Technical Director.
In the order shall be appointed:

- A theoretical training instructor and an operational training instructor;
- Number of training programme;
- Form and location;
- Training period.

Expert from the corresponding plant department can be appointed as an operational training instructor.

Basic provisions of personnel training

Personnel training system is purposed to provide knowledge and practical skills necessary for work performance and process and equipment control, as well as the responsible attitude to work which is required for implementation of the established tasks and allotted functions as per the job description.

Personnel training system comprises the following components:

- Psycho-physiological examination of the candidates for training (for operation personnel);
- Input check of knowledge and development of individual training programme;
- Training in accordance with the training programme;
- Qualification;
- Development of technical training means and their appropriate maintenance by means of organizational, training, procedural, technical and operational documentation;
- Preparation and archiving of training documentation.

At INPP the personnel training is conducted by means of initial training and continuing training.

Initial training

Initial training – training of a fresh-comer for the relevant position at INPP, as well as training of INPP employee for promotion.

The initial training is conducted in the following sequence:

- After the corresponding procedures are performed in the personnel department the employee's manager shall perform the primary on-the-job instructing of the employee;
- To determine the input knowledge level and practical skills of the trainee the input knowledge check shall be performed. It is performed by the TC instructor in form of interview or written test in the presence of the trainee's manager;
- On the basis of the input knowledge check and in accordance with the approved and registered training programme for the relevant position the individual training programme shall be developed for the specific employee training;
- Upon passing all training stages in accordance with the individual programme the employee shall take internal exam at the TC or at shift (for operation personnel);
- In case of the positive result of the internal exam the employee shall go through position qualification procedure in the appropriate committee;
- The initial training is completed in case the qualification procedure is successfully passed;

After the initial training is completed the employee on the basis of the qualification committee conclusion is allowed to the doubling work performance under supervision and guidance of the experienced employee (for operation personnel) and/or independent work performance.

Training of the personnel consists of the theoretical training and on-the-job training (probation).

Number of the theoretical training items and their contents is specified in accordance with the specific activities performed at INPP.

Theoretical training of the personnel can be performed in form of courses or individually by the TC instructors or the relevant experts of INPP departments.

Training using the full scope simulator or other technical means (training computer programmes, equipment mock-ups, actual components and samples, etc.) shall be indicated in the promotion training programme and is conducted by the TC instructor.

On-the-job training (probation) is purposed to the personnel to acquire practical skills and attitudes in situ and is conducted by the on-the-job instructor.

In course of probation the employee studies and applies in his working area the rules, standards, job description and operation manuals in accordance with his job description, obtains experience in providing proper, safe and least-cost operation of the serviced equipment.

At the end of the on-the-job training (probation) and before the qualification by the appropriate qualification committee the employee's practical skills are checked in accordance with the "Regulation on qualification of the INPP operation personnel", PTOed-1409-3.

Continuing training of the operation personnel

Continuing training is purposed to maintaining and improvement of INPP operation personnel job proficiency with respect to their knowledge, skills and attitude to work.

Continuing training is conducted on the routine basis. Personnel job proficiency maintenance and improvement schedules are annually included into the document "Plan of INPP personnel preparation".

Continuing training is conducted in the following forms: operation personnel job proficiency maintenance and improvement.

***Job proficiency maintenance** – activity intended for ensuring that the personnel professional knowledge and skills necessary for implementation of tasks according to specific position and profession requirements are maintained at the proper level. Job proficiency maintenance procedures are conducted periodically over the whole labour activity.*

Job proficiency maintenance includes:

- Training in accordance with the programmes of job proficiency maintaining in TC or in other training institutions;
- Periodic instructions;
- Studying of industry and in-house experience;
- Qualification in the form of periodic knowledge check-up and re-qualification;
- Performance of practice exercises (emergency and fire protection training, full-scale simulator training);
- Studying of changes on the basis of systems and equipment modifications.

Job proficiency maintenance of operation personnel at TC, job positions of which are included into the "Position List of managers, experts and qualified workers subject to compulsory training at TC" PTOed-1416-1, is performed in accordance with programs. Positions for which simulator training is compulsory are highlighted in the above-mentioned List.

Performance of instructions is one of the forms aimed at maintaining the operation personnel job proficiency. Instructions permit to recollect personnel knowledge of regulations and rules, job descriptions and operation manuals. In addition, instructions permit to improve operation and maintenance techniques used for equipment, systems and constructions of INPP.

Another form of job proficiency maintenance is studying of industry and in-house experience.

The relevant emergency and fire protection training is conducted in INPP departments in compliance with the schedules. This training is aimed at maintaining the skills required for accident mitigation, proper behavior in the emergency situation, verifying shift personnel interaction, skills required for rendering the medical aid and using the individual protective and fire protective means.

Qualification improvement – activity aimed at improving the personnel current professional theoretical knowledge and skills required for specific positions and profession. On the grounds of qualification improvement the professional level or category may be increased.
Qualification improvement includes:

- Qualification and professional level increase at the specific-purpose courses, qualification improvement courses at INPP TC, or at other organizations, specific institute faculties of the Lithuanian Republic and abroad;
- Personnel experience exchange at foreign NPP;
- Training for professional level increase.

Qualification improvement training can be conducted either as an on-the-job process or as a specific lesson course.

Personnel qualification improvement training is performed in TC in accordance with the programmes which include training duration and sequence, improvement of technical knowledge and knowledge on safety culture and industry safety.

Specific-purpose courses are intended for studying the new equipment, goods, materials, processes, mechanical and automated tools used in operation process, rules and requirements of their safe operation, technical documentation and economical issues relating to the operation.

Qualification improvement training is performed at plants, organizations, and special institute faculties of the Lithuanian Republic and abroad on the contract basis.

MCR operators and Plant Shift Supervisors

During continuing training the MCR staff solves the follow main tasks:

- Maintaining of the basic knowledge scope at the proper level;
- MCR staff training with respect to the diagnostics skills and emergency situation mitigation;
- Complex training on the basis of modifications performed;
- Training of organisational and managerial skills;
- Training of operative work skills;
- Improvement of team work methods.

Within the frames of personnel continuing training in accordance with the "Programme of MCR staff qualification training in TC" the annual sessions are arranged consisting of lecture, seminars, practice exercises on the full-scope simulator.

In course of these sessions the seminars and lectures are conducted involving INPP senior staff, e.g.:

"Review of last modifications and changes in the operating and technical instructions of TD, RD, I&C, CD";

"Analysis of incidents at NPP with RBMK related to FC damage";

"Reactor diverse shutdown system";

"New directions in organisation of NPP with RBMK water chemistry";

"Design and operation principle of CPS cluster-regulating device";

"Safety justification of solely operating INPP Unit";

"Some aspects of survey organization at INPP at present time and for the near-term outlook".

Training using the full-scope simulator is conducted in accordance with scenarios of normal operation, emergency situation and accidents.

In course of continuing training the new knowledge is given, relevant skills and interconnections between operators are trained. Each lesson is analyzed upon its completion to:

- Solidify the skills acquired;
- Indicate good achievements throughout the exercise task performance;
- Reach thorough understanding of technological process dynamics;
- Work out ability of situation analysis;
- Work out skills of teamwork.

While working out skills in the accident mitigation training it is taken into consideration that operator can act in the following circumstances:

- Time constraints;
- Sudden increase of information flow in case of accident;
- Possible stress of operator,
- Lack of operational experience in accident conditions;
- Probability of safety systems hidden failure to occur.

Technical support personnel (maintenance personnel)

Continuous training is conducted in the following forms of:

- Preparation for the special types of work;

- Seminars aimed to perform practical training for the equipment maintenance procedures and experience exchange at the results of power units overhaul;

- Periodical and additional instructions which are aimed at studying of modifications in technological processes of equipment repair and introduction of additional requirements regarding repair technique, as well as special-purpose instructions held before implementation of repair works;

- Qualification improvement at special-purpose courses held at special educational institutions and other organisations of the Lithuanian Republic or abroad;

- Training for professional level increase;
- Maintenance of practical skills necessary for implementation of tasks before commencement of works.

Preparation for the special types of work includes the training purposed to mastering of new equipment, repair tool set and technological processes, such as:

- Work with split pipe cutter P5928M.00.00.00.00 for maintenance of weld seam of welding pipeline DU800 to primary circuit to MPC sucker;
- Work with machine for cutting of nib seam of FC with hydroblasting;
- Works on remedial maintenance of the system regulating heat carrier consumption in RBMK-1500 fuel channels;
- Work with power tools P5942, P5947;
- Remedial maintenance of pipeline fitting of a pump-heat exchanging installations division;
- Works on remedial maintenance of block valves;
- Maintenance of heat-exchange apparatus;
- Work with manual pneumatic machines;
- Performance of works on explosion-protected electrical equipment maintenance;
- Work on single-shell hydraulic press.

Rights, obligations and responsibilities of personnel trained in TC

All rights, obligations and responsibilities of an employee trained are specified and authorized in the job description of the corresponding employee.

Qualification requirements to instructors, their rights, obligations and responsibilities

Position of the TC instructor can be rendered to a person having higher technical education, experience of INPP equipment operation or maintenance no less than 5 years. Position of the TC instructor can be also rendered to a person having technical secondary education and work experience for the required specialty no less than 8 years, having received favourable evaluation by the Department of State Security on admission to work at the plant and having passed medical examination in compliance with the established order for the given specialty.

Position of the MCR senior instructor can be rendered to a person having higher technical education, experience of INPP equipment operation no less than 5 years with at least 3 of them performing the relevant MCR job (PSS, DPSS, SUO, SRO, STO), having received favourable evaluation by the Department of State Security on admission to work at the plant and having passed medical examination.

Prior to the independent work performance the instructor shall be trained in accordance with the program for job preparation, acquire the relevant psycho-physiological training in the TC or corresponding educational institution and be qualified by the relevant plant committee for such a position.

Qualification of instructors' knowledge is performed in accordance with the test-papers, approved by the General Director and endorsed by VATESI.

Further on, qualification procedure for the instructor position (senior instructor) is performed once per 3 years. The instructor shall take an exam on nuclear power safety rules and regulations, operating regulations and safety rules, fire fighting regulations, technological regulations, job descriptions and operation manuals in accordance with the test-papers.

For the purpose of qualification maintenance instructors shall annually for the period of 2 weeks work on probation at workplace in the appropriate departments.

All rights, obligations and responsibilities of the MCR senior instructor, TC instructor are listed and authorized in the corresponding job descriptions.

Qualification organization

Qualification for position includes assessment of employee knowledge level and practical work, and conclusion of qualification committee.
Knowledge check within the frames of qualification procedure is performed on the basis of test-papers or special questions by means of oral or written examination. During examination procedure additional questions, which lie within the scope of the training program but not included into the test-paper, could be asked to the examinee.

Knowledge of trainees during qualification is marked (checked) on the scale: GOOD, SATISFACTORY, UNSATISFACTORY.
Checking of professional skills is a part of the qualification procedure. It is performed at the end of the on-the-job training as a part of the initial training for the relevant position:

- For MCR personnel – full-scale simulator training, which is evaluated by a mark;
- For managers and experts of maintenance personnel, as well as operation personnel – evaluative work that verifies knowledge of rules, regulations, job descriptions, operation manuals and ability to use the above documentation at workplaces.
- For qualified workers of maintenance personnel – qualification (trial) work (qualification (trial) work is considered to be successfully performed if no time limits were exceeded, no spoilage is found caused by the examined person, no industrial safety rules are violated).

After an employee (operation personnel) has successfully passed over all qualification stages, he/she is allowed either to the doubling work performance under supervision and guidance of the experienced employee and/or independent work performance.

Further on, the qualification committee concludes on the employee's compliance with the work status in accordance with the results of the periodic knowledge check. The committee also evaluates the efficiency of the employee's practical activity during performance of his/her functions since the last qualification.

Persons got unsatisfactory mark at the routine exam shall take reexamination in one month at the latest.

Qualification of INPP personnel is performed by the qualification committee, which are appointed by the order of the Director General.

Number of examination committees at INPP is determined considering the necessity of timely and proper qualification.

Qualification committee shall consist, as minimum, of three members.

Training and qualification of employees on performance of dangerous works and works with the potentially dangerous equipment shall be accomplished in accordance with the "Uniform regulations on employees instruction, training and qualification on safety and health issues" approved by Order No. A1-223/V-792 dated 2003 12 31 of the Minister of social insurance and labor and Minister of public health.

Management of training center

The Training Center makes part of the Technical Directorate and directly reports to the Technical Director (Chief Engineer).

The Training Center is guided by and the responsibility for its activity rests with the Head of TC.

Organization structure and manning table of the Training Center are approved by the General Director when submitted by the Technical Director and Personnel Director.

The Training Center consists of the training service department and technical means department.

The Training Center departments are managed by and the responsibility for their activity rests with the Deputy Heads of TC.

Resources of the training center

INPP personnel training in the TC is accomplished in accordance with the annual training plan.

Training costs are covered from INPP personnel training budget calculated in compliance with the planned costs.

All TC buildings are covered by balance of Ignalina NPP.

TC archive and records

TC documentation on training and qualification of operation personnel is maintained in accordance with the requirements of procedure “Documentation control and records”, code PTOed-0211-1.
Organizational documentation is maintained in accordance with the requirements of “Instruction on development, registration and record of INPP organizational documentation” code SEKorg-0212-16B1.

TC Reorganization and wind-down

TC Reorganization and wind-down shall be performed within frames of the state enterprise Ignalina Nuclear Power Plant and in compliance with provisions of Law of the Lithuanian Republic and INPP Statute.

New information

Section 11.2. Added information concerning personnel employment issues in relation with Unit 1 shutdown.
Section 11.3. The lists of Lithuanian laws and International document are updated.

Article 12: HUMAN FACTORS

Each Contracting Party shall take the appropriate steps to ensure that the capabilities and limitations of human performance are taken into account thought the life of a nuclear installation.

The main regulatory requirements on human factor are set in "General Regulations for Nuclear Power Plant Safety" (VD-B-001-0-97) and "Requirements for modifications in nuclear facilities" (VD-E-08-2000).

The Human Factor Management program has been developed at INPP. The program sets out actions on human factor management for the following INPP activities:

- Selection of staff;
- Personnel recruitment;
- Personnel training and qualification;
- Personnel motivation;
- Provision of information;
- Personnel reliability;
- Workplace organization;
- Documentation control;
- Modifications;
- Using internal and industrial experience;
- Operation organization.

INPP Safety and Quality Assurance Service carries out analysis of the human factor impact on INPP safety.
The following documents regulate INPP staff management process that involves recruiting, primary and continuous training, certification and access to independent work at the plant:

- Management Procedure, QA-2-014, "Personnel";
- General Requirements, QA-1-009, Personnel Training and Certification;
- Regulation on Arrangement of Work with INPP Operating Personnel;
- Standing Order on Operating Personnel Training;
- Standing Order on the Training Center;
- List of positions of managers, experts and skilled workers who shall undergo compulsory training in the Training Center;
- Regulation on Development and Implementation of Training Program and Examination Papers for a Position;
- Standing Order on Certification of Operating Personnel;
- The Plant Schedule of Work with INPP Operating Personnel;
- The Advanced Program of Support and Improvement of INPP Personnel Qualification;
- The Training Program for Workers in the Areas of Ionizing Radiation;
- The Program of INPP Personnel Psycho-physiological Examination;
- The Instruction on Organization of Emergency Exercises at INPP.

The requirements and provisions settled out in above INPP documents correspond to IAEA (International Atomic Energy Agency) recommendations as well as laws and legal acts currently in force in the Republic of Lithuania.

These documents provide that INPP meets the following criteria:

- Recruiting and personnel training ensures INPP safe operation and maintenance. Personnel state of health and their medical and psychophysical characteristics comply with the functions performed.
- Primary training provides personnel with sufficient skills to perform due tasks and understand consequences of their activities with respect to safety.
- Personnel certification makes it certain that the plant staff has enough qualification to fulfil its duties in order to provide safe and reliable operation of the plant.
- Planed and systematic conduct of work with the staff. System of continuous personnel training is in place.
- To maintain qualification and knowledge the personnel have periodical briefings.
- The personnel providing safe operation of equipment shall have periodic training on simulators and other technical means, undergo emergency preparedness and fire preparedness training; the operation personnel shall pass periodic assessment of their psychophysical state.
- The training is conducted in accordance with written and approved procedures. The procedures are systematically revised with consideration of operational experience, implemented equipment modifications and experiences of other NPPs. The training process is planned and monitored and the results are recorded.
- The training programs contain objectives to be achieved as well as types and methods of training.
- The maintenance personnel shall have general training as for all INPP personnel, know general parameters and functions of the systems they work with, and also be aware of safety and quality assurance aspects as well as quality control issues.
- The managers are experts in their area have had basic training and obtain required knowledge and experience in nuclear energy.
- The personnel related to safety are periodically certified.
- Instructors, who work in the training department shall have enough qualifications to provide training and sufficient competence of the trainees. They are aware of and can provide basic training. They are chosen among the experienced staff. Instructors are technically competent and have authority among plant personnel.
- Working places of the personnel, responsible for the plant safety, meet current ergonomics requirements.
- The man-machine interface provides sufficient data about the plant and its systems status as well as systems control and personnel attention in case of deviations from normal operation.
- The staff has all necessary means to carry on its duties: documentation, materials and equipment.
- The operating environment at the plant meets current standards and does not allow that hazardous influence of physical, chemical, biological and other harmful factors exceed the specified limits.
- INPP safety and personnel health system is aimed at ensuring the plant safety and personnel health by reducing the occurrence of accidents ant rate of personnel occupational diseases.
- The personnel activities are being monitored. A system is in place to record events and incidents, caused by human error at INPP, investigate the causes and develop corrective measures; perform probabilistic safety assessment considering human factor and monitor psychophysical capabilities of personnel providing safe operation of the plant.

During the process of personnel training and qualification maintenance at INPP particular attention is given to the personnel actions and interactions during accidents, as well as to practical skills required for the control of the reactor installation and the plant as a whole.

The personnel errors and actions, not defined in the instructions, are subject of analysis to identify direct and indirect causes and contributors to the event. To eliminate causes of the event and prevent further recurrence, the corrective actions are developed and implemented.

Event registration, reporting and analysis criteria, event analysis methodologies as well as responsibilities of the staff in this area are established in corresponding INPP procedures ("Instruction on Reporting about Unusual Events at INPP", "Instruction on Analysis of Unusual Events" and "Instruction on Analysis of Low-level Events").

Event analysis methodology is based on ASSET methodology and is directed towards identification of direct and indirect causes of the event. The events that have occured in the result of the inconsistency of the personnel actions with the expected behavior the "Procedure for additional analysis of events caused by the incorrect personnel actions" is used for additional in-depth analysis. Other procedures related to regulation of activities on registration and analysis of events related to human factor are in place at INPP ("Personnel Training and Qualification" (QA-1-009), "Corrective Measures and Improvement Program" (QA-1-018), Management Procedure "Assessment of Internal and Industrial Experience" (QA –2-003), and "Instruction on Assessment and Usage of Internal and Industrial Experience").

In order to provide a wide use of internal operating experience, the event analysis reports are placed into the INPP`s Information System on Unusual Events which include reports on events, that occured since the units commissioning.

The use of Internal and External Experience is regulated by the procedure "Assessment of Internal and Industrial Experience".

Aspects of staff motivation are highlighted in the "Policy" of the plant. In addition, the motivation issues are considered during workshops on safety culture, which are conducted for the plant personnel on a regular basis.

Article 13: QUALITY ASSURANCE

Each Contracting Party shall take the appropriate steps to ensure that quality assurance programmes are established and implemented with a view to providing confidence that specified requirements for all activities important to nuclear safety are satisfied throughout the life of the nuclear installation.

13.1. Quality assurance (QA) policies

The INPP established clearly defined safety and quality assurance policy and objectives. The INPP mission is providing safe, reliable and cost-effective operation of both power units and to decommission them safely (Unit 1 was taken out of operation in December 2004, and the remaining Unit 2 will produce power until the end of 2009), to ensure safety in all phases of lifecycle of the units.

The main principles of the INPP Safety and Quality Assurance Policy are implementing safety culture at all levels within the INPP organization; ensuring reliable, safe and cost-effective plant performance; and providing clear distribution of functions, authorities and responsibilities within the INPP organization in order to avoid plant management shortcomings. The Policy provides necessary conditions for continual improvement of the organizational management, improvement of the personnel and equipment; upgrading of the responsibility of each manager for specifying tasks and requirements for the personnel under his/her authority. Additionally, the Policy makes necessary provisions for encouragement of all INPP employees to actively participate in safety and quality improvement process; in continual assessment of INPP performance for the purpose of quality improvement.

Safety and Quality Policy of Ignalina NPP was updated on 2005-09-12 to include statements related to decommissioning of the plant. Those new decommissioning related statements are:

- Managers and personnel of INPP will ensure effective interfaces in the process of decommissioning Unit 1 of the plant. Within this process there should be ensured the level of co-operation should be the same as during operation of Unit 1. We should demonstrate that besides we can safely operate the unit, we also can safely take the unit out of operation too.
- Social security should be provided to the personnel. We should preserve the core INPP personnel and ensure unconditional implementation of Strategy for Social Support to Personnel.

13.2. QA programmes relating to all aspects of safety throughout the life of the nuclear installation

The INPP has established a three-level QA documentation system. The Quality Assurance Manual is the main 1st level document applicable to development, implementation and improvement of the Quality Assurance System. It specifies the Safety and Quality Assurance Policy and objectives, and establishes the basis for effective management of all activities performed at INPP. The Quality Assurance Manual includes the following sections:

- INPP Mission and Objectives;
- Legislative Framework of INPP Operations;
- Safety and Quality Codes and Standards;
- INPP Organization and Responsibilities;

- INPP Safety and Quality Policy;
- Management Principles and Assessment of INPP Performance;
- Management Self-assessment;
- Description of INPP QA System;
- Safety;
- Planning;
- Personnel Training and Competence;
- Control of Non-conformities;
- Corrective Actions and Improvements Program;
- Control of Documents and Records;
- Control of Work Processes;
- Procurement;
- Inspection and Testing;
- Audits.

The 2nd level of QA system documents is the so-called management procedures. The INPP developed, implemented and update 26 management procedures covering the following main activity areas:

- Safety Culture;
- Control of Documents and Records;
- Evaluation of Internal and Industrial Experience;
- Environment Protection;
- Radiation Safety;
- Fire Safety;
- Industrial Safety;
- Emergency Preparedness;
- Operations;
- Software;
- Maintenance;
- Ageing Management;
- Inspection and Testing;
- Core and Fuel Management;
- Radioactive Waste Handling and House-keeping;
- Personnel;
- Chemistry Control;
- Plant Modifications;
- Procurement;
- Design Control;
- In-house Fabrication of Spare Parts and Items;
- Storage of Materials and Equipment;
- Physical protection;
- External and Internal Communications;
- Decommissioning;
- Construction.

The management procedure for decommissioning was approved on 2005-05-31.

3rd level documents are detailed work procedures, as other QA documents, they are developed in accordance with the requirements of management procedures and specify how work shall be done.

Safety and Quality Assurance Department is responsible for managing the development, implementation and continual improvement of the Quality Assurance System at the INPP. This department is independent from the production function and reports directly to INPP Director General.

Manager of Safety and Quality Assurance Department is Deputy Director General for safety and quality assurance, and possesses the delegated authority for development, implementation and maintenance of the INPP Quality Assurance System, for assessment of its effectiveness and for required personnel training in the area of quality.

The Quality Assurance Division, which is under the Safety and Quality Assurance Department, performs the independent function of monitoring the effectiveness of the INPP Quality Assurance System. Additionally, the Quality Assurance Division is responsible for auditing quality management systems of the contractors supplying equipment, doing contract work or supplying services to the INPP. This activity is performed in accordance with the Nuclear Safety Requirements for the operating organization activity related to the purchase of goods, labour and services (P-2004-03), which came into force on 31 July 2004. The Quality Assurance Division personnel received the required training related to contractors' changeover to ISO 9001:2000 quality management standard.

13.3. Methods used in implementing and assessing QA programmes

The Quality Assurance Division is responsible for planning, conduct and reporting on audits of the INPP Quality Assurance System. Audits are planned in such way that each activity area is audited once per three years; and each plant department be audited once per two years. Besides it, the Quality Assurance Division conducts external audits of organizations supplying goods, work and services to the INPP. There are work procedures specifying requirements for planning, preparation, conduct and reporting on internal and external audits. Audit reports are distributed to respective INPP top managers and to the managers of audited departments and to VATESI.

INPP specialists, who are in the list of qualified auditors and list of lead auditors, participate in internal and external audits. There is a work procedure specifying requirements for auditors and lead auditors competence. The list of qualified auditors and list of lead auditors are updated annually.

INPP General Director exercises continuous control over quality assurance related activities. Quality assurance issues are discussed at regular meetings chaired by General Director. Annual reports on improvement of the INPP Quality Assurance System are submitted to VATESI.

13.4. Regulatory control activities

In accordance with the General Regulations for Nuclear Power Plant Safety, VD-B-001-0-97, the safety of NPP must be ensured by the implementation of system of technical and organizational measures, which includes also the implementation of quality assurance system at NPP.

The General Requirements for Quality Assurance at Nuclear Power Plant and other nuclear facilities, VD-KS-02-99, were issued by VATESI on the basis of the Law on Nuclear Energy of the Republic of Lithuania. The Regulations VD-KS-02-99 establishes regulatory requirements to the organization operating nuclear power facilities with respect to their obligations to develop

implement and maintain the efficient QA system. The requirements are of general type and concern all types of activities, which have direct and indirect influence to the safety of nuclear power facility. The requirements are obligatory for organizations, carrying out transportation, treatment and storage of nuclear and radioactive materials and as well shall be considered by the organizations, which activities can influence the safety of nuclear facility. According to VATESI requirements, the INPP Quality Assurance System shall comply also with IAEA Safety Series QA 50-C/SG code and guides. New IAEA requirements – The Management System for Facilities and Activities, GS-R-3 – will be introduced at INPP after new requirements of the national regulatory body are implemented.

In accordance with national regulations, VATESI carry out regulatory inspections of Ignalina NPP, which cover also an assessment of INPP quality management system. In July of 2003 VATESI carried out special inspection of INPP quality system. Inspection was conducted with participation of western nuclear safety experts from Sweden and France. 10 inadequacies were determined and 2 good practices were highlighted in the inspection report. The determined inadequacies were related mainly with the quality management of activities connected to the decommissioning process.
As a result of the mentioned inspection, INPP performed corresponding corrective measures to eliminate the determined inadequacies, including review of the Quality Assurance Manual, review of corresponding and preparation of additional management procedures.

In November of 2004 VATESI carried out special inspection at Ignalina NPP. Ten inadequacies were determined and five good practices were highlighted in the inspection report. 7 of the inadequacies are I and II type that means that appropriate corrective measures have to be implemented in order to solve the identified problematic issues. Three additional inadequacies are classified level III that are relevant to “observations” with no compulsory implementation of corrective measures.

Main inadequacies were related to the quality management issues of the decommissioning activities. The QM documents in use at the INPP Decommissioning Department make up a stand-alone system, which is not interfaced with the overall INPP QM system. It was not properly described decommissioning activities in INPP QM system: INPP quality policy does not include decommissioning activities and INPP QM system does not have the decommissioning procedure. Not a single internal audit was performed in order to evaluate compliance of INPP Decommissioning Department activities with the requirements of INPP quality management system. INPP did not have a proper system informing INPP personnel about the decommissioning process. INPP has not provided substantiation and risk assessment for the phasing out of the Technical Department and transferring the units to the responsibility of the Decommissioning Department as described in the Final Decommissioning Plan. In accordance with the identified inadequacies, INPP has prepared a plan of corrective measures. But, it has to be underlined that VATESI and INPP usually reach common understanding on safety issues and it allows solving the identified problems having a normal working dialog without using any strict sanctions. The temporary shutdown for Unit 1 was used only one time. Mostly VATESI uses written requirements for taking corrective actions.

As a result of VATESI inspection carried out in November 2004, INPP approved a plan of measures in order to eliminate the identified inadequacies. It was foreseen concerning the quality management inadequacies connected to the decommissioning process:

- to finalize and approve the Decommissioning Procedure,
- to review the Policy of Ignalina NPP in the area of Quality Management in order to include in it also the decommissioning activities,
- to perform the internal audit of the Decommissioning Service (internal INPP department),

- to include requirements in the Decommissioning Procedure on providing information to the personnel of INPP about the process of decommissioning.

Those INPP measures after the inspection were completed.

In October 2006 VATESI carried out special inspection of the quality system in activities of Decommissioning Services of INPP. This inspection was conducted with participation of western nuclear safety expert from Sweden. 13 inadequacies were determined within the inspection report. The determined inadequacies mainly relate to management and improvement of projects and organizational changes in the early stage of INPP decommissioning phase. As a result of this inspection, INPP identified and started to implement the corresponding corrective measures to eliminate the determined inadequacies, including personnel training policies in relation to INPP decommissioning and improvement of ways information on decommissioning is presented to INPP staff.

In October 2006 VATESI also carried out special inspection of the quality system implemented at State Enterprise Radioactive Waste Management Agency (RATA). 10 inadequacies were determined within the inspection report. They mainly relate to management and improvement of agency's activities by means of the newly implemented quality management system. As a result of this inspection, RATA identified and started to implement the corresponding corrective measures.

13.4.1. VATESI quality management system

The official decision to establish VATESI quality management system was made on 5 October 2000 (order No. 21 of Head of VATESI). The general principles of quality management system were defined; plans for preparation of individual documents were approved.

The implementation of VATESI quality management system is aimed at:

- Enhancing the efficiency of VATESI management, optimizing the planning and use of VATESI resources;
- Assuring adequate licensing, safety assessment and supervision of nuclear power facilities;
- Assuring adequate management and control of other internal VATESI activities (management of information, projects, training activities and other).

The following 2nd level VATESI quality management documents (procedures) were prepared and approved:

- VATESI Mission;
- VATESI Quality Manual (KU-I-01);
- Regulations for strategic planning of VATESI activities (KU-II-02);
- Regulations for preparation of nuclear safety regulatory documents (KU-II-03);
- Regulations for the training of VATESI staff (KU-II-04);
- Regulations for public information (KU-II-05);
- Procedure of VATESI inspection activities (KU-II-06);
- Licensing procedure (KU-II-07);
- Rules of financial control (KU-II-08);
- EU support project management procedure (KU-II-09);
- Internal regulations for co-ordinating EU related issues (KU-II-10);
- Manual for certification of safety important systems and elements of Ignalina NPP (KU-II-12).
- VATESI management procedure on sending and receiving of documents (KU-II-11)

- Accounting policy (KU-II-13).

The implemented quality assurance system of VATESI also includes nine detailed instructions (the 3rd documents), such as:

- Instructions for drawing of nuclear safety regulations (KU-III-01);
- Instructions for registering inspections and monitoring corrective measures (KU-III-02).

The indicated VATESI quality management documents were prepared and approved. So, these documents are valid. Using of these documents by VATESI personnel means implementation of the defined QM procedures. Usually, practical use of the approved QM documents identifies some deficiencies in the approved procedures. In this case, the QM documents are accordingly corrected and improved. No separate Implementation program or plan for VATESI QM system was approved after indicated QM documents were started to use. VATESI Quality Manual (KU-I-01) describes principles for management of internal QM documents. It is determined that further development of quality management system is performed in accordance with defined internal VATESI needs and recommendations received from external institutions, organizations, enterprises or individual experts. The mentioned external organizations can be, for example: IAEA (with services of IRRT mission), Ministry of Economy, Ignalina NPP, VATESI Technical Support Organizations and other.

The Ministry of Economy is indicated taking into account Lithuanian legislation concerning internal audit of particular state institutions. Being relatively small institution, VATESI do not have a separate employee (job position) to perform internal audit. In this case, VATESI uses services of audit division that belongs to the Ministry of Economy. On the regular basis, competent auditor of the Ministry of Economy performs audit of VATESI activities and presents report of audit with appropriate recommendations. In future, effectiveness of the quality management system may also be evaluated using Regulatory performance self-assessment tool (the document is under preparation by IAEA).

VATESI QMS is to be further enhanced through preparing new and improving the already approved quality management documents.

VATESI QM documents are reviewed in accordance with existing necessity. Responsible specialist for the timely review of the document is indicated on the first page of it. VATESI Quality Manual (KU-I-01) describes principles for management of internal QM documents. It is determined that further development of quality management system is performed in accordance with defined internal VATESI needs and recommendations received from external institutions, organizations, enterprises or individual experts.

New information

Section 13.1. Revised in order to reflect INPP aims regarding decommissioning and for better reflection of INPP main aim statement within Mission and the Main Aim, the 1st level INPP QA document. Decommissioning related statements presented.
Section 13.2. Management procedures (“Software” and “Decommissioning”) added to the list. Subsequent text bellow the list of 2nd level QA documents, explaining plans to prepare new procedure on decommissioning. Reference to new VATESI regulatory document P-2004-03 is added.
Section 13.4. Information about future introduction of new IAEA requirements “The Management System for Facilities and Activities, GS-R-3” to the INPP QA system is included. Information about inspections on quality management at INPP and RATA are added.

Article 14: ASSESSMENT AND VERIFICATION OF SAFETY

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

i. *Comprehensive and systematic safety assessments are carried out before the construction and commissioning of a nuclear installation and throughout its life. Such assessments shall be well documented, subsequently updated in the light of operating experience and significant new safety information, and reviewed under the authority of the regulatory body;*

ii. *Verification by analysis, surveillance, testing and inspection is carried out to ensure that the physical state and the operation of a nuclear installation continue to be in accordance with its design, applicable national safety requirements, and operational limits and conditions.*

14.1. Licensing process and Safety Analysis Reports for different stages of a Nuclear Installation project (e.g. sitting, design, construction, operation)

Lithuania has established basic criteria of safety, and also the main principles and character of the technical and organizational measures aimed at ensuring safety. The detailed application of these principles and measures is laid down in norms and technical requirements.

It is stated in the Law on Nuclear Energy (Articles 25 and 26) that it is prohibited to construct, reconstruct, operate and decommission nuclear facilities without a license issued by VATESI. Article 27 of the Law says that VATESI may establish additional requirements for the licensed activity. One of such principal requirements of VATESI to the applicants is a submission of safety analysis reports for getting a license.

Article 31 of the Law says that designs for the construction or reconstruction, upgrading, expansion, dismantling and decommissioning of nuclear facilities are subject to a comprehensive state expert evaluation. The expert evaluation organized by the Ministry of the Environment upon receiving the design.

These statements are further specified and developed in the "Regulations for Licensing of Nuclear Power Related Activities", "Regulations for Procedures for Issuing a License for Unit Operation at Ignalina Nuclear Power Plant", "General Regulations for Nuclear Power Plant Safety", "Nuclear Safety Regulations for Reactor Installations of Nuclear Power Plants" and in the other norms and standards.

The "Nuclear Safety Regulations for Reactor Installations of Nuclear Power Plants" in their turn say that the “Technical Justification of Nuclear Power Plant Safety” should contain the chapter "The Reactor Plant Technical Safety Justification". "The Reactor Plant Technical Safety Justification” shall be prepared by competent organizations and approved by Operating Organization. The shape and content of the reactor plant Safety Justification Report should conform with the current normative technical document. The indicated regulations also set a number of specific requirements to the content of safety justification (safety analysis) reports.

Safety Assessment is part of licensing procedure before issue of licence for construction, operation or decommissioning of a nuclear facility. In the case of safety related modification when the licence is not required to issue, technical justifications shall be performed based on highest scientific and

technical knowledge. In both cases, Safety Assessment and Technical justifications have to have an independent expertise review, be approved by the Operating Organization and presented to the State Control and Supervision Institutions for review.

Before a construction permit for plant or systems (components) of an NP is issued, the Operating Organization shall create the infrastructure (subdivisions) required for safe operation of the nuclear plant, endowing those subdivisions with the necessary rights as well as financial, material and human resources, imposing on them full responsibility for their activities, and monitoring the correct implementation thereof.

The State Control and Supervision Institution require additional documents or conduct inspections, if it finds out that after review of the submitted documents the information is not sufficient to assess the documents following the valid criteria. It also assess the safety culture in the applicant organization and assess its technical and organizational measures, verify the effectiveness of the quality assurance system of the applicant and check if the requirements of the quality assurance system at the nuclear facility for purchased services or goods are kept.

The licence is liable to develop the annual report for the nuclear facility in accordance with the requirements of the nuclear safety regulations and submit it to the State Control and Supervision Institution. Periodic safety assessment is required to perform under licence condition in period of 10 years.

Before start of operation shall be submitted assessment of tests results and confirmation of their acceptability. Information concerning radiation protection at the nuclear facility has to be presented. Radiation sources shall be described in detail, analysis and assessment of possible effects shall be performed in accordance with the requirements of radioactive protection regulations, organizational and technical means and methods of radiation protection, and measurement methods and means shall be indicated. Shall be presented the description of the means, equipment, technologies, work processes, which will be used during the dismantling of equipment, assessment of the radiological status, ensuring the radiation protection of personnel and inhabitants during decommissioning activities.

The following permissions are issued by State Control and Supervision Institution at the beginning of operation of a nuclear facility:

- to bring nuclear fuel onto the site of a nuclear facility;
- to load the nuclear fuel into the reactor for the first time;
- to perform the physical start-up (experiments) of the reactor;
- to perform the industrial start-up of the reactor;
- to perform the functional experiments of systems;
- to use the natural resources;
- to perform emissions of radionuclides into the environment.

In the case of non-routine operation, test or experiment the licensee is required to establish the programme for such operation and agree it with State Control and Supervision Institution. The licensee has established quality assurance procedure QA-2-016 “Modifications of NPP” to ensure proper design, review, control and implementation of modifications. The State Control and Supervision Institution review and assess modifications, which are safety related.

The following documents shall be submitted for review, assessment and decision about License, such as:

Administrative

- ”Application letter” in which the Operator presents the request to be licensed
- Certificate of state registration of entity

- Document certifying that the Operator is in charge of NPP property Statute of the Operating organisation (Operator)
- Plant organisation for operation and safety management arrangements
- QA manual and procedures
- Plant personnel qualification and training program

Technical (Safety validation)

- Technical Safety Justification of Nuclear Plant and of the Reactor Unit with updating Justification of the plant safety status
- The Safety Analysis Report (SAR)
- Probabilistic Safety Assessment Report (PSA)
- Status of implementation of the remedial measures (including commissioning program and test results) and plan for the future Compliance demonstration with the yearly permits conditions
- Operator position on international recommendations and status of their implementation
- Preliminary decommissioning program
- Commissioning program and test results
- Description and verification of current plant state
- History of safety performance
- Operating experience evaluation (analysis of safety significant events occurred in the plant and lessons learned from experience of similar plants and world-wide plants)
- Assessment of plant systems design and capability
- Improvements and updating of safety analysis (considering assumptions and data consistent with the actual status of the plant and with an enlarged spectrum of reference events)
- Modifications (design, implementation and commissioning) and repairs
- Backbiting from technical developments (including research findings)
- Management of equipment ageing
- Equipment qualification
- Human factors
- Radiation protection
- Emergency planning and preparedness
- Fire protection
- Waste and spent fuel management
- List of modifications since unit commissioning etc

Operation

- Technical Specifications
- List of operating procedures
- Emergency and accidents management’s procedures
- Emergency planning
- Long term in-service inspection program
- Provisions of Physical security.

14.2. Summary of essential generic results of continued monitoring and periodic Safety Assessments of INPP using deterministic and Probabilistic Analyses

As to the deterministic safety assessment of INPP, it was performed initially by the designers of reactor plant and INPP as a whole and was documented in so called "Technical Justification of Safety". The first in-depth safety analysis of INPP using Western methodology was completed in 1997. Main results of this analysis were presented in the first Lithuanian report on NSC.

In-depth safety analysis for Unit 2 was finished in 2004. The Safety Analysis Report (SAR-2) for Ignalina NPP Unit 2 was one of the key documents for obtaining the license. The principal objectives of the report were to identify the current safety level of the Unit 2, to assess the factors that may affect its operating safety, and to recommend compensatory measures that would improve safety. SAR-2 and its review conclusions confirmed that the technical condition and operation of Unit 2 meet the key nuclear and radiation safety requirements set forth in standard documents of the Republic of Lithuania and international regulations. No major deficiencies were revealed that would necessitate shutting the Unit 2 down immediately or reducing its power.

Based on the results of SAR-2 and its review a new safety improvement program (SIP-3) was initiated. More details on safety improvement programs are presented in section 6 of this report. Following the closure of Unit 1 at Ignalina NPP, the necessity arose of substantiating safety of the single operating Unit 2. For this purpose the Safety case for single operating Unit2 of INPP was prepared. It had to confirm possibility of continued Unit 2 operation following the Unit 1 final shutdown. After completion of review activities VATESI stated the safety level of single operating Unit 2 to be acceptable.

Both Level 1 and 2 PSA studies were completed for INPP. The main results are presented in chapter 6 of this report.

A wide range of additional safety analyses was performed in the frames of Safety Improvement Program. These analyses are described in chapter 6 of this report. Implementation of safety improvement measures allows further safe operation of the plant.

14.3. Verification programmes (preventive maintenance, in-service inspection of main components, evaluation of ageing process, etc.)

VATESI performs the supervision of preventive maintenance, in-service inspection of main components, ageing management processes at INPP in accordance with General Requirements for Nuclear Power Plant Safety (VD-B-001-0-97) issued by VATESI in 1997, General Maintenance Requirements for Nuclear Power Plants (VD-E-01-98) issued by VATESI in 1998 and Requirements for Ageing Management of Systems and Components Important to Safety of Nuclear Facilities (VD-E-05-99) issued by VATESI in 1999.

In compliance with the Quality Management Programme and Documentation control system acting at INPP all works relating to preventive maintenance, in-service inspection of main components and ageing management shall be performed only on the basis and in accordance with the approved documents.

Operational staff of INPP performs preventive maintenance during walk down with control condition of equipment and environment. Also during operation INPP engineering support staff carries out the diagnostic activities of system and components, vibration and failures analysis of

equipment, which are important to safety. The results of preventive maintenance are the basis to prepare the plans for repair or replace the components, to carry out modifications.

In-service inspection is carried out in according to INPP regulations for systems, equipment and pipework important for safety. These regulations have been developed in accordance with the requirements for in-service inspection [PNAE G-7-008-89] and experience of in-service inspection in other nuclear power plants, and IAEA Guidelines [NS-G-2.6, IAEA-TECDOC-1400]. They determine the in-service inspection requirements for all safety-related systems, except for the metal components of the active zone, which are inspected in accordance with the requirements of other regulations.

Much importance is attached to the condition of the plant and pipework, and both destructive and non-destructive checks this testing, carried out according to regulations for RBMK-1500 reactors. These detail the objectives, activities, methods, quantity, frequency, and the organizational and administrative arrangements. The manager of the INPP Safety and Quality Assurance Service is responsible for this.

Non-destructive testing is carried out by the INPP Department of Metals and Technical Inspection and, if necessary, by certified organisations. The regulations list the plant that must be inspected, and the areas and volumes for defined non-destructive testing. They also present the programme for checking the state of the corrosion samples, and describe the main inspection methods used for metals, such as non-destructive surface and volumetric methods, and the destructive methods and inspection using samples. All inspections are carried out according to existing standards or instructions, agreed by VATESI.

The regulations define the methods for assessing the results, consistent with the IAEA Guidelines, and the recording requirements. Personnel carrying out inspections are certified, in accordance with the regulations [PNAE G-7-010-89], to carry out inspections according to specified methods. Staff's performing non-destructive testing is certified according to the European Standard EN473. Personnel supervising the inspections are also certified.

In accordance with Requirements for Ageing Management of Systems and Components Important to Safety of Nuclear Facilities (VD-E-05-99) INPP prepared the ageing management program for safety related systems, components and structures. The main task of this programe is to select components, which are important from safety point of view, to assess the condition of these components, tendencies of degradation and, if it is nesseccary, to take corrective measures – repaire or replace them, to perform modifications. It is continuously work and INPP constantly provide the faults analyse, the maitinence and in-service inspections programs analysis to ensure the reliability of systems and components important to safety of nuclear facilities.

14.4. Regulatory control activities

Lithuanian nuclear power safety inspectorate (VATESI) in accordance with the established responsibilities and the national regulations for the verification of the safety of nuclear installations is performing combined day to day and year to year supervision and systematic safety reassessment through the inspection program with consideration of cumulative effects of modifications, changes to procedures, the aging of components, operating experience and technological developments so that the regulatory body can determine whether the operator has a functional self-assessment system of high quality and is conducting its activities in accordance with its own established procedures for ensuring that regulatory objectives and requirements are met, all activities at the plant have been executed safely and meet the safety objectives and licence conditions.

Regulatory control covers such activities:

- Application of quality assurance principles at all stages;
- Assessment of the safety of the design (particularly design modifications)
- Review of tests;
- Continuing monitoring and inspection of the installation during operation, including environmental monitoring;
- Assessment of the need for and control of modifications.

Regulatory supervision of ISI at INPP includes:

- Review and approval of Standard ISI program of INPP;
- Review of annual ISI programs of INPP;
- Review and assessment of annual ISI results of INPP;
- Review, development and approval of ISI regulations;
- Review and approval of ISI methodologies and procedures;
- Review of the results of materials investigations of INPP components and pipelines;
- Review and consideration of safety justifications in case of deviations from ISI acceptance.

Also, maintenance of safety-related systems and equipment in good operating condition through the implementation of preventive maintenance measures and replacement of worn-out components of nuclear power plants is required by [VD-B-001-0-97].

As stated in the [VD-E-01-98], maintenance is a complex activity of planned and systematically executed measures, with the purpose of ensuring the reliable functioning of systems (elements) consistent with the design assumptions, in particular those of safety. The maintenance activity includes routine service, overhaul, planned maintenance, breakdown maintenance, and replacement of obsolete components, plant modifications and the proving of plant by tests, calibration and inspections. The basic tasks of maintenance are thus:

- prevention of damage to, and failure of, NPP systems (components) by means of condition monitoring and preventive maintenance;
- replacement of worn systems (components) prior to their failure;
- restoration of the function of systems (components) in the event of failure and/or damage during operation;
- improvements to systems (components) by means of modifications;
- reduction of dose levels to ones that are As Low As Reasonably Achievable (ALARA principle).

The management of the maintenance activity is carried out in accordance with the “Maintenance and repair” procedure [QA-2-010]. This document is consistent with the requirements of QA, [VD-E-01-98] and takes into account the Guidelines of the IAEA [50-SG-Q]. The procedure covers the following aspects:

- general principles;
- planning;
- standards, repair procedures and other documentation;
- personnel training;
- means of provision;
- stored backlog;
- permission to carry out the work;
- protection and safety of work;
- criteria of quality;
- preparation of work and its control;

- isolation of equipment and control of its acceptance for repair;
- control of the execution of repair work;
- acceptance after repair;
- quality control of the repair work, meeting the production plans;
- inspections and tests;
- documents;
- self-estimation of maintenance activities;
- elimination of discrepancies;
- responsibilities and powers.

Maintenance is organised on the principles of precaution, specialisation, control and co-ordination. The plant maintenance service has the following resources:

- specialised workshops that carry out the maintenance and repair of equipment and structures in accordance with their function (e.g. reactor workshop, electrical workshops, etc.);
- workshops carrying out special kinds of work (e.g. a workshop for centralised repair, decontamination workshop, etc.);
- functional departments (departments for the planning and preparation of repairs, and a design department).

Workshop maintenance services have specialised workplaces arranged in accordance with the needs of the equipment being maintained. The INPP administration is responsible for the quality of work carried out by both INPP divisions and contractors. For co-ordination of the INPP divisions, procedures are reviewed annually. The permission of VATESI for restart units of INPP after annual outage is obligatory in accordance with “P-2004-02”.

Article 15: RADIATION PROTECTION

Each Contracting Party shall take the appropriate steps to ensure that in all operational states the radiation exposure to the workers and the public caused by a nuclear installation shall be kept as low as reasonably achievable and that no individual shall be exposed to radiation doses which exceed prescribed national dose limits.

15.1. Summary of Laws, Regulations and Requirements Dealing with Radiation Protection as Applied to Nuclear Installations

Changes in the legislation dealing with radiation protection of the general public, the workers of nuclear installations and the environment at the period of 2004-2008 are following:

- Law on Radiation Protection (No. VIII-1019, 1999, last amended 2004)
- Law on Nuclear Energy (No I-1613, 1996, last amended 2006)
- Law on the Management of Radioactive Waste (No. VIII-1190, 1999, last amended 2005)
- Law on Environmental Protection (No. I-2223, 1992, last amended 2005)
- Law on Environmental Monitoring (No. VIII-529, last amended 2006)
- Governmental Resolution No 461 On the Regulation on Providing of Data Concerning Activities Related with the Disposal of Radioactive Waste to the Commission of the European Communities (2007)
- Order of the Minister of Health No. V-834 On Regulations on the Import, Export, Transit and Transportation of Radioactive Materials and Radioactive Waste (2004)
- Order of the Minister of Health No. V-136 On Approval of Risk Categories of Potentially Dangerous Installations with Sources of Ionizing Radiation and Their State Radiation Protection Supervision and Control (2005)
- Order of the Minister of Health No. V-687 On Approval of the Rules of Safety of the Sources of Ionizing Radiation (2005)
- Order of the Minister of Health No. V-1020 On Approval of the Rules of the Control of Orphan Sources and Sealed Sources of High Activity (2005)
- Lithuanian Hygiene Standard HN 83:2004 "Radiation Protection of Outside Workers" (2004)
- Lithuanian Hygiene Standard HN 52:2005 "Radiation Protection in Industrial Radiography" (2005)
- Lithuanian Hygiene Standard HN 86:2005 "Non Medical Nuclear and X-rays Equipment" (2005)
- Normative Document LAND 34 – 2000 “Clearance Levels of Radionuclides, Conditions of Reuse of Materials and Disposal of Waste” (2000, amended in 2005)
- Normative Document LAND 36 – 2000 “Measurement of Radionuclide Content in Environmental Components – Gamma Spectroscopic Analyze of Samples by Spectrometer with Semiconductor Detector” (2000, amended in 2005)

- Normative Document LAND 37 – 2000 “Measurement of Radionuclide Content in Environmental Components – Concentration of Caesium Dissolved in Water Employing Absorbing Filters and Estimation of Water Activity Concentration” (2000, amended in 2005)
- Normative Document LAND 42 – 2001 “Limitation of Radioactive Discharges from Nuclear Facilities, Permitting of Discharges and Radiological Monitoring” (2001, amended in 2005)
- Normative Document LAND 64 – 2005 “Determination of Strontium-90 in Environmental Samples. Radiochemical Method” (2005)
- Order of the Director of the Radiation Protection Centre No. 46 On Approval of Danger Categories for Radiation Sources and on Approval of Rules for their Assignment (2004).

A new wording of the Regulation on Providing of Data Concerning Activities Related with the Disposal of Radioactive Waste to the Commission of the European Communities was adopted by the Governmental Resolution No 461 on 9 May 2007 (in compliance with the Article 37 of the Euratom Treaty). The purpose is to clarify procedure on data inventory preparation and coordination with the competent authorities. The responsibility to submit the data about planned activity to the European Commission was delegated to the State Nuclear Safety Authority (VATESI). Environmental Protection Agency under the Ministry of Environment is obliged to submit the annual data on the radioactive liquid and atmospheric discharges and inform the Commission about discharges permissions and licenses issued for activities related with radioactive waste disposal.

15.2. Implementation of National Laws, Regulations and Requirements relating to Radiation Protection

15.2.1. Dose Limits

The basic standards and safety requirements for occupational and public exposure (including dose limits) in practices with sources of ionizing radiation are established in Lithuanian Hygiene Standard HN 73:2001 "Basic Standards of Radiation Protection". The basic regulation which sets out requirements for radiation protection of workers working at the nuclear facilities and for radiation protection of members of the public during the nuclear facilities operation and decommissioning is the Lithuanian Hygiene Standard HN 87:2002 „Radiation Protection in Nuclear Facilities" (2002). The requirements of the Hygiene Standards are in compliance with International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, BSS No. 115, Vienna, IAEA, 1996, 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 license holder shall ensure that doses of nuclear facilities workers do not exceed limits of occupational exposure determined by HN 73:2001 "Basic Standards of Radiation Protection":

Application	**Dose limit**	
	Occupational	Public
Effective dose	100 mSv in a consecutive 5 year period, subject to a maximum effective dose of 50	1 mSv in a year, in special circumstances - up to 5 mSv in a single year provided that the

	mSv in any single year	average dose over 5 consecutive years does not exceed 1 mSv per year
Equivalent dose in a year:		
• for the lens of the eye	150 mSv	15 mSv
• for the skin	500 mSv	50 mSv
• for the extremities (hands and feet)	500 mSv in a year	-

Establishing the investigation levels and dose constraints shall ensure the radiation protection of workers. The investigation levels are established in order to fix the achieved real level of exposure and to ensure optimal measures for protection of workers against the dangers of sources, used during the NPP operation. Investigation levels shall be regularly reviewed taking into account the radiation protection conditions at the NPP. The daily effective dose constraint established by the license holder for Ignalina NPP workers is 0.2 mSv.

According to the HN 73:2001 "Basic Standards of Radiation Protection" the value of 100 mSv per a five-year period is adopted as a limit effective dose for workers. Annual limit effective dose cannot exceed 50 mSv/year. An average annual dose for INPP personnel and outside workers should not exceed 20mSv/year for any 5 years.

This requirement is met for INPP personnel and there are no recorded cases of a dose 100 mSv/year exceeding for any 5 years. The number of INPP workers with individual exposure dose higher than 20 mSv was not recorded in 2001. There were 40 people in 2002 and 3 people in 2003. During the period from 2004 to 2006 the individual annual dose did not exceed 20 mSv/year. An average individual dose does did not exceed 20 mSv/year for the last 5 years.

The highest individual exposure dose for outside workers has not exceeded 20 mSv from 2000 to 2006. The only exception was 2004, when 43 workers had maximum individual dose higher than 20 mSv/year. Exceeding the highest individual exposure dose for more than 20 mSv/year was related to works with contaminated equipment during scheduled maintenance of Unit 2 on repairing the joints of the pipes and restoring the insulation in exceeding gamma emission conditions. The INPP management gave permission and confirmed with Radiation Protection Centre the increase of maximum individual dose for 2004 more than 20 mSv/year for those workers provided that the total individual dose for 5 years (2000-2004) would not exceed 100 mSv.

Individual monitoring of internal and external exposure of the INPP personnel is carried out with the help of the individual dosimetry control computer-based system, which includes:

- Thermo luminescence dosimetry system RADOS;
- Direct-reading electronic dosimetry system RAD-51, RAD-52, RAD-62, RAD-80;
- Gamma spectrometric system WBC ACCUSCAN 2260-G2KG (Whole Body Counter);
- Local net;
- Software support for collecting, storing, processing and displaying the information of individual personnel radiation monitoring from individual dosimetry control system RADOS and WBC ACCUSCAN 2260-G2KG.

Individual monitoring of personnel exposure aims at assessing and ensuring radiation protection of workers in the INPP protected area, obtaining the information about internal and external exposure doses, timely identification of cases of increased radionuclide content level in organism, and as a proof of the fact that the dose limits are not exceeding both in normal plant operation and in possible emergency conditions.

Individual monitoring of external exposure of INPP personnel and outside workers is set for a period of one month. In the period of the plant preventive maintenance an extraordinary exposure dose monitoring is conducted for personnel whose total individual dose is reaching 2,0 mSv (based on the results of shift-time measurements). The results of individual monitoring of the INPP personnel and outside workers for 2004-2006 are shown in the Tables below:

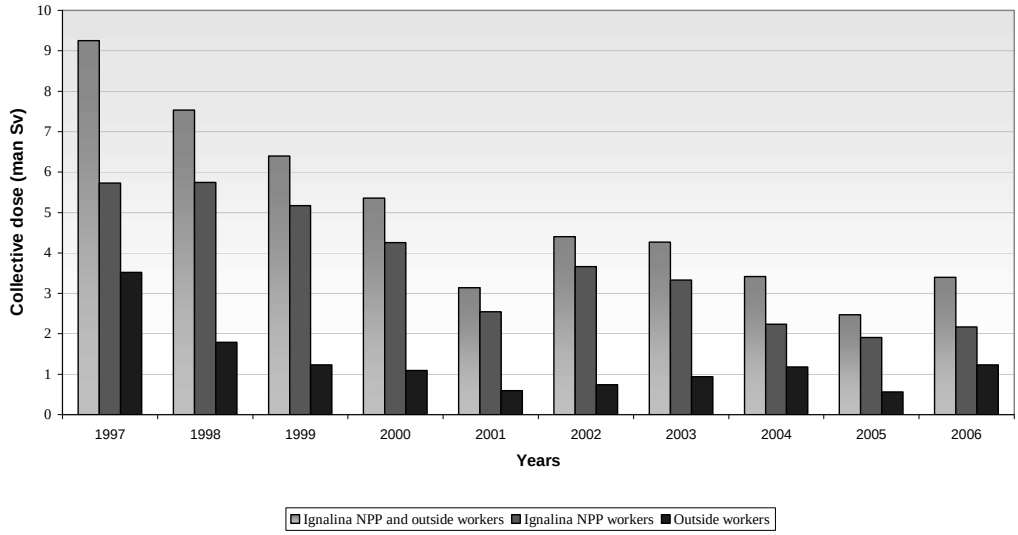
Exposure and collective dose dynamics of the INPP workers 2004 – 2006

Year	Number of workers	Average/highest individual exposure dose, mSv	Collective dose ManSv
2004	2916	1.53/19.16	4.47
2005	2794	0.68/13.55	1.91
2006	2492	0.87/16.96	2.18

Exposure and collective dose dynamics of the outside workers 2004 – 2006

Year	Number of workers	Average/highest individual exposure dose, mSv	Collective dose ManSv
2004	1483	1.59/29.41	2.35
2005	1403	0.40/13.16	0.56
2006	1513	0.81/19.91	1.23

In the chart below the collective doses of Ignalina NPP and outside workers (per one unit) from 1997 to 2006 are presented in graphic form:



Individual monitoring of internal exposure of INPP personnel and outside workers is conducted by gamma spectrometric measuring system WBC ACCUSCAN with the aim of obtaining the information about internal exposure doses, timely identification of cases of increased radionuclide content level in organism and prevention of fixed annual exposure dose exceeding. Personnel internal exposure control is realized in accordance with the "Time Schedule for Radiation Protection Monitoring at INPP".

In 2004 the individual dosimetry control computer-based system (ASIDK) and database of personnel individual dosimetry control were upgraded. The upgrade of the systems enabled to estimate the value of effective dose of internal exposure in mSv. The values of personnel internal

exposure effective dose estimated during the period from 2004 to 2006 are shown in the Table below:

Year	The internal exposure effective dose of INPP personnel and outside workers, man						Number of people measured with WBC, man
	Less than minimal registration level of WBC (RLWBC= 0.001 mSv)	RLWBC-0.1 mSv	0.1-0.2 mSv	0.2-0.3 mSv	0.3-0.4 mSv	over 0.4 mSv	
2004	2203	185	32	11	3	5	2439
2005	2254	167	19	5	1	–	2446
2006	2106	115	11	6	1	–	2239

The highest internal exposure value of INPP worker was registered in 2004, which amounted to 0,665 mSv. The highest measured activity of Co-60 radionuclide equals 1460 Bq.

The following kinds of personnel internal exposure monitoring are provided according to the "Time Schedule for Radiation Protection Monitoring at INPP": confirmative, target, permanent, special, incoming, and outlet.

The confirmative monitoring of personnel internal exposure is carried out once a year for all personnel in order to ensure the sufficiency of radiation protection of personnel. The target monitoring of internal exposure is carried out during and after plant preventive maintenance for the INPP personnel and outside workers depending on radiation conditions at working places and results of external exposure individual dose measurement when performing volume-dose jobs. Permanent monitoring of personnel internal exposure is carried out basing on results of worker confirmative monitoring in case when annual effective internal exposure dose is expected to be higher than 5 mSv/year. The special monitoring is performed for workers whose individual external exposure dose is higher that 20 mSv. The incoming monitoring is aimed at identifying individual background level of internal exposure of personnel employed to work in the protected area. The outlet monitoring is aimed at identifying internal exposure of personnel after finishing works in INPP protected area due to leaving the job or changing the area.

As regards the limitation of public exposure that might cause the nuclear facilities operation and decommissioning, HN 87:2002 establishes the dose constraints for the members of public. The annual effective dose constraint for the members of public because of operation and decommissioning of NPP is 0.2 mSv. The annual dose constraint is a basis for calculation of maximum permitted activity levels of radionuclides released to atmosphere or discharged into the water.

15.2.2. Fulfilment of conditions for the discharges of radionuclides into environment

Requirements of Normative Document LAND 42 – 2001 limiting discharge of radionuclides into environment are applied in order to protect humans, other living organisms, natural resources (the land, forest, water) and other environmental entities from harmful influence of ionising radiation and contamination by radionuclides from nuclear installations. The requirements of this document are obligatory to nuclear facilities when designing, constructing and operating them as well as to nuclear facilities during decommissioning. This normative document regulates operation of nuclear facilities under normal conditions, including short-time anticipated operational transient, and it is not applicable for accidents.

The new radioactive discharges authorization for period 2006-2010 was issued to Ignalina Nuclear Power Plant in December 2005. The Ignalina NPP airborne and liquid discharges limits were established considering the requirements of the Normative Document LAND 42 – 2001 "Limitation of Radioactive Discharges from Nuclear Facilities, Permitting of Discharges and Radiological

Monitoring". Authorised discharges limits and data on airborne and liquid discharges into environment from Ignalina NPP are provided in the tables below:

Discharge limits of Ignalina NPP

Type of discharges	Discharge limits, Bq/year
Airborne discharges	$1{,}41 \cdot 10^{16}$ (including: noble radioactive gases – $1{,}39 \cdot 10^{16}$; radioactive aerosols – $9{,}4 \cdot 10^{11}$; I-131 – $9{,}87 \cdot 10^{11}$)
Liquid discharges	$8{,}811 \cdot 10^{12}$

Discharges of radioactive noble gases, radioactive aerosols and I-131 from INPP during 2004-2006

Year	Noble radioactive gases, 10^{13} Bq		Radioactive aerosols, 10^{8} Bq		I-131, 10^{9} Bq	
	Sum	% from DL*	Sum	% from DL	Sum	% from DL
2004	6,16	0,44	8,42	0,09	10,63	1,07
2005	7,44	0,54	5,59	0,06	6,81	0,69
2006	3,12	0,22	6,91	0,07	7,7	0,78

*DL – Discharge limit

Activity of noble gas release was basically determined by the following isotopes (% from total release per 2006):

- Xe-133 (56,98%), Ar-41 (30,79%), Xe-135 (10,64%), Kr-85m (1,59%).

Activity of radioactive aerosols release was basically determined by the following nuclides (% from total release per 2006):

- I-131 aerosol (17,87%); I-133 (15,92%), Cs-137 (14,79%), Co-60 (14,78%), Sr-90 (8,57%), Mn-54 (8,099%), Cr-51 (5,27%), Sr-89 (4,15%), Zn-65 (3,38%), Fe-59 (3,266%), Nb-95 (2,02%), Mo-99 (0,596%), Co-58 (0,574%), Zr-95 (0,379%), Cs-134 (0,328%).

Discharges of radionuclides into the lake Drukshiai during 2004-2006

Year	Discharges, Bq
2004	$9{,}2 \cdot 10^{11}$
2005	$3{,}24 \cdot 10^{12}$
2006	$5{,}76 \cdot 10^{11}$

No exceeding of limits in discharges was fixed.

Annual dose for critical group of public during normal operation of Ignalina NPP did not exceed dose constraint value (0,2 mSv):

- in 2004 (two units was operated) – $1{,}89 \cdot 10^{-3}$ mSv and $6{,}1 \cdot 10^{-4}$ mSv due to the airborne and liquid discharges respectively, in total $2{,}5 \cdot 10^{-3}$ mSv per year;
- in 2005 (one unit was operated) – $1{,}13 \cdot 10^{-3}$ mSv and $9{,}59 \cdot 10^{-4}$ mSv due to the airborne and liquid discharges respectively, in total $2{,}09 \cdot 10^{-3}$ mSv per year;
- in 2006 (one unit was operated) – $1{,}39 \cdot 10^{-3}$ mSv and $1{,}47 \cdot 10^{-4}$ mSv due to the airborne and liquid discharges respectively, in total $1{,}54 \cdot 10^{-4}$ mSv per year.

15.2.3. Steps taken to ensure that radiation exposure are kept as low as reasonably achievable

According to the requirements of HN 87:2002, the radiation protection programme is established at the plant. Following items shall are included in the programme:

- classification of working areas and access control;
- local rules, measures of supervision of safety at work and order of organisation of work;
- procedures of monitoring of workplaces and individual monitoring of workers;
- individual protective equipment and rules for their application;
- main premises, control systems for assurance of radiation protection;
- application of optimisation principle (ALARA) and measures on exposure reduction;
- programs of health surveillance;
- mandatory training of workers and their instructions.

Implementation of the ALARA Program at the Ignalina NPP was started in 1996. The aim of the ALARA Program at INPP for 2006 and subsequent years is to make the personnel exposure dose as low as reasonable achievable and to provide maintaining of individual exposure limit within 20 mSv/year for 5 years, as well as to reduce the personnel collective annual dose.

The following principles are considered to be the basis of the ALARA Program:

- Any exposure can be authorized if the assumed advantage is higher than the exposure risk;
- The exposure level shall be as low as reasonably achievable considering all social and economic conditions
- Certain regulations and instructions shall be to restrict the exposure level in order to make the exposure risk as low as possible.

The ALARA Program has the following basic directions at the Ignalina NPP:

- Proper organization of the activities.
- Personnel learning and training.
- Improvement of working conditions.
- Perfection of engineering process.
- Quality maintenance.
- Safety culture.
- Human element impact.

The ALARA foundations are applied and adapted in all operation stages related to radiation. Application of new principles of activity organisation, performance of scaled works on equipment upgrading, dose reduction for personnel of Unit 1, which was shutdown in 2005, enabled reducing the INPP personnel and outside workers collective dose from 10,71 mSv (in 2000) to 3,41 mSv (in 2006).
Under normal operation the collective dose is 12-30% and during maintenance it is 70-88% of annual personnel exposure collective dose.

Since 1997 Ignalina NPP has been implementing the Quality Assurance Program. The procedures of the first and second levels have been prepared and their main purpose was the implementation of the ALARA Program at the Ignalina NPP.

Responsibility for radiation protection is sharply defined at the Ignalina NPP in accordance with a Control Procedure of the second level “Radiation Protection” QA 2-005:

- Director General is responsible for radiation protection of INPP, distribution of authority and allocation of responsibility, implementation ALARA foundations at INPP as well as financing of radiation protection activity.
- Technical Director is responsible for organization of activities on INPP radiation protection according to ALARA rules, standards and principles.
- Heads of subdivisions are responsible for organization of activities on radiation protection in their subdivisions in accordance with rules and standards, for training and professional skills of their stuff, for making such working conditions when personnel exposure doses will be maintained as low as reasonable achievable.
- Head of the Radiation Protection Department is responsible for INPP radiation protection program management.
- Head of the Safety and Quality Assurance Service is responsible for organization and conducting of audits on radiation protection activity as well as coordination and corrective actions in this document.
- Every worker is responsible for fulfillment of radiation protection requirements.

The staff that works in radiation exposure conditions is trained according to the programs on radiation protection preparation in INPP Training Centre.

Radiation protection skill content is included in a worker's Job Description as well as a program for a post preparation. The course duration is 30 hours for workers dealing with the ionising exposure sources and 60 hours for those responsible for radiation protection with retraining every 5 years and 270 hours for first course for those responsible for radiation protection in potentially dangerous facilities of I, II and III risc categories.

The personnel engaged in works related to high exposure doses shall undergo additional training course before they can start working. The training is arranged on a regular basis, and special training simulators are applied.

Outside workers are also trained and examined on radiation protection according to the same programs in the Ignalina NPP Training Centre before they are left for work in a protected area.

Radiation protection and ALARA foundation training is realized in accordance with a Control Procedure QA-2-014.

According to the Lithuanian Hygiene Standard HN 87:2002 "Radiation Protection in Nuclear Facilities" the INPP territory and its premises are divided into the protected area and the monitored area. The premises in the INPP protected area are subdivided into three categories according to their radiation condition.

Classification of INPP protected areas

Room category	Colour of the area	Frequency of service	Dose rate mSv/h	Surface alpha contamination Bq ·cm^{-2}	Surface beta contamination Bq ·cm^{-2}	Total aerosol activity Bq ·cm^{-3}
I	Red	No service	>56	>20	>266	>1110
II	Yellow	Periodic	12-56	4-20	40-266	185-1110
III	Green	Permanent	<12	<4	<40	<185

- The first category premises are unmanned ones, closed and sealed when the unit operates at power. The doors of these premises are painted in red and marked with radiation danger

marks additionally. These premises are among the most radiation dangerous ones. It is forbidden to enter the first category premises when the unit operates at power. The entrance into premises is permitted only by special permission in exceptional cases.

- The second category premises are those, the entrance into which is only permitted for periodic maintenance of the equipment located in them (for example, a Central Hall, a Spent Fuel Storage Pools Hall, a sample cutting room). The doors of these premises are painted in yellow. Radiation danger level in these premises is lower than for those of the fist category. The entrance into premises is permitted only by special permission.
- The third category premises are those of personnel permanent residence (for example, operator rooms, control panels, workshops, laboratories, corridors, etc.). The doors of these premises are painted in green.

The entrance into premises painted in yellow and red is strictly regulated. Activities in this area are permitted only if there is an order or a special permission. The activities in strictly regulated area are carried out according to the following order:

- people responsible for radiation protection and safety shall assess the radiation condition of working places and develop the principles of requirements to safety;
- operators shall prepare the working place;
- workers get appropriate instructions;
- workers shall be followed by a person responsible for dose monitoring, who assess the radiation conditions.

In order to reduce the personnel expose dose the working area or object is decontaminated before the activities can be started, for example, the exposure dose in the primary circuit can be reduced by means of decontamination of pipes. The activities with increased exposure are usually carried out with the following radiation protection means: lead screens, distance safety equipment, video-monitoring systems.

To provide radiation protection a system of job confirmation procedures has been developed at the plant, a system of permission issue for carrying out of radiation dangerous works is being efficiently used. All activities under ionising exposure conditions are carried out in accordance with “Direction on Radiation Accident Prevention during Work Performance in Controlled Area” requirements.
Medical examination of the personnel who works in a protected area includes an initial medical examination and a subsequent annual health control. According to the Order No 561 issued by the Ministry of Health the plant personnel shall pass medical examination once a year. In case doctors find any contraindications, this person is not allowed to work with sources of ionising radiation.

The license holder once per year shall provide reports on implementation of ALARA principle to the Radiation Protection Centre and to the State Nuclear Power Safety Inspectorate.

Internal Control of Radiation Protection and Safety

The Radiation Protection Department of the Ignalina NPP, which is in direct subordination to the Technical Director, carries out an internal control of radiation protection and safety. The department is responsible for the organization, control and implementation of the requirements ensuring the radiation protection and safety. The tasks, duties, coordination of the activities between the subdivisions of the department are laid down in “The Standing Orders of the Department”.

According to the laws of the Lithuanian Republic, requirements of the rules and standards of industrial and radiation protection, environment protection and Quality Assurance Program, the Radiation Protection Department is made responsible for the following functions:

- Organization of works on radiation protection assurance and personnel exposure reduction. Carrying out of dosimetric monitoring in the protected and monitored areas. Individual dosimetric monitoring of personnel exposure. Monitoring of INPP radioactive substance emissions and discharging into environment, control of emission and discharging permissible quota observance.
- Carrying out of environment objects radiation and chemical monitoring. Performance of meteorological watches. Control of norms observance specifying radio nuclide and hazardous chemical substance content in environmental objects. Assessment of impact to environment and assessment of a population critical group exposure dose. Control of plant subdivisions to fulfill the requirements of normative documents in the field of environmental protection.
- Providing of continuous work of radiation protection control and ecological monitoring equipment by means of timely and qualitative repair works. Upgrading and modernization of radiation protection control devices and equipment. Supervising and installation of new systems of radiation protection control and ecological monitoring. Organization of assembling works and production of optional equipment and auxiliaries. Organization of repair work by contractors.
- Conformance inspection of plant means of labour, working places, man-to-man defense means, production areas and accommodation spaces, buildings and labour management to industrial safety normative standards. Participation in trial boards on equipment, working places, production divisions, production areas and accommodation spaces acceptance into operation. Conducting of entrance training for persons, who are given an employment.
- Carrying out hygienic inspections of working places with the help of laboratory instrumental samples and ergonomic investigations for conformance reveal of working places to sanitation standards and measurement development in case of infringement.

15.2.4. Environmental radiological monitoring

To evaluate Ignalina NPP impact to environment and population permanent radiation monitoring is carried out on the Ignalina NPP site and within a radius of 30 km. Radionuclide concentration measurements in foodstuffs, drinking water and soil have been conducting since the moment the Ignalina NPP had been put into operation. The investigation data show that the Caesium and Strontium radionuclide activities in foodstuffs and drinking water do not considerably differ from the activity level in other regions of Lithuania and do not exceed those laid out in the Lithuanian normative documents.

^{137}Cs concentration in fish and soil in the Ignalina NPP region in 2004

Name of sample	Average values of the Ignalina NPP region, (Bq/kg)
Fish	1,10
Soil	4,98

^{137}Cs concentration in fish and soil in the Ignalina NPP region in 2005

Name of sample	Average values of the Ignalina NPP region, (Bq/kg)
Fish	1,15
Soil	3,38

^{137}Cs concentration in fish and soil in the Ignalina NPP region in 2006

Name of sample	Average values of the Ignalina NPP region, (Bq/kg)
Fish	0,99
Soil	3,38

^{90}Sr and ^{137}Cs activity in the different fish of Druksiai lake in 2004

Sample type	^{90}Sr activity, (Bq/kg)	^{137}Cs activity, (Bq/kg)
Bream (fillet)	0,84	0,60
Crucian (fillet)	5,23	0,88
Perch (fillet)	1,23	1,87
Pike (fillet)	0,18	1,56
Roach (fillet)	1,16	0,77
Tench (fillet)	0,46	0,89

^{90}Sr and ^{137}Cs activity in the different fish of Druksiai lake in 2005

Sample type	^{90}Sr activity (Bq/kg)	^{137}Cs activity (Bq/kg)
Bream (fillet)	0,89	0,72
Crucian (fillet)	0,20	0,72
Perch (fillet)	1,03	2,48
Pike (fillet)	0,20	1,77
Roach (fillet)	2,50	0,78
Tench (fillet)	0,19	0,43

^{90}Sr and ^{137}Cs activity in the different fish of Druksiai lake in 2006

Sample type	^{90}Sr activity, (Bq/kg)	^{137}Cs activity, (Bq/kg)
Bream (fillet)	0,98	0,60
Crucian (fillet)	0,46	0,59

Sample type	^{90}Sr activity, (Bq/kg)	^{137}Cs activity, (Bq/kg)
Perch (fillet)	0,86	2,18
Pike (fillet)	0,21	1,25
Roach (fillet)	0,44	0,84
Tench (fillet)	0,42	0,46

The monitoring of the population exposure in the zone of 30 kilometres is carried out. It was determined that the annual exposure dose of the population does not exceed the fixed limit of 0.2 mSv.

All release pathways at the Ignalina NPP are monitored. The ventilation stacks of NPP are monitored (activities of noble gases, particles, iodine and aerosol) continuously. The water is checked every time before the content is discharged into the lake and also the water from intake and outlet channel is tested for laboratory measurements every day.
On the site and in the vicinity there are TL dosimeters set out for measurements of accumulated dose, which are evaluated by power plant not less than twice a year. Also, on- line monitors of in-situ dose rate measurement are set around the Ignalina NPP. The monitor readings permanently can by made available to the authority.

In order to control the influence of the Ignalina NPP to environment sampling of aerosols and atmospheric precipitation (continuously), water, bottom sediments, grass and other environmental samplings are performed. The results of measurements are reported to the authority.

The automatized system AKRB-06 for control of assurance of radiation protection of workers and environment is in operation at the Ignalina NPP. System operates in the territory of INPP and in the monitoring area of potential radioactive contamination.

AKRB-06 registers all parameters (levels of radioactive discharges into environment, levels of gamma radiation and air contamination in the INPP rooms, contamination of technological media), characterizing radiological situation in the INPP and environment, for all the modes of operation. Information with signaling or alarming devices is automatically presented to the radiation situation supervision desk by the system of radiation control.

Modernization of the system AKRB-06 began in 2003 and continued up to 2006.

15.3. Regulatory Control Activities

The main law establishing the legal basis for radiation protection allowing to protect people and the environment from the harmful effects of ionizing radiation is the Law on Radiation Protection (1999). According to this Law the regulatory body coordinating the activities of executive and other bodies of public administration and local government in the field of radiation protection, monitoring and expert examination of public exposure is the Radiation Protection Centre (RPC). Among other responsibilities the RPC is responsible for the radiation protection of workers and the general public from negative impact which may cause the ionizing radiation, including ionizing radiation, arising from nuclear facilities in operation and decommissioning.

RPC annually conducts 5-6 inspections at Ignalina NPP. The radiation situation (levels of ionizing radiation, surface radioactive contamination etc.) is assessed during inspections. It is also inspected, how the radiation protection requirements for practices with sources, during the management of radioactive waste and spent nuclear fuel, measures for optimization of occupational radiation protection are implemented, occupational exposure results, monitoring of work places and workers' individual exposure, effectiveness of training in radiation protection and other issues important from radiation protection viewpoint are also inspected. The results of assessment of occupational doses of Ignalina NPP workers show, that the main part of occupational doses (up to 80%) is governed by the works carried out during outages. Therefore, during inspections serious consideration is paid to assessment of radiation protection measures and implementation of radiation protection optimization (ALARA) principle during the outages. RPC also inspects how the outside workers follow the radiation protection requirements during their work in the controlled area of Ignalina NPP and keeps under the control the occupational doses of ouside workers as well as the occupational doses of Ignalina NPP workers.
RPC is responsible for dose assessment to public (in the vicinity of NPP as well) on the results of environmental monitoring, including foofstuffs, drinking water, gamma dose equivalent etc. For this purpose data from other state institutions involved in the environmental monitoring network are delivered to RPC, the data from the Ignalina NPP environmental monitoring as well.

According to the Law on Nuclear Energy (1996) the functions of control of safety of nuclear facilities are performed by the State Nuclear Safety Inspectorate of the Republic of Lithuania (VATESI). In implementing state regulation of nuclear safety, radiation protection within its competence, accounting for and control of nuclear materials in the sphere of nuclear energy, VATESI approves standards and rules of operation of nuclear facilities, in those radiation protection issues are always taken into account, and performs surveillance over compliance with radiation protection regulations, standards and procedures during operation and maintenance of these facilities.

The Ministry of Environment approves requirements on radiation protection of environment and issues permits for radioactive discharges into the environment. The implementation of these requirements is controlled by Environmental Protection Agency under the Ministry of Environment. Environmental Protection Agency provides environmental radiological control within the sanitary protection zone of the nuclear facility. There are four automatic gamma dose rate measurement stations around Ignalina NPP. Renovation of automatic gamma dose rate measurement stations was done in 2006 with the aim to improve radiation and nuclear safety control system. There is a station of aerosol sampling in 60 km distance from Ignalina NPP. Environment samples are periodically taken within the zone of Ignalina NPP: water and bottom sediments of Druksiai Lake, including water samples from release canal. Control of Ignalina NPP laboratory is provided for ensuring of reliability of results.

New information

The content of the Article 15 "Radiation Protection" was renewed. In Chapter 15.1 the list of legal laws and regulations changed at the period of 2004-2008 was updated and the summary of changes in some of them was given. Information and considerations concerning implementation of national laws, regulations and requirements relating to radiation protection were renewed and the data about doses, monitoring activities, discharges, radionuclide concentration measurements in foodstuffs, drinking water and soil at the period 2004-2008 were updated. In Chapter 15.3 "Regulatory Control Activities" activities of regulatory authorities were presented more properly.

Article 16: EMERGENCY PREPAREDNESS

1. Each Contacting Party shall take the appropriate steps to ensure that there are on-site and off-site emergency plans that are routinely tested for nuclear installations and cover the activities to be carried out in the event of an emergency.
For any new nuclear installation, such plans shall be prepared and tested before it commences operation above a low power level agreed by the regulatory body.

2. Each Contacting Party shall take the appropriate steps to ensure that, insofar as they are likely to be effected by a radiological emergency, its own population and competent authorities of the States in the vicinity of the nuclear installation are provided with appropriate information for emergency planning and response.

3. Contracting Parties which do not have a nuclear installation on their territory, insofar as they are likely to be effected in the event of a radiological emergency at a nuclear installation in the vicinity, shall take the appropriate steps for the preparation and testing of emergency plans for their territory that cover the activities to be carried out in the event of such an emergency.

16.1. General description of laws, regulations and requirements for on-site and of-site emergency preparedness

The main document that regulates development of defense and national security system of the Republic of Lithuania is the Law on the Fundamentals of National Security accepted in Seimas (Parliament) on 19 December, 1996. The system of national security in Lithuania consists of the basic resolutions, principles and methods confirmed by this purpose activities of the State and population, the whole complex of means directed towards the country integration into Europe and Transatlantic Unions, laws and other legal acts, activities of state institutions founded for this purpose and ways of their interaction. There are civil protection and rescue institutions among them. Government manages all national security means implementation and obligates all civil protection institutions and Lithuanian economy infrastructure objects to execute compulsory rescue and civil protection tasks.

Atomic Energy Law, accepted in Seimas (Parliament) on 14 November, 1996, defines allocation of functions for responsible institutions in the field of nuclear accident prevention and management of accidents and their consequences.

The Civil Protection Law (15 December, 1998). The Law says how the Civil Protection and Rescue System activities must be organized in Lithuania, provides the basics for legislative and organizational matters and describes responsibilities which lie on state and municipal authorities, public and private organizations and population of Lithuania.

The procedure of stockpile, storage, renewal and usage of the national reserves of civil protection means is defined by the Law State Reserve, approved by Seimas on 31 August 2000.

National Emergency Response Plan in the Event of a Radiological Accident at Ignalina Nuclear Power Plant verified by the order No. 371 of Ministry of National Defense, dated April 11, 2000, provides means of protecting the population, their scope, terms, assignment of responsibilities, and implementation procedure.

Governmental Resolution No. 578 “On the approval of general provisions of dosimetric control in case of radiological accident” approved by the Government of the Lithuania on 12 May 1998 is the main document co-ordinating dosimetric control of the workers at the accident site, population and environment. In case of an radiological accident dosimetric control should be organised and carried out according to this Resolution and following to the approved instructions of the Fire protection and rescue services. Radiation Protection Centre and Environmental Protection Agency under the Ministry of Environment are responsible institutions for organising, co-ordinating and control of dosimetric procedures within the limits of its competence.

General Regulations for Nuclear Power Plant Safety. Order of VATESI No. 56, June 9, 1997 establishes the purpose, reference points and basic criteria of safety, and also the main principles and character of the technical and organizational measures aimed at ensuring safety including on-site emergency response planning.

The General requirements for Nuclear Installations’ Emergency Response Plan. Order of Head of VATESI No. 22.3-74 December 31, 2003. Based on IAEA TECDOC-953. Establishes general requirements for Emergency Response Plan content and main criteria for decision making in approval process.

There are other normative legitimate acts which, inter alia, covers emergency preparedness issues such as Hygiene Standards of the Republic of Lithuania HN 73-1997 “Basic Standards of Radiation Protection”, HN 99:2000”Protective actions of public in case of radiological or nuclear accident” etc. Numerous legitimate acts regulating specific fields exist at the district and local levels.

The responsibilities for various governmental or other institutions are stated in legal acts approved by the Government.

16.2. Implementation of emergency preparedness measures, including the role of the regulatory body and other entities

16.2.1. Classification of emergency situations

A radiological accident is an infringement of planned operation due to the equipment damage, erroneous behaviour of the Plant’s personnel, transgression from the technological processes, natural disasters or other causes, during which an unforeseen irradiation of the personnel and inhabitants beyond the normal operation limit may occur.

In accordance with the requirements of the main documents on radiation protection and safety of the International Atomic Energy Agency (IAEA) and the legislation of the EU, levels of emergency interventions at INPP are determined, during which mitigation measures of the plants operational disorders are taken and which are enabled while there are no technical or radiological indications of the accident, but its occurrence is forecasted.

A Plan for Protection of The Population of the Republic of Lithuania in Case of an Emergency in the Ignalina Nuclear Power Plant (hereinafter referred to as “the Plan”) provides for the population’s protection measures, their volume, schedule, executors in charge and operational procedure.

The Plan for sets forth measures for three emergency classes:

- Alert – in the event of the infringement of NPP's operations, likely to cause danger for the staff members and population. Countermeasures are prepared to be applied outside the zone of sanitary protection.
- Local accident – in the event of the amount of radioactive materials and ionizing radiation, exceeding values of normal operation limits, being released out to the zone of sanitary protection, but remaining within the limits of it.
- General accident – in the event of radioactive materials, released during disordered operations of the NPP, being spread outside the territory of the zone of sanitary protection, and the amount of the radioactive materials exceeds the values of normal operation limits.

Criteria for radioactive protection applied in the Plan correspond to hygienic standards developed in compliance with requirements of IAEA and the EU documents regulating radioactive protection and safety.

The following accident classes are defined at the INPP respectively:
Alert – it is a nuclear power plant status involving failures resulting in significant or unknown decrease in the level of plant safety. At the emergency of this class ERO is put into the state of readiness and additional assessment of the situation is performed.

Site Emergency – failures in the operation of nuclear power plant resulting in reduction of facility personnel safety level. The events might be the following:

- considerable decrease in the level of protection provided to the core or spent fuel;
- situations when any additional work failures can cause spent fuel or core disturbance;
- large irradiance dozes on the facility.

At the emergency of this class measures should be taken to perform protective actions off-site and to limit exposure of radiation on-site personnel.

General Emergency – failures resulting in release or substantial risk of radioactivity release beyond the controlled area requiring urgent protective actions. The indicated failures include:

- actual or projected damage to the core or large amounts of spent fuel;
- radioactivity releases beyond the controlled area resulting in the course of several hours in doses exceeding intervention levels for urgent protective actions.

In case of declaring this accident class urgent protective actions are recommended for the public residing in the vicinity of the plant.

Accident classification at the INPP is carried out on the basis of INPP Accident Classification Procedure.

16.2.2. Overall national emergency preparedness scheme

The Fire and Rescue Department under the Ministry of Interior is an integrated part of the civil protection and rescue system and is responsible for the organising disaster prevention coordination the civil protection activities of public institutions and economic entities and ensuring the preparedness to implement the planed civil protection measures in emergency situations during peacetime or war. The Ministry of the Interior in conjunction with other institutions is responsible for the elaboration and implementation of the governmental policy in the field of civil protection in peacetime. It also coordinates the activities of the institutions of the civil protection and rescue system regarding the implementation of tasks prescribed to their scope of responsibility.

On January 1, 2005 the Civil Protection Department was merged into the Fire and Rescue Department under the Ministry of Interior of the Republic of Lithuania (hereinafter – FRD). Now FRD has all the duties and responsibilities that initially both institutions have in case of nuclear and radiological emergency as well.

FRD functions in the field of civil protection are as follows:

- Planning
- Management and coordination
- Warning and information
- Fire extinguishing and rescue

FRD coordinates the implementation of emergency planning process specially in case of accident at Ignalina NPP. Of course special attention is paid to municipalities close to the Ignalina NPP.

Based on the principles and requirements defined in international agreements, Lithuania has created the national legal system for regulating nuclear safety. As nuclear safety requirements are becoming more stringent, the legal system has been continuously improved.

Objectives of the civil protection and rescue system are as follows:

- creation of conditions for public establishments, economic entities and individuals to shift from regular life (work) conditions to those prevailing in the event of an emergency;
- keeping quiet, preserving human lives, health, property, protecting environment against emergency effect;
- guaranteeing optimal consumption of public resources to ensure public safety, keep the national economy vivid, localize emergency centers and liquidate their consequences;
- having the general public prepared for practical actions, encouraging its initiatives in the mentioned areas, reinforcing trust in proper functioning of civil protection and rescue system.

The Civil Protection and rescue system is comprised off FRD, Emergency Committee, Emergency Management Centre, Ministerial, other state and municipal civil protection offices, fire protection offices, searching and rescue groups, Other territorial offices involved in warning, rescue, support to and evacuation of the population.

National management of emergencies is carried out on three levels: state (governmental), regional (district or county) and municipal, the Government of the Republic of Lithuania taking general management of the national preparedness in the country.

The state level comprises the Government of the Republic of Lithuania, the Emergency Commission, the Emergency Management Centre, the FRD, ministries, other governmental institutions, including VATESI, the Fire Protection Department under the Ministry of Interior.

The regional (county) level comprises the County Head Administration, the County Emergency Response Centre, the Population Warning and Notification Services, as well as other Civil Security divisions.

The municipality level comprises the Municipal Administration, the Municipal Emergency Response Centre, the Fire Protection Service, the Population Warning and Notification Services, as well as other institutions, economic entities. Preparations for likely emergencies are carried out by means of planning related activities on each level of the civil protection system.

Ignalina Nuclear Power Plant is one of the most risk-bearing objects in the Republic of

Lithuania, requiring most of attention from side of the civil protection system.

16.2.3. On-site and off-site emergency plans of nuclear intallations, including supporting agencies and systems

16.2.3.1. Off-site emergency plan

A Plan for Protection of the Population of the Republic of Lithuania in Case of an Emergency in the Ignalina Nuclear Power Plant, approved by the Minister of the National Defence of the Republic of Lithuania on April 11, 2000, provides for the population's protection measures, their volume, schedule, executors in charge and operational procedure.

The Plan is designated for proper organization and co-ordination of actions taken by municipal, ministerial and governmental offices for implementation of civil protection measures, organization of operations related to rescue activities and liquidation of the emergency consequences.

Main goals of development of the Plan for protection of the population are the following:

- maximal emphasize of a risk of the emergency spreading outside the territory of the NPP and restriction of consequences of the accident on the site;
- prevention of fatal health injuring effects;
- . maximal emphasize of the population risk of getting seriously sick.

As a result of joining 'Harmonization of Regional Emergency Preparedness' – a Project led by IAEA, - the Plan took into consideration methodology developed by IAEA, i.e., technical documents – TECDOC. The Plan is a product of integrated planning, comprised of: a plan for emergency preparedness in the Ignalina NPP and actions of the staff members of NPP; action plans for district and local municipal establishments in the event of an emergency in the Ignalina NPP and actions of the staff members in district and local municipal establishments; action plans for ministries and actions of the staff members of ministries.

Composition of The Plan.

General provisions. Concepts, definitions, legal bases of the Plan, development concept of the Plan, linkage with other plans, layout data for the Plan's development (Ignalina NPP's characteristics, characteristics of Ignalina NPP's region, climatic and meteorological characteristics of the region, characteristics of radioactive danger and criteria for radioactive protection of the population).

Preparedness for an emergency. There are preset lists all governmental establishments involved in preparation for a likely emergency, simultaneously establishing their responsibilities and functions. It also includes the procedure for reviewing and updating of the Plan, the procedure of preparation of the population for an emergency and related actions in the event of an emergency.

*Organization of civil protection management and distribution of functions. T*his chapter describes a system for warning and interrelations among responsible establishments and organization of management on the local and governmental level. Nuclear energy management on governmental level is carried out in routine activities by the respective authorities in the limits of their competence.

In the event of a nuclear accident in the Ignalina NPP, ministries and governmental authorities are engaged to execute the functions carried out by the ministries and governmental authorities in their daily routine. Concerning the FRD it means: organization of warning, fire protection and rescue and public information and inspection of contaminated territory.

In the case of an emergency actions of ministries and government authorities shall be coordinated by the Emergency Committee. The Emergency Committee is comprised of ministerial and governmental officers entitled to decisions making. Operation body of the Emergency Committee is the Emergency Management Centre comprised of ministerial officers and the headquarters of the FRD.

In the event of an emergency the Emergency Management Centre shall:

- forthwith inform the Prime Minister on likely or de facto nuclear accident, its forecast consequences and the applied preventive measures;
- manage rescue operations and liquidation of consequences of the general emergency, aggregate the existing national forces and material resources, if the accident covered territories of more than one district;
- organize aggregation and co-ordination of assistance required for rescue operations and liquidation of the consequences of the emergency;
- if necessary, prepare and submit the Government proposals and drafts of decisions related to liquidation of the consequences of the emergency, organization of related operations and provision of assistance;
- prepare and submit the Government a report on material resources required for liquidation of the consequences of the emergency and proposals concerning compensations to victims;
- inform the general public on the accident and related actions according to issues delegated under authority of the Emergency Committee.

In the event of an emergency the personnel of the Ignalina Nuclear Power Plant shall inform about emergency in the NPP and the existing situation in compliance with approved scheme for preliminary information on a radiation emergency in the Ignalina NPP. Such kind of notices shall be given to: municipalities situated in the zones of preventive and urgent protection measures and administration of territorial units in neighboring countries: Daugavpils Region in Latvia and Braslav Region in Byelorussia.

FRD shall pass information on the emergency to the ministries, District Managers' Administrations, municipalities of cities/towns and regions. For this purpose it shall use automatic system for the national managing bodies and warning of the population, public means of communication (subscribers' telegraph, telephone, fax for general purposes) and direct telephone, telegraph and radio communication channels additionally arranged by FRD. In addition, the FRD also transmits information on the emergency to state civil protection management bodies in the neighboring countries. International notification and information issues lays on VATESI.

In order to minimize the consequences of an emergency, the Plan provides for a number of preventive measures against radiation effects: prevention of the population from being exposed to radioactive release in open areas by means of providing shelters or staying at home, regular usage of iodine preparations, application of individual prevention measures, evacuation, limitation or prohibition of consumption of contaminated foodstuffs, regulation of the population entering the contaminated zones, elementary cleaning of contaminated foodstuffs, organization of health care, deactivating of the contaminated area.

Radiation surveillance in the contaminated area is arranged and actively implemented during early phase of a nuclear accident. As for the late phase, radioactive contamination is constantly observed, while inspection of radiation is carried out only if this is required. Radiation surveillance is planned and coordinated by the FRD on the basis of information provided by administration of the Ignalina Nuclear Power Plant on characteristics of the accident, dose-metric data, forecasts of Hydrometeorological Service, needs and recommendations of the Ministry of Environment,

Ministry of Health Care and other authorities. First of all radiation surveillance is to be carried out in the zone of 30 km in four different routes. For this purpose, forces of units of FRD shall be used.

Decisions concerning regular prophylactic application of iodine preparations in the event of an emergency in the Ignalina NPP shall be made by district Emergency management centers. Population in the zones of long-term protection measures (in radius of 50 km from the Ignalina NPP) shall be supplied with stabile iodine preparations in advance by local municipalities of cities and regions. The latter shall acquire such preparations on their own account, consequently distributing iodine preparations for the population and replacing them prior to the date of expiration. The remaining population of the Republic of Lithuania shall by themselves acquire regular iodine preparations and ensure their stocks in advance. Iodine preparations should be supplied to drugstores enabling the population to acquire them for regular usage.

In the event of the general emergency in the INPP a decision to evacuate the population exposed to radioactive contamination as well as the process of evacuation itself shall be managed on the highest level by a head official for civil protection operations assigned by the Prime Minister. Proposals concerning evacuation shall be given by municipal emergency management centers in districts, regions (cities/towns) on the basis of the situation analysis and likely future forecasts. Evacuation might be implemented in the urgent procedure, if a territory has already been contaminated, or in the planned procedure through population collecting posts, taking into consideration a particular situation and specific features of the area. In the event of urgent evacuation from the territory contaminated with radioactive materials, the population is evacuated right from their places of residence or/and work. The population collecting points serve for evacuation of people from the territory, which, according to forecasts, might be contaminated with radioactive materials and therefore might be dangerous for work or living. Taking into consideration meteorological conditions (direction of the wind), evacuation might be carried out in two directions.

In the early phase of the accident, what is of the most importance, is sanitary cleaning of the population, deactivation of transport modes, buildings and roads. Initial sanitary cleaning of the population shall be carried out in the interim evacuation posts. If the level of radioactive contamination detected in clothes and footwear of the evacuated population is within the permitted limits, further sanitary cleaning shall be carried out in the places provided for acceptance and settlement of the evacuated individuals. In the event of higher level of contamination of the evacuated population and being it impossible to carry out sanitary cleaning in intermediate evacuation point, the evacuated individuals might be asked to get off and be provided with uncontaminated cloths from the state reserve for civil protection measures. Sanitary cleaning of the evacuated individuals shall be carried out in the places of their acceptance and settlement by means of showers existing in hostels, sports halls and other places.

16.2.3.2. On-site emergency plan

Emergency planning and preparedness.

In order to protect Ignalina Nuclear Power Plant (further INPP) personnel, population of the Republic of Lithuania from potential consequences of the radiological accident, emergency planning and preparedness are carried out at the INPP.

Emergency planning process at the INPP includes:

- analysis of credible emergency situations and assessment of their consequences to the personnel, population, environment taking into account the worst conditions;

- establishment of Emergency Response Organization (further ERO) capable to eliminate potential emergency situations and their consequences;
- formation of Emergency Response Organization management structure capable to manage different emergency situations;
- concern for continuous operability of technical devices ensuring emergency prevention, limitation and elimination;
- accumulation of essential material assets, technical recourses allotted for functioning of Emergency Response Organization;
- keeping in constant readiness for functioning ERO Emergency Operation Centres;
- training of ERO managers and personnel;
- drafting of documents prescribed by VATESI and recommended by IAEA;
- timely update of Emergency Response Plan considering results of tabletop drills and full scale exercises, conclusions of inspections performed by VATESI and INPP Safety and Quality Assurance Service.

Director General leads emergency planning process via Emergency Response Organization Staff.
INPP Emergency Response Organization structure (Heads of Emergency Response Organization Services and their subordinate personnel) is formed on the basis of production principle out of departments and divisions personnel considering the specific tasks that are dealt by the power plant divisions under the normal operation.

In order to ensure constant preparedness of Emergency Response Organization to act it is necessary to have not less than 3 specially instructed persons for each position in Emergency Response Organization meeting the requirements of that position.
Emergency Response Organization personnel should be adequately instructed and trained to meet the requirements of those positions.

INPP Emergency Response Plan.

INPP Emergency Response Plan is the main operative procedure to carry out organizational, technical, medical, evacuation and other activities related to protection of the plant, personnel, and the environment from accident consequences, natural calamities, man made events.

The requirements of Emergency Response Plan (further ERP) are applied to Emergency Response Organization Management and personnel, also to all INPP personnel in case of an emergency at INPP.
ERP is drafted on the basis of various national legal acts as well as international recommendations and requirements.

INPP Emergency Response Plan consists of two parts:
- General Part with Appendices;
- Operative Part.

The General Part of the Plan with Appendices contains:
- policy, objectives, tasks set by INPP management for Emergency Response Organization;
- responsibility of INPP management for emergency planning;
- INPP Emergency Response Organization organizational structure;
- tasks set for INPP Emergency Response Organization Services and subdivisions;
- notification and preparedness of INPP Emergency Response Organization;
- measures applied in the event of an emergency at INPP;

- premises and technical means necessary for execution of emergency preparedness functions;
- co-operation with local, regional, state authorities while rending assistance in the event of an emergency;
- resources available at the plant during an emergency;
- radiation dose limits;
- training of Emergency Response Organization managers and personnel, also INPP personnel in the field of emergency preparedness;
- appendices.

Operative part of the Plan contains:

- Emergency Planning Instruction;
- Notification Procedure in Case of an Emergency at INPP;
- Emergency Response Organization Management Assembly and Preparedness Procedure in Case of an Emergency at INPP;
- Personnel not Included into ERO Services Assembly and Order of Acting in Case of an Emergency at INPP Instruction;
- Managing Emergency Activities from Emergency Operation Centre;
- INPP Accident Classification Procedure;
- Instruction for Facility Personnel Protection and Activities against Impact of Harmful Toxic Materials in the Event of an Emergency at the Plant and Neighbouring Installations;
- Instruction on Cooperation of ERO Services Personnel and Fire Rescue Service for Visaginas Town and INPP Regarding Fire Extinguishing on the Equipment Owned by the INPP Structural Subdivisions.
- Emergency Response Services Instructions.

INPP Emergency Response Plan is applied to:

- Emergency Response Organization management and personnel;
- INPP personnel (not involved in Emergency Response Organization);
- Staff of Fire Rescue Service for Visaginas Town and the INPP;
- INPP Protection Team Staff;
- Contractor organizations personnel carrying out works at INPP;
- Personnel detached for service.

ERP is updated once in three year.

Premises and resources ensuring functioning of Emergency Response Organization.

For carrying out tasks Emergency Response Organization is provided with:

- premises;
- personal protective means;
- dosimetric control devices and radiation monitoring equipment;
- communication and notification means;
- necessary tools, equipment and machinery;
- foodstuffs supply and water.

Transport to ERO Services is provided by State Enterprise ,,Visagino transporto centras” in accordance with previously made agreement.

Emergency Response Organization Operation Centres.

Emergency Response Organization Emergency Operation Centre equipped with necessary accident management and information communication devices.

Technical Support Centre provided with equipment essential for work of experts.

Premises for operations personnel allotted for accident management:

- unit control room - 1, 2 - main 1-st and 2-nd units control boards;
- auxiliary shutdown room - 1, 2 – remote 1-st and 2-nd units scram and cooling control boards;
- central control board of INPP electric part;
- radiation protection main control board;
- environmental laboratory (auxiliary board of radiation control).

Emergency preparedness signals are predefined at the INPP that are communicated to the plant management and personnel by appropriate technical communication means.

In case of activation INPP Emergency Response Plan Plant Shift Supervisor notifies:

- the plant management;
- the plant personnel;
- central dispatcher office of joint-stock company “Lithuanian Energy”;
- Fire Rescue Service for Visaginas town and INPP;
- VATESI officer on duty in Vilnius;
- VATESI Supervision group at INPP;
- INPP Protection Team;
- Municipality of Visaginas town;
- Officer on duty of Civil Protection Department of Utena County;
- Senior Operations Manager of Control Centre of Fire and Rescue Department under the Ministry of Interior of the Republic of Lithuania.

After assembly of Heads of Emergency Response Organization Services at Emergency Operation Centre and approval of accident class INPP management makes further notification:

- Director General notifies Ministry of Economy, Director of Fire and Rescue Department under the Ministry of Interior of the Republic of Lithuania, SKI (Sweden) (“Inmarsat”);
- Technical Director notifies Head of VATESI;
- Heads of Emergency Response Services notify Ministry of Environment, Ministry of Health Care, State Security Department.

When data of off- site radiation monitoring are available and after processing the received data and projecting the development of the radiological situation ERO Staff fill in Plant Status Assessment Form and send it out to state, regional, local authorities.

In case of general emergency, after the Government Emergency Commission has assembled and started to work, head of civil protection operations on the state level presents decisions regarding the nuclear power plant to the head of ERO in form of appropriate instructions obligatory for all executors in case of emergency situation.

Accident management is performed in accordance with corresponding strategies. Accident management activities are aimed at reaching the following safety objectives:

- prevent further development of accident in case of the reactor core damage;
- ensure continuous cooling of the reactor core;
- make effort to ensure the of accident localization system integrity.

The concept of defence in depth is determined to provide two goals of the strategy – accident prevention and mitigation of consequences.

Co-operation with local organizations involved in activities in case of emergency at the INPP, is documented in the form of pre-signed agreements between the INPP and appropriate local organizations.

16.2.4. Measures for informing the public

A central concern of civil protection is to warn and alert the population as quickly as possible. To warn and notify the population in case of an accident the state warning and notification system "Signalas" has been created as the network of 513 centralised electric sirens. Centrally controlled sirens can be triggered by the Fire and Rescue Department's Situations Coordination Centre and to reach 1,8 million or 50% of the population living in cities and district centres. The 547 local electric sirens supplement this system. If case of a major accident or large scale threat The Fire and Rescue Department under the Ministry of the Interior shall notify the population through the first and the second Lithuanian radio and TV channels, most of commercial broadcasting companies (which work in FM), as well as through the wire radio communication network. For informing the public some additional means such, manual sirens, special cars with sound amplifying equipment and couriers can be used according to schemes prepared and approved with town and municipal boards in advance.

At the Situations Coordination Centre of the Department twenty-four hours duty officer gathers operative information concerning threats or accidents and keeps in touch with all managing units and key members of the community as well.

Population of the state is being provided permanently with information on civil protection issues via mass media, furthermore, special booklets including recommendations on behaviour during different emergency situations are being published.

16.3. Training and exercises

16.3.1. General scheme

The following groups of persons involved in the civil protection training:

- Employees of the enterprises, institutions and organizations of all types (they are being trained without leaving their job duties);
- Kindergartners, students of the general education, higher and (high depends on its good will and Rectors decision) schools (they get fundamental knowledge on the civil protection and practical actions in the mentioned schools);
- Heads, deputy heads, subdivisions heads and civil protection specialists of the governmental and local authorities, enterprises and organizations, members of emergency management centres and specialists of other institutions (being trained in training sections of the civil protection departments in counties and in the Fire fighters Training School's Civil Protection Training Centre of the Fire and Rescue Department);
- The unemployed (discussions, lectures, TV, booklets, etc.).

The Civil Protection training is performed in the Fire fighters Training School's Civil Protection Training Centre of the Fire and Rescue Department and in civil protection departments training sections in every of 10 counties.

The training for each selected person, depending on his/her position, is to be performed once in 3 - 5 years. The training courses adjusted to every specific purpose, duration from 35 to 70 hours. Officers of the fire-prevention service are trained in the Fire Fighters Training School in Vilnius.

Training sessions and exercises are organized at three levels.

The Fire and Rescue Department under the Ministry of the Interior is responsible for the organization of training sessions and exercises at the national level.

Governors of the regions (counties) organizes training sessions and exercises at the regional level.

Mayor of municipality organizes training sessions and exercises at the municipal level.

The Fire and Rescue Department under the Ministry of the Interior controls planning, organization and implementation of all training and exercises at all levels:

- Training sessions at the national level are organized once a year, exercises – once in 3 years;
- Training sessions at the regional level are organized twice a year, exercise – once in 3 years;
- Training sessions at the municipal level are organized twice a year, exercise – once in 2 years.

In case of needs training sessions and exercise can be organized more frequently.

The main task of the training sessions and exercise is to check the procedures described in the "National Emergency Response Plan in the Event of a Radiological Accident at the Ignalina Nuclear Power Plant" and to continue to improve it. It would help counties, municipalities, ministries and other governmental institutions organize and coordinate all actions during an accident in the INPP on appropriate way.

16.3.2. Training of heads and personnel of Emergency Response Organization to act in case of an emergency at the INPP

Training of heads and personnel of Emergency Response Organization to act in case of an emergency at the INPP is organized as follows:

- Director General as the Head of Emergency Response Organization is trained according to a special program once per three years at Training Centre of the Fire and Rescue Department (further on FRD) under the Ministry of Interior.
- Director General conducts:
- annual training for managers of subordinate group in accordance with 6-hours training programme.
- tabletop drills for heads of Emergency Response Organization Services not less than once per year;
- full scale exercises once per three years.

Technical Director as Plant Operation Manager is trained once per three years at Training Centre of FRD under the Ministry of Interior in accordance with the same training programme as for Director General.

Technical Director conducts annual training for managers of subordinate group in accordance with 6-hours training programme.

Head of Civil Protection and Emergency Situations Staff, as a Manager of Emergency Response Organization, once per five years is trained at Training Centre of FRD under the Ministry of Interior in accordance with a special programme.

Head of Civil Protection and Emergency Situations Staff conducts annual training for managers not included into ERO Services in accordance with 6-hours training programme.

Heads of structural divisions as Heads of Emergency Response Services conduct training for sub-heads of subordinate services teams, groups.

All the INPP personnel should be trained to act in case of an emergency.

Once per three years Emergency Response Organization Services personnel (part of personnel) participate in full scale exercises for checking emergency preparedness level of personnel and its ability to work in complicated conditions while carrying out the set tasks.

All the INPP personnel should be trained to act in case of an emergency. The training of personnel includes:

- initial instructing in accordance with requirements for held position while assigning to work;
- improvement of practical skills during exercises and drills;

Training of Emergency Response Organization Services personnel is conducted by heads of corresponding teams and groups.

After completion of theoretical course Emergency Response Organization Services personnel (part of personnel) participate in functional exercises for improvement of practical skills of carrying out the set tasks.

Once per three years Emergency Response Organization Services personnel (part of personnel) participate in full scale exercises for checking emergency preparedness level of personnel and its ability to work in complicated conditions while carrying out the set tasks.

16.3.3. Training and exercises of Regulatory Authorities' staff

Main regulating institutions, such as VATESI, Radiation Protection Centre, has established its own emergency staff training and exercising programs. In accordance with internal procedures on ERC staff functional training, all VATESI's Emergency response centre staff has to pass initial and refreshing training permanently. Each key staff members or groups have personal set of issues to be covered. Training consists from theoretical and practical parts and, depending on position in ERC, could last from few to few tens of hours. Training programs are based on Systematic Approach to Training (SAT) philosophy.

Key Authorities also actively participate in various international training courses and exercises, such as Convex, ECURIE, CBSS, FALKEN/DEMOEX (Sweden, 2006), PSI Air Interdiction Exercise (Lithuania, 2007) etc., organized by the IAEA, EC, NATO and other international organizations. Lithuania is one of very few countries, which participated in all IAEA exercises up to now.

16.4. International arrangements, including those with neighbouring countries

In 1994 Lithuania has joined to Convention on Early Notification of a Nuclear Accident and in 2000 to Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency. VATESI and Fire and Rescue Department are responsible authorities respectively. According to IAEA's EPR-ENATOM requirements, VATESI is National Warning Point, National Competent Authority for events abroad and, together with Fire and Rescue Department - National Competent Authority for domestic events.

After joining EU in 2005, Lithuania became a part of ECURIE system. VATESI is contact point in these arrangements as well as CoDecS station operator.

A great attention in Lithuania is paid to the development of bilateral co-operation with the neighbouring countries. Mutual assistance policy between Lithuania and the neighboring countries is based on bilateral agreements. Bilateral agreement between Lithuania and Denmark *On information exchange and co-operation in the field of nuclear safety and radiation protection* has been signed on 26 March 1993. The bilateral agreement between Lithuania and Norway *On Early Notification of a Nuclear Accident and Information exchange about Nuclear Objects* has been signed on 13 February 1995. The Arrangement between Lithuania and Poland *On information exchange and co-operation in the field of nuclear safety and radiation protection has been signed on 2 June 1995.* The Agreement between Lithuania and Latvia *On Early Notification of Nuclear Accidents, Exchange of Information and Co-operation in the Field of Nuclear Safety and Radiation Protection has been signed on 3 October 2003.*

New issues

Section 16.2.2. On January 1, 2005 the Civil Protection Department was merged into the Fire and Rescue Department under the Ministry of Interior of the Republic of Lithuania (hereinafter – FRD). Now FRD has all the duties and responsibilities that initially both institutions have in case of nuclear and radiological emergency as well.

In March 2006 the FRD prepared and the Government approved (resolution No. 241) The Criteria of the Emergency Events. It reflects the position and the perception of threat in the Republic of Lithuania. The Criteria related the nuclear and radiological accidents are included.

In April 20, 2006 issued FRD directors order (No. 1-160). The essentials of the activities in the event of radiological emergency. Guidelines for fire brigades.

In May 2006 was arranged the top-table exercises at the national level. Administrative personnel from Ignalina, Zarasai, Visaginas, Molėtai Utena, Švenčionys municipalities and Utena and Vilnius counties administration Civil Protection Departments have attended.

Participation in various international emergency exercises.

The main task of the top table exercises was the evaluation the new prepared plan for protection of the population of the Republic of Lithuania in case of an emergency in the Ignalina Nuclear Power Plant

New version of the INPP Emergency response plan was drafted and reviewed by Authorities. Will be approved in 2007.

Section 16.4. Added information about International arrangements, including those with neighbouring countries

Article 17: SITTING

Each Contracting Party shall take the appropriate steps to ensure that appropriate procedures are established and implemented:

- *for evaluating all relevant site-related factors likely to affect the safety of a nuclear installation for its projected lifetime;*
- *for evaluating the likely safety impact of a proposed nuclear installation on individuals, society and the environment;*
- *for re-evaluating as necessary all relevant factors referred to in sub-paragraphs (i) and (ii) so as to the continued safety acceptability of the nuclear installation;*
- *for consulting Contracting Parties in the vicinity of a proposed nuclear installation, insofar as they are likely to be affected by that installation and, upon request providing necessary information to such Contracting Parties, in order to enable them to evaluate and make their own assessment of the likely safety impact on their own territory of the nuclear installation.*

17.1. Description of licensing process, including summary of nationals laws, regulations and requirements relating to the sitting of nuclear installations

17.1.1. Criteria for evaluating all site-related factors affecting safety

Parliament of the Republic of Lithuania, by the advice of the Government, adopts a law on the construction of a new nuclear plant and its site. In making a decision on the construction of a specific nuclear facility, the Government of the Republic of Lithuania takes into consideration:

- economic and public needs;
- the principal characteristics of the use of natural resources and their impact on the environment;
- nuclear safety and radiation protection guarantees;
- the opinion of the local authority on whose territory the intended facility will be sited.

Ministry of Economy organise the drafting of a special project for the choice of the site for a new nuclear power plant or other state nuclear facilities, exploring several alternative sites. Information about the site of nuclear facility shall be presented as follows:

- geographical location of the nuclear facility, topographical and demographic situation on site area (taking into account the density of population and distribution in site area and its approaches);
- characteristics of site (data of meteorological, hydrological and geological research - prevailing winds, lightning, tornadoes, cyclones, precipitation, floods, geological structures, seismic activity, status of radioecology, ambient radioactivity, description of possible consequences in case of accident, possible effects on food production);
- situation of other industrial facilities around the nuclear facility, consequences to the safety of the nuclear facility caused by possible accidents in these facilities;
- other parameters of the site, which can be important to ensure the safety of the nuclear facility and minimise risk to the inhabitants from radiation;

Evaluations of site-related geotechnical aspects that may affect safety are required by national regulation STR “Geological and engineering survey”. They are also considered in accordance of IAEA recommendations (Safety Standard Series No. NS-G-3.6). Such factor are as follows: earthquakes, surface faulting, floods and water waves, slope instability, collapse, subsidence or

uplift of surface, soil liquefaction, behaviour of foundation materials. Site specific micro seismic and geological data are used for site investigation.

Evaluating site-related factors (population distribution, dietary habits, use of land and water, radiological impacts of other releases of radioactive material in the region) from radiological point of view was made according IAEA recommendations (Safety Standard Series No. NS-R-3, Site Evaluation for Nuclear Installations, IAEA, 2003) and requirements of national regulations. Potential radiological impact on the region for operational states and accident conditions was determined and estimated.

Analysis of explosion and aircraft crashes impact are required by national regulation "Requirements of impact analysis for nuclear facilities due to explosion and aircraft crash". They are also considered in accordance of IAEA recommendations (Safety Standard Series No. NS-G-3.1).

17.1.2. Criteria for evaluating the nuclear safety impact of the nuclear installation on the surrounding environment and population.

According to the Law on Environmental Impact Assessment 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.

A proposed nuclear activity (nuclear power stations and other nuclear reactors, including decommissioning of power stations or reactors; production, processing, enrichment, storage and disposal of nuclear fuel) is included in Annex I, the List of the Types of Proposed Economic Activities that shall be Subject to the Environmental Impact Assessment according to the Law on Environmental Impact Assessment of the Republic of Lithuania, it means that environmental impact assessment for such activities is obligatory.

Some legal acts were amended since 2004. For the present Environmental impact assessment is carried out in accordance with the revised versions of the Law on Environmental Impact Assessment of the Proposed Economic Activity (1996, last amended in 2005, Official Journal No. 84-3105); Governmental Resolution No. 900 On Empowering the Ministry of Environment and the Subordinate Institutions (2000, last amended in 2003, Official Journal No. 14-582); the Order of the Minister of Environment on Approval of Regulations on Preparation of the Environmental Impact Assessment Program and Report (2000, revised 2006, Official Journal No. 6-225); the Order of the Minister of Environment on Informing the Public and Public Participation in the Process of Environmental Impact Assessment (2000, revised 2006, Official Journal No. 93-3472); the Order of the Minister of Environment on Approval of Guidelines on the Quality Control of Environmental Impact Assessment of a proposed Economic Activity (Official Journal, 2000, No. 93-3472); the Order of the Minister of Environment on Investigating the Environmental Impact Assessment Document at the Ministry of Environment and Subordinate institutions (2000 revised 2006 No. 75-2882).

Participants of the environmental impact assessment shall be as follows:

- Competent authority – The Ministry of Environment as competent authority coordinates the environmental impact assessment (EIA) process. This institution also investigates and approves EIA programs, examines the proposals of the public, the EIA reports and conclusions issued by other relevant parties and makes justified decisions if the proposed economic activity, taking into account it's nature and size, may be carried in a chosen site. The Ministry of Environment also has the right to require amendments or correction of EIA documents, if the quality of EIA documents is not satisfactory, or some topics are not

adequately covered.

- Relevant parties of the EIA – governmental institutions, responsible for health protection, fire-prevention, protection of cultural heritage, development of economy and agriculture, and municipal administrations. In some cases, assistance of additional governmental institutions might be required. As regards radioactive waste management facilities State Nuclear Power Safety Inspectorate and Radiation Protection Centre participate in the EIA process as relevant parties. The relevant parties of EIA, in accordance with their competence review the EIA programs and reports and provide conclusions regarding the EIA programs, reports and the feasibility of the proposed economic activity. They also have the right to require for amendment or corrections of the EIA documents if the topics within the scope of their competence are not investigated sufficiently.
- Organiser of the proposed nuclear activity (developer).
- Preparer of EIA documentation that is obliged by organiser (developer).
- The public.

The preparer of EIA documentation obliged by the organiser (developer) shall carry out EIA procedures and prepare EIA documentation:

- **EIA program** shall include at least the following information: short description of the main alternatives studied by the preparer of the EIA documents; short description of the technical characteristics, technological process and materials planned to be used, as well as needed amount of natural resources and land use (during the construction and operation phases); short description of the territories that could be significantly affected; information about what components of the environment and what impacts will be analysed during the environmental impact assessment; information on what aspects the impacts of the proposed economic activity on public health will be analysed; methods that will be used to predict and assess the effects on the environment, measures envisaged to avoid, reduce or offset negative environmental effects; information whether proposed economic activity may cause a significant negative impact on the environment of any foreign State; other important information.

The prepared program is submitted to the relevant parties of EIA that examine EIA program and provide conclusions in accordance with their competence. Relevant parties also have right to require for amendment or corrections of the program if the topics within the scope of their competence are not investigated sufficiently. Then the conclusions from all relevant parties of EIA and EIA program are submitted to the competent authority (Ministry of Environment), which reviews these documents and approves EIA program, however competent authority also has right to require for amendments and correction of the program.

- **EIA report** is prepared by the preparer of EIA documents. The report shall include at least the following information: information about the organizer (developer) of the proposed economic activity; information about the preparer of EIA documents; detailed information according to the topics of the EIA program and also additional information: description of the expected pollutants (names, calculations, hazardousness, risk group, etc.); description of waste generation and management; components of the environment that could be affected by the proposed economic activity; description and assessment of potential impacts of the proposed economic activity on public health, fauna and flora, soil, earth surface and underground, water, environmental air, climate, landscape, biodiversity, economic conditions, cultural heritage and the interaction of these components; methods that were used to predict and assess the effects on the environment; a description of measures envisaged to avoid, reduce or offset negative environmental effects or to alleviate their consequences; analysis of the alternatives and the indication of the reasons for the choice, taking into account the best available modes and production of potential

environmental impact, at least several alternatives (e.g. Alternative locations, timings, technical and technological solutions, environmental impact mitigation measures) shall be investigated in the report, including the "zero" alternative, that refers to the environmental conditions and natural changes in the environment if the activity is not carried out and is used as the environmental baseline evaluation and a base for assessment and comparisons; identification of possible emergencies and accident-avoidance and emergency measures; analysis of environmental monitoring data (if available) and plan for environmental monitoring; a summary of all information considered in the report; other information that shall be included in the report (a description of technical or practical problems encountered by the preparer of the EIA documents in performing the EIA).

The developer informs the public about its completion and the forthcoming public hearing. Public hearing is organized by the developer. The public may submit motivated proposals regarding the environmental impact assessment and EIA report. According to the justified proposals of the public, amended report is provided to EIA relevant parties, which make conclusions regarding the report and the possibilities to carry out the proposed economic activity. Then the report, conclusions of the EIA parties, a justified evaluation of the public proposals are provided to the competent authority. After examination of the EIA documents Competent authority makes justified decision if the proposed economic activity, taking into account its nature and size, may be carried in a chosen site. Competent authority also informs the public about its decision and the reasons and considerations.

A positive decision adopted by the competent authority regarding the possibilities of carrying out a proposed economic activity shall be 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.

17.1.3. Transboundary co-ordination (participation in environmental impact assessment process)

A proposed nuclear activity (nuclear power stations and other nuclear reactors, including decommissioning of power stations or reactors; production, processing, enrichment, storage and disposal of nuclear fuel) shall be subject to the transboundary EIA according to 1991 United Nations Convention on Environmental Impact Assessment in a Transboundary Context (Espoo convention).

For other projects the transboundary impacts are analysed through screening procedure. If competent authority decides that project might have significant transboundary effects national and transboundary EIA procedure will be applied.

In 1994 Lithuania signed an Agreement between the Government of the Republic of Lithuania and the Government of the Republic of Poland on the implementation of the Convention on Environment Impact Assessment in a Transboundary Context.

Lithuania has intention to sign bilateral agreements with Latvia and Belarus. The draft Agreement between the Government of the Republic of Lithuania and the Government of the Republic of Belarus on the implementation of the Convention on Environment Impact Assessment in a Transboundary Context was prepared and sent to Belarus.

Decisions made during 2004-2007 on EIA of proposed nuclear activities:

In August 2006, the Ministry of Environment made a decision regarding the Decommissioning of Ignalina Nuclear Power Plant from environmental point of view: "To approve Ignalina Nuclear

Power Plant Unit 1 decommissioning project for defuelling phase according to the presented EIA Report". Latvia was informed about the project in October 2004. Latvia had no intentions to participate in EIA procedure. Belarus was not the Party of the Espoo Convention at that time.

In July 2004, the Ministry of Environment approved the EIA program of the construction of The Near Surface Repository of the Radioactive Waste. The draft EIA report was sent to Latvia in December 2004. Party responded that it will participate in the EIA process and provided comments on EIA documentation. Then on request of the developer the EIA procedure was stopped. The supplemented EIA report (additional alternative site was analysed) was submitted to Latvia and also to Belarus for comments (because Belarus ratified Espoo convention on February 9, 2006) in October 2006. The comments from the Parties were received in January 2007. The Ministry of Environment in accordance with Espoo Convention requirements organised final transboundary consultation meeting with Latvian experts on the 16th of March, 2007 (in Vilnius). The final transboundary consultation meeting with Belarusian experts was organised on the 19th of April, 2007 (in Vilnius). During the consultation meetings the received comments from these countries were discussed. In June 2007 the Ministry of Environment, taking into account the results of transboundary consultations as well as the conclusions of relevant EIA parties made a justified decision that the proposed activity may be carried in 2 chosen sites. The Government taking into account the decision of Ministry of Environment will choose one site.

In December 2005, the Ministry of Environment approved the EIA program for the Construction of the Facility for Interim Storage of Spent Nuclear Fuel From Ignalina Nuclear Power Plant Units I and II. Latvia and Belarus were notified and provided with draft EIA program in December 2005. Parties responded that they will participate in EIA process and provided their comments. The draft EIA report was submitted to Latvia and Belarus for comments in January 2007. The comments were received at the beginning of April 2007. Final transboundary consultation meetings were organised at the beginning of September. It is planned that Ministry of Environment will make a justified decision regarding this activity in October, 2007.

In February 2007, the Ministry of Environment approved the EIA program for the Construction of the Solid Radioactive Waste Management and Storage facilities at Ignalina Nuclear Power Plant. Latvia and Belarus were notified and provided with draft EIA program in July 2006. Parties responded that they will participate in EIA process and provided their comments in August 2006.

In July 2007, environmental impact assessment for the construction of nuclear power plant in Lithuania has begun. Ministry of Environment according to Espoo Convention has sent notification and environmental impact assessment program to the countries which may be affected by the proposed activity.

17.2. Implementing provisions for fulfilment of the above mentioned criteria

The structural components of the Ignalina Nuclear Power Plant are designed in accordance with the specification set forth in "Design Safety Regulations of Nuclear Power Plants (OPB-83)". The generic requirement of this document is that safety-related systems and elements of nuclear power plants have to be able to fulfill their functions under all conditions. This implies that they have to accommodate stresses imposed by natural phenomena as well as mechanical, thermal, chemical and other impacts which may arise during design basis accidents.

The term "external events" (relative to a nuclear power plant) covers such natural phenomena as a earthquakes, flooding, strong winds, lightning, snow and ice, and such man-made events as aircraft

crashes, industrial explosion, sabotage and terrorist action. On site fire and flooding are usually also considered as external events.

The mentioned site-related factors likely to affect the safety of nuclear installation were evaluated partly during the design stage of Ignalina NPP in accordance with existed requirements. The site was originally selected taking into account relevant factors like the above-mentioned and the population density at various distances. Present legal provisions to maintain the environmental conditions of the sites include restrictions for building activities close to the site. There are no chemical installations, gas pipelines and other facilities and human activities that might endanger the plant safety.
Safety analysis of nuclear power plants requires the consideration of an "Aircraft crash on the reactor hall". The consideration of this event is proposed in a list of hypothetical accidents defined in 1990 by the Kurchatov Atomic Energy Institute, Moscow, Russia. This requirement was imposed after completion of the Ignalina NPP.

The requirements for considering an aircraft crash therefore were not imposed on any RBMK plant. This was due mainly to three major considerations:

- There were no such regulatory requirements at the time when the plants were developed and no such requirements were introduced by the regulatory bodies;
- Such events are sufficiently unlikely, besides, the RBMK sites are situated reasonably far from airports;
- Until recently, there were no reliable statistics on flight incidents and fatal accidents involving both civil and military aircraft, which could be used when considering such events regarding nuclear power plants.

The fist comprehensive study of seismic activity of Lithuania was carried out in 1988 as a part of re-examination of safety of Ignalina NPP. The experts came to the conclusion that seismic hazard was not sufficiently assessed when designing INPP although local and international regulations insisted on it. In order to improve the situation the experts proposed to install a seismic network and monitor local seismicity.

The group of industrialised states G-7 approved the plan of actions for improving the safety of Soviet nuclear reactors in 1992. A fund named "Account of Nuclear Safety" provided an irrevocable loan for Lithuania to renovate safety systems of INPP in 1994. One of the projects considered installation of a Seismic Alarm System (SAS). This system was designed to issue alarm when damaging seismic wave approaches the INPP. The SAS was complemented with the Seismic Monitoring System (SMS). The SMS was designed to collect data of local seismicity and dynamic behaviour of structures of INPP. The SMS consists of six vertical short period seismometers installed in boreholes with at the depth of 30 m located at a distance of ~30 km from the INPP. The signals of the seismometers are transformed to digital form and telemetered continuously to the control center in INPP. The server records data of seismometers if a local or teleseismic event is detected.

SAS and SMS including four outside seismic stations on territory of Lithuania were installed in June of 1999. Two more seismic stations had to be installed on the territory of Latvia and Belarus. However, no construction has been started in 2007. Seismic alarm and monitoring system has been put into trial operation in 1999. Since 2006 seismic alarm and monitoring system is under modification in order to improve its reliability.

17.3. Activities related to maintaining the continued safety acceptability of the Nuclear Installation, taking account of site-related factors

A study of available catalogues of historical earthquake observations in Latvia and Lithuania indicates that the average seismicity of those regions does not deviate significantly from the seismicity of southern Fennoscandia. Furthermore, there is no indication that the seismicity in the near-field of the Ignalina NPP deviates from the average. Therefore, in the first approach, the average occurrence frequencies of earthquakes of various magnitudes in southern Sweden are adopted for expressing the seismicity in the Ignalina near-field and far-field. The distribution of focal depths is also assumed to be the same as in Sweden. Since the sedimentary rock cover below Ignalina is similar to the sedimentary rock cover in parts of Scania (e.g. Barsebäck), transformation of seismic waves, coming from the harder basement rock, is assumed to be the same in Ignalina as in this part of Scania (southern-most Sweden).

Thus, the uniform hazard response spectra for outcropping sedimentary rock in southern Sweden are adopted to define a reference seismic hazard level. It should be observed that the amplification of the seismic waves when propagating from the hard basement rock through the sedimentary layers, of the order of 50 per cent, is included in the spectra (as well as the doubling of incoming waves due to reflection, of course). Possible additional soil amplification in Ignalina has to be considered. Such effects cannot be assessed with any good precision without detailed information of the soil properties. However, issues of wave amplification in soft rock and soil and de-amplification with embedment depth can be treated approximately, leading to a further amplification of the Swedish spectra as described below.

Historical data and recent instrumental measurements refute the conventional opinion of Lithuania as a non-seismic territory. In comparison to Latvia and Estonia, Lithuania is the most quiet territory in terms of seismic activity. Only one strong event was registered in the Lithuanian territory in 1909. However, dozens of hazardous historical earthquakes shuttered the earth close to the Lithuanian border in Belarus and Latvia. A rapture of the ground was reported close to the eastern border of Lithuania, resulting from a strong earthquake in the beginning of 20^{th} century. Its traces are recognizable until now, presenting a spectacular geoindicator of earthquake danger.

Seeking to assess the modern seismic activity in Lithuania and the adjacent Baltic Sea area, registration data by the Scandinavian seismic network were collected, for there were no good-quality seismic stations available in Lithuania until recently. More than a hundred low-intensity ($M<3$) seismic events were recorded by seismic stations since seventies. Because of low magnitude and long distance from the epicentres to the registration stations, uncertainty determining the epicentres remains, as well as the recognition of the nature of the source of events, which can be either of natural or artificial origin. The program EXFILTER (SEISAN program suite) has been used to refine the data set. Against the background of unevenly scattered events, some regular clusters were recognised, which mark areas of enhanced tectonic activity. This particularly concerns the Baltic Sea territory.

The territory of Lithuania is not very seismically active, being in a stable, intraplate tectonic setting, but historical data show that earthquakes of destructive character have occurred in the past. During the last several years, stations of the Scandinavian seismologic system fixed a number of weak seismic events in the territory of Lithuania. Other studies during the last decade show that much of the Earth's crust is affected by horizontal tectonic stresses. Most deformation (about 90%) is related to tectonic faults, an abundant system of which characterizes the territory of Lithuania. Seismological studies in other countries show that only 2% of seismic deformation energy discharges by earthquakes whose intensity in less than 5 (using the MSK-64 scale). Thus, the occurrence of strong, though rare, earthquakes in the territory of Lithuania may be a natural and

unavoidable phenomenon. That is, the Earth's crust in Lithuania may be considered to be in a "seismic" condition.

In soviet time a governmental commission evaluated the seismic hazard level of INPP (Conclusions of the Governmental commission for seismic hazard assessment in INPP on the seismic hazard level in Ignalina NPP region. Moscow, 1988). The evidences are too scarce to enable evaluation of the periodicity of the earthquakes in the Ignalina INPP area. Still, the listed evidences of the location of the Druksiai lake at the intersection of faults showing recent activity, the location of INPP close to the active fault zone of the Druksiai graben, and the occurrence of the earthquakes of intensity 7 not far away from INPP demonstrates that there is high probability of recurrence of the seismic event of similar intensity in the future.

The Russian company Hydroprojekt performed a seismic potential analysis of the INPP. Based on historical data and soil properties, it was concluded that the maximum possible earthquake is MSK64=7, maximum magnitude 4, epicentral distance 5-10 km, maximum acceleration 0.1g. It was recommended to perform general seismic zoning and microseismic zoning.

The microseismic zoning was performed for INPP in 1988. The study was conducted by the Institute of the Building Geotechnical Investigations of the joint enterprise "Building investigations". The seismic micro-zoning was based on the results of the geotechnical, geophysical and seismic-engineering multidisciplinary studies. Also, the modeling technique was applied. It was observed that INPP site is quazy-homogeneous with respect to the seismic properties of the soil. The top 10 meters soil is of 3rd class (according to Russian norms SNiP II-7-81). At the depth of the base of the structure the maximum calculated seismic intensity was estimated at 7 grades and the project seismicity 6 grades. The seismic acceleration was estimated at amax=100 cm/s2=0.1 g (assuming Tmax=0.15-0.4 s) and 75 cm/s2=0.075 g for the base depth of 10 m.

Integrated geological mapping was performed in the INPP area and surroundings in 1988-1995. It comprised seismic profiling, potential field, hydogeological, geotechnical studies, drilling activities. No additional seismological information was collected. However, the studies resulted in detailed identification of the tectonic structures (faults), sedimentary layers and crystalline basement. The geotechnical soil properties were studied. The measurement was performed in a few deep wells that provide information on P-wave velocities from the near-top of the sedimentary cover to the crystalline basement. Two types of faults are distinguished in the Ignalina area, i.e. the oldest pre-platform and younger platform ones. The former does not dissect the sedimentary cover, whereas the latter penetrates into the sediments overlying the crystalline basement. The faults detected in the sedimentary cover are oriented N-S, W-E, NW-SE and NE-SW. The faults exceed 20 km in length. The amplitudes are in the range of 10-55m.

The tectonic activity of the faults is evidenced by geodetic measurements of recent movements of the ground surface in the polygon established around the INPP area (Druksiai lake). The data collected during 1989-1998 indicates that the vertical movements of the ground are related to the activity of the tectonic blocks bounded by the faults of the crystalline basement and sedimentary cover. The relative magnitude of the vertical movements of the blocks reaches 0.5 mm per year.

Maps of the Peak Ground Acceleration (PGA) with 10 % probability of transcendence in 50 years and 100 years were compiled for the Baltic region in 1998. The values of the INPP are range in order of 50-60 cm/s^2.

In 2004-2006 were reviewed documents, related to sitting of a near surface repository for low and intermediate level short-lived radioactive waste, spent nuclear fuel interim storage facility. It were assessed the possibilities of sitting of geological disposal facility for long-lived radioactive waste.

Evaluation of the results of first stage of geological and engineering survey of new NPP was performed in 2006.

17.4. Internationals arrangements, including those with neighboring countries, as necessary

Information about nuclear facilities and activities on territory of Lithuania shall be submitted to neighboring countries according the bilateral agreements (as in paragraph 16.4.) and The Regulation on Providing of General Data Concerning Plans for the Disposal of Radioactive Waste to the Commission of the European Communities (as in paragraph 15.1.).

Article 18: DESIGN AND CONSTRUCTION

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

- *the design and construction of a nuclear installation provides for several reliable levels and methods of protection (defence in depth) against the release of radioactive materials, with a view to preventing the occurrence of accidents and to mitigating their radiological consequences should they occur;*
- *the technologies incorporated in the design and construction of a nuclear installation are proven by experience or qualified by testing or analysis;*
- *the design of a nuclear installation allows for reliable, stable and easily manageable operation, with specific consideration of human factors and the man-machine interface.*

18.1. Description of licensing process, including summary of national laws, regulations and requirements related to design and construction of Nuclear Installations

A nuclear power plant or a nuclear reactor may be designed only subject to a resolution adopted by the Government of the Republic of Lithuania on the basis of the law on the construction of such a power plant or a nuclear reactor. Other nuclear facilities may be designed, and the nuclear power plant may be reconstructed subject to a resolution adopted by the Government of the Republic of Lithuania on the recommendation by the Ministry of Economy. A particular design of a nuclear facility is prepared subject to:

- the drafting and approval of a special site selection scheme after consideration of several alternative construction sites in a manner prescribed by the Law on Territorial Planning;
- the approval of a detailed plan of the territory;
- legally effected in a prescribed manner taking over of the land intended for the construction site for public needs.

In the manner prescribed by the Government of the Republic of Lithuania, the construction or reconstruction design of a nuclear facility is co-ordinated with the following state institutions: the Ministry of the Environment; the Ministry of Economy; the Ministry of National Defence; the Ministry of Social Security and Labour; the Ministry of the Interior; the State Security Department; the State Nuclear Power Safety Inspectorate (VATESI); the local authority, whose territory or its part is within the sanitary protection zone of the facility.

Designs for the construction, reconstruction, upgrading, expansion, dismantling and decommissioning of nuclear facilities is subject to a comprehensive state expert evaluation. The expert evaluation is organized by the Ministry of the Environment upon receiving the design submitted by the client. The construction designs of nuclear power plants and nuclear reactors may be submitted for additional international expert evaluation organized by the client. The findings of the expert evaluation are incorporated into the comprehensive state expert evaluation findings. The evaluation expenses are borne by the client.

The Government or an institution authorized by it issues an authorization for the construction or reconstruction of a nuclear facility in the prescribed manner. The builder/client seeking to obtain an authorization to construct or reconstruct a nuclear facility must submit:

- an application of the prescribed form;
- a licence issued by VATESI to construct a nuclear facility;

- a document certifying the builder's/client's title or other rights to the plot of land;
- the design of the nuclear facility with the prior official approval following the established procedure;
- findings of expert examination of the nuclear facility design;
- a decision of a competent institution that the intended economic activity is permitted on the chosen site from the point of view of environmental impact;
- a document on the appointment of the chief technical supervision officer of the construction of the nuclear facility;
- a certificate of cadastral measurements of the nuclear facility and its formal registration (in the event of reconstruction of the nuclear facility).

An authorization for construction or reconstruction of a nuclear facility is issued within 20 days after the day of filing of the documents, at the latest, after examining them and ascertaining that construction of the nuclear facility conforms to the requirements of the regime of the building site as laid down by the document of territorial planning.

Where an authorization for the construction or reconstruction of a nuclear facility is not issued the Government or an institution authorized by it within 20 days informs the builder/client about it in writing, by giving a reasoned justification for refusal to issue an authorization. An authorization for construction or reconstruction of a nuclear facility becomes invalid:

- by a court decision;
- by a decision of the Ministry of the Environment when it is discovered that it was issued unlawfully;
- where, within 10 years after the date of issue of the authorization the nuclear facility was not commissioned.

The rules for issuing authorizations for construction or reconstruction of a nuclear facility are defined by the Government. The institution authorized by the Government manages records of issue of authorizations for the construction or reconstruction of nuclear facilities, their list and statistical reports.

State control and supervision of the construction of nuclear facilities is exercised during all the major stages of work - design and construction, commissioning, operation and decommissioning. During all the stages of work, compliance with the conditions and requirements set for nuclear safety, radiation protection regulations and other statutory acts is controlled and supervised by the following institutions within their competence: VATESI, the Ministry of Health, the Ministry of the Environment, the Ministry of Social Security and Labour, the Ministry of the Interior, the State Security Department, the Radiation Protection Centre and the county Governor.

Sanitary protection and monitoring zones are established around nuclear facilities. The size of the area depends on the purpose of the facility and the requirements of operation safety rules and standards. The boundaries of the sanitary and monitoring zones are fixed in the documentation of the facility construction design.

Prior to the commissioning of the facility, all the populations are resettled from the sanitary protection zone in the manner prescribed by the Government. Any activities as well as construction of installations and buildings unrelated to the operation or service of the facility are prohibited therein. Land, woods and water bodies on the territory of the sanitary protection zone may be used only subject to an approval of the Operating Organization and permits of the Ministry of Environment and the Ministry of Health. The basic requirements for the sanitary protection and monitoring zones of a nuclear power plant or a nuclear reactor, and the conditions for

decommissioning conditions are stipulated by the law on nuclear power plants or on nuclear reactors.

Organizations, involved in design, construction, installation and adjustment work, as well as companies which manufacture nuclear plant equipments, has prepared quality assurance programs of their own relating specifically to the activities in which they are engaged.

18.2. Implementation of the "defense-in-depth" concept

A necessity to implement the "defence-in-depth" concept at all stages of safety related activities (including design and construction) is stated in the "General Regulations for Nuclear Power Plant Safety", item 1.2.3 of which reads: "1.2.3. The safety of a nuclear plant shall be guaranteed by applying of the principle of "defence-in-depth", i.e. by the sequential implementation of protection measures based on a system of barriers to prevent the spread of ionizing radiation and radioactive materials to the environment, and systems of technical and organizational measures to protect these barriers and retain their effectiveness, and also to provide direct protection for the population.

The system of barriers includes:

- the fuel matrix;
- the fuel element cladding;
- the boundary of the primary coolant circuit;
- the hermetically sealed protective enclosure surrounding localizing safety systems.

The system of technical and organizational measures includes:

- the selection of an appropriate site for the nuclear plant;
- the establishment of a sanitary-protection zone and a monitoring zone around the plant;
- a conservative approach to plant design incorporating fail-safe characteristics in the reactor itself and specific safety systems;
- quality assurance designed to guarantee the requisite systems (components) of plant and of all work carried out at the plant;
- nuclear plant operation in accordance with norms and technical requirements;
- maintenance of safety-related systems in good operating conditions through the implementation of preventive maintenance measures and replacement of worn-out components;
- timely diagnosis of defects, detection of any deviations from normal functioning, and implementation of measures to remove their causes;
- organization of an effective system for registration of the operational results and monitoring measures;
- implementation of measures designed to prevent initiating events from developing into design-basis accidents, and design-basis accidents from developing into beyond-design-basis accidents;
- mitigation of the consequences of accidents which could not be effectively forestalled through localization of the radioactive materials released;
- measures designed to protect localizing safety systems against destruction during beyond-design-basis accidents and to maintain them in a functional state;
- preparation, and scrupulous implementation when required, of emergency plans for the site itself and the area surrounding the site;
- selection and training of operating personnel for the actions required in both normal and emergency conditions;
- inculcation of safety culture.

The principle of "defence-in-depth" is activated at all stages of safety-related activities. During normal operation all barriers and all means designed to protect them must be in good operating condition. If any of the barriers provided in the plant design or any of the means intended to protect those barriers (in the frames of justified conditions of safe operation) are found to be out of order, operation at power is not permitted.

The extent, to which the various safety functions are to be implemented, is specified in norms and technical requirements, and for each individual plant shall be stated and justified in the technical design" (The end of item 1.2.3).

The INPP safety is provided by engineering devices and organizational activities, which ensure that the internal and external exposure of staff and public, pollution of environment by radioactive products under normal and design accidents do not exceed the prescribed limits.

The immediate cross rupture of Dy 900 pressure header resulted in a primary circuit leakage is taken as a maximum design accident. In accordance with the General Regulations for Nuclear Power Plant Safety the safety systems are designed in such way, which allows ensuring the plant safety in the event of any design accident.

The key safety design principles appear as follows:

- Ensuring of reliable core cooling both under normal and emergency conditions;
- Ensuring of full localization of the coolant released from the circuit in the event of the accidents resulted in disconnecting or putting the process equipment out of order;
- Ensuring of full localization of the active core releases in the event of primary circuit tube rupture which is regarded as the most severe from the radiological point of view;
- Ensuring of premise protection from collapse under emergency conditions in the event of overpressure in rooms and a primary circuit tube rupture;
- Ensuring of equipment and pipelines protection from breaking in emergency conditions in the event of overpressure in the primary circuit.

The Plant safety is provided by:

- Primary Circuit design, which ensures the satisfactory conditions for natural coolant circulation;
- Designing of the Circulation Pump with additional excursion, which ensures the availability of extra pump force in the event of disconnection for the time required to change over to the reactor core cooling mode with natural circulation;
- Locating pipelines and equipment with core coolant in protected rooms;
- Locating the Primary Circuit pipelines in the tight compartments, which are designed to withstand the overpressure in the event of a pipeline rupture;
- Using hermetically sealed pipe ducts which penetrate the rooms with different design pressure;
- Installing leakage belts on pipes which enable to reduce the coolant flow rate in the event of a pipe rupture;
- Backing up safety devices and equipment for normal operation;
- Implementing activities to ensure integrity of ECCS pipes in the event of Primary Circuit pipe rupture;
- Installing the required number of process control devices;
- Supplying reliable amount of power to the users who provide reactor control, operation and cooling;

- Inspecting metal state and welds of pipes and equipment first while installing and then regularly while operating;
- Providing activities to improve quality of normal operation and safety devices while manufacturing.

18.3. Prevention of accidents and their mitigation

In accordance with the "General Regulations for Nuclear Power Plant Safety" (items 1.2.12 and 1.2.14) the following measures should be taken for prevention of accidents and their mitigation: Reactor and nuclear plant designs shall provide for technical means and organizational measures to prevent design-basis accidents and to limit their consequences and to ensure safety in the face of any of the initiating events anticipated in the design, with the assumption of one additional failure (independent of the initiating event) among any of the following safety system elements: an active element or a passive element having mechanical moving parts, or a personnel error independent of the initiating event.

In addition to the single failure (independent of the initiating event) of one of the elements mentioned above, account must be taken of undetected failures among elements which are not monitored during plant operation and which can also lead to a violation of safe operating conditions, thereby influencing the development of the accident.

Reactor and nuclear plant designs shall provide measures to control beyond-design-basis accidents, if such accidents are not excluded by virtue of the fail-safe characteristics of the reactor installation and the principles of its construction.

The design of the reactor facility and NPP includes engineering arrangements and organizational measures to prevent design accidents and to mitigate their consequences. The design allows ensuring safety at any single designed initial event with overlapping of one event which is independent on the initial event of the failure of any of the following safety system element: an active or passive element having mechanical moveable parts or caused by a human error which does not depend on the initial event.

In addition, the design allows to account not only the failure of one of the above elements which does not depend on the initial event, but a number of unidentified failures of the elements which are not controlled in the course of operation but the failure of which has some impact on the accident generation.

18.4. Measures for ensuring the application of technologies proven by experience or qualified by testing or analysis

"General Regulations for Nuclear Power Plant Safety" require (item 1.2.4) that the technical and organizational arrangements made to ensure plant safety must be proven by prior experience or testing, experimental investigations and operational tests on prototypes, and must conform to the norms and technical requirements adopted for the nuclear power sector. This approach is to be taken not only in the design of equipment and of the plant as a whole, but also in the actual manufacture of equipment and in the construction and operation (decommissioning) of the plant.

The engineering and organizational decisions taken to ensure INNP safety have been proven and checked by previous practice or tests, appropriate studies, operational experience of the prototypes.

It means that they are in full conformity to the nuclear codes and regulations as defined in the Feasibility Report for Reactor Facility.

When the first plants with RBMK-1000 were being designed, the initial emergency events were listed. Besides, the most dangerous ways of their generation were considered.

The original list of initial events has been sufficiently extended on the basis of experience gained from the reactor facilities operated at Leningrad, Kursk and Chernobyl NNPs and to meet the NPP safe operation requirements which lately have been tightened to meet the international nuclear excellence requirements in general and to implement INPP SAR recommendations in particular.

Applying the proven technology while performing civil work, which is to be supported by appropriate QA activities, provides the required quality of construction.

18.5. Requirements on reliable, stable and easily manageable operation with specific consideration of human factors and man-machine interface

In the above mentioned “The General Regulations for Nuclear Power Plant Safety" (VD-B-001-0-97) is stated that NPP design should provide means to eliminate single personnel errors or lessen their consequences, including those during the maintenance.

The “Nuclear Safety Regulations for the Reactor’s of Nuclear Power Plants” (VD-T-001-0-97) define in detail the requirements of the "General Regulations for Nuclear Power Plant Safety" as to ensuring nuclear safety. In general terms the above mentioned regulations require that design of the NPP’s (their systems and structures) shall be optimal for operator performance.
It is required that:

- the working areas and working environment of the site personnel shall be designed according to ergonomic principles;
- systematic consideration of human factors and the human-machine interface shall be included in the design process at an early stage and shall continue throughout the entire process, to ensure an appropriate and clear distinction of functions between operating personnel and the automatic systems provided;
- the human-machine interface shall be designed to provide the operators with comprehensive but easily manageable information, compatible with the necessary decision and action times;
- verification and validation of aspects of human factors shall be included at appropriate stages to confirm that the design adequately accommodates all necessary operator actions;
- as equipment operator, the operator shall be provided with sufficient information on parameters associated with individual plant systems and equipment to confirm that the necessary safety actions can be initiated safely;
- the design shall be aimed at promoting the success of operator actions with due regard for the time available for action, the physical environment to be expected and the psychological demands to be made on the operator. The need for intervention by the operator on a short time-scale shall be kept to a minimum. It shall be taken in to account in the design that the necessity for such intervention is only acceptable provided that the designer can demonstrate that the operator has sufficient time to make the decision and to act; that the information necessary for the operator is simply and unambiguously presented.

Summary of the regulations and requirements relating to the design and construction of nuclear installation:

1. General Safety Regulations for Nuclear Power Plants;
2. Nuclear Safety Regulations for Nuclear Power Plant Reactor Installations;

3. General Regulations for the Development of Regulatory Documents on Nuclear Power Safety;
4. Regulations for the Organization Operating Ignalina Nuclear Power Plant;
5. Regulations for Licensing of Nuclear Power Related Activities;
6. Requirements for Licensing of Ignalina Nuclear Power Plant Unit;
7. Constructions of Exceptional Significance the Design and Construction Process of which can be Performed by the Design and Construction Enterprises which have Received a Qualification Certificate for such Activities from the Ministry of Environment;
8. Attesting of Design and Construction Enterprises;
9. Procedure for the Construction Design Process;
10. Structure of a Construction Project;
11. Procedure for the Establishment of Construction Works Design Conditions, Co-Ordination and Approval of Construction Projects;
12. Expert Examination of the Construction Project and of the Construction;
13. Procedure for the State Supervision over the Compliance with Special Requirements for Construction Works;
14. Procedure for the Acceptance of Constructions as Fit for Use;
15. Estimation of the Failure Conditions in Construction Works;
16. Justification of Construction Process;
17. The Issues of Environmental Protection in the Construction Design Project;
18. Procedure for Issuing of Permissions to Build and Demolish Constructions;
19. The Essential Requirements Pertaining to Construction Works. Mechanical Steadiness and Strength;
20. The Essential Requirements Pertaining to Construction Works. Safety in Case of Fire;
21. The Essential Requirements Pertaining to Construction Works. Hygiene, Health, Environmental Protection;
22. The Essential Requirements Pertaining to Construction Works. Safety in Use;
23. The Essential Requirements Pertaining to Construction Works. Protection Against Noise;
24. The Essential Requirements Pertaining to Construction Works. Energy Economy and Heat Retention;
25. Seismic Design Standards for Nuclear Power Plants;
26. Technical Safety Justification for Nuclear Power Plants;
27. Technical Justification of Reactor Installation RBMK-1500.

Article 19: OPERATION

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

i. *The initial authorization to operate a nuclear installation is based upon an appropriate safety analysis and a commissioning program demonstrating that the installation, as constructed, is consistent with design and safety requirements;*
ii. *Operational limits and conditions derived from the safety analyses, tests and operational experience are defined and revised as necessary for identifying safe boundaries for operation;*
iii. *Operation, maintenance, inspection and testing of a nuclear installation are conducted in accordance with approved procedures;*
iv. *Procedures are established for responding to anticipated operational occurrences and to accidents;*
v. *Necessary engineering and technical support in all safety-related fields is available throughout the lifetime of a nuclear installation;*
vi. *Incidents significant to safety are reported in a timely manner by the holder of the relevant license to the regulatory body;*
vii. *Program to collect and analyze operating experience are established, the results obtained and the conclusions drawn are acted upon and the existing mechanisms are used to share important experience with international bodies and with other operating organizations and regulatory bodies;*
viii. *The generation of radioactive waste resulting from the operation of a nuclear installation is kept to the minimum practicable for the process concerned, both in activity and in volume, and necessary treatment and storage of spent fuel and waste directly related to the operation and on the same site as that of the nuclear installation take into consideration conditioning and disposal.*

19.1. Description of licensing process, including summary of national laws, regulations and requirements related to operation of Nuclear Installations

According to the laws and regulations acting in the Lithuanian Republic any activity relating to the nuclear energy is allowed if the state control and supervision authorities have issued the relevant license (Law of the Republic of Lithuania on Nuclear Energy; General Regulation on Safety of Nuclear Power Plants; Rules of Nuclear Safety of Reactor Facilities at Nuclear Power Plants; NPP Operating Organization. General Requirements; Standing Order on INPP Operating Organization; General Requirements for Nuclear Power Plants Maintenance; Provision on Licensing of Nuclear Related Activities in Energy Sector; Requirements on Procedure of Issue of License for Operation of INPP; Provision on State Nuclear Power Safety Inspectorate - VATESI).

Construction of a new nuclear power plant or a new nuclear reactor, as well as decommissioning of any nuclear installation can be commenced only if the relevant Law proposed by the Government has been enacted by the Seimas (Parliament). Construction of a new nuclear power plant or a new nuclear reactor, as well as decommissioning of any nuclear installation can be commenced only if the technical design has been duly approved and relevant license (permit) has been issued by the state control and supervision authorities.

Nuclear Power Plant is put to operation in accordance with the programs of physical, energy start-up and commissioning of NPP. The state control and supervision authorities shall endorse the programs. The license for industrial operation of each Unit of NPP can be granted to the NPP

operating organization by the State Nuclear Power Safety Inspectorate (VATESI) energy on the basis of positive results of commissioning works, availability of updated technical safety justification of reactor facility and NPP and statement on NPP Unit acceptance to industrial operation and endorsement of other state control and surveillance authorities.
License for operation of Unit 1 meeting the Western practice was granted to Ignalina NPP in 1999 for 5 years period. On 29 July 2004 the License was reviewed and extended for unlimited time. According to the Resolution of the Government of the Republic of Lithuania No 1491, dated 2004 11 25, INPP Unit 1 was shutdown on 31 December 2004 and it will no longer produce electricity. However, its operation license is to remain valid until nuclear fuel has been unloaded from the Unit. Unit 1 was granted a status of permanently shutdown unit in December 2006 and the license conditions were reviewed on 6 March 2007.
The process of licensing INPP Unit 2 began in mid – 1999 and was finished in 2004 – VATESI, having analyzed the application documents and assessed safety of INPP Unit 2, issued on 15 September 2004 license empowering Ignalina NPP to operate Unit 2.

Following the decommissioning of Unit 1 at INPP, the necessity arose of substantiating safety of single operational Unit. Therefore the Ignalina NPP submitted to VATESI Safety case for single operating power Unit 2 of INPP in which assessed the safety level of Unit 2 with Unit 1 shut down, conducted the analysis of the factors that may negatively affect Unit 2 safety, and identified corrective measures aimed at mitigating negative effects of the factors. VATESI reviewed these documents by the end of 2005 and stated the safety level of single operating INPP Unit 2 following the final closure of Unit 1 to be acceptable.

Operational organization bears complete responsibility for safe operation of Ignalina NPP in accordance with the requirements established by the corresponding legislation of the Lithuanian Republic, regulations and standards of nuclear safety and radiation protection, operational organization procedures, discipline and organizational norms, as well as License for operation including measures towards accident prevention and reduction of accident consequences, recording and storage of the nuclear materials and radioactive substance, environment protection and environmental monitoring in the sanitary-protective zone and surveillance zone and monitoring of the Ignalina NPP operation purpose, i.e. its operation shall meet the objectives it was designed and constructed for.

Operational organization responsibility can not be reduced due to the independent activity and responsibility of enterprises, institutions, organizations and their co-operations, officials and other persons performing works or providing services to the Operational organization (designers, suppliers, civil organizations, commissioning and repair organizations, etc.), as well as due to the independent activity and responsibility of state control and surveillance authorities.

At present, in the frame of the availability of the Operation License, The Regulatory Authority grants a separate permit for restarting of the unit after each scheduled outage and unplanned stopping.

19.2 Description of steps undertaken by the Contracting Parties to perform their obligations under Article 19 of Convention:

19.2.1. The initial authorization to operate a nuclear installation

The commissioning program was developed prior to Ignalina NPP start-up. The Program was agreed with the General Designer of INPP, General Designer of Reactor, Scientific Adviser and endorsed by the regulating body and approved by the Operating organization. Pre-commissioning tests gave the evidence that the whole INPP and its individual units, safety systems and

components, normal operation systems, safety-related systems operate as designed. Each Unit of Ignalina NPP was brought to first criticality and power in accordance with the statuary procedures upon receipt of the corresponding permit from the regulating authority.

When implementing each INPP unit commissioning program, the physical parameters of the reactor, safety systems and all components were determined, as well as the operating parameters of the safety-related systems and components, and the limits and conditions of safe operation. The operation procedures were corrected on the basis of start-up work performance. Following the full-scale tests of the systems and components, each unit was accepted to put into commercial operation. The Regulatory Authority granted an operating permit for each plant unit. In accordance with the Operation Licenses conditions, annual permits shall be obtained after each outage.

19.2.2. Operational limits and conditions

It is stated in clause 5.1.2 of "General Regulations for Nuclear Power Plant Safety Provision" that the principal document defining safe operation is the technical specification, which lays down main modes and functions of safe operation as well as general sequence the performance of all operations related to plant safety, and also specifies the limits and conditions of safe operation. The limits and conditions of safe operation shall be justified by design and/or other relevant documents".

For Ignalina, limits and conditions of safe operation was set and justified in the Technical Safety Justification prepared by the plant Main Designer (NIKIET, Moscow) and Scientific Adviser (RNC KI, Moscow) and the General Designer (St-Petersburg, Russia). In the frames of in-depth safety assessment (Safety Analysis Report of Western style, SAR-1) the limits and conditions of safe operation were reviewed and their correctness was confirmed.

Technical Specification - The basic document specifying the safety of Ignalina NPP and determining the limits and conditions of safe operation - shall be reviewed every three years. If necessary, the relevant corrections are incorporated to the Technical Specification in case the norms, standards and regulations have changed in course of system and equipment modifications or operation experience of INPP enrichments. Each new issue of the Technical Specification or after each update of the Technical Specification it shall be endorsed by the Regulating authority of the Lithuanian Republic. The last version of the Technical Specification entered into force on 9 September 2004.

In case the established limits and conditions of safe operation can not be met at any Unit of INPP for reactor power operation, reactor shall be shutdown.

19.2.3. Operation, maintenance, inspection and testing of a nuclear installation

In accordance with the Quality Assurance Program and Documentation control system acting at INPP all works relating to operation, maintenance, inspection and testing of all systems and equipment, including nuclear facility and safety related-systems shall be performed only on the basis and in accordance with the approved documents.

Document preparation, approval of its acceptability and support is performed in accordance with the established procedures.

Normal and emergency operating procedures, as well as testing procedures are developed in the operation-by-operation manner. There are the stops provided to assess results. The most important operations are performed under the direct supervision of another person. All actions of both the executors and their supervisors are recorded and signed in the relevant reports. The application area,

limitations, responsibilities and actions of the personnel to detect normal operation failures are determined in each procedure.

Any testing at Ignalina NPP not covered by the Technical Specification and operation procedures shall be performed in accordance with the special programmes presenting measurers to provide testing safety.

Prior to the document entering into force (including testing programs) the applicability, usability of the documents shall be confirmed (review, endorsement and approval). Confirmation of applicability shall be based on the critical analysis of adequacy of the measures providing safe and correct operation and shall be performed in compliance with the established procedures. The most important documents shall be agreed with the State Nuclear Power Safety Inspectorate (VATESI).

All documents and records are registered in special electronic system (ARKI). These systems, on one hand, provide storage of documentation electronic copies and, on the other hand, access of all INPP users to the corresponding documents.

In course of preparation and registration of the documents each document shall be provided with the relevant identification according to the priority of each document with regard to safety.
Plant personnel use only the documents passed review, approval and registration. All key personnel are provided with access to ARKI system purposed to search of any necessary document.

Results of all works, first of all related to the safety shall be recorded in report documentation and records (reports, check-lists, statements, logs, etc.), which are made on the material providing their safe storage within the required time. Documents and records related to the safety shall be kept all operation life-period of the plant and subsequently handed over to the State archive for storage.

In order to supply personnel with correct, currently acting at Ignalina NPP documentation the maintaining of documentation is provided. The maintaining process covers the following stages: to put the document to operation, to determine commencement/completion dates of document using, to multiply the relevant numbers of copies, to distribute among the personnel, to analyse the existing documents referred to the new documentation, to incorporate corrections, to mark the uncontrolled copies in due way, to review and replace the obsolete documentation, to hand over the documentation to the State archive and to destroy the documentation not subject to storage.

Replacement and incorporation of corrections to the document do not require the corresponding document to be taken from the personnel.
Documents developed by external organizations (design, etc.) are subject to review and their applicability is subject to approval prior to their using at Ignalina NPP.
All copies of the documents availability of which is currently sustained shall be taken away (eliminated) from the personnel.

The originals of the documents and records are stored in within the established storage time. Documents and records, related to safety are stored for the period of operation. Elimination of the documents and records not in action anymore and their archiving shall be performed in accordance with the established procedures.
Access to the archive documents and records shall be provided in accordance with the relevant procedures.

Reproduction of the records is ensured considering any and all changes of the documentation preparation which may take place in the future in course of information system modifications.

Following the expiration of the validity and storage term of all the documentation at INPP, it is reviewed by the expert committee in order to make a decision regarding the documentation either to be handed over to the State archive for its permanent storage or discarding. The Director General of the INPP approves the above-mentioned decision. The documentation containing the decisions of the expert committee shall be stored permanently.

Documentation that considers having scientific and practical value for the Lithuanian Republic shall be handed over to the State archive. As a rule, these are safety-related documents and records.

In compliance with the Quality Assurance Program and Documentation control system acting at INPP all works relating to operation, maintenance, inspection and testing of all systems and equipment, including nuclear facility and safety related-systems shall be performed only on the basis and in accordance with the approved documents. Document preparation, approval of its acceptability and support is performed in accordance with the established procedures.

Normal and emergency operating procedures, as well as testing procedures are developed in the operation-by-operation manner. There are the stops provided to assess results. The most important operations are performed under the direct supervision of another person. All actions of both the executors and their supervisors are recorded and signed in the relevant reports. The application area, limitations, responsibilities and actions of the personnel to detect normal operation failures are determined in each procedure.

Any testing at Ignalina NPP not covered by the Technical Specification and operation procedures shall be performed in accordance with the special programmes presenting measurers to provide testing safety.

Prior to the document entering into force (including testing programs) the applicability, usability of the documents shall be confirmed (review, endorsement and approval). Confirmation of applicability shall be based on the critical analysis of adequacy of the measures providing safe and correct operation and shall be performed in compliance with the established procedures. The most important documents shall be agreed with the State regulating authority (VATESI).

All documents and records are registered in special electronic system (ARKI). These systems, on one hand, provide storage of documentation electronic copies and, on the other hand, access of all INPP users to the corresponding documents.

In course of preparation and registration of the documents each document shall be provided with the relevant identification according to the priority of each document with regard to safety. Plant personnel use only the documents passed review, approval and registration. All key personnel are provided with access to ARKI system purposed to search of any necessary document.

Results of all works, first of all relating to the safety shall be recorded (reports, check-lists, statements, logs, etc.). Records are made on the material providing their safe storage within the required time. Records relating to the safety shall be kept all operation life-period of the plant and subsequently handed over to the State archive for storage.

In order to supply personnel with correct, currently acting at Ignalina NPP documentation the maintaining of documentation is provided. The maintaining process covers the following stages: to put the document to operation, to determine commencement/completion dates of document using, to multiply the relevant numbers of copies, to distribute among the personnel, to analyze the existing documents referred to the new documentation, to incorporate corrections, to mark the uncontrolled copies in due way, to review and replace the obsolete documentation, to hand over the

documentation to the State archive and to destroy the documentation not subject to storage. Replacement and incorporation of corrections to the document do not require the corresponding document to be taken from the personnel.

Documents developed by external organizations (design, etc.) are subject to review and their applicability is subject to approval prior to their using at Ignalina NPP. All copies of the documents availability of which is currently sustained shall be taken away (eliminated) from the personnel.

The originals of the documents and records are stored in within the established storage time. Documents and records, related to safety are stored for the period of operation. Elimination of the documents and records not in action anymore and their archiving shall be performed in accordance with the established procedures.

Access to the archive documents and records shall be provided in accordance with the relevant procedures. Reproduction of the records is ensured considering any and all changes of the documentation preparation, which may take place in the future in course of information system modifications.

Documentation with the expired validity term of storage at INPP and which considers having scientific and practical value for the Lithuanian Republic shall be handed over to the State archive. As a rule, these are safety-related documents and records. Selection of documentation to be handed over to the State archive shall be performed by the expert committee in accordance with the acting regulation on Expert Committee of scientific and technical documentation at INPP.

19.2.4. Emergency operating procedures

The previous practice in emergency situations (accidents) control either at Ignalina NPP or other NPPs in the formal USSR was based on so called event-oriented emergency procedures, the documents, which are necessary for control of emergency situations. However, according to item 5.1.4 of “General Regulations for Nuclear Power Plant Safety”, VD-B-001-0-97, an operating organization and NPP administrative management have developed and issued special symptom-based emergency operating procedures in order to improve safety.

According to the procedures mentioned, the actions of the plant personnel are based on criteria of events, condition of the reactor as well as on forecast of conditions as they are expected to evolve during the accident. The personnel actions are aimed to restore essential safety functions of NPP and limit the radiation consequences of the accident.

Symptom-based emergency operating procedures sufficiently compensate the drawbacks of the event-based emergency operating procedures providing maximum achievable safety of the plant within the project.

Efficiency of symptom based emergency operating procedures is defined through fail-safety of the main safety systems. It shall be done by development of special emergency procedures like Emergency Procedures of Support and Procedures of Support.

The documents have been developed under international safety improvement project “Lisbon Initiative” with participation of experts from Lithuania, Russia, Sweden and the USA. These are the basic materials used for symptom based emergency operating procedures development:

- The standards of the Republic of Lithuania;
- IAEA Guidelines;
- Reports from NIKIET;

- USA standards, series NUREG, NUREG/CR, as well as INPO and DOE Guidelines (Institute Nuclear Power Operations, Department of Energy)

The complete package of documents including symptom-based emergency operating procedures, emergency procedures of support and procedures of support was developed, verified and validated in 2000, and after the personnel had a training on the full-scale simulator, it was put in force in 2001.

Maximum efficiency while operation of an emergency situation (accident) can be achieved by integrated application of event-based and symptom-based Emergency Operating Procedures.
In order to prevent development of any deviations from normal operation into emergency situation Ignalina NPP has developed and implemented special procedures for an operator's actions in case of alarm (reaction to alarm signal). These documents define the high priority actions of an operator after the deviation has been revealed. The documents are located on alarm panels that inform the operator about deviation from normal operation.

All instructions and procedures including emergency operating procedures and "reaction to alarm signal" procedures are periodically reviewed. After any systems or equipment has been modified the procedures are changed without delay.

On the basis of the item 1.2.14 of "General Regulations for Nuclear Power Plant Safety Provision" (VD –B-001-0-97), in 2003 work on the project "Development of a guidance to control beyond design basis accidents in Ignalina NPP" by the organizations JEL, VOLIAN enterprises (England), Lithuanian Energy Institute with the participation of INPP were started. Works performed under the mentioned project are divided into 5 tasks:

1. Development of the list of INPP beyond design basis accidents;
2. Performance of the beyond design basis accidents analysis;
3. Selection of high level management strategies and determination of necessary changes in instrumentation and equipment of the plant;
4. Determination of strategies of accidents beyond design basis management and development/validation of accidents beyond design basis management manual;
5. Preparation of personnel training specialists and carrying out of training of the personnel to work with the accidents beyond design basis management manual.

The final report on Task 1 „Development of the list of INPP beyond design basis accidents" was drafted in 2003. The list of 18 beyond design basis accidents resulting in the reactor core damage is justified and characterized in this report on the basis of INPP PSA and substantiation of symptom-based emergency procedures. The final report on Task 2 „Performance of the beyond design basis accidents analysis", containing the analysis of the accident sequence and possible consequences for more than 50 accident scenarios, was issued in 2005. The final report on Task 3 „Selection of high level management strategies and determination of necessary changes in instrumentation and equipment of the plant" was developed and approved in the same year. Strategies for mitigation of severe accidents in the reactor and the spent fuel storage pool are defined and characterized in this report. As well, the requirements for measuring devices detecting the beginning of the reactor core damage, its further control and the efficiency of applied strategies are defined. Specific equipment modifications required for detection, control and monitoring of beyond design basis accidents are foreseen. The characteristics and location of devices for their application in procedures in case of beyond design basis accidents are documented. INPP Beyond Design Basis Accidents Management Manual (RUZA) was developed as a result of implementation of Task 4. The above-mentioned manual contains five strategies:

- RUZA-R1. Provision of heat removal from the reactor;
- RUZA-R2. Pressure reduction in the reactor cavity:

- RUZA-R3. Control of accident localization system condition.
- RUZA-RB. Reduction fission products release;
- RUZA-B. Control of spent fuel storage pools condition.

Technical evaluation has been developed for each RUZA in order to support decision making for selection and performance of actions regarding beyond design basis accidents management. Beyond Design Basis Accidents Management Manual was validated and verified in 2006.

At present Beyond Design Basis Accidents Management Manual is submitted to VATESI for approval. Preliminary material dedicated for preparation of trainers carrying out training of the personnel to be working with the Beyond Design Basis Accidents Management Manual has been received regarding Task 5. The works on the project are planned to be finished in 2007.

19.2.5 Necessary engineering and technical support in all safety-related fields

In 1991, when Lithuania gained its independence, the country lacked the national infrastructure (design and research institutes) to support safe operation of nuclear facilities. VATESI has made special efforts to establish the national Technical Support Organizations (TSO).

The first TSO was established in 1992. It was the Ignalina Safety Analysis Group (ISAG), formed by the Resolution of the Government of Lithuania at the Lithuanian Energy Institute. The experts from ISAG performed modeling and analysis of thermal and hydraulic processes in the Primary Circuit during transient and emergency situations, modeling of physical processes in the core, thermal and hydraulic calculations of the Accident Confinement System, assessment of INPP constructions reliability and other activities. Experts of Lithuanian TSO were involved in RSR teams. At present ISAG is a Lithuanian TSO with great experience in the area of nuclear safety.

In 1992 VATESI initiated co-operation with the Department of Mechanics at Kaunas University of Technology. On VATESI request the experts of the department together with Lithuanian Energy Institute have prepared a safety analysis report for the spent fuel storage casks and provided their conclusions.

VATESI sought advice from the specialists of the Department of Welding and Materials in Vilnius Gedimino Technical University. In 1995 VATESI granted to the State Information Technology Institute (VITI) for design of information systems, software, automatic control system elements related to updating of the TITAN computer system at INPP.

The Construction Reliability Center was established according to VATESI requirements in 1994. The experts of the Center deal with assessment of remaining life of INPP equipment. The specialists of Ultrasonic Test Laboratory have designed and manufactured devices for measurement of thickness of the fuel channel walls.

To co-ordinate TSOs activities and to promote the growth of nuclear safety infrastructure in Lithuania, special TSOs' Council for co-ordination was founded in 1997. PHARE/LI/TSO/02 project "Assistance in the enhancement of Lithuanian TSO's capabilities to support the Nuclear Safety Regulatory Authority" started in 1998. The project is aimed to improve Lithuanian TSO capabilities in NDT, structural integrity and welding areas.

At the same time technical and scientific support is provided by INPP designers (INPP General Designer, St' Petersburg, Russia) and by the designers of the reactor (reactor General Designer – NIKIET and Research Manager – Kurchatov Institute, Moscow).

There are several special departments at Ignalina NPP that provide engineering support to the plant departments:

- Nuclear Safety Department that curates all issues related to nuclear safety, fuel and the reactor core;
- Technical Documentation Control Department (in accordance with the changes in management structure of INPP the specialists from former Engineering Support Department moved to Technical Documentation Control Department) provides assistance to the plant departments in the area of thermal and hydraulic processes, PSA (Probabilistic Safety Analysis) calculations, reliability and diagnostics and monitoring of rotating machinery vibration, solving of engineering problems related to operation and repair of technological systems, spent nuclear fuel and radioactive waste management, preparation for decommissioning and decommissioning of the INPP. Also this department provides support to the plant departments in the area of technical documentation management;
- Design Department supports the plant departments in the area of equipment repair technologies development and design works;
- Planned Preventive Maintenance Department ensures the support of the departments of the station during preparation and planning of maintenance of the Units and main facilities of the plant, co-ordination of preparation and planning of maintenance and technical reorganization of the equipment and constructions.

19.2.6-7 Incident Reporting and Feedback

System for reporting of unusual events at INPP is established in Lithuania in accordance with international practice and based on IAEA recommendations. INPP has all necessary administrative and technical measures to fulfill the task.

In accordance with the requirements of Lithuanian Regulatory Authority VATESI all categorized events that happen at INPP shall be reported to VATESI in a timely manner. The information shall be delivered in accordance with the procedure, which is now in force and is approved by VATESI. VATESI shall be informed about the events verbally as soon as possible, and not later than in an hour after the event has happened. Written reports about the event shall be delivered to VATESI in a special format within 24 hours.

In accordance with the plant event analysis procedure, the events shall be investigated according to ASSET technique developed by IAEA. As well as events related to human factor are analyzed in accordance with the Methodology of Additional Analysis of Human-Error-Related Events. The investigation considers all possible causes including the root ones and defines activities that will prevent the causes in future. The detailed reports that include event investigation and preventive actions are transferred to VATESI and operators-members of WANO within 30 days. If an event leads to the unit shut down, then the unit cannot be put in operation until the causes of the event have been revealed and eliminated.

INPP personnel gains and uses information related to safety, operating experience and valuable practice either from the plant departments or from other NPPs and international organizations. Main sources of such information are event investigation reports from NPPs with RBMK reactors as well as WANO and IAEA/NEA IRS database.

19.2.8. The generation of radioactive waste resulting from the operation of a nuclear installation is kept to the minimum practicable for the process concerned, both in activity and in volume, and necessary treatment and storage of spent fuel and waste directly related to the operation and on the same site as that of the nuclear installation take into consideration conditioning and disposal

Radioactive Waste Management Strategy was approved by the Government of Lithuania in 2002 that includes detailed plans for short-term and long-term perspectives. It encompasses management of all types of radioactive waste, taking into account a new radioactive waste classification, introduced by VATESI at the end of July 2001 in the document Regulation on the Pre-disposal Management of Radioactive Waste at the Nuclear Power Plant. Strategy takes into account interdependencies between different steps of radioactive waste management and disposal of this waste. For this moment Strategy is under revision.

New classification system is used for new radioactive waste management facilities at Ignalina NPP. Other waste from old storage facilities will be retrieved, classified according new classification system and then conditioned. After storage these waste will be disposed of in disposal facilities. It is envisaged to construct two disposal facilities for very low level and for low and intermediate level radioactive waste. Technical specification for very low level waste disposal facility is prepared and reviewed by VATESI. For low and intermediate level waste disposal facility (near surface) siting process is undergoing. Disposal of high level waste is not resolved yet.

INPP has developed activities on implementation of the Regulation on the Pre-disposal Management of Radioactive Waste at the Nuclear Power Plant. Thus, implementation of those activities enables INPP to modernize radioactive waste management to treat radioactive waste considering new requirements, which take into account interdependence of all radioactive waste management phases. Hence, radioactive waste disposal requirements shall be considered in waste processing phase. It is assumed that the modernization of radioactive waste management system could be completed in 2009-2010.

Decommissioning waste of Ignalina NPP will be managed at new waste treatment and storage facilities which will be constructed in 2009-2010 as a part of modernization of radioactive waste management system.

Operational radioactive waste at INPP consists of solid and liquid waste, ion-exchange resins and a small amount of spent lubricant materials. Spent nuclear fuel is considered as high level radioactive waste.

Solid radioactive waste at INPP is segregated into three groups by the surface dose rate, according to standards that were applied in a former USSR and applicable at INPP. The solid waste at INPP is dumped into reinforced concrete compartments in storage buildings No. 155, 155/1, 157, 157/1 located on INPP site. There is no reprocessing of solid waste before it is dumped. All the waste from these facilities will be retrieved, characterized and conditioned according new requirements mentioned before.

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 INPP site. According to the Plan of Transfer of Bitumenised Waste Storage Facility (build. 158) to Final Disposal Facility INPP shall perform long term safety assessment. If an outcome of this assessment is negative, build. 158 will remain as a storage facility and INPP would develop actions plan of facility decommissioning. If positive then this storage facility will be transferred to disposal facility.

Spent ion-exchange resins are stored in special tanks. In 2006 the cementation facility and storage facility for cemented waste started operation. 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. A new storage facility for cemented waste is designed for 60 years storage. Conditioned waste will be disposed in near surface disposal facility.

19.2.8.1. Waste minimization

According new regulation on predisposal management of radioactive waste, Ignalina NPP shall keep the generation of radioactive waste to the minimum practicable, in terms of both activity and volume, using best available technology without involving excessive costs. For this moment Ignalina optimized processes o waste generation which allowed reduce amount of waste.

For minimization purpose was constructed installation for free release of solid operational radioactive waste. It started operation in 2006. After measurements in this installation part of the waste can be treated as non-radioactive and can be stored in ordinary refuse tip for non-hazardous waste.

Another free release facility will be constructed for decommissioning waste, which should start operation in 2008.

19.2.8.2. Spent fuel

Due to the fact that the issue of spent nuclear fuel reprocessing had been closed, it was decided to build interim spent nuclear fuel storage facilities at INPP. 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 facility was designed for allocation of 20 CASTOR RBMK casks and 52 CONSTOR RBMK casks. The modernization performed in 2003 and later in 2006 allowed extending the capacity of the storage facility enabling to store 26 more CONSTOR casks. Now the storage facility can accommodate 20 CASTOR casks and 78 CONSTOR casks.

It is obvious that existing spent fuel storage facility is not sufficient. It was decided to construct another storage facility which could store all the rest spent fuel. It is foreseen to construct it until 2009-2010.

Lithuania shall also consider the issue of final repository for high-level radioactive waste. The final repository for spent nuclear fuel will be required in 50 years.

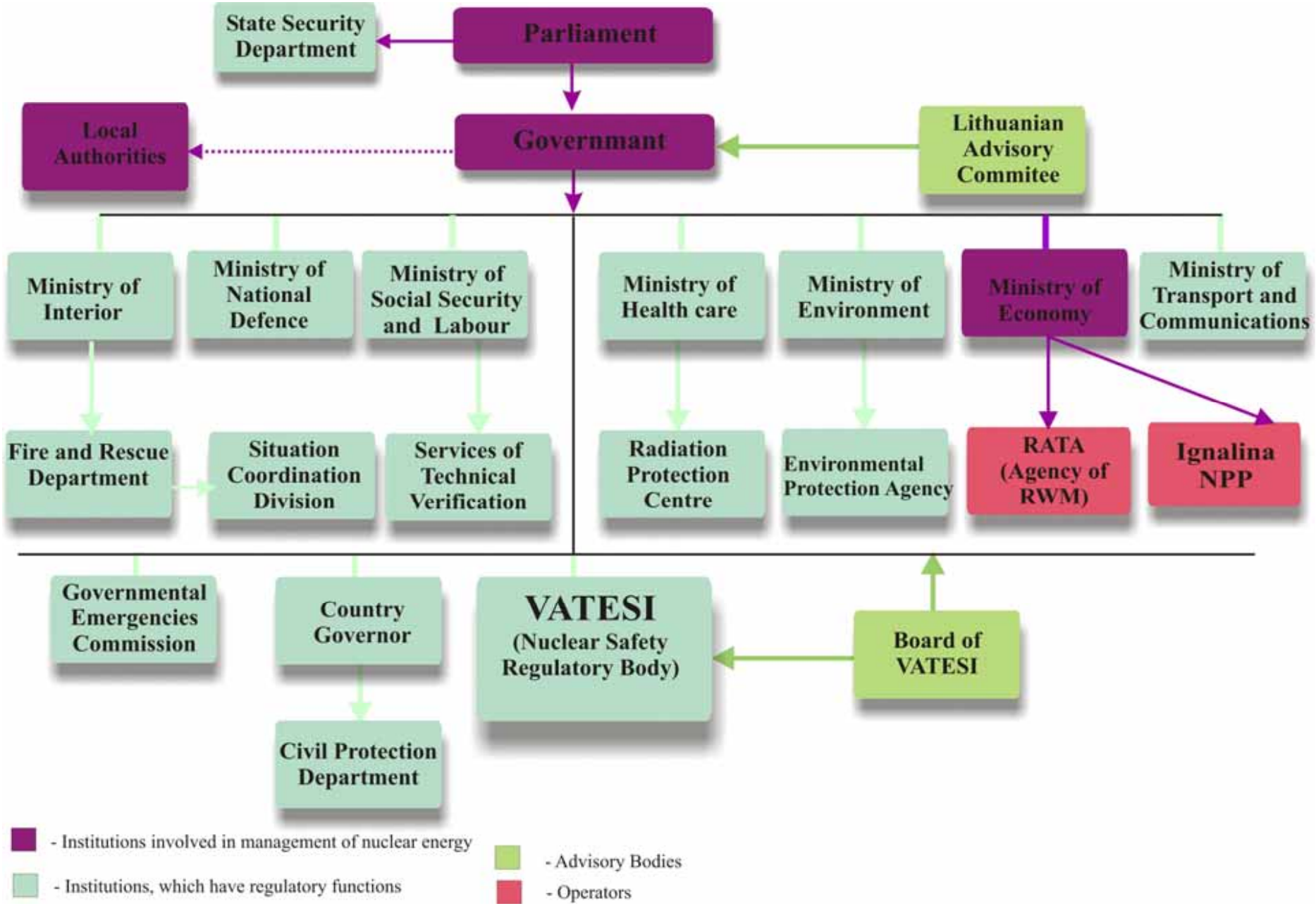
New information

General information. Radioactive Waste Management Strategy is under revision; in 2006 the cementation facility and storage facility for cemented waste started operation; for minimization purpose was constructed installation for free release of solid operational radioactive waste. It started operation in 2006; the modernization performed in 2003 and later in 2006 allowed extending the capacity of the storage facility for spent fuel enabling to store 26 more CONSTOR casks; it was decided to construct another storage facility which could store all the rest spent fuel. It is foreseen to construct it until 2009-2010; it is assumed that the modernization of radioactive waste management system could be completed in 2009-2010.

Section 19.2.4. Added information about beyond design basis accidents control procedures.

ANNEXES

Annex to 7.1 **Chart of interaction between regulatory bodies and INPP**



The Nuclear Energy Law (the main law in nuclear energy sector) provides following competence set for national authorities:

In exercising state powers in the sphere of nuclear energy *the Seimas (the Parliament*) of the Republic of Lithuania shall:

- formulate state policy in the sphere of nuclear energy;
- solve the principal issues of development of nuclear energy in Lithuania;
- by the advice of the Government, adopt a law on the construction of a new nuclear plant and its site or on the mounting of a new nuclear reactor, also on the decommissioning of a nuclear facility. The law shall establish the principal requirements for a nuclear plant or a nuclear reactor and for the zones of sanitary protection and monitoring.

The Government of the Republic of Lithuania shall:

- in the manner prescribed by law, adopt decisions on the construction of individual nuclear facilities;
- form a commission for the commissioning of a nuclear facility;
- 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;
- approve regulatory enactments for the acquisition, storage, transport and disposal of nuclear and radioactive materials and submit them to the ministries referred in the Law on Nuclear Energy and the Government institutions for approval in cases specified in the above articles;
- establish the procedure of licensing of nuclear activities;
- establish the specific conditions and requirements for the zones of sanitary protection and monitoring and the course of their development;
- coordinate the activities of ministries and other state institutions in drafting nuclear accident prevention and management plans.

In adopting a decision on the construction of a specific nuclear facility, the Government of the Republic of Lithuania shall take into consideration:

- the economic and public needs;
- the principal characteristics of the use of natural resources and their impact on the environment;
- nuclear safety and radiation protection guarantees;
- the opinion of the local authority on whose territory the intended facility will be sited.

The Ministry of Economy shall:

- perform the functions of the founder of operating organizations of nuclear facilities (this issue should be revised taking into account the provisions of the Law on New Nuclear Power Plant);
- implement state policy in the sphere of nuclear energy;
- organize bilateral and multilateral international co-operation in the area of nuclear energy;
- organize nuclear accident prevention, accident management, investigation and elimination of the consequences of the accident in the nuclear facilities under its control;
- within the scope of its competence represent the Republic of Lithuania in international nuclear energy organizations and conferences;
- organize the drafting of a special scheme for the choice of the site of a new nuclear power plant and other state nuclear facilities, exploring several alternative sites;
- after the approval of a detailed site plan, proceed in an established manner with the legal formalities of the acquisition for the public needs of the site for the construction of a nuclear power plant or other state nuclear facilities;
- organize the development of the nuclear energy infrastructure in the Republic of Lithuania; establish institutions of design, research and technology (together with the Ministry of Education and Science) to meet the needs of the operating organizations of nuclear facilities;

- perform the functions established by this Law and those assigned by the Government.

Local authorities in the territories under their jurisdiction which are within the sanitary protection or monitoring zones of a nuclear facility, within the framework of their competence, shall:

- take part in controlling the activities of nuclear power plants, nuclear reactors and other nuclear energy installations for which sanitary protection zones have been established;
- control the compliance with the landscape and architectural requirements of a nuclear facility, also with the sanitary, hygienic and nature protection requirements of a nuclear facility and its territory;
- take part in decision making about the construction of nuclear facilities in their territory, the reconstruction of the facilities or their decommissioning;
- obtain information from the facility operator about the failure, shut-down, release of radioactive materials and other incidents;
- prepare the population protection plans, implement them in the event of nuclear accidents;
- inform the population about the radiological situation in the area where nuclear plants and other nuclear facilities are sited and about the radiation protection measures which are being implemented.

The Governmental Emergencies Commission shall:

- direct the activities of management of a nuclear accident and elimination of its consequences;
- mobilize material and other resources necessary for the containment of a nuclear accident;
- perform other tasks and functions provided in its regulations.

In implementing state regulation of nuclear safety, radiation protection and accounting for nuclear materials in the sphere of nuclear energy *State Nuclear Power Safety Inspectorate* (VATESI) shall:

- together with the Ministry of Environment approve technical regulations of the design and construction of nuclear facilities, and of maintenance of the structures;
- approve standards and rules of operation of nuclear facilities, standards and rules of storage and disposal of radioactive materials used in nuclear energy and establish the procedure for their drafting;
- control the compliance with the requirements stipulated in licenses and safety regulations;
- implement state control for the accounting for and control of nuclear materials;
- inform the mass media about the radiation and safety situation in nuclear facilities;
- prepare surveys on the safety of nuclear facilities and submit them to the Government, local authorities and other authorities concerned;
- organize and support research into and expert analysis of nuclear safety and radiation protection, independently carry out the analysis of incidents and occurrences;
- co-ordinate and control the preventive measures for the staff and the population in the event of a nuclear facility accident, monitor the state of accident preparedness of the facility;
- impose sanctions established in statutory acts on violators of safety rules;
- organize bilateral and multilateral international co-operation in the sphere of nuclear safety and radiation protection.
- In performing its functions VATESI shall act independently, in accordance with laws, its own regulations and other legal acts. To prevent a possible nuclear accident, VATESI may resort to any preventive measures within its competence, a temporary shutdown of a nuclear facility included.
- According the Statute of VATESI, that approved by the Governmental Resolution No. 1014 of 1 July 2002, VATESI is ruled by the Head of Institution and has a consultative body - *Board of VATESI*. The Board is comprised of 7 members: two members of Parliament, two representatives of ministries (the Ministry of Health and the Ministry of Environment), two nuclear experts and the Head of VATESI. The Head of VATESI can’t be Chairperson of the

Board. The Board is empowered to consult the Government of the Republic of Lithuania and VATESI on nuclear safety issues.

The Ministry of Health shall:

- prepare and approve standard acts and rules on the health of the personnel of nuclear facilities and the population residing in the monitored zones of the facility and control compliance thereof;
- undertake environmental health studies of radiation impact on people and their environment and establish health protection requirements;
- agree on the sitting for nuclear facilities and undertake state environmental health analysis of their construction;
- take part in the authorization of the constructed or reconstructed nuclear facilities, issue the environmental health passport for work with radioactive materials and other sources of ionizing radiation;
- establish the standards for medical examination for the personnel working with radioactive materials and the sources of ionizing radiation, the frequency of the examination, contraindications and control the compliance with the standards;
- undertake monitoring of the health of the nuclear facility personnel and the residents of the monitored zone of the facility;
- ensure the preparedness of medical institutions for the elimination of the consequences of the accident;
- establish the radiation protection norms for the population and control compliance with them;
- organize medical examination of the containment forces of a nuclear accident and the population affected by radiation exposure and submit findings and proposals for the reduction of radiation exposure;
- determine occupational diseases for the personnel in the sphere of nuclear energy and study the causes of the diseases;
- carry out population education on radiation protection.

Most of these functions are delegated to *Radiation Protection Centre*, which was established in 1997.

The Ministry of Environment shall:

- after co-ordination with the Ministry of Health, determine the limits of radioactive emissions into the environment and the permitted pollution norms, monitor compliance with them, and establish the procedure of emission licensing;
- jointly with the Ministry of Health establish radiation protection standards and monitor compliance with them;
- co-ordinate in the manner prescribed by law assessment of the impact on the environment;
- together with VATESI approves technical regulations for the design and construction of nuclear facilities;
- co-ordinate the projects for sitting, reconstruction and expansion of nuclear facilities and facilities related to their operation;
- take part in state monitoring of design and construction of nuclear facilities (structures) in the manner prescribed by the Government of the Republic of Lithuania;
- issue licenses for the use of natural resources, organize state radio-ecological monitoring, co-ordinate and control radiological monitoring nuclear facilities;
- organize and co-ordinate scientific research of the impact of nuclear facilities on the environment;
- prepare and approve methodology of assessment of radiation damage to the environment and its compensation;
- periodically inform the public, national and local authorities about the radiation situation in the country and in the environment of nuclear facilities;

- on the recommendation of the institutions exercising state control and supervision of construction of nuclear facilities or at its own initiative shall cancel the authorization to construct or reconstruct a nuclear facility when it is discovered that the authorization was issued unlawfully.

The Ministry of Social Security and Labour shall:

- The Ministry of Social Security and Labour is responsible for the supervision of the potentially dangerous technical installations. According to the Law on the Supervision of Potentially Dangerous Installations, the services for technical verification shall supervise potentially dangerous technical installations with the exception of those under the control of VATESI;
- The State Labour Inspectorate at the Ministry of Social Security and Labour shall control compliance with the requirements of labour, safety at work and related statutory acts.

The Ministry of Transport and Communications shall:

- takes part in drafting laws and secondary legislation regulating transportation of nuclear and radioactive materials;
- participates in training and certification of the personnel involved in transportation of nuclear and radioactive materials;
- organises railway transport for the evacuation of the population from the danger zone in the event of a nuclear accident.

The Ministry of National Defense shall:

- takes part in drafting and implementing coordinated interdepartmental anti-terrorist and anti-penetration protection plans of the nuclear power plant and other nuclear facilities;

The Ministry of the Interior shall:

- ensures fire protection of the nuclear power plant and other nuclear facilities, conduct the state fire protection examination of their construction and reconstruction designs, co-ordinate the fire protection systems of those facilities;
- set forth fire protection requirements for nuclear facilities, exercise compliance with them and apply sanctions laid down in statutory acts for violators of fire protection regulations;
- promptly extinguish fires breaking out at nuclear facilities, participates in the management of a nuclear accident and its consequences, organize radiation monitoring of a contaminated area;
- exercise and ensure physical safety of a nuclear power plant;
- drafts, co-ordinate and implement interdepartmental anti-terrorist and anti-penetration action plans;
- analyze and control the crime situation in the regions with nuclear facilities;
- investigate the cases of theft and illegal possession of nuclear and radioactive materials, also of other dual-purpose commodities;
- ensure the security of transportation of nuclear and radioactive material cargoes across the territory of the country.

The Ministry of the Interior through the *Fire-prevention and Rescue Department:*

- draws up a population radiation protection plan in the event of a nuclear accident which shall be a model for other institutions authorized in a prescribed manner;
- within the framework of its competence implements the measures for the elimination of the accident and its consequences;
- jointly with other state institutions organizes training sessions of population protection in the event of nuclear accidents.

The State Security Department shall:

- exercise prevention of subversive, sabotage and terrorist acts as well as other offences aimed at damaging the interests of state security at nuclear facilities, in their environment, and on transportation routes of nuclear and radioactive materials;
- in keeping with the state security interests, undertake operations and inquiries to detect and investigates actions constituting a threat to nuclear facilities, nuclear installations, equipment and technologies.
- decide upon the credibility of persons working at nuclear facilities or those who are appointed to transport nuclear and radioactive materials;
- control the effectiveness of physical safety and emergency preparedness of the nuclear power plant and other nuclear facilities;
- take part in drafting and implementing the nuclear power plant and other nuclear facilities interdepartmental anti-terrorist and anti-subversive co-coordinated action plans.

The County Governor on the territory whereof the construction of a nuclear facility is planned or has already started, in exercising supervision and control of the facility, acts within the limits of the powers delegated to him by the Law on the County Government, this Law and other laws and subordinate legislation of the Republic of Lithuania.

The Local Authorities in the territories under their jurisdiction takes part in controlling the activities of nuclear power plants, nuclear reactors and other nuclear energy installations for which sanitary protection zones have been established; controls the compliance with the landscape and architectural requirements of a nuclear facility, also with the sanitary, hygienic and nature protection requirements of a nuclear facility and its territory; takes part in decision-making about the construction, reconstruction or decommissioning of nuclear facilities in their territory; prepares the population protection plans, and implement them in the event of nuclear accidents; inform the population about the radiological situation in the area where nuclear facility is sited and about the radiation protection measures which are being implemented.

Advisory body in the field of nuclear safety established by national legislation:
The Nuclear Safety Advisory Committee, which includes nuclear experts from Lithuania, Germany, Finland, France, the USA, Sweden, Ukraine and the United Kingdom, advises the Government in resolving problems in the field of nuclear energy. The Committee works with the Government, VATESI, the Ministry of Economy and managers of the state enterprise Ignalina NPP, state enterprise RATA and provides advice on upgrading nuclear safety and on the development of an efficient regulatory infrastructure.

Annex to 7.2

List of Legislative Regulations Dealing with or concerning to Nuclear Energy and Radiation Protection and Related Documents

I. The Laws of the Republic of Lithuania

- The Law on Environmental Protection (21 January 1992, No I-2223);
- The Law on State Enterprises (21 Dec 1994, No I-722);
- The Law on Nuclear Energy (14 Nov 1996, No I-1613);
- The Law on Construction (19 March 1996; new version 8 Nov, 2001, No IX-583);
- The Law on the Assessment of the Impact on the Environment of the Planned Economic Activities (15 August, 1996, new version of 21 June 2005, No X-258);
- The Law on Environmental Monitoring (20 Nov 1997, new version of 4 May 2006, No X-595);
- The Law on Waste Management (16 June 1998, No IX-1004);
- The Law on Civil Protection (15 Dec 1998, No VIII-971)
- The Law on Energy (16 May 1995, No IX-884);
- The Law on Transit and Export of Strategic Goods and Technologies (5 July 1995, new version of 29 April 2004 No IX-2198);
- The Law on Occupational Health Care (18 March 1999, No VIII-1095);
- The Law on Radiation Protection (12 January 1999; No VIII-1019);
- The Law on Radioactive Waste Management (20 May 1999, No VIII-1190);
- The Law on the Supervision of Potentially Dangerous Installations (2 May 1996; new version of 2 Oct, 2000, No VIII-1972);
- The Law on the Decommissioning of Unit 1 at the State Enterprise of Ignalina Nuclear Power Plant (12 July 2001, No IX-466);
- The Law on Enterprises and Installations Possessing Strategic Influence for National Security (10 Oct 2002, No IX-1132);
- The Law on Additional Employment and Social Guarantees for the Employees of the State Enterprise Ignalina Nuclear Power Plant (29 April 2003, No IX-1541);
- The Law on State Enterprise Ignalina Nuclear Power Plant's Fund for Decommissioning (12 July 2001, new version of 22 June 2006, No X-710);
- The Law on the Nuclear Power Plant (28 June 2007 No X-1231).

II. Multilateral international treaties and conventions and treaties with international organizations

- The Convention on Nuclear Safety, (in force by the Resolution of the Parliament of 17 Oct 17 1995, No. I-1063);
- The Convention on the Physical Protection of Nuclear Materials (in force by the Resolution of the Government 16 Nov 1993 No. 778p);
- The Convention on Early Notification of a Nuclear Accident (ratified on 18 Nov 1997 No VIII-523);
- The Joint Convention on Safety in Spent Nuclear Fuel Management and in Radioactive Waste Management (ratified on 18 Dec, 2003, No IX-1921);
- Vienna Convention on Civil Liability for Nuclear Damage (ratified on 30 Nov, 1993, No I-314);

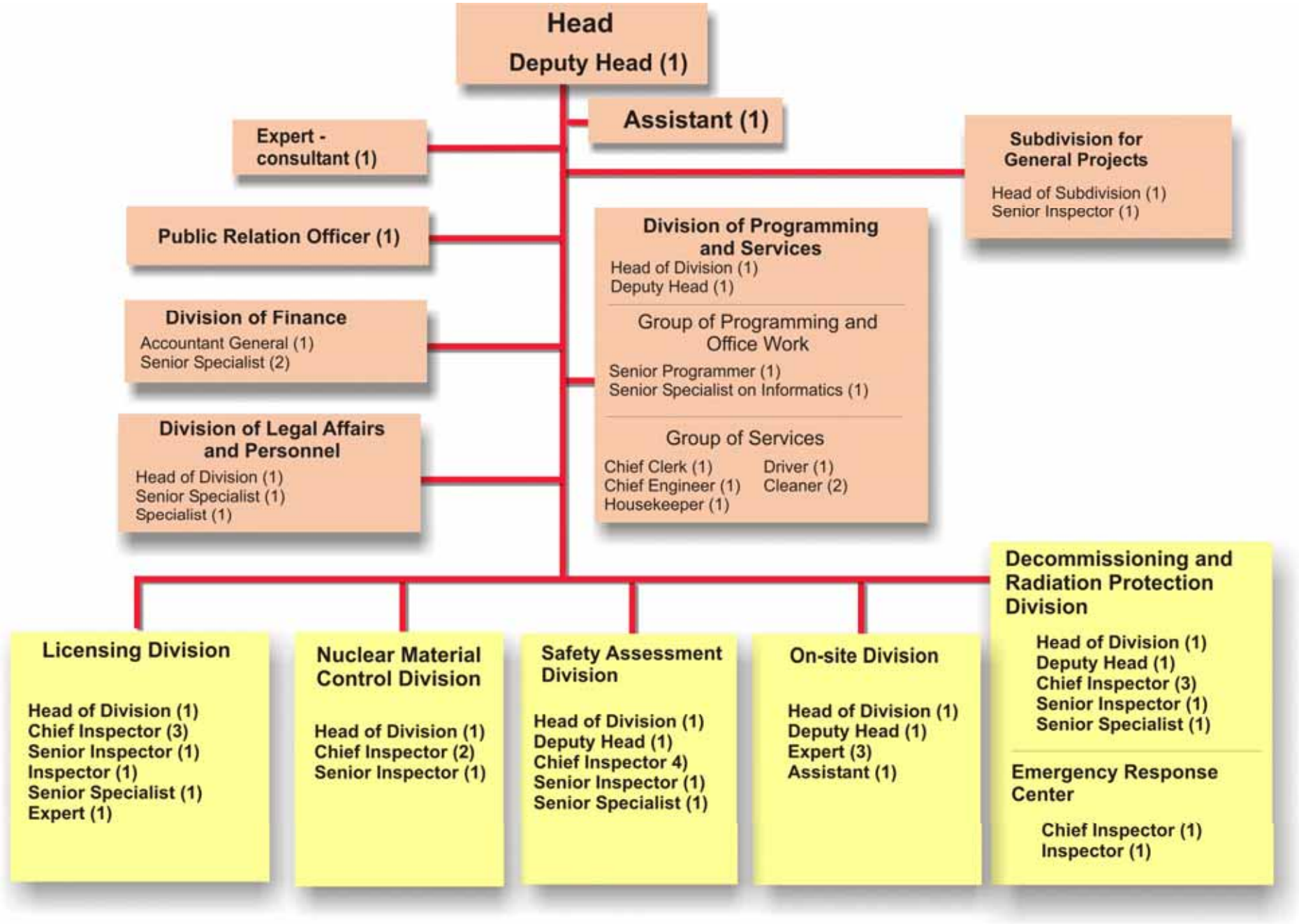
- The Joint Protocol relating to the Application of the Vienna and Paris Conventions on Liability for Nuclear Damage (ratified on 30 Nov, 1993, No I-314);
- Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency; 1986 Sept 26 , ratified 20 July, 2000, No VIII-1882);
- Convention on Environmental Impact Assessment in a Transboundary Context (ESPOO, 1991) (ratified on 7 Oct, 1999, No VIII-1351);
- Convention on the Protection and Use of Transboundary Watercourses and International Lakes (ratified on 2 Dec, 2003, No IX-1863);
- Agreement between the Government of the Republic of Lithuania and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (not valid from 13 March, 2007);
- Protocol Additional to the Agreement between the Government of the Republic of Lithuania and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (in force by the law of the ratification of 21 March, 2000, No VIII-1578) (not valid from 13 March, 2007);
- Treaty on the Non-Proliferation of Nuclear Weapons, signed on 1 July 1968 in London, Moscow and Washington (in force by the Resolution of the Parliament of 26 June, 1991, No I-1492);
- Comprehensive Nuclear-Test-Ban Treaty (ratified on 28 Oct, 1999, No VIII-1372);
- The 1957 European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR); (ratified on 16 June, 1998, No VIII-788);
- The Trilateral Agreement on Safeguards Application between EU Member States which do not possess nuclear weapons, EURATOM and IAEA concluded pursuant to the Nuclear Non-Proliferation Treaty signed on 5 April, 1973, Brussels, as well the Additional Protocol to the Agreement Implementation signed 22 Sept, 1998, Vienna (ratified on 13 March, 2007, No X-1051);
- International Convention for the Suppression of Acts of Nuclear Terrorism of 2005, New York (ratified on 17 May, 2007, No X-1143);
- The Protocol on Amendment to the Vienna Convention on Civil Liability for Nuclear
- Damage (signed by the Republic og Lithuania in 1998, however has not been ratified);
- The Convention on Supplementary Compensation for Nuclear Damage (signed by the the Republic of Lithuania in 1998, however has not been ratified).

III. Bilateral Agreements

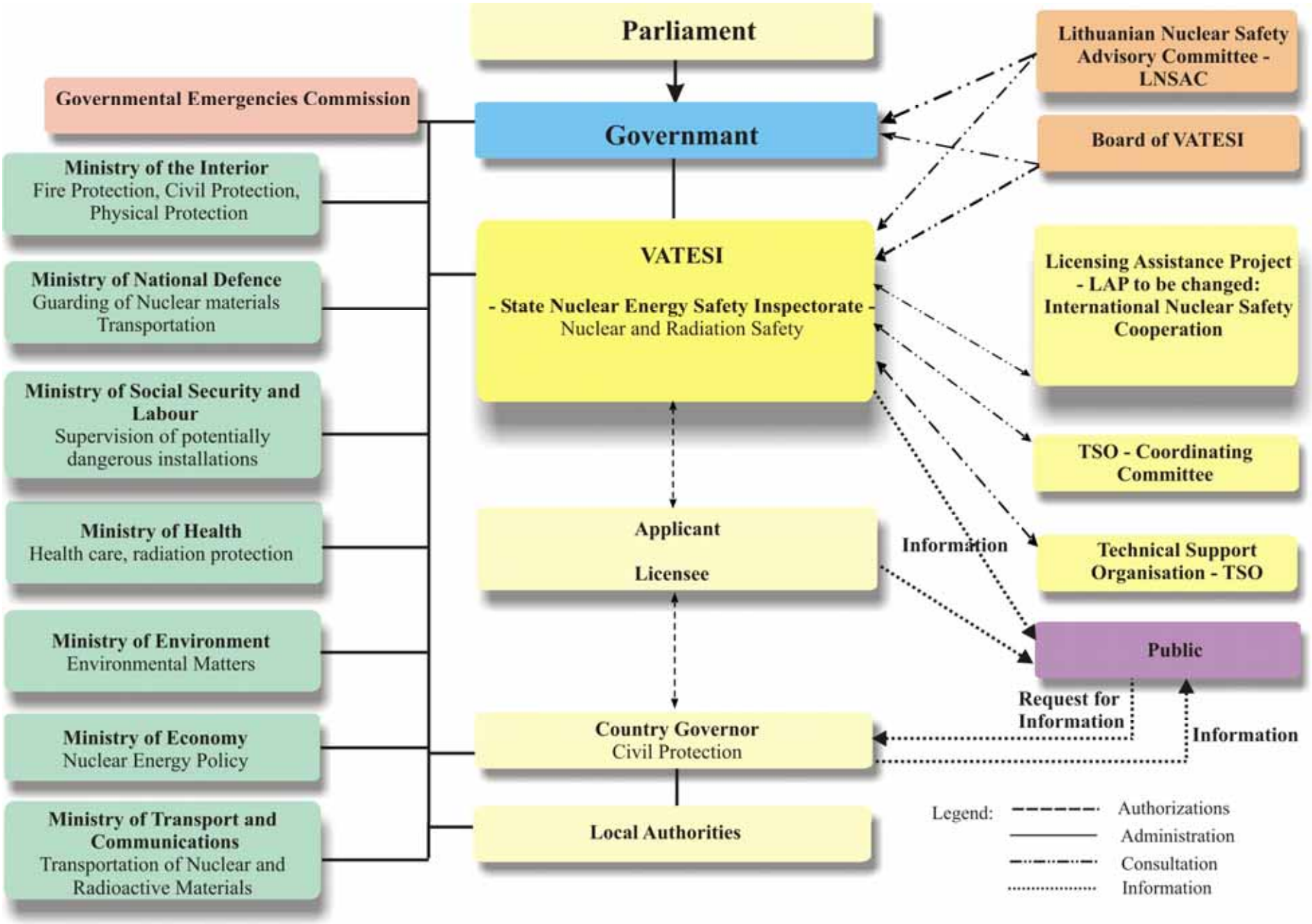
- Agreement between the Government of the Kingdom of Denmark and the Government of the Republic of Lithuania concerning information exchange and co-operation in the fields of nuclear safety and radiation protection, 16 March 1993;
- Agreement between the Government of the Republic of Lithuania and the Government of the Kingdom of Norway on early notification of nuclear accidents and on the exchange of information on nuclear facilities, 13 February 1995;
- Agreement between the Government of the Republic of Lithuania and the Government of the Republic Poland on early notification of a nuclear accidents, and on co-operation in the field of nuclear safety and radiation protection, 2 June 1995;
- Agreement between the Government of the Republic of Lithuania and the Government of the Republic Latvia on early notification of nuclear accidents, exchange of information and co-operation in the field of nuclear safety and radiation protection, 3 October 2003;
- Decree of the Premier Minister on establishment of a permanent Governmental working group for cooperation and exchange of information with Byelorussia on nuclear energy issues, 30 May, 2006;

- Draft Agreement between the Government of the Republic of Lithuania and the Government of the Republic Belarus on early notification of nuclear accidents, exchange of information and co-operation in the field of nuclear safety and radiation protection.

Annex to 8.3


Head
Deputy Head (1)
Assistant (1)
Expert - consultant (1)
Public Relation Officer (1)
Division of Finance
Accountant General (1)
Senior Specialist (2)
Division of Legal Affairs and Personnel
Head of Division (1)
Senior Specialist (1)
Specialist (1)
Subdivision for General Projects
Head of Subdivision (1)
Senior Inspector (1)
Division of Programming and Services
Head of Division (1)
Deputy Head (1)
Group of Programming and Office Work
Senior Programmer (1)
Senior Specialist on Informatics (1)
Group of Services
Chief Clerk (1)
Chief Engineer (1)
Housekeeper (1)
Driver (1)
Cleaner (2)
Licensing Division
Head of Division (1)
Chief Inspector (3)
Senior Inspector (1)
Inspector (1)
Senior Specialist (1)
Expert (1)
Nuclear Material Control Division
Head of Division (1)
Chief Inspector (2)
Senior Inspector (1)
Safety Assessment Division
Head of Division (1)
Deputy Head (1)
Chief Inspector 4)
Senior Inspector (1)
Senior Specialist (1)
On-site Division
Head of Division (1)
Deputy Head (1)
Expert (3)
Assistant (1)
Decommissioning and Radiation Protection Division
Head of Division (1)
Deputy Head (1)
Chief Inspector (3)
Senior Inspector (1)
Senior Specialist (1)
Emergency Response Center
Chief Inspector (1)
Inspector (1)

Annex to 8.4


Parliament
Governmant
Governmental Emergencies Commission
Ministry of the Interior
Fire Protection, Civil Protection, Physical Protection
Ministry of National Defence
Guarding of Nuclear materials Transportation
Ministry of Social Security and Labour
Supervision of potentially dangerous installations
Ministry of Health
Health care, radiation protection
Ministry of Environment
Environmental Matters
Ministry of Economy
Nuclear Energy Policy
Ministry of Transport and Communications
Transportation of Nuclear and Radioactive Materials
VATESI
- State Nuclear Energy Safety Inspectorate -
Nuclear and Radiation Safety
Applicant
Licensee
Country Governor
Civil Protection
Local Authorities
Lithuanian Nuclear Safety Advisory Committee - LNSAC
Board of VATESI
Licensing Assistance Project - LAP to be changed: International Nuclear Safety Cooperation
TSO - Coordinating Committee
Technical Support Organisation - TSO
Public
Information
Request for Information
Information
Legend:
Authorizations
Administration
Consultation
Information

Measures to Improve Safety (Follow up the Third Review meeting recommendations)

1. Safety measures following the shutdown of Unit 1
2. Safety Assurance during the Operation of Unit 2 (with personnel motivation assessment)
3. General Overview of INPP Safety Improvement Program during the Period of 2005-2007 (SIP-3)
4. International arrangements, including those with neighbouring countries

1. Safety measures following the shutdown of Unit 1

As long as nuclear fuel is still in the reactor or spent fuel storage pool (SFSP), Unit 1 is classified as nuclear facility. All decommissioning activities during this stage shall be performed in accordance with the design requirements, safe operation limits and conditions.

The safety case of Unit 1 decommissioning during the reactor and SFSP defuelling stages is provided in ,,INPP Unit 1 Decommissioning Safety Analysis Report (DSAR) for Defuelling Stages 1 and 2“, which was developed by the Decommissioning Service and agreed with the Regulatory Authority of the Republic of Lithuania in 2005. The 1st defuelling stage can be characterized as a stage of fuel unloading from the reactor and the subsequent storage of spent fuel assemblies (SFA) in SFSP or their transportation to Unit 2 for complete burn up. This stage started after the final shutdown of Unit 1 (FRS) and covers all activities related to defuelling process until no fuel elements are left in the reactor core. When this task is accomplished, some of the systems that were necessary for the reactor defuelling, can be put out. The second stage – unloading of spent fuel elements from SFSP - is performed after accomplishing of the 1st stage. The 2nd stage continues until all fuel elements are transferred to the off-site interim storage facility and there is no fuel left in Unit 1.

DSAR defined the safety systems and equipment that shall remain in operation during the Unit 1 decommissioning process.

,,Technological Regulation for Operation of INPP Unit 1 during the Reactor Defuelling Stage“ is the main guiding document defining safe maintenance of Unit 1 and safe operation limits and conditions. The Technological Regulation is developed for defuelling stage and is approved by Regulatory Authority of the Republic of Lithuania. All procedures related to operation and maintenance of systems and equipment of Unit 1 have been reviewed.

Safe maintenance of Unit 1 is financed from the Ignalina Program. Since 2005 January 1 Salaries for main personnel involved in servising Unit 1 have been paid from the funds of European Commission. Technical maintenance of Unit 1 is financed from the national fund.

2. Safety Assurance during the Operation of Unit 2 (with personnel motivation assessment)

According to VATESI requirements in order to continue Unit 2 operation after Unit 1 final shutdown, INPP has prepared a Safety Justification for the only operating Unit 2 (SJ).

The Safety Justification for the only operating Unit 2 was developed on the basis of Unit 2 condition at the end of December 2004 (the scheduled date of the Unit 1 final shutdown).

The Safety Justification is based on SAR-2 and RSR-2, it covers the safety issues related to changes of operation conditions for Unit 2 process systems and common plant process systems and changes of administrative structure of INPP following the Unit 1 final shutdown.

The Safety Justification for the only operating Unit 2 has been developed to cover two stages of the Unit 1 decommissioning:

- From the Unit 1 final shutdown until the beginning of the fuel unloading from the reactor;
- From the start of the fuel unloading from the reactor of Unit 1 until the competition of the fuel unloading procedure.

The Safety Justification also considers planned modifications of Unit 2 systems, which are affected by the Unit 1 final shutdown, configurations of Unit 1 process systems during the decommissioning of Unit 1.

A list of all Unit 2 systems as well as common plant systems was compiled in order to evaluate the effect of the Unit 1 final shutdown on the safety of Unit 2 operation. After the analysis of all Unit 2 systems had been conducted, a list of Unit 2 systems, which have connections with Unit 1 and common plant systems, was defined. Also, a list of Unit 2 systems with transit communications going through Unit 1 premises to common plant facilities was made. Analysis of the Unit 1 final shutdown effect on the safety of Unit 2 operation was conducted for all systems included into above-mentioned lists. The Safety Justification for the only operating Unit 2 includes four Parts:

- Part 1 – Peculiarities of INPP operation with two and only one (Unit 2) units.
- Part 2 – Analysis of systems, which have technological communications with Unit 1 systems.
- Part 3 – List of failures.
- Part 4 – Analysis of failures and external events.

The effect of Unit 1 final shutdown on human factor (Safety Justification, Part 5) and INPP physical protection (Safety Justification, Part 6) was considered.

As a result of the analysis, which had been conducted in Parts 1-4, a list of Unit 1 Safety Related systems and elements was defined. This list also includes elements of common plant systems, which are located at Unit 1 and the efficiency of which should be preserved after the Unit 1 final shutdown in order to assure safe operation of Unit 2.

In addition, a list of systems and element, which are required for normal operation and which do not affect the safety of Unit 1, was defined. The latter list also includes elements of common plant systems, which are located at Unit 1 and which should be left in operation after the Unit 1 final shutdown.

The amount of common plant systems' equipment, which should be left in operation after the Unit 1 final shutdown, was assessed.

Lists of Unit 1 premises where normal operation conditions should be assured after the Unit 1 final shutdown were compiled with regard to each system. In addition, a list of operational documentation, which should include all changes made after the Unit 1 final shutdown, was defined.

Analysis of all initiating events, which had been considered in SAR-2 (Task 12, Part 4), was conducted in order to determine the effect of Unit 1 and 2 communications on the consequences of these events. Unit 1 systems are included into the analysis of the effect on Unit 2 safety under one initiating event only – "loss of the Service Water Supply System". In the Safety Justification of the only operating Unit 2 Report (Part 1-4 "Service Water Supply System") it is shown that the Service Water Supply System, which will be left in operation at Unit 1, will provide the required amount of service water to Unit 2 provided that the loss of Service Water Supply System at Unit 2 has occurred. The consequences of other initiating events do not depend on the operation of Unit 1 systems.

The Safety Justification of the only operating INPP Unit 2 provides evidence that the continuation of Unit 2 operation after the Unit 1 final shutdown is possible. Results and conclusions of the Safety Justification of the only operating Unit 2 have provided the basis for decision-making by VATESI on issuance of Operation License for INPP Unit 2 after the Unit 1 final shutdown.

Permission for the Unit 1 final shutdown was received from VATESI at the end of 2006 after the completion of the following works:

- Construction of new Heat Only Boiler Station and Steam Boiler Station;
- Issuance of the "INPP Unit 1 Decommissioning Project for the 1st and 2nd stages of fuel unloading;
- Issuance of new "Technological Regulations on the operation of Unit 1", PTOed-0905-1;
- Preparation of Technical Order on "Joint operation of On-site Central Heating Plant (OCHP) and Boiler Station" Тгрп-0931-1932;
- Conducting of personnel emergency training on assurance of safe operation of both units during the only operating Unit 2 outage or OCHP failure;
- Implementation of Safety Justification of the only operating Unit 2 basic recommendations.

3. General Overview of INPP Safety Improvement Program during the Period of 2005-2007 (SIP-3)

3.1. INPP Safety Improvement in 2005 (SIP-3/2005)

Ignalina NPP Safety Improvement Program No.3 (SIP-3/2005) comprised 115 activities to be implemented during the period from 2005 to 2009.

In 2005, 43 activities of Ignalina NPP Safety Improvement Program No.3 (SIP-3/2005) were implemented. The most significant activities are the following:

- Commissioning of the Safety Parameter Display System at Unit 2.
- Replacement of doors in the rooms containing the components of safety-related systems with more than 1-hour fire resistant doors.
- Purchase of a new hauling unit for transportation of radioactive waste.
- Improvement of physical protection system of INPP perimeter.
- Implementation at ICS of a program for diagnostics of EP ORM system.
- Implementation of control means of cars' concealed cavities and difficult of access places at the checkpoints.

- Re-equipping of checkpoint for oversized motor transport.
- Implementation of stationary means for explosives and drugs detection.
- Procurement of a new set of automatic equipment for welding under welding flux of CONSTOR casks lids, containing spent fuel.
- Safety analysis of compacting device (bldg. 150 room 162).
- Performance of analysis of 1346.00.00.000 container drop to the lid of the transfer canyon in Reactor Hall.
- Performance of additional analysis of computer codes of ALS thermal-hydraulic behavior during accident.
- Additional analysis of calculation codes on the basis of calculation of heat conductivity of ALS building units.

Total expenditures under SIP-3/2005 program amounted to 82 352 000 LT (or about 23.87 MEURO).

3.2. INPP Safety Improvement in 2006 (SIP-3/2006)

Ignalina NPP Safety Improvement Program No.3 (SIP-3/2006) comprised 86 activities to be implemented during the period from 2006 to 2009.

In 2006, 28 activities of Ignalina NPP Safety Improvement Program No.3 (SIP-3/2006) were implemented. The most significant activities are the following:

- Implementation of facility of Unit 1 fuel afterburning in the reactor of Unit 2.
- Implementation of LBB concept at INPP. Additional installation of small leak detection systems in rooms where PC, feed water and direct steam lines are located.
- Design, equipment purchase and installation of Cementation Facility for ion exchange resins and slurry.
- Upgrading of Unit 2 radiation safety automatic control system.
- Implementation of the Second Diverse Shutdown System at Unit 2.
- Upgrading of factory waste segregation and measurement system for separation of radioactive wastes.
- Implementation of protection signal on decreasing of flow rate in GDH in AZ-1.
- Development of the Program and Safety Justification of INPP Unit 1 reactor during SFA unloading after the reactor decommissioning.
- Development and implementation of a new Technical Specification on Unit 1 operation.
- Development of Guidance on the management of beyond design accidents.
- Performances of calculations of ALS condense capacity during design basis accidents when modeling ALT scheme with more than one condensation pool.
- Development, delivery and mounting of the SFA fuel element cladding integrity system at Unit 1 and 2.
- Modernization of the compartment Nr.8 in SRWS (build. 157/1) for its usage for interim storage of SRW.

Total expenditures under SIP-3/2006 program amounted to 60 893 000 LT (or about 17.65 MEURO).

3.3. INPP Safety Improvement in 2007 (SIP-3/2007)

Ignalina NPP Safety Improvement Program No.3 (SIP-3/2007) comprised 90 activities to be implemented during the period from 2007 to 2009.

Total expenditures under SIP-3/2007 program is planned to amount to 33 929 000 LT (or about 9.83 MEURO).

3.4. Funding of SIP-3

Safety Improvement Program is funded by different sources (see TABLE 3).

TABLE 3

Total expenditures (MLt)	**Including:**			
	Own sources	**Public Interests**	**Loan**	**Unit 1 Decommissioning Fund**
2005				
82.352	32.592	42.597	7.163	
2006				
60.893	31.056	29.419	0	0.418
2007				
33.929 (planned)	21.091 (planned)	12.28 (planned)	0	0.558 (planned)

4. International arrangements, including those with neighboring countries

In 1994 Lithuania has joined to Convention on Early Notification of a Nuclear Accident and in 2000 to Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency. VATESI and Fire and Rescue Department are responsible authorities respectively. According to IAEA's EPR-ENATOM requirements, VATESI is National Warning Point, National Competent Authority for events abroad and, together with Fire and Rescue Department - National Competent Authority for domestic events.

After joining EU in 2005, Lithuania became a part of ECURIE system. VATESI is contact point in these arrangements as well as CoDecS station operator.

A great attention in Lithuania is paid to the development of bilateral co-operation with the neighbouring countries. Mutual assistance policy between Lithuania and the neighbouring countries is based on bilateral agreements. Bilateral agreement between Lithuania and Denmark *On information exchange and co-operation in the field of nuclear safety and radiation protection* has been signed on 26 March 1993. The bilateral agreement between Lithuania and Norway *On Early Notification of a Nuclear Accident and Information exchange about Nuclear Objects* has been signed on 13 February 1995. The Arrangement between Lithuania and Poland *On information exchange and co-operation in the field of nuclear safety and radiation protection has been signed on 2 June 1995.* The Agreement between Lithuania and Latvia *On Early Notification of Nuclear Accidents, Exchange of Information and Co-operation in the Field of Nuclear Safety and Radiation Protection has been signed on 3 October 2003.*