Republic of Lithuania

CONVENTION ON NUCLEAR SAFETY SEVENTH LITHUANIAN NATIONAL REPORT

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Lithuanian Geological Survey under the Ministry of Environment
Environmental Protection Agency
Radiation Protection Centre
State Enterprise Ignalina Nuclear Power Plant
Fire and Rescue Department under the Ministry of the Interior of the Republic of Lithuania
UAB VAE SPB

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Seventh Lithuanian National Report

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A. Goštauto g. 12, LT-01108 Vilnius Lithuania
www.vatesi.lt; atom@vatesi.lt;

Contents

Acronyms and abbreviations

EPA	Environment Protection Agency
ABWR	Advanced Boiling Water Reactor
ALARA	As Low As Reasonable Achievable
AMC	Accident Management Centre
ASSET	Assessment of Safety Significant Event Teams
AS&QMD	Audit, Safety and Quality Management Department (INPP)
ATWS	Anticipated Transient Without Scram
BWR	Boiling Water Reactor
CPS	Control and Protection System
DSAR	Decommissioning Safety Analysis Report
DSS	Diverse Shutdown System
D&D	Dismantling and Decontamination
ECURIE	European Community Urgent Radiological Information
EIA	Environmental Impact Assessment
ENSREG	European Nuclear Safety Regulators Group
EML	Environmental Monitoring Laboratory
EPO	Emergency Preparedness Organization
EPP	Emergency Preparedness Plan
ERC	Emergency Response Centre
ESI	Emergency Support Instruction
EU	European Union
EURATOM	European Atomic Energy Community
FA	Fuel Assemblies
FC	Fuel Channel
FDP	Final Decommissioning Plan
FINAS	Fuel Incident Notification and Analysis System
HERCA	Heads of the European Radiological Protection Competent Authorities
IAEA	International Atomic Energy Agency
IMS	Integrated Management System
INES	International Nuclear Event Scale
INPP	Ignalina Nuclear Power Plant
IRS	International Reporting System for Operating Experience
ISFSF	Interim Spent Fuel Storage Facility
ISI	In-Service Inspection
I&C	Instrumentation and Control
LBB	Leak Before Break
LHMT	Lithuanian Hydrometeorological Service
LGT	Lithuanian Geological Survey
MCC	Main Circulation Circuit
MCP	Main Circulating Pump
MCR	Main Control Room

MoH	Ministry of Health
NI	Nuclear Installation
NIKIET	Research and Development Institute of Power Engineering
OEF	Operational Experience Feedback
OIL	Operating Intervention Level
OSART	Operational Safety Review Team
PAGD	Fire and Rescue Department
PSA	Probabilistic Safety Assessment
PSAR	Preliminary Safety Analysis Report
QA	Quality Assurance
QM	Quality Management
RATA	Lithuanian State Company “Radioactive Waste Management
RAMP	Review of Accident Management Programs
RBMK	Channel-type Large Power Reactor
RCR	Reserved Control Room
RSC	Radiation Protection Centre
RSR	Review of Safety Report
RUZA	Guidelines on the management of the beyond design accidents
SAR	Safety Analysis Report
SFA	Spent Fuel Assemblies
SF	Spent Fuel
SFSP	Spent Fuel Storage Pool
SIP	Safety Improvement Program
SOAI	Symptom Based Oriented Accident Instructions
SPH	Storage Pool Hall
SPI	Safety Performance Indicators
SSC	Structures, Systems and Components
SSRM	Site Safety Review Mission
SWMSF	Solid Waste Management & Storage Facility
TG	Turbine generator
TLD	Thermo-luminescent Dosimetry
TS	Training Subdivision
TSC	Technical Support Centre
TSO	Technical Support Organisation
USIE	Unified System for Information Exchange in Incidents and
VAE	Joint stock company “Visagino atominė elektrinė”
VATESI	Lithuanian State Nuclear Power Safety Inspectorate
Visaginas PGV	Visaginas Fire and Rescue Board
VNIPIET	All-Union Research and Development Institute for Energy
VNPP	Visaginas Nuclear Power Plant
WANO	World Association of Nuclear Operators
WENRA	Western European Nuclear Regulators’ Association

Introduction

Republic of Lithuania signed the Convention on Nuclear Safety (CNS) on 23 March 1995. The CNS was ratified on 17 October 1995 and entered into force on 24 October 1996. This report is issued according to Article 5 of the CNS. It is the seventh in it series and provides updated information as compared to the Lithuanian National Report issued in 2013. All reports on CNS are available on the State Nuclear Power Safety Inspectorate (VATESI) website: www.vatesi.lt.

Information presented in this report demonstrates that Republic of Lithuania fulfils its obligation under the CNS.

The structure and content of the Report was prepared taking into account recommendations provided in IAEA Guidelines regarding National Reports under the Convention on Nuclear Safety INFCIRC/572/Rev.5. Report contains two additional chapters regarding post Fukushima actions and implementation of Vienna Declaration. A summary of highlights and issues raised about Lithuania during the sixth review meeting are presented in Summary section.

Overview of the national nuclear programme

Currently nuclear installations in Republic of Lithuania are Ignalina Nuclear Power Plant (INPP), which is in permanent shutdown, Dry type interim spent nuclear fuel storage facility (SNFSF) and storage facilities for radioactive waste that are on the same site and are directly related to the operation of the INPP. All these nuclear installations and storage facilities for radioactive waste are operated by one licence holder – State Enterprise Ignalina Nuclear Power Plant. Activities and facilities other than INPP, related to safety of spent nuclear fuel and radioactive waste management, are covered by the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

Ignalina Nuclear Power Plant

The INPP contains two RBMK-1500 type reactors, which belongs to the category of “boiling water” channel-type reactors. The INPP is located in the north-eastern part of Lithuania, near the borders with the Republic of Latvia and the Republic of Belarus. The power plant was built as part of the Soviet Union's North-West Unified Power System.

The INPP Unit 1 was connected to the power grid at the end of 1983, and Unit 2 - in August 1987. The design lifetime of the Units was projected to last till 2014 and 2017 respectively. The INPP Unit 1 was permanently shut down on 31 December 2004 and Unit 2 was permanently shut down on 31 December 2009 in compliance with the protocol of Lithuania’s EU accession.

Defueling of Unit 1 reactor started in 2006 and was completed in December 2009. Defueling of Unit 2 reactor started in 2010 and after unloading of about 1/3 of reactor inventory is now awaiting for free space in the unit’s pool. Currently Unit 1 and Unit 2 are maintained in the post-operation state, in accordance with operation licence amended by VATESI. The spent nuclear fuel storage pools of both Units are filled up by fuel assemblies awaiting for start of spent fuel transport to new dry type interim spent fuel storage facility.

Decommissioning of various Unit 1 and Unit 2 facilities is underway. These activities are performed in accordance with the INPP Final Decommissioning Plan and in line with Unit 1 and Unit 2 Decommissioning Projects.

In response to the events at Japan’s Fukushima Daiichi Nuclear Power Plant, the stress tests were conducted in 2011-2012 at INPP according to ENSREG stress tests specification. Appropriate Plan of strengthening nuclear safety in Lithuania was prepared in 2013 and is in implementation stage.

Dry type interim spent nuclear fuel storage facility (SNFSF)

Spent nuclear fuel at INPP is stored in spent fuel storage pools and dry type interim spent nuclear fuel storage. Spent fuel storage pools are located near to the reactor hall of each Unit, and dry

storage facility (SNFSF) is located nearby INPP site. Wet storage option was provided in the initial design of INPP that was developed in the 70s of the last century in the former Soviet Union. It was intended to store the spent nuclear fuel unloaded from the reactors for several years in spent fuel storage pools and then to ship it for reprocessing. From the beginning of the 90s spent fuel reprocessing option was not considered anymore, so the decision was taken to build up a dry type interim storage for spent nuclear fuel at INPP and store it for 50 years. The storage is a passive storage system, which does not require any auxiliary equipment for decay heat removal.

Visaginas Nuclear Power Plant

UAB VAE SPB as a company responsible for the implementation of the preparatory works for the construction of the new NPP has performed a potential site evaluation against national and IAEA requirements. Site evaluation process has started in 2008. Evaluation included both deterministic and probabilistic assessments of various site related phenomenon. Also site evaluation report includes a peer review reports for all its parts. After considering the following aspects:

– the effects of external events occurring in the region of the Visaginas sites;

– the characteristics of the Visaginas sites and their environment that could influence the transfer to persons and the environment of radioactive material that has been released;

– the population density and population distribution and other characteristics of the external zone in so far as they may affect the possibility of implementing emergency measures and the need to evaluate the risks to individuals and the population, it was concluded that there are no exclusion criteria and no deficiencies that cannot be compensated for by means of design features, measures for site protection or administrative procedures. Therefore, both investigated sites are suitable for construction of the VNPP.

Site Evaluation Report was reviewed by Independent IAEA Site Safety Review Mission (SSRM) which took place on 8–12th of November, 2010. IAEA experts stated that “Sites evaluation is conducted in line with IAEA requirements and guides, the volume of investigation is sufficient, and sites are suitable for construction of VNPP”. The experts of the mission have submitted several recommendations, which may be implemented only after selecting of nuclear technologies and layout of nuclear facilities providing opportunities for additional investigations related with design works.

Site Evaluation Report was reviewed by Lithuanian authorities involved in coordination, including Lithuanian Hydro-meteorological Service (hereinafter – the LHMT), Lithuanian Geological Survey (hereinafter – the LGT), Radiation Protection Centre (hereinafter – the RSC), Fire and Rescue Department under the Ministry of Interior (hereinafter – PAGD), Civil Aviation Administration and approved by VATESI. Finally the VATESI approved the Site Evaluation Report on 30 October 2014. The results of the Site Evaluation Report shall be used in design process of the VNPP and shall constitute (updated where necessary) a part of the future PSAR.

National policy towards nuclear activities

Like many other countries in Europe, Lithuania is also facing challenges in the energy sector on three main dimensions: security of energy supply, competitiveness and sustainability of the energy sector. This situation was determined by historic and political circumstances as well as scarce internal energy resources. Most of energy resources used in Lithuania are imported. After the shutdown of INPP, the country is not able to satisfy its internal electricity demand at competitive prices. The Lithuanian electricity network is not connected to the European electricity system and therefore electricity can be imported only from a very limited number of countries.

In order for Lithuania to become a fully-fledged Member State of the European Union, the Lithuanian energy sector should be entirely integrated into the European energy system. The country must have sufficient local capacity to satisfy the internal energy demand and, with regard to energy related questions, should be able to participate and compete in common EU energy markets and effectively cooperate with other countries.

The National Energy Independence Strategy, approved by Resolution No X-2133 of the Seimas of the Republic of Lithuania dated 26 June 2012 sets a number of tasks and major solutions in the fields of electricity, heating, gas, oil, renewable energy sources and improvement of energy efficiency, environment protection and reduction of greenhouse gas emissions. In current National Energy Independence Strategy (2012) as in previous National Energy Strategies (1994, 1999, 2002, 2007) nuclear energy is seen as a part of the Lithuanian energy supply mix. National Energy Independence Strategy (2012) sets the strategic target – construction of a new regional nuclear power plant in Visaginas (VNPP).

In 2009 the Ministry of Energy started tendering process, which resulted with selection of Hitachi Ltd. (as the Strategic Investor) together with Hitachi-GE Nuclear Energy (as ABWR technology provider) for the new NPP in Visaginas site. In 2012, the UAB "Visagino atominė elektrinė" (in August 2013 renamed to „Lietuvos energija", UAB) was appointed by the Lithuanian Government as a national investor of the VNPP, which together with other project participants will hold shares in the Project Company. National investor shall have no less than 34% of the VNPP's shares.

After non-binding referendum on VNPP (in October 2012) a Special Working Group was established to evaluate VNPP project and the National Energy Independence Strategy. As a result, safe nuclear energy development has again been identified as necessary integral part of the Lithuanian energy supply mix. Taking into account these results and respecting the results of the referendum the Government stated that the project might be continued if it is being developed together with Regional Partners (Estonian and Latvian states and their utility companies) and in case it is economically viable.

As an outcome of these discussions, Strategic Investor with the support of Japanese Government and participation of Japanese export credit agencies JBIC and NEXI submitted proposals on improvement of the financial conditions for the project. Additionally all of the project's potential investors (LT, LV, EE utility companies and Hitachi) carried out economic viability assessment of VNPP project that identified certain outstanding issues requiring attention of project hosting Government as well as the Governments of other Baltic States.

These results were evaluated favourably and discussed among all three Baltic Prime Ministers during their meeting in November 2013. It was decided to pursue with the resolution of the outstanding issues named by potential investors.

Baltic Prime Ministers decided to make use of the Committee of Senior Officials of the Baltic Council of Ministers composed of high level governmental representatives and competent institutions experts for the consideration and resolution of intergovernmental outstanding issues. Lithuanian Government has also established national Governmental commission dedicated to address remaining outstanding issues. Currently all interested parties are in the process of discussing possible ways for resolving the outstanding issues.

Summary

Safety improvement measures resulting from European Union (EU) „stress tests" that were foreseen to be implemented in INPP units and in existing SNFSF were completed by the end of 2015. The remaining measures are related with the future facilities and will be implemented in due time in accordance with the the Plan of Strengthening Nuclear Safety in Lithuania (National Action Plan).

In 2014, VATESI agreed the Site Evaluation Report of new Visaginas NPP (VNPP). New sites are in the vicinity of existing INPP site. Sites for the construction of VNPP are selected in accordance with the IAEA safety standards and national Nuclear Safety Requirements BSR-2.1.3-2010 "General requirements on site evaluation for nuclear power plants". During the VNPP site evaluation process all available geological, geophysical, seismological, meteorological, hydrological and other data collected by expert teams for the region extending more than 300 km from the sites. New site vicinity and site scale electrical resistivity tomography, seismic and engineering geological surveys were

conducted in 2009-2010. The gathered available data and newly acquired results were collected and analysed by Lithuanian and foreign experts in Site Evaluation Report. All documents were independently reviewed and improved when necessary after the review taking into account the IAEA safety standards and national Nuclear Safety Requirements BSR-2.1.3-2010 "General requirements on site evaluation for nuclear power plants".

During the reporting period VNPP project was proceeding in its development. Currently a company called UAB VAE SPB (which stands for Joint Stock Company VNPP special purpose vehicle) analyses opportunities for the development of a new nuclear power plant project in Lithuania – the company in 2015 took over the previously carried out preparatory works, projects and programmes. In presence of a favourable economic and political situation, the company would ensure the continuation of works and directly participate in the implementation of a new nuclear power plant project.

UAB VAE SPB is a company which shares are 100% owned by "Lietuvos energija", UAB (previously UAB VAE). The VNPP project preparatory works implementing company is developing and improving its own competence in safety and seeks external competences in the safety related aspects of activities of the organization. All the sites studies and assessments, including EIA and potential site evaluation are done in accordance with national requirements, international practice and in line with the relevant IAEA safety standards.

Since 2009 Lithuania concerns about Ostrovets NPP project being developed in vicinity of capital city Vilnius (see Figure 1). It is important to stress that the selected site is not acceptable taking into account residual risk of sever accident and it is not properly investigated, compliance of design with some modern safety standards is not justified and "stress tests" are not performed, infrastructure and strategy for management of radioactive waste and spent nuclear fuel are not established and it is not evident that operating organization and regulatory authority are capable to perform their own responsibilities for safety (more details are provided in Article 16.6).

Figure 1. Ostrovets NPP project being developed in vicinity of Vilnius

Lithuania will keep focusing on these issues and will strive to receive all answers to its questions and requests and to make sure that these answers and requests make it clear that nuclear power plant in Belarus is sited, designed and built in full compliance with IAEA and other international environmental, nuclear and radiation safety requirements.

Integrated Regulatory Review Service mission

From 18 to 29 April 2016 full scope Integrated Regulatory Review Service (IRRS) mission took place at the VATESI and Radiation Protection Centre (RSC) Headquarters in Vilnius. The IRRS mission has covered all civilian nuclear and radiation source facilities and activities regulated in Lithuania. The review compared the Lithuanian regulatory framework for safety against IAEA safety standards as the international benchmark for safety.

The IRRS team carried out the review in the following areas: responsibilities and functions of the government; the global nuclear safety regime; responsibilities and functions of the regulatory body; the management system of the regulatory body; the activities of the regulatory body including the authorization, review and assessment, inspection and enforcement processes; development and content of regulations and guides; emergency preparedness and response; control of medical exposures, occupational radiation protection, control of radioactive discharges and materials for clearance, environmental monitoring, transport, waste management and decommissioning.

The IRRS mission included one policy issue discussion on regulatory policy for authorization of dismantling activities during transitional period from operation to decommissioning.

The most significant challenges for the regulatory authorities at the time of the mission were implementation of new international standards on radiation protection and nuclear safety, and securing resources and skills necessary to ensure the appropriate regulatory oversight of the ongoing decommissioning activities at INPP.

The IRRS team identified a number of good practices and made recommendations and suggestions that indicate where improvements are necessary or desirable to continue enhancing the effectiveness of regulatory functions in line with IAEA safety standards.

Action plan concerning recommendations and suggestions provided by IRRS mission team is under development and shall be endorsed in the near future.

Challenges for Lithuania identified during the 6th Review Meeting and their implementation

To maintain safety of INPP while spent nuclear fuel is in the units

Both Units of the INPP are now permanently shutdown and under decommissioning process. Though the number of operating normal operation systems important to safety and safety systems at Unit 1 is reduced from 53 to 11, at Unit 2 from 64 to 47, all systems important to safety of the spent fuel stored in storage pool hall (SPH) and Unit 2 reactor remains under the same safety requirements as during the INPP operation pursuant to the regulatory requirements. Systems and equipment important to safety and remaining in operation are operated and maintained in compliance with the safe operation conditions and limits set in the Technical Specifications for operation of the Units.

Regardless of INPP Units 1 and 2 were permanently shut down and configuration of its systems and components has been significantly altered, INPP has been further performing non-destructive testing of fuel channels, piping metal condition and equipment of systems important to safety and other maintenance activities to maintain the acceptable conditions of systems and components important to safety. The INPP has established and developed ageing management system and prepared Ageing Management Programme according to “Ageing Management Requirements of Systems and Elements important to safety of Nuclear Power Facilities”, VD-E-05-99.

Fresh and spent nuclear fuel is stored in its dedicated places under conditions established in the internal normative technical documents in accordance to the regulatory requirements, including the procedure established for accounting of nuclear fuel. Modification of the existing cask handling system at Units, to upgrade of Unit 1 and Unit 2 Spent Fuel Pool Halls cranes to ensure safe and sufficient operational functionality and to fit B1 Project requirements were successfully performed in the frames of B1 Project implementation. Operation and maintenance of the systems remaining in operation is performed by qualified and appropriately trained staff undergoing training in accordance with annual training programs. Implementation of safety improvement measures under the Safety Improvement Program (SIP-3) is continued by implementing annually revised Programme including safety improvement measures linked to the post-Fukushima lessons learned and “stress test” peer review recommendations and suggestions.

To implement projects related to the spent nuclear fuel and radioactive waste management

The main development in the construction of the new facilities includes significant progress made towards completion of the Interim Spent Fuel Storage Facility (ISFSF – Project B1) and Solid Waste Management & Storage Facility (SWMSF – Project B2/3/4) construction projects.

Construction of a new Dry Interim Spent Fuel Storage Facility

With regard to necessity to handle and store the remaining approximately 15500 spent nuclear fuel assemblies from the shutdown INPP Units, in 2003 the Government of the Republic of Lithuania decided to construct a new dry type spent nuclear fuel storage facility (B1 Project) designed for handling and storage of the remaining spent nuclear fuel assemblies. The licence to construct the new dry type interim spent fuel storage facility was issued to INPP by VATESI in 2009. The construction of the new ISFSF was completed in 2014. ISFSF cold trials were completed in June 2015. Hot trials are scheduled in the period from September 2016 till August 2017.

Construction of Solid Waste Management & Storage Facility (B2/3/4 Project)

The objective of B2/3/4 Project is to build a new INPP Solid Waste Management and Storage Facilities. The Project includes two independent components to be implemented simultaneously:

- B2 (New Solid Waste Retrieval Facilities Design and Construction);
- B3/4 (New Solid Waste Management and Storage Facilities Design and Construction).

It is scheduled to complete cold trials in August 2017 and to start hot trials in February 2018 followed by the start of the SWMSF commercial operation in late autumn 2018.

Construction of Landfill Disposal Facility (B19 Project)

Commercial operation of the Landfill Buffer Storage Facility started on 28 May 2013 and currently the Buffer Storage Facility is being filled with Class A radioactive waste packages waiting for the Landfill Disposal Facility to be built. On 30 July 2013 VATESI approved technical design of the Very Low Level Radioactive Waste Repository. Approximately 60 000 m^3 of radioactive waste will be **disposed** in the repository. On 23 December, 2015 INPP got a License No 16.1-89(2015) for Construction and Operation of the Landfill Disposal Facility issued by the Order No 22.3-228 of the Head of VATESI dated 2015-12-10. Tendering for construction of the Landfill Disposal Facility is now in progress. The permit for commercial operation of the 1st module of the Landfill Disposal Facility is expected to be obtained in the third quarter of 2017.

Construction of Near Surface Repository (B25 Project)

Low and intermediate level short-lived radioactive waste must be handled and placed in the repository for low and intermediate level short-lived radioactive waste. In December 2008 VATESI approved the technical specification of the repository for low and intermediate level short-lived radioactive waste (Project B25). The capacity of the repository will be approximately 100 000 m^3 of radioactive waste.

For the Near Surface Repository, the Basic Design and the Preliminary Safety Analysis Report were submitted to the state institutions for approval. A licence for construction and operation of the Near Surface Repository is expected to be obtained in mid of 2017. Completion of the Near Surface Repository construction of the 1st group of vaults is scheduled to be completed by 2021.

To implement projects for decontamination and dismantling of appropriate systems and components

Projects related to dismantling and decontamination (D&D) of INPP systems and equipment not necessary for safety assurance are implemented in compliance with the technological solutions and the sequence developed and accepted in the technological design documents and within the very clearly defined equipment dismantling boundaries. The safety of implementation of such solutions is substantiated in the safety analysis documents approved by the VATESI. Prior to commencement of D&D activities preparatory works ensuring waste temporary storage, packaging sites, transportation

conditions and routes, sites for dismantled equipment preliminary decontamination, fragmentation, works related to preparation of building systems for performance of D&D works, etc. are performed.

Safe operation of the SNF handling system during dismantling of equipment located in bld. A1, (see Fig. 2) will be substantiated in the Technological Design documentation and Safety Justification Report to be approved by the regulatory body leading to issue of the authorisation to start dismantling activities and proving that the works can be performed in accordance with the nuclear and radiation safety requirements, and the risks associated with their performance do not exceed the level of impact to safety as during the operational and maintenance period.

The INPP systems and equipment dismantling sequence under the INPP Immediate Dismantling Strategy follows "a building after building" approach and is in detail established within Decommissioning Projects for Final Shutdown and Defueling Phase (DPs). DPs provide description of the INPP Unit 1 and Unit 2 systems that may be modified and isolated at each defueling stage as a consequence of losing their functions to ensure safe operation of other remaining in operation systems and normal operation functions. The safety of the work performance is substantiated in the corresponding Decommissioning Safety Analysis Reports in compliance with the requirements of the Nuclear Safety Requirements BSR-1.5.1-2015 „Decommissioning of Nuclear Facilities". Dismantling of separate systems and components is performed within the scope of the changed operational Licences conditions issued by the regulatory authority having approved the technological design documents and documents substantiating safe performance of D&D works developed by the licence holder.

The main achievements in the dismantling and decontamination (D&D) projects are as follows:

– completion of Unit 1 Bld. 117/1 equipment (Emergency Core Cooling System) dismantling in 2011, completion of Unit 1 Bld. 119 (Boiler House) equipment dismantling in 2013, completion of phase D1 D&D of Reactor Gas Circuit (Bld. V1) in 2013;

– completion of Unit 2 Building 117/2 equipment D&D activities in 2015;

– Unit 1 Turbine Hall (Bld. G1) equipment dismantling is in progress: 96% of all to be dismantled equipment have been dismantled by the end of 2015;

– Unit 2 Turbine Hall (Bld. G2) equipment is in progress: 21% of all to be dismantled equipment have been dismantled by the end of 2015;

– Performance of preparatory works for D&D of Unit 1 Bld. D1 (Control, Electrics & Deaerators) equipment;

– Preparation for Bld. A1 (Reactor Building) equipment D&D: development of the Environment Impact Assessment Report, Safety Analysis Report and Technological Design is in progress;

– Engineering on dismantling of Unit 1 structures and components from the reactor cavity (Project UP01), including the corresponding engineering analyses, research, documentation development, are in progress.

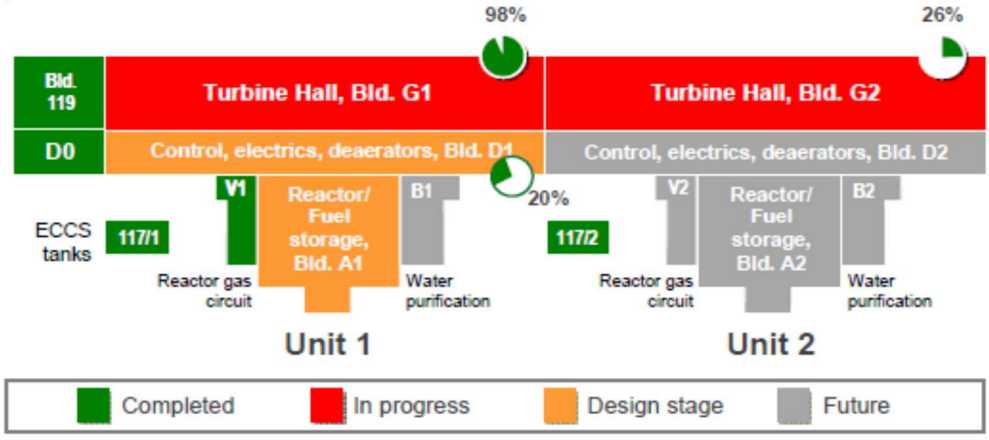


Figure 2. Current status of D&D progress

To be prepared for construction of new NPP

Appropriate training of the staff of future operator, VATESI and other institutions and organizations

The implementation of the IAEA national project, Strengthening the Nuclear Safety Regulatory Authority and Other Institutions for the Possible Licensing of a New Nuclear Power Plant, was approved by the IAEA Board for the period of 2014–2015 and started in January 2014. Twenty four specialists have participated in workshops and training courses under this IAEA project, and have improved their knowledge. In order to continue preparation for construction of new NPP, the further IAEA national project, Enhancing the Regulatory Infrastructure in Line with International Safety Standards, for period 2016-2017 would be implemented.

IAEA support provided through the national projects helps Lithuanian specialists of nuclear safety to improve their technical knowledge, familiarise themselves with the most relevant international requirements in nuclear safety and the best practice in other countries.

The VATESI cooperates with the United States Nuclear Regulatory Commission since 1994. Current Arrangement (hereinafter – Arrangement) between the United States Nuclear Regulatory Commission (hereinafter – the USNRC) and the VATESI for the Exchange of Technical Information and Cooperation in Nuclear Safety Matters was signed on 14 September 2015, as the extension of similar bilateral cooperation arrangements signed in 1994, 2000, 2005, and 2010. The Arrangement foresees different possibilities for enhancing VATESI specialists' qualification such as to participate in USNRC staff training courses, to acquire on the job training experience by working on a certain period's assignments together with the USNRC staff or to participate in USNRC inspectors visits on reactor operation or reactor construction inspections, including extended briefings at USNRC regional inspection offices.

On 31 December 2014 Memorandum for Information Exchange between the VATESI and the Nuclear Regulation Authority of Japan came in force. The participation of VATESI staff in international training courses and workshops is foreseen in the Memorandum as well.

In 2014-2016 Nuclear Engineering Intensive Courses were organized by Tokyo Institute of Technology and Hitachi, Ltd. in cooperation with Kaunas University of Technology for students and workers of state institutions.

Continuation of development of Nuclear Safety Regulations in line with IAEA and EU requirements, WENRA reference levels and safety goals

Pursuant to Paragraphs 10–11 of the Nuclear Safety Requirements BSR-1.1.1-2014 "Rules of Procedure for Drafting of Nuclear Safety Requirements and Nuclear Safety Rules", approved by the order No. 22.3-58 of the Head of VATESI, 15th of June, 2009, VATESI, while making proposals for new or amended legislation, shall make sure they comply with international treaties ratified by the Republic of Lithuania and they are drafted taking into consideration the best international and national practices of foreign countries, documents of the IAEA, documents of the WENRA and documents of other international organisations and agencies.

The following regulatory requirements were adopted keeping in mind the development of the project of a new power plant:

1) Nuclear Safety Requirements BSR-2.1.3-2010 "General requirements on site evaluation for nuclear power plants";

2) Nuclear Safety Requirements BSR-2.1.4-2011 "Preparation and Use of the Nuclear Power Plant's Safety Analysis Report";

3) Nuclear Safety Requirements BSR-2.1.5-2015 "Commissioning of Nuclear Power Plant".

The new nuclear safety requirements for design and operation of NPP are in the advanced stage of preparation. Furthermore appropriate nuclear safety rules are under preparation as well.

Challenges identified by the Special Rapporteur of the 6th RM

Information was prepared in this chapter in order to reflect in a systematic way the challenges identified by the Special Rapporteur during the 6th Review Meeting of the Contracting Parties to the CNS. These challenges are:

1. How to minimize gaps between Contracting Parties' safety improvements?
2. How to achieve harmonized emergency plans and response measures?
3. How to make better use of operating and regulatory experience, and international peer review services?
4. How to improve regulators' independence, safety culture, transparency and openness?
5. How to engage all countries to commit and participate in international cooperation?

In order to overcome these challenges Republic of Lithuania:

1. After implementing EU stress tests has developed and provided to the European Commission Plan of Strengthening Nuclear Safety in Lithuania (National Action Plan). Important to note, that all the measures for existing facilities are already implemented. In order to be in line with state of the art safety improvements Lithuania actively participates in ENSREG and WENRA activities.
2. Is implementing recommendations of HERCA-WENRA, negotiates with Belarus corresponding bilateral agreement.
3. Participates in IRS and European Clearinghouse activities, willingly provides experts for implementation of IAEA missions programme and in April 2016 successfully hosted IRRS mission.
4. Ensures independency of the regulatory body, further strengthening safety culture, transparency and openness. Currently regulatory body transposes amendments of EU Directive on Nuclear Safety into the national legal system.
5. Actively participates and encourages neighbours to join regional and worldwide networks of nuclear safety.

Also Lithuania seeks to further maintain competence capacities ("know-how") and safety culture on national level (operators, regulators and TSOs) in order to ensure proper understanding of the recent nuclear safety requirements and to maintain the appropriate safety level on nuclear installations taking into account operating experience, insights gained from safety analysis for operating nuclear installations, development of technology and results of safety research, when available and relevant. This goal could be reached with active participation in relevant international cooperation activities, including peer review services, and to transfer gained experience and knowledge during implementation of national nuclear power program.

All these above mentioned challenges are particularly important for countries considering introduction of nuclear power and closely related with questions raised by Lithuania concerning Ostrovets NPP (Belarus) project being developed in vicinity of Lithuania's capital city Vilnius. In this relation Lithuania, as potentially impacted side, is seriously concerned about harmonization of emergency plans and response measures, use of international peer review services and regulatory experience, regulators' independence, safety culture, transparency and openness of Belarus side, as Ostrovets NPP project developer (more details are provided in Article 16.6).

A1. Implementation of the Vienna Declaration on Nuclear Safety

1. New nuclear power plants are to be designed, sited, and constructed, consistent with the objective of preventing accidents in the commissioning and operation and, should an accident occur, mitigating possible releases of radionuclides causing long-term off site contamination and avoiding early radioactive releases or radioactive releases large enough to require long-term protective measures and actions.

2. Comprehensive and systematic safety assessments are to be carried out periodically and regularly for existing installations throughout their lifetime in order to identify safety improvements that are oriented to meet the above objective. Reasonably practicable or achievable safety improvements are to be implemented in a timely manner.

3. National requirements and regulations for addressing this objective throughout the lifetime of nuclear power plants are to take into account the relevant IAEA Safety Standards and, as appropriate, other good practices as identified inter alia in the Review Meetings of the CNS.

1. Safety Requirements for new Nuclear Installations

The position of the Vienna Declaration regarding safety of new nuclear installations is going to be implemented in legal requirements implementing amendment of Nuclear Safety Directive (see Article 18).

2. Safety Assessments and Improvements of the Existing Nuclear Installations

Pursuant to Part 7 of Article 32 of the Law on Nuclear Safety, a licensee shall perform a periodical safety analysis and justification and prepare a periodical safety review report at least every 10 years after the issuance of a permit for the commercial operation of a nuclear installation. If any nonconformities are identified, indispensable corrective measures ensuring the compliance of a nuclear installation with its design documentation shall be developed and implemented, as well as proper fulfilment of all requirements set in legal acts and normative technical documents shall be ensured.

Pursuant to the conditions set in licence for operation of INPP Unit 1, periodical safety review of Unit 1 at the stage of fuel removal from the Unit shall be performed by the beginning of 2017. Therefore, the INPP is in the process of Unit 1 periodical safety review performance. The periodical safety review of INNP Unit 1 is going to be performed in accordance with regulatory requirements and recommendations set forth in the IAEA Specific Safety Guide No. SSG-25 „Periodic Safety Review for Nuclear Power Plants“. The scope of the periodical safety review of INNP Unit 1 was discussed with VATESI and covers at least the following areas:

– site characteristics, taken into account in the design that may impact the safety, and if necessary their reassessment based on new data and new methods used;

– actual status of SSCs important to safety taking into account implemented modifications, ageing effects and other effects which may impact the safety and the design lifetime;

– applicable safety requirements and their implementation, analysis of how the licence conditions are followed;

– analysis of events impacting the safety (review of results of earlier performed deterministic safety analysis for completeness of the set of postulated initiating events for design basis accidents and beyond design basis accidents);

– emergency preparedness issues;

– measures related to radiation protection assurance, including radiological impact of the nuclear power plant on environment, personnel, population;
– fire protection measures and fire risk analysis;
– safety performance indicators and effectiveness of safety and quality management;
– operational experience and effectiveness of the feedback during the period under review;
– aging of SSCs important to safety, effectiveness of aging management;
– use of experience from other plants and research findings;
– operating organization, quality management systems and safety culture, staff training and qualification;
– physical protection issues.

In response to the event at Japan's Fukushima Daiichi Nuclear Power Plant, the European "stress tests" were conducted in 2011 – 2012 at INPP according to specification agreed by ENSREG. The "stress tests" were performed for two permanently shutdown INPP power units, existing Dry Spent Fuel Storage Facility and the New Interim Spent Fuel Storage Facility. Taking into account results and conclusions of INPP "stress tests" as well as suggestions and recommendations provided by peer-review experts , the internal INPP Action Plan was developed and approved by VATESI. Since the planned improvements measures were important to safety, they were also included into the annually reviewed INPP Safety Improvement Programme (SIP-3/2012) followed by their inclusion in subsequent SIP-3/2013, SIP-3/2014, SIP-3/2015 (for more details on SIP see Article 6). More details on INPP "stress tests" results and safety improvements measures associated with post-Fukushima lessons learned are presented in Section A2 of this report.

Safety assessment of radiological consequences in case of beyond design basis earthquake during spent fuel transportation

The evaluation of the spent fuel cask tip over in case of earthquake during transportation as well as assessment of radiological impact of such postulated scenario was carried out in 2016. The Report on Evaluation of Activity Release after a Cask Over-Tipping Accident was developed by the ISFSF construction (B1 Project) contractor and approved by license holder. It provides safety justification of this beyond design basis accident and assessment of its impact to personnel and the environment.

At the request of VATESI the Report on Evaluation of Activity Release after a Cask Over-Tipping Accident was supplemented by additional calculations related to assessment of the capability of special bolts and sealings of the primary lid of the cask to withstand the cask over-tipping and falling down on the solid concrete base during its transportation from the INPP Units to the ISFSF site. The performed calculations, by applying highly conservative model, proved that those bolts of the primary lid keep their tightness, thus the primary lid remains in the dedicated place and prevent scattering of fuel bundles from the cask; the primary lid remains leaktight thus release of radioactive gases and solid particles to the environment is prevented. Regardless of the fact that such scenario of the cask over-tipping during transportation due to external events is unlikely, as a safety improvement measure this beyond design basis accident was included into the INPP Emergency Preparedness Plan documentation.

3. Improvement of the national legislation for nuclear safety

The necessary provisions of the Vienna declaration will be implemented in the national legislation implementing amendment of Nuclear Safety Directive (Council Directive 2014/87/Euratom of 8 July 2014), which sets the similar safety principles as the Vienna Declaration. Provisions of this amendment are going to be implemented in the Law on Nuclear Energy, the Law of Nuclear Safety and in appropriate regulatory requirements.

It should be noted, that requirement for periodical safety review already exists in the Law on Nuclear Safety and in the regulatory requirements. The periodical safety review shall be performed

for nuclear installations at least every ten years. The requirement is going to be updated in accordance with the amendment of Nuclear Safety Directive.

Pursuant to Paragraphs 10–11 of the Nuclear Safety Requirements BSR-1.1.1-2014 "Rules of Procedure for Drafting of Nuclear Safety Requirements and Nuclear Safety Rules", approved by approved by the order No. 22.3-58 of the Head of VATESI, 15th of June, 2009, VATESI, while making proposals for new or amended legislation, shall make sure they comply with international treaties ratified by the Republic of Lithuania and they are drafted taking into consideration the best international and national practices of foreign countries, documents of the IAEA, documents of the WENRA and documents of other international organisations and agencies.

One of the main regulations for possible new build, Nuclear Safety Requirements "Design of Nuclear Power Plant", is going to be based on IAEA Specific Safety Requirements SSR 2/1 "Safety of Nuclear Power Plants" and WENRA positions concerning new nuclear power plants. The SSR 2/1 and the WENRA positions fully reflect principles set by the Vienna Declaration.

A2. Activities related to post-Fukushima lessons learned

Implementation of "stress tests" peer review recommendations and suggestions

In response to the event at Japan's Fukushima Daiichi Nuclear Power Plant, the European "stress tests" were conducted at INPP in 2011 – 2012 according to the specification agreed by ENSREG. The "stress tests" were performed for two permanently shutdown INPP power units, existing Dry Spent Fuel Storage Facility and the New Interim Spent Fuel Storage Facility. Taking into account results and conclusions of INPP "stress tests" as well as suggestions and recommendations provided by peer-review experts, the internal INPP Action Plan was developed and approved by VATESI. Continuing the participation in follow-up activities of "stress tests", the Plan of Strengthening Nuclear Safety in Lithuania (National Action Plan) associated with post-Fukushima lessons learned and „stress tests" peer review recommendations and suggestions as well as results of the IAEA mission on Emergency Preparedness Review that was conducted in Lithuania in 2012 was developed by VATESI. The National Action Plan was prepared in accordance with ENSREG requirements and was presented during the National Action Plans Workshops, which were organized by ENSREG in 2013 and in 2015. More details participation of Lithuanian side in European "stress tests" and follow-up activity are provided in 6th National Report of Convention on Nuclear Safety as well as in ENSREG website (http://www.ensreg.eu/EU-Stress-Tests).

Status and progress of all measures included in the National Action Plan is summarized in the Table 1. The measures provided in the Table 1. reflect the present status and progress on implementation of the National Action Plan. National Action Plan includes 14 measures, 10 of them are implemented and 4 – are in progress. It should be noted that all safety improvement measures related to nuclear safety of INPP Units and operating spent nuclear fuel storage facilities were completed. Remaining safety improvement measures related to IAEA mission on Emergency Preparedness Review, and measure on updating of IAE emergency preparedness procedures taking into account results of evaluation of the spent fuel cask tip over in case of earthquake during transportation (measure No. 5) are under implementation.

Minor changes of the National Action Plan were carried out since it was presented in 6th National Report of Convention on Nuclear Safety. The measures No. 1 and 2 of the National Action Plan were modified in order to reflect WENRA Safety Reference Levels for Existing Reactors, which were updated on 24th September 2014 in relation to lessons learned from TEPCO Fukushima Dai-ichi accident. The measures No. 3 of the National Action Plan was modified taking into account the results of the IAEA mission on Emergency Preparedness Review. The deadlines of measures No. 2, 4, 5 and 13 was changed (for clarification see the relevant comments in Table 1.).

Table 1. Summary of measures of the Plan of Strengthening Nuclear Safety in Lithuania (National Action Plan)

No.	Topic	Measure/Comments	Basis	Status/ Deadline	Responsibility
1.	Natural hazards	**Measure:** To consider the necessity of revision of the national nuclear safety regulations applied to the identification of natural hazards, their assessment and the corresponding assessment for "cliff-edge" (margins) effects in compliance with planed WENRA guidance when it will be issued. **Comments:** The measure is included in the National Action Plan in accordance with WENRA statement. VATESI is participating in the WENRA activities (working group T1 Natural hazards) related to preparation of the guidelines.	ENSREG Peer Review Report Planned WENRA guidance	In progress/ 1 year after issuing of WENRA guidance	VATESI
2.	General	**Measure:** To carry out review of WENRA Safety Reference Levels for Existing Reactors, which were updated on 24th September 2014 in relation to lessons learned from TEPCO Fukushima Dai-ichi accident, and if necessary:	ENSREG Peer Review Report, WENRA Safety Reference Levels for Existing Reactors	In progress/ 2017	VATESI
2.1		- update of existing or develop of new ones national nuclear safety regulations applied to permanently shutdown INPP;			
2.2		- as much as it is applicable update of existing or develop of new ones national nuclear safety regulations applied to new NPP. **Comments:** The updated WENRA Safety Reference Levels for Existing Reactors are going to be reviewed and, were appropriate, national nuclear safety regulations would be improved.			
3.	Emergency preparedness/ Severe accident management	**Measure:** To implement the following actions of EPREV Action Plan:	EPREV review mission report	In progress/ 2016	VATESI
3.1		- in connection with revised emergency classes of INPP, to carry out renew of the "State residents protection plan in case of nuclear accident";			
3.2		- to conduct a joint RSC, Environmental Protection Agency (EPA) under the Ministry of the Environment, VATESI and INPP table top exercise to test collaboration abilities for predictions on radiological consequences, including dose projection and formulating recommendations for residents, in case of nuclear accident;		Implemented/ 2015	RSC, EPA, VATESI, INPP
3.3		- to conduct a joint PAGD, VATESI, RSC and MoH table top exercise to test effectiveness of public information system in case of radiological accident. **Comments:** The measures linked to the results of the IAEA mission on Emergency Preparedness Review and related to emergency preparedness for responding to a nuclear or radiological accident have been included in the National Action Plan after approval		In progress/ 2016	PAGD, VATESI, RSC, MoH

No.	Topic	Measure/Comments	Basis	Status/ Deadline	Responsibility
		of the measures of improvements among all Lithuanian institutions involved in this mission.			
4.	Natural hazards	**Measure:** To evaluate the spent fuel cask tip over in case of earthquake during transportation and to assess radiological impact on the environment, personnel and population. **Comments:** Initially the action was planned to be finished in 2013. The date of implementation of the action is revised taking into account updated schedule of the INPP Interim Spent Fuel Storage Facility (ISFSF) construction project.	National final report on "stress tests"	Implemented/ 2017 (initial deadline 2013)	INPP
5.	Natural hazards	**Measure:** To consider the necessity of improvement of emergency preparedness procedures or updating those after confirmation of the calculation results of the spent fuel cask tip over during transportation. **Comments:** See comment No. 4.	National final report on "stress tests"	Implemented/ 2017 (initial deadline 2013)	INPP
6.	Natural hazards	**Measure:** To assess the robustness and availability of accident management centre of organization of emergency preparedness against an earthquake. If needed, to develop measures to improve the robustness of accident management centre. **Comments:** INPP has performed the assessment of the robustness and availability of accident management centre (AMC) of organization of emergency preparedness in case of earthquake and has prepared the report of the assessment. The seismic analysis, including specific calculations were carried out for the assessment of the robustness and availability of AMC. The model of AMC was developed and computer code (SCAD) was used for calculation of seismic impact. The results of the calculations confirmed the robustness and availability of the AMC in case of earthquake with peak ground acceleration 0,13g. VATESI performed review and approved this report.	National final report on "stress tests"	Implemented/ 2014	INPP
7.	Natural hazards	**Measure:** To consider the possibility of the seismic warning and monitoring system application for formalization of the emergency preparedness announcement criterion and to include this criterion in the operational manual of the seismic warning and monitoring system. **Comments:** INPP has performed assessment of the data, which generates the seismic warning and monitoring system and determined the new criterion for formalization of the emergency preparedness announcement. The new criterion have been included in the operational manual of the seismic warning and monitoring system of INPP. VATESI	National final report on "stress tests"	Implemented/ 2012	INPP

No.	Topic	Measure/Comments	Basis	Status/ Deadline	Responsibility
		carried out the review of documents submitted by the INPP, which are related with implementation of this action, and has approved them.			
8.	Natural hazards	**Measure:** To provide data transfer of the seismic warning and monitoring system to the computer information system of organization of emergency preparedness, i.e. to the accident management centre, technical support organization and emergency control room and to update corresponding procedures of organization of emergency preparedness. **Comments:** INPP has installed necessary hardware options, which ensure data transfer of the seismic warning and monitoring system to the computer information system of organization of emergency preparedness. Relevant emergency preparedness procedures have been updated by INPP and approved by VATESI.	National final report on "stress tests"	Implemented/ 2013	INPP
9.	Natural hazards	**Measure:** To assess the possibilities of the emergency removal and repair works by organization of emergency preparedness for beyond design-basis emergency scenarios related to the level of earthquake above maximal calculated earthquake and resulting in the cracks or collapse of the construction structures of the operating spent fuel interim storage facility and new spent fuel interim storage facility, including casks blockage by debris, as well as cracks or collapse of the construction structures of the "hot cell" of the new spent fuel interim storage facility during the works with spent nuclear fuel in the "hot cell". **Comments:** INPP has performed the assessment of the issues specified in this action and has prepared the report. In the light of this report's findings, relevant emergency preparedness procedures of INPP have been updated and approved by VATESI.	National final report on "stress tests"	Implemented/ 2013	INPP
10.	Design issues	**Measure:** To provide the power supply of water temperature and level instrumentation in the storage pools of both units from diesel generator No. 7 of unit 2 or from the mobile diesel generator connected to Unit 2. **Comments:** INPP has implemented the modification of the emergency power supply system, including installation of special power sockets for mobile diesel generator in different places of Unit 2 building. The relevant operation documentation and emergency preparedness procedures of INPP have been updated and approved by VATESI.	National final report on "stress tests"	Implemented/ 2011	INPP

No.	Topic	Measure/Comments	Basis	Status/ Deadline	Responsibility
11.	Design issues	**Measure:** To provide the diesel fuel supply for assuring long-term operation of emergency diesel generators. **Comments:** INPP has assessed the time of operation of the emergency diesel generators. According to the results of the assessment, demand for extra fuel will occur after more than 5 days of nonstop emergency diesel generator operation. INPP signed a contract with a fuel supply company for supply of additional fuel in January 2012.	National final report on "stress tests"	Implemented/ 2012	INPP
12.	Design issues	**Measure:** To evaluate the capacity for work of water temperature and level instrumentation in the spent fuel storage pools as well as radiation detectors in the spent fuel storage pools halls of both units in conditions of beyond design-basis accident. If needed, to develop the appropriate improvement measures. **Comments:** INPP has performed the evaluation of the equipment performance in conditions of beyond design-basis accident and prepared the corresponding report. Taking into account results of this evaluation, relevant severe accidents management guidelines of INPP have been updated and approved by VATESI.	National final report on "stress tests"	Implemented/ 2013	INPP
13.	Design issues	**Measure:** The special sub-module of the plant computer information system will be developed to provide information about the water temperature and level measurements in spent fuel storage pools as well as radiation level in the spent fuel storage pools halls from both units during and after beyond design-basis accident. The data of water temperature and level measurements in the spent fuel storage pools, radiation level measurements in the spent fuel storage pools halls will be transferred to the computer information system of organization of emergency preparedness, i.e. to the accident management centre and technical support organization. The data of water temperature and level measurements in the spent fuel storage pools will be transferred to the VATESI. **Comments:** INPP has implemented the modification of the plant main computer information system and developed special algorithm, which is dedicated to display data of water temperature and level in the spent fuel storage pools measurements as well as radiation level measurements in the spent fuel storage pools halls in case of beyond design-basis accident. The necessary hardware options have been installed as well, which allows the transmission of the data of water temperature and level in the spent fuel storage pools measurements as well as radiation level measurements in the spent fuel storage pools halls to the computer information system of organization of emergency	National final report on "stress tests"	Implemented/ 2015 (initial deadline 2013)	INPP

No.	Topic	Measure/Comments	Basis	Status/ Deadline	Responsibility
		preparedness. The implemented modification includes the transmission of data of water temperature in the accident management centre of VATESI as well.			
14.	General	**Measure:** To examine existing documents concerning the spent fuel storage pools safety. To review management procedures and manuals of beyond design-basis accidents in the spent fuel storage pools. To evaluate planned and implemented modifications related with the spent fuel storage pools safety. To determine additional measures if needed. **Comments:** I NPP carried out the assessment of the existing documents, planned and implemented modifications, emergency preparedness exercises results and plans and other aspects related to the spent fuel storage pools safety. The results of performed assessment concluded that current and implemented technical and organizational measures of the INPP ensure the high nuclear safety level of the spent fuel storage pools in stage of final shutdown of INPP. VATESI carried out review and assessment of the documents submitted by INPP relating to the implementation of the action and approved them.	ENSREG Country Peer Review Report	Implemented/ 2013	INPP

Compliance with Articles 6 to 19

Article 6 Existing Nuclear Installations

Each Contracting Party shall take the 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. Existing Nuclear Installations as defined in Article 2 of the Convention

The INPP is the only nuclear power plant in Lithuania. It contains two RBMK-1500 type reactors which are water-cooled, thermal neutron with graphite moderators, pressure-tube type boiling-water reactors. Both Units are now in permanent shutdown state. They are under decommissioning process, but still operated and maintained under separate operational licences in accordance with the safe operation conditions and limits set in the Technical Specifications for operation of systems and equipment important to safety and remaining in operation. Based on safety justification documents some of process equipment which are no more required for ensuring safety functions were taken out of operation, isolated and dismantled or are under dismantling process.

Defueling of Unit 1 reactor started in 2006 and was completed in December 2009. Defueling of Unit 2 reactor started in 2010. Currently Unit 2 reactor is loaded with 1134 fuel assemblies as the spent fuel pools are completely filled up (7175 fuel assemblies stored in Unit 1 and 7246 fuel assemblies in Unit 2 spent fuel pools). Defueling of Unit 2 reactor was stopped until commissioning of the new Interim Spent Fuel Storage Facility, while transportation of spent fuel to the existing Spent Fuel Storage Facility of dry type was stopped in mid 2010 as it reached design capacities.

There are a few nuclear facilities for management of radioactive waste and storage of spent nuclear fuel at the site of INPP. These facilities are described in detail in reports issued in accordance with Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

6.2. Overview of significant safety related issues, including events that occurred in the nuclear installations over the last three years, and measures taken in response to these issues

The INPP had reported on 9 events to VATESI, during the period of 2013-2015. All the events were rated at level 0 / below the scale in accordance with INES scale. The events are analysed, reported and preventive and corrective measures directed towards elimination of event consequences and origination causes, as well as prevention of their recurrence are taken in accordance with the established procedures.

In accordance with the tripartite agreement between the Government of the Republic of Lithuania, the IAEA and EURATOM, the INPP has a system to ensure international guarantees providing for periodic checks (inspections) of operating documents, actual number of fissile nuclear materials held by the IAEA and EURATOM inspectors. During the period of 2013-2015 at the INPP 13 common inspections were held by the IAEA and the EURATOM.

6.3. Overview of planned programmes and measures for the continued safety upgrading of nuclear installations

Regardless of the fact that INPP Unit 1 and Unit 2 are in permanent shutdown, INPP further implements the safety improvement measures in accordance with INPP's Safety Improvement Program (SIP-3) which is revised on an annual basis and is submitted it to VATESI for review and approval.

Three SIP-3 measures are being implemented on a permanent basis: the measures for reducing the frequency of an individual exposure (the ALARA principle and radiation monitoring), managing the ageing of the safety-related structures, systems and components and maintaining the qualified condition of the safety-related structures, systems and components.

The following safety improvement measures including ones linked to the post-Fukushima lessons learned and "stress test" peer review recommendations and suggestions (see Table 1 of Section A2.) were implemented during the period of 2013 – 2015:

– Conservation of the fully loaded compartments of the Solid Radioactive Waste Storage Facility (building 157/1);

– Reconstruction of spent fuel storage pools sections by installing armour-plated sheets;

– Construction of Solid Waste Management and Storage Facility;

– Performance of Unit 2 safety related systems equipment and pipes metal inspection and control, including welding seams;

– Define methodology and measuring devices for activity determination of difficult-to-measure nuclides;

– Evaluation of radiological consequences due to over-tipping of a cask filled with spent nuclear fuel during its transportation from the INPP Units to the ISFSF site in case of beyond design basis earthquake;

– Assessment of INPP Accident Control Centre structures robustness calculation and modelling, in case of a beyond design basis earthquake, and blocking INPP Accident Control Centre access in case of fallen structures of the nearby administrative buildings No. 185 and No. 140/2 in case of a beyond design basis earthquake;

– Performance of upgrade of INPP computerised data system enabling to receive data on water level and temperature in Unit 1 and 2 spent fuel storage pools as well as radiation level within the spent fuel storage pools halls in conditions exceeding the normal operation limits including in case of beyond design basis accidents;

– Installation of water level control systems at Unit 1 and 2 spent fuel storage pools was implemented. The installed systems ensure water level control during the normal operation conditions and in case of design and beyond design basis accidents;

– Installation of screen "Beyond design basis accident management" in the Automated Radiation Safety Monitoring System;

– Modification related to provision of additional possibility for Emergency Preparedness Organisation, Technical Support Organisation and Control Room staff to control the spent fuel pools water level and temperature by directly obtaining data from the Unit 2 data-computing system;

– Installation of water level control systems at Unit 1 and 2 spent fuel storage pools, which ensure water level control during the normal operation conditions and in case of design and beyond design basis accidents.

Based on the assessment of the results of the implementation of the INPP Safety Improvement Programme, the planned and implemented measures were sufficient and effective in order to ensure safety functions performance and the safety level of INPP during the period of 2013-2015. Safety Improvement Program (SIP-3) is continued in 2016 year.

6.4. Installations for which decisions on shutdown have been made

In compliance with the protocol of Lithuania's accession to the EU, the INPP Unit 1 was shutdown on 31 December 2004 and Unit 2 was shutdown on 31 December 2009.

In order to establish legal, organizational and technical measures related to INPP decommissioning, radioactive material and radioactive waste management and subsequent supervision and control, as well as foresee measures related to mitigation of the negative social and economic consequences within the Ignalina region as a result of the INPP decommissioning, on 9 February 2015 the Government of the Republic of Lithuania approved the INPP Decommissioning Interdepartmental Action Plan.

The main objectives set in the Action Plan include:

– To ensure safe and fluent INPP decommissioning process by using allocated funds in transparent and efficient manner;

– To mitigate the negative social and economic consequences within the Ignalina region as a result of the INPP decommissioning.

– In order to reach the first objective several tasks must be fulfilled, among which:

– To ensure safe and efficient INPP decommissioning process and its supervision;

– Develop radioactive waste management infrastructure based on the state-of-the-art technologies, ensure safe and effective INPP operational and decommissioning radioactive waste management;

– The following tasks are set for reaching the second objective:

– Provide for the possibility for already dismissed or to be dismissed INPP employees to integrate into the labour market and mitigate dismissal consequences;

– To reduce energy consumption in public facilities and multi-storied buildings within the Ignalina region.

As appendices, the Action Plan contains Measures for Implementation of the INPP Decommissioning Interdepartmental Action Plan objectives and tasks for the period of 2016 – 2018 (amended), and the assessment criteria for reaching the above mentioned objectives.

The Final Decommissioning Plan

The Final INPP Decommissioning Plan (FDP) is the definitive and the only fully inclusive reference document describing how the INPP is being and will be decommissioned which is produced to meet regulatory and legal requirements of the Republic of Lithuania.

In compliance with the Nuclear Safety Requirements BSR-1.5.1-2015 "Decommissioning of Nuclear Facilities" the FDP shall be reviewed at least once per 5 years considering the experience gained during the implementation of the decommissioning process, changes in the decommissioning strategy, decommissioning performance schedule, financing, etc. Therefore, on 25 August, 2014 the Minister of Energy of the Republic of Lithuania approved the updated FDP, Rev 07, by the order No 1-230.

The updated FDP includes all of the decommissioning process changes which have occurred in the period from 2004 to early 2014. On the basis of INPP decommissioning experience, international experience of NPP power units decommissioning, recommendations of the members of the INPP international technical support experts group, a new decommissioning projects structure was developed and implemented in 2013, and on the basis of it the INPP Decommissioning Megaproject Schedule, including the decommissioning costs, has been developed and presented in FDP Rev 07.

Though the final date of termination of the overall decommissioning process has shifted, the adopted decommissioning strategy remains unchanged and is further implemented in compliance with the immediate dismantling strategy.

The overall INPP decommissioning process is subdivided into several stages in order to facilitate coping with arising risks and to ensure reliable distribution of funds and consecutive

implementation of works. In respect to nuclear safety the activities such as handling of spent fuel, modification and isolation of systems, dismantling and decontamination of systems not important to safety is carried out after the final shutdown of the reactors. The preparatory works, actual dismantling and decontamination works are performed by the INPP qualified staff in compliance with the regulatory requirements within the scope of Units operational licences.

The Plan encompasses the entire period of the INPP decommissioning (starting with the preparatory works for step by step dismantling of separate installations, systems and equipment not needed any more to ensure the safe operation and maintenance of the INPP, actual dismantling and decontamination of those installations, construction of new facilities dedicated for interim storage of spent fuel and radioactive waste, removal of spent fuel from the units to the constructed interim storage facility, demolishing of emptied buildings and to the final restoration of the site).

6.5. Statement on the position concerning the continued operation of the nuclear installations

Currently both INPP Units have the status of the permanently shutdown units. Based on paragraph 3 of Article 29 of the Law on Nuclear Safety the Licences for operation of the NPP Units are valid as long as all nuclear fuel is not completely removed from the Units. All requirements pertaining to the power unit in operation are applicable during this period.

Two defueling stages are differentiated in the Decommissioning Safety Analysis Report (DSAR):

– Defueling phase 1 – a stage starting after the final reactor shutdown, when the reactor is cooled down, fuel unloading from the reactor and the subsequent storage of spent fuel assemblies (SFA) in the SFSP or their transportation to Unit 2 for complete burn up (in case of Unit 1). The phase ends up when the reactor is completely defueled.

– Defueling phase 2 – a stage starting after the stage 1 and ends up by SFA removal from the SFSP to the ISFSF, i.e. the complete defueling of the Unit.

Both phases are associated with isolation, preparation for dismantling and subsequent dismantling of systems and equipment that are not needed any more to ensure safety and safe operation of the remaining in operation safety systems and equipment. Dismantling of separate systems and components is performed within the scope of the changed operational Licence conditions issued by the regulatory authority.

The INPP systems and equipment dismantling sequence under the INPP Immediate Dismantling Strategy follows “a building after building” approach and is in detail established within Decommissioning Projects for Final Shutdown and Defueling Phase and is substantiated in corresponding Decommissioning Safety Analysis Reports in compliance with the requirements of the Nuclear Safety Requirements BSR-1.5.1-2015 „Decommissioning of Nuclear Facilities“. Implementation of the following principles ensures safe performance of the D&D process:

– provision of worker safety;

– provision of operational integrity of equipment remaining in operation;

– application of the ALARA principle;

– application of the specific dismantling sequence „dismantling from radionuclide non-contaminated equipment towards radionuclide contaminated equipment;

– use of available equipment and devices, experience gained during implementation of previous D&D projects;

– application of such D&D techniques that lead to generation of minimum quantities of secondary waste and releases (radioactive and nonradioactive) into the environment;

– due to minimisation of dismantled equipment fragmentation at the dismantling sites, equipment is dismantled in as large as possible pieces depending on the load carrying capacity of

lifting devices, sizes of openings made for waste transportation and capacity of fragmentation facilities;

– use of mobile filtering devices for confinement of gases and aerosols;

– provision of separate transportation routes for different activity waste, i.e. free released waste and very low level waste routes are separated to prevent spread of contamination;

– decontamination of very low level waste to allow for subsequent categorisation as conditionally non-radioactive waste leading to minimisation of final disposal costs and environmental impact;

– subdivision of the entire scope of to be dismantled equipment into numerous working areas depending on the equipment location. At a time only the same type of equipment is dismantled.

Construction and commissioning of new facilities for spent nuclear fuel storage and radioactive waste processing and storage will enable to further proceed with the decommissioning activities, thus enhancing the safety level at the Units as:

– Commissioning of the Interim Spent Nuclear Fuel Storage Facility will enable to unload and transport remaining fuel assemblies from the Units thus reducing the risk related to the fuel storage in the reactor core and spent fuel storage pools;

– Commissioning of the Solid Radioactive Waste Retrieval Facility, Solid Radioactive Waste Processing and Storage Facility, Landfill Facility, Near Surface Repository, Reactor Graphite Waste Interim Storage Facility will enable to handle produced operational radioactive waste and waste produced during dismantling and decontamination activity complying with new requirements of the Laws of the Republic of Lithuania, the European Union standards and the IAEA recommendations.

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 licence;

(iii) a system of regulatory inspection and assessment of nuclear installations to ascertain compliance with applicable regulations and the terms of licences;

(iv) the enforcement of applicable regulations and of the terms of licences, including suspension, modification or revocation.

Article 7(1) – The legislative and regulatory framework governing the safety of nuclear installations

7.1. Overview of the primary legislative framework for nuclear safety, including interfacing national legislation

The main laws, regulating nuclear energy, are:

– Law on Nuclear Energy;
– Law on Nuclear Safety;
– Law on Radiation Protection;
– Law on Radioactive Waste Management.

The Law on Nuclear Energy was adopted in 1996 and was amended in 2011 (new edition). Law on Nuclear Energy establishes the general legal basis for activities involving nuclear materials, for other areas of nuclear energy involving sources of ionising radiation and for management of nuclear

fuel cycle materials, including radioactive waste, managed at a nuclear installation. Regulation and supervision of nuclear safety, radiation protection and safety of radioactive waste management in the area of nuclear energy is performed under this Law, the Law on Nuclear Safety, the Law on Radiation Protection and the Law on Management of Radioactive Waste. The amendments to the Law on Nuclear Energy of 2011 establish the basis for a stronger nuclear regulatory authority with functions clearly separated from the functions of other authorities, institutions or organizations engaged in development of the nuclear energy or use of nuclear energy, including production of electricity. Since October of 2011, VATESI is accountable to the President of Republic of Lithuania and the Government of Republic of Lithuania.

The Law on Nuclear Safety, adopted in 2011, among other provisions, establishes a detailed procedure for issuing licenses, permits and other types of authorization, including the documents required and conditions to be fulfilled in order for an activity to receive authorization. This law also establishes the main principles for safety assessment and provides for different types of enforcement measures, including economic sanctions (penalties) for the most severe cases of noncompliance with safety requirements.

The Law on Nuclear Energy and the Law on Nuclear Safety transpose the Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for safety of nuclear facilities.

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 sources, and prescribes general rules for their use. The Law also provides powers and responsibilities to the authorities in this field. Since October 2011, VATESI is responsible for exercising state regulation of and supervision over the radiation protection of those engaged in the activities in the area of nuclear energy involving sources of ionising radiation. Other major amendments to this law were made in 2016. As a result to these amendments, since May 1st, 2016, VATESI is empowered to:

- set requirements for physical protection of sources of ionising radiation used in the area of nuclear energy and supervise their implementation;
- set requirements in nuclear energy area for obligatory radiation safety training, instructing and evaluation of knowledge of persons, responsible for radiation safety, and supervise their implementation;
- set requirements for certification of persons, seeking to obtain the right to train persons, responsible for radiation safety, and perform the certification.

The 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. Since October 2011, VATESI is responsible for establishing the clearance levels of radionuclides for the materials and waste generated during the activities involving sources of ionising radiation in the area of nuclear energy (formerly functions of the Ministry of Environment).

The Law on Radioactive Waste Management and the Law on Nuclear Energy transpose the provisions of council Directive 2011/70/Euratom of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste (the Laws were amended in 2014). The amendments to the Law on Radioactive Waste Management of 2014 are related to the introduction of the new and revision of the current definitions, introduction of additional principles of the radioactive waste management, defining of the content of the radioactive waste management program, specifying authority responsible for preparation and submission of the national reports to the European Commission, establishing deadlines of reporting and notification to the European Commission.

7.2. Ratification of international conventions and legal instruments related to nuclear safety

Lithuania is a party to the main relevant international conventions. There was no new development in the area of ratification of international conventions and legal instruments related to nuclear safety during the reported period. There were several new agreements concluded between VATESI and other regulatory bodies:

– Memorandum for Information Exchange between the VATESI and the Nuclear Regulation Authority of Japan, came into force on 31st of December, 2014;

– Arrangement between the VATESI and the United States Nuclear Regulatory Commission for the Exchange of technical information and cooperation in nuclear safety matters, came into force September 22nd, 2015;

Also Joint Action Plan between the Government of the United States of America and the Government of the Republic of Lithuania on Combating Illicit Trafficking of Nuclear and Radioactive Materials and Related Technology was signed in 2013.

Article 7(2)(i) – National safety requirements and regulations

7.3. Overview of the secondary legislation for nuclear safety and regulations and guides issued by the regulatory body

The most significant regulations and rules issued or amended by the regulatory body during reported period:

Regulatory system, inspection and enforcement:

– Order No. 22.3-58, 15th of June, 2009, approved by the Head of VATESI "On the Approval of Nuclear Safety Requirements BSR-1.1.1-2011 "Rules of Procedure for Drafting of Nuclear Safety Requirements and Nuclear Safety Rules", was amended in 2014 (new edition – Nuclear Safety Requirements BSR-1.1.1-2014 "Rules of Procedure for Drafting of Nuclear Safety Requirements and Nuclear Safety Rules"). The Rules of Procedure for Drafting of Nuclear Safety Requirements and Nuclear Safety Rules establishes rules of procedure for planning and implementing the process of drafting new and amended nuclear safety rules and requirements, adopted by VATESI. The new edition was adopted in order to formally introduce and elaborate on the use of the principle of graded approach in the process of establishing rules and requirements for licensees and to harmonize the Rules with recently amended general rules of legal technique.

– Order No. 22.3-82, 25th of August, 2011, approved by the Head of VATESI "On the Approval of Nuclear Safety Requirements BSR-1.1.3-2011 "Inspections Conducted by State Nuclear Power Safety Inspectorate", was amended in 2016. The most significant changes are:

1) The existing classification of inspections is replaced with a more streamlined, comprised of regular inspections (carried out according to the schedules or other aspects of ordinary activities carried out by an economic entity), technical inspections (witness inspections carried out during technical checks of nuclear facilities' structures, systems and components or equipment, or during other inspections that are performed by an economic entity) and special inspections (other inspections, aimed at inspecting the specific aspects of safety or responding to the existing unexpected, unplanned, unusual situations, occurred unusual event or obtained specific information);

2) More streamlined procedures for inspecting suppliers of license and permit holders are introduced;

3) The right to declare the compliance of the activities in the area of nuclear energy with sources of ionising radiation carried out by licensees or temporary permit holders with the legal acts regulating radiation protection by submitting the Declaration of compliance with the established radiation protection requirements. The submittal of the Declaration results in possibility to decrease the number of inspections of the aforementioned activities;

4) The procedures and forms were revised and amended taking into account the existing practice in order for the requirements to be more comprehensible and transparent;

5) The application of the graded approach to inspection activities for the various facilities and activities was highlighted;

6) The principles for determining of periodicity of regular inspections were updated.

– Order No. 22.3-106, 24th of October, 2011, approved by the Head of VATESI "On the Approval of Nuclear Safety Requirements BSR-1.1.4-2011 "Rules of Procedure for Applying the Enforcement Measures Set by VATESI", was amended in 2016 (new edition – Nuclear Safety Requirements BSR-1.1.4-2016 "Rules of Procedure for Applying the Enforcement Measures Set by VATESI"). The main goal of the amendment was to harmonize the provisions of the Requirements with the new Code of Administrative Offences and describe actions to be taken if an incompliance is found not during a physical inspection (e.g. during the assessment of documents of the supervised legal entity).

– Order No. 22.3-37, 15th of June, 2011, approved by the Head of VATESI "On the Approval of Nuclear Safety Requirements BSR-1.1.2-2011 "Rules of Procedure for Confirmed Written and Published Public Consultations", was amended in 2016 (new edition – Nuclear Safety Requirements BSR-1.1.2-2016 "Rules of Procedure for Confirmed Written and Published Public Consultations"). The main goal of the amendment was to harmonize the provisions of the Requirements with recently amended general rules of providing services in state institutions.

Radiation protection:

– Order No. 22.3-73, 29th of April, 2016, approved by the Head of VATESI "On the Approval of Nuclear Safety Requirements BSR-1.9.4-2016 "On Procedure of Obligatory Radiation Protection Training, Examination, Briefing of Radiation Workers and Radiation Protection Officers Involved in Activities with Sources of Ionising Radiation in Nuclear Energy Area and of Certification of Natural Persons Seeking to Obtain Right to Teach Radiation Protection", was adopted due to amendments of the Law on Radiation Protection in 2016, mentioned in Article 7.1 of this report.

Management system:

– Order No. 22.3-56, 21st of June, 2010, approved by the Head of VATESI "On the Approval of Nuclear Safety Requirements BSR-1.4.1-2010 "Management System Requirements", was amended in 2016 (new edition – Nuclear Safety Requirements BSR-1.4.1-2016 "Management System"). The regulation sets requirements for establishment, implementation, assessment and continuous improvement of the management system of the licensees acting in the field of nuclear energy and defines basic requirements for development of safety culture. The most significant changes are:

1) Broadened scope of application – these requirements are now mandatory to persons with the licence for shipment of nuclear fuel cycle materials, nuclear materials and fissile materials and for acquisition, possession and usage of nuclear materials and fissile materials in quantities established in Annex 1 of the Law on Nuclear Safety;

2) Introducing requirements for security culture;

3) Transposition of the Safety reference levels for existing reactors, issued by the Western European Nuclear Regulators Association (WENRA) on 30th of May, 2014.

– Order No. 22.3-22, 29th of January, 2014, approved by the Head of VATESI "On the Approval of Nuclear Safety Requirements BSR-1.4.2-2014 "Management of Construction of Nuclear Facility", was adopted. It establishes requirements for license holder's quality management system for construction of safety related structures, systems and components of nuclear facilities during the phases of construction, operation, decommissioning of nuclear facilities and surveillance of closed radioactive waste repositories.

Operation:

– Order No. 22.3-99, 7th of October, 2011, approved by the Head of VATESI "On the approval of Nuclear Safety Requirements BSR-1.8.2-2011 "Categories of Modifications of Nuclear

Installations and Procedure of Performing the Modifications", was amended in 2015 (new edition – Nuclear Safety Requirements BSR-1.8.2-2015 "Categories of Modifications of Nuclear Installations and Procedure of Performing the Modifications"). The Requirements establish categories of modifications of nuclear installations and assigns the licensee with the responsibility to document the modification process, carry out safety assessments and in the case of safety related modifications – to submit documents for the approval of VATESI. The new edition endeavours to streamline the modification procedure during construction and commissioning of nuclear facilities and refines upon the description for categorization of modifications.

– Order No. 22.3-141, 16th of July, 2015, approved by the Head of VATESI "On the Approval of Nuclear Safety Requirements BSR-2.1.5-2015 "Commissioning of Nuclear Power Plant". The new nuclear safety requirements sets requirements for commissioning of nuclear power plants with pressurized or boiling light water reactors and pressurized heavy water reactors, including requirements for preparation, content and scope of commissioning programme, management of the commissioning process, implementation of the commissioning programme.

– Order No. 22.3-60, 30th of July, 2010, approved by the Head of VATESI "On the Approval of Nuclear Safety Requirements BSR-1.8.1-2010 "Notification on Abnormal Events in Nuclear Power Plants", was amended in 2015. The amendment introduces a more detailed procedure for analysis of licensees reports on abnormal events, carried out by VATESI. The amendment also establishes procedure for independent investigation of nuclear and radiological accidents, carried out by VATESI, including the scope of the investigation and rights and responsibilities of investigation commission.

– Order No. 22.3-57, 10th of April, 2014, approved by the Head of VATESI "On the Approval of Nuclear Safety Requirements BSR-1.7.1-2014 "Fire Safety of Safety related Structures, Systems and Components important to Safety of Nuclear Facility", was approved to establish requirements for fire safety of structures, systems and components important to safety of nuclear facility. It replaces requirements approved by the Head of VATESI, Order No. 42, October 11th, 2002, of a similar scope. The main goals of the new Requirements are to:

1) Adjust it to the recent general changes in nuclear energy safety legal acts;

2) Establish the applicable criteria and requirements for the protection against fires of safety related structures, systems and components important to safety of nuclear facility, including the commissioning and decommissioning stages, and aims to prevent or to limit the consequences of such fires;

3) Establish the requirements to apply defence in depth principle for the design fire safety assurance measures of safety related structures, systems and components important to safety of nuclear facility;

4) Establish the requirements for subdivision of the nuclear facility buildings into fire compartments and fire cells.

Decommissioning:

– Order No. 22.3-216, November 30th, 2015, approved by the Head of VATESI "On the approval of Nuclear safety requirements BSR-1.5.1-2015 Decommissioning of Nuclear Facilities", was approved. The new requirements replace requirements of 2009 of a similar scope and include following main changes as compared to previous legislation:

1) List of definitions was significantly updated and specified (e.g., decommissioning project, surrogate radionuclides, background radiation, etc.);

2) The provisions for performing various radiological surveys during decommissioning of nuclear facility were clarified (e.g. characterization, scoping, final status, verification radiological surveys);

3) The requirements were harmonized with IAEA's General Safety Requirements Part 6 "Decommissioning of Facilities" and WENRA's Safety reference levels for the decommissioning of nuclear facilities;

4) The requirements for decommissioning projects, safety analysis and justification of decommissioning of nuclear facilities were laid out in more details;

5) Based on experience gained during the INPP's dismantling and decontamination activities, the requirements for dismantling and decontamination activities, removal of structures, systems and components and other preparatory actions for decommissioning during period of transition between permanent shutdown and the issuing license for decommissioning were streamlined.

Radioactive waste and spent fuel management:

– Order No. 22.3-103, May 27th 2015, approved by the Head of VATESI "On the Approval of Nuclear Safety Requirements BSR-3.2.1-2015 "Radioactive Waste Acceptance Criteria For Near Surface Repository", was adopted. The requirements establish waste acceptance criteria for low and intermediate level short-lived radioactive waste to the near surface repository and requirements for radioactive waste packages specifications of low and intermediate level short-lived radioactive waste to be disposed to the near surface repository. The requirements replace the Order No. 22.3-40, 27th of April, 2009, approved by the Head of VATESI of a similar scope.

Nuclear Security:

– Order No. 22.3-37, 4th of April, 2012, approved by the Head of VATESI "On the Approval of Nuclear Safety Requirements BSR-1.6.1-2012 "Physical protection of nuclear facilities, nuclear material and nuclear fuel cycle material", was amended in 2015. The amendment establishes clear criteria for when the division to security areas of nuclear facility has to be reviewed. The amendment also strives to streamline the procedure of preparation, review, renewal and agreement of the security plan and provides for more detailed content of programme for evaluation of effectiveness of nuclear facility physical protection system.

Nuclear Material Accounting and Control:

– Order No. 22.3-85, May 30th, 2014, approved by the Head of VATESI "On the Approval of Nuclear Safety Requirements BSR-1.2.1-2014 "Rules of Procedure of Nuclear Material Accounting and Control, and Provision of Information about Research and Development Activities" and repeal of some Orders approved by the Head of State Nuclear Power Safety Inspectorate", was adopted. It establishes requirements for nuclear material accounting and control and also rules of procedure for provision of information on nuclear fuel cycle related research and development activities to European Commission and VATESI. This document replaces General Requirements of Nuclear Material Accounting and Control and Provision of Information about Activities in the Field of Nuclear Energy or Another Fields Related to the Use of Nuclear Energy (approved by the Head of VATESI, Order No. 22.3-11, January 28th, 2008,) and Recommendations for Implementation of the General Requirements (approved by the Head of VATESI, Order No. 22.3-12, January 28th, 2008). Compared to the previous regulation, the new Rules of Procedure provide for more detailed and mandatory rules and as well as introduce a possibility of accounting for nuclear material in a nuclear material balance zone established by VATESI for natural persons using nuclear material for purposes other than commercial activities and legal persons handling nuclear material for short periods or those not required to obtain a license.

7.4. Overview of the process of establishing and revising regulatory requirements, including the involvement of interested parties

Pursuant to the Article 5 of the Law on Nuclear Safety, the Head of VATESI approves the nuclear safety requirements and the nuclear safety rules, mandatory to all persons acting in the field of nuclear energy and approves the description of the procedure for drafting the nuclear safety requirements and the nuclear safety rules. The procedure of issuing these documents consists of these stages:

1. *Planning*. Pursuant to Nuclear Safety Requirements BSR-1.1.1-2014 "Rules of Procedure for Drafting of Nuclear Safety Requirements and Nuclear Safety Rules", the five-year Program for Development of Normative-Technical Documents, describing priorities and needs of the

development of these documents in the different areas of nuclear safety (the Programme for 2015–2019 is currently in force; it is revised every year) and The Plan for drafting and review of Normative-Technical Documents (for each year) are approved by the Head of VATESI.

2. *Drafting*. The draft of nuclear safety requirements or rules is developed by specialists of VATESI and discussed internally.

3. *Agreement*. The draft of nuclear safety requirements or rules is provided for agreement of other state institutions (if needed) and for comments or proposals of other interested parties (licensees, such as INPP, RATA or VAE) by publishing it in the Legislative Information System of Chancellery of Seimas (Parliament of Republic of Lithuania) (the addressees get notifications about a new draft), which is a mandatory procedure. As the database is public, all drafts are also available for the comments of the public. If there are a lot of relevant and complex comments or proposals, meetings can be organized in order to discuss and solve the issues.

4. *Approval* by the Head of VATESI and *publishing* in the Register of Legal Acts.

Article 7(2)(ii) System of licensing

7.5. Overview of the licensing system and processes including types of licensed activity

The Law on Nuclear Energy and the Law on Nuclear Safety together with the regulations made under the Laws establish the authorisation system for activities related to nuclear materials or nuclear fuel cycle materials, as well as for nuclear facilities during the following life-stages: site evaluation, design, construction, commissioning, operation and decommissioning as well as release from control. The supervision of closed radioactive waste repository, acquisition, keeping, use and transportation of nuclear or nuclear fuel cycle materials is also executed according to the laws mentioned above.

Some of the steps of the licensing process are divided into several sub-steps. Licences, permits and approvals of the documents are used as authorisation steps and sub-steps.

The Law on Nuclear Safety establishes types of licences and permits issued by VATESI. It also should be mentioned that some activities (hold points) during various stages in the lifetime of a nuclear facility require separate authorizations that have to be supported by safety review and assessment.

The Law on Nuclear Safety together with the Regulations on the Issue of Licences and Permits Necessary to Engage in Nuclear Energy Activities and the Rules on Import, Export, Transit and Transport of Radioactive Material, Radioactive Waste and Spent Nuclear Fuel regulates issuance, amendment and suspension of licences and permits, listed in the Law on Nuclear Safety, supervision of keeping, list of documents which have to be submitted for issue of every type of licences and permits or amendments of a licence or permit, and instructions for providing documents, which must be provided in order to get a revocation of suspension of licences and permits. Detailed requirements for the safety document are determined in respective nuclear safety requirements and rules issued by VATESI. Some requirements for content of the documents that applicant is required to provide for the issue and amendment of an appropriate licence or permit are established by the aforementioned Regulation as well.

Together with the application to issue a licence or permit a schedule of application documents has to be prepared and agreed with VATESI. The Law on Nuclear Safety sets requirements and conditions for acceptance of application, acceptance of a schedule of application document, as well as time limits of the acceptance of application and agreement on schedule.

According to VATESI internal management system documents “Procedure Document on Review and Assessment of Safety Justifying Documents” and “Procedure Document for Licensing”, specialists of VATESI have to prepare review and assessment reports as well safety evaluation reports in support to VATESI decisions on the issue of authorization. According to recent practice, safety evaluation reports are usually available to applicant (licence holder) and its summary is available to

public on VATESI website. List of the documents, under which a licence or permit is issued is required to be added to a licence or permit.

The Law on Nuclear Safety sets requirements and conditions and time limits for issuance of a licence and permit. Some additional conditions (e.g., necessary authorisations by other national regulatory bodies) are also established by the Law on Nuclear Safety as well as the Law on Nuclear Energy. Licence or permit has to be issued for an unlimited period of time until official decision of the regulatory body in this regard (with an exception for permits to transport radioactive materials or spent nuclear fuel). The permits to transport radioactive materials or spent nuclear fuel are issued for 3 years period. The Law on Nuclear Safety also determines conditions for making decision not to issue a licence or permit specifying the reasons based on provisions of the Law.

Law on Nuclear safety determines the right of VATESI to set licence or permit conditions. Conditions can be amended in prescribed manner by VATESI.

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

7.6. Involvement of the public and interested parties

VATESI applicants, licence holders, other regulatory bodies involved and public in authorization process are considered as VATESI stakeholders for external communication in the VATESI Manual of Integrated Management System and the Procedure Document on Monitoring of Interested Parties. The Documents define approaches for communication with every group of stakeholders, its expectations, and communication tools.

According to legal acts regulating public information, VATESI has to provide information on VATESI decisions and on the bases for decisions which were made for granting or refusing an authorisation. Usually, the following information is provided to the public:

– short description on the licence, permit or temporally permit issued and licensed activity (or refusal of an authorisation) in VATESI News page on VATESI web site;

– title and requisites of a licence permit or temporally permit holder and number, date of issue, date of amendment or revocation of a single licence or permit in VATESI web page “Services”.

VATESI informs public according to the management system document “Procedure Document on Public Communication”.

7.7. Legal provisions to prevent the operation of a nuclear installation without a valid licence

The Law on Nuclear Safety Article 22, Part 4 prohibits every activity associated with nuclear facility, nuclear materials and nuclear cycle materials without an authorisation issued by VATESI (licence or permit prescribed in the Law).

Article 7(2)(iii) – System of regulatory inspection and assessment

7.8. Regulatory strategies

VATESI carries out inspections of facilities and activities to verify that the authorized party (license holder) is in compliance with the regulatory requirements and within the conditions specified in the authorization (license). The regulatory inspections are conducted at all stages of the lifetime of a nuclear facility: during the evaluation of a construction site for a nuclear facility, construction, commissioning, operation or decommissioning stages. VATESI have right to inspect the applicants for obtaining licenses, permits and temporary permits, license, permit and temporary permit holders,

suppliers of goods or contractors performing works for the holders of VATESI issued licenses and permits, the entities carrying out the assessment of the construction site of the nuclear facility and other entities performing operations related to nuclear or nuclear fuel cycle materials. VATESI inspects activities of an organization that are related to nuclear safety, radiation protection, physical protection and to the fulfilment of obligations on non-proliferation of nuclear weapons.

7.9. Overview of the regulatory inspection and assessment process with regard to the safety of nuclear installations and basic features of inspection programmes

The regulatory inspections of facilities and activities are planned (included in the annual plan) or unplanned. The unplanned inspections can be announced or unannounced. VATESI conducts four general types of inspections, namely Special inspections, Regular (routine) inspections, Technical checks and Regulation checks. Special inspections are carried out by VATESI inspectors to control the satisfaction of defined safety requirements, conditions of structures, systems and components, satisfaction of requirements defined in the normative technical documents of the licence holder. Regular or routine inspections are periodically recurring activities which necessary to control the satisfaction of defined safety requirements by state management and supervisory bodies and by inspected organization. Technical checks are verification of technical conditions of nuclear facility's separate systems, facilities and equipment, defined in the special (operation, test, repair and similar) technical normative documents. The objective of Technical checks is to ascertain that important to safety pressurized components at INPP (equipment and pipelines) have been manufactured, connected, installed, maintained and operated in accordance with the requirements of the regulations and operation manuals, as well as that they are in good condition and it is possible to use them in the course of the start-up – commissioning works and to operate the facility at the specified operational parameters (e.g. pressure and temperature). Regulation checks are inspections of personnel particular actions (activities) given in nuclear facility's Technical Specification (the principal document that defines safety of INPP operation). Usually Regular (routine) inspections, Technical and Regulation checks are carried out by VATESI's resident inspectors from Surveillance Division.

Inspections shall be planned and conducted in compliance with the principle of graded approach, in order to ensure a more efficient use of financial and human resources and to target inspections at activity areas which related to nuclear safety, radiation protection and physical protection and to the fulfilment of obligations on non-proliferation of nuclear weapons and pose a higher potential risk to employees of the economic entities being supervised, population and environment. While selecting the areas for inspections, priority shall be given to areas posing the highest risk to be assessed taking into account the following aspects:

- the quantity, composition and physical state of radionuclides in the nuclear facility or in an individual unit of its equipment, the probability of their spread and their potential impact on employees, population and environment;
- the risk of failure of physical safety barriers containing radionuclides;
- the availability of access to nuclear materials and/or nuclear fuel cycle materials;
- the number of employees and/or population who may be affected by licensed activities, failures of nuclear facility or its individual equipment, including nuclear and radiological unusual events and accidents, and potential damage such failures may do to the environment and property of people;
- data of nuclear facility safety indicators and their variation trends, if applicable;
- for respective SSC:
- safety class (if these are classified in terms of safety);
- seismic category (if these are categorised);
- potential risks of failure and consequences thereof;

– importance to safety under the conditions of external danger (such as extreme meteorological and geological phenomena, etc.);

– passivity;

– the periodicity of implementing maintenance, surveillance and inspection measures to be undertaken by the holder of licence and/or permit, in order to ensure functionality of these SSCs;

– ageing;

– ongoing and/or implemented modifications;

– results of maintenance, surveillance and inspections;

– operational experience of the nuclear facility and SSCs and experience of other persons operating in the sector of nuclear energy;

– results of previous inspections.

Periodicity of inspections is established considering results of previous inspections and essential events, which has influence on organization activities.

The main regulation for conducting regulatory inspection is Nuclear Safety Requirements BSR-1.1.3-2016 „Inspections Conducted by State Nuclear Power Safety Inspectorate“. Based on the BSR-1.1.3-2016, VATESI management document The Procedures for Special Inspections and for Routine Inspections by VATESI were drafted and approved. These procedures were superseded by VATESI management system document Procedure document for inspections PR-6, approved on November 6, 2014.

In 2015, Nuclear Safety Requirements BSR-1.1.3-2011 “Inspections Conducted by the State Nuclear Power Safety Inspectorate” were revised, in order to make more clear provisions related to the procedure of organizing and conducting inspections of supervised economic entities. The revisited legal act came into force on 1 May 2016, and it is followed by the revision of the internal inspection procedures.

The systematic performance of inspections is ensured by developing an annual plan of inspections in accordance with the established criteria and taking into account risk in the corresponding activity. The annual inspections plan involves all types of inspections. Backbone of this plan is Regular (routine) inspections with established periodicity in the procedure document PR-6. Comprehensive analysis of particular area (for instance, management of beyond design basis accidents, quality management, safety culture, ageing management, assessment of operational experience, implementation of modification) are performed during Special inspections. Also description of safety related areas, which should be cover during construction, operation or decommissioning, are described in Procedure document for inspections PR-6. Regular inspections are based on inspection areas (initiating events, safety systems, integrity of physical barriers, emergency preparedness, radiation protection, radioactive waste management), safety indicators (readiness of safety systems, integrity of fuel and others) as well as list of safety related systems (Emergency core cooling system, system of protection against overpressure in the Main Circulation Circuit, Accident confinement system, Service water system, Intermediate circuits, Electric power supply system, Reactor power control systems and others) which are under supervision of VATESI.

The results of an inspection are put down in report, and the organization that has been inspected is familiarized with it. If violations of regulatory requirements or incompliances with good practice are found during the inspection, the enforcement actions shall be applied in accordance with the procedure set forth by the laws. The inspection report together with the document formalizing the enforcement measures shall be sent to the organization. The latter, after having analysed the documents regarding application of the enforcement measures, has to draw up a plan aimed at eliminating detected violations. VATESI performs supervision of the plan of implementation of corrective measures.

Each year the following safety-related areas are inspected: training of INPP personnel, safety systems and safety-related systems (emergency core cooling system, emergency power systems, fire protection systems, system of protection against overpressure in the Main Circulation Circuit and

others), management of beyond design basis accidents, quality management, management of radioactive waste, safety culture, ageing management, emergency preparedness, assessment of operational experience and others. The number of inspections performed by VATESI during period 2013-2015 are presented in Figure 7.1.

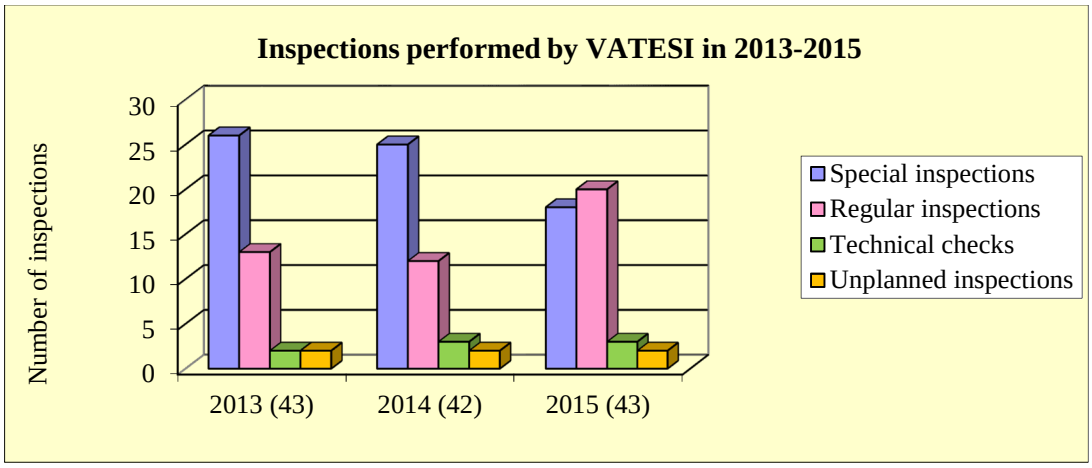


Figure 7.1 Inspections performed by VATESI in 2013–2015

Article 7(2)(iv) – Enforcement of applicable regulations and terms of licences

7.10. Power for legal actions

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

7.11. Overview of enforcement measures available to the regulatory body

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

VATESI is empowered to impose the following administrative enforcement measures:

– to issue an economic entity with a written order to eliminate insignificant violation of requirements of legal acts;

– to issue the licence or permit holder with a warning from the Head of VATESI before issuing them with the mandatory requirement;

– to provide mandatory requirements to all licence or permit holders, committing them to eliminate the detected violations in nuclear safety, to suspend the works within the time-limits set by the Head of VATESI and/or to shut-down the nuclear reactor, to decrease its capacity, to discontinue operation of other equipment or activities according to Law on Nuclear Safety;

– to warn the legal entity about suspending of the license, permit (temporary permit), to suspend the license, permit (temporary permit), to revoke the license, permit (temporary permit);

– to warn natural persons with an attestation certificate to train persons responsible for radiation protection about suspension of attestation certificate, to suspend attestation certificate, to

warn about termination of the validity of attestation certificate and to terminate the validity of attestation certificate;

– to impose administrative fines on natural persons according to Code of Administrative Offences of the Republic of Lithuania;

– to impose fines on legal entities according to the Law on Nuclear Safety (otherwise known as economic sanctions).

7.12. Experience with legal actions and enforcement measures

In the period of 2014–2016 VATESI issued:

– mandatory requirements to eliminate detected violations of the nuclear safety requirements and rules (to take remedial actions);

– warnings to the licence holders about consequential suspension of the licence.

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.

Article 8(1) – Establishment of the regulatory body

8.1. Legal foundations and statute of the regulatory body

In accordance with national legislation, the Convention on Nuclear Safety, 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 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. VATESI activities are financed by the Lithuanian state budget appropriations and other legitimate income.

VATESI's statute was amended in 2016 due to new functions assigned to VATESI pursuant to the amendments of the Law on Radiation Protection (see Article 7.1 of this report). VATESI carries out its activities in accordance to strategic action plan and annual plan, approved by the Head of VATESI.

8.2. Mandate, mission and tasks of the regulatory body

The legal framework establishes the VATESI as a single organization, responsible for state regulation and supervision of nuclear safety in Republic of Lithuania. VATESI sets safety requirements and rules, supervises compliance with them, applies enforcement measures in case of incompliance with safety requirements and rules, issues licenses, permits and temporary permits, assess safety of nuclear facilities and related activities.

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

The main tasks of VATESI in the area of nuclear safety is regulation and implementation of state regulation and supervision of nuclear safety, radiation safety of nuclear energy activities involving sources of ionizing radiation, physical protection of nuclear installations, nuclear materials and/or nuclear fuel cycle materials and accountancy and control of nuclear materials as well as supervision of requirements arising from international nuclear weapon non-proliferation obligations of Republic of Lithuania. Other tasks of VATESI:

– preparation and submission of national reports in accordance with international conventions and agreements;

– taking part in the activity of the IAEA, missions, commissions and committees of safety experts – advisors;

– within VATESI's competence, cooperating with and participating in international organisations, associations and forums (ENSREG, WENRA, EURATOM, etc.);

– developing and maintaining multilateral and bilateral cooperation (with the IAEA, Sweden, the US, Japan, Ukraine, etc.).

Decisions are taken independently by VATESI in carrying out its the statutory functions. VATESI responsibilities are kept apart from other institutions, agencies or organizations engaged in development of nuclear energy or nuclear energy utilization features.

8.3. Authorities and responsibilities of the regulatory body

The Law on Nuclear Energy (last amendment in 2014) provides for main legal authority and responsibilities of Regulatory Body. Furthermore, the duties and responsibilities of VATESI are stated in the Statute of VATESI (Government resolution No. 1406 of 21 of November, 2012, as amended in 2013 and 2016). According the Law on Nuclear Energy, VATESI exercises functions of the state regulation and supervision and performs the following main functions:

– creates and improves the state regulatory and supervision system for nuclear safety, radiation safety in the area of nuclear energy, physical protection of nuclear installations, nuclear and nuclear fuel cycle materials, as well as accounting and control of nuclear materials;

– prepares and submits to the Government drafts of laws and legal acts regarding regulating areas, and drafts and approves requirements and rules mandatory to all the state and municipal authorities, also to all persons engaged in such activities;

– supervises the compliance with requirements of the legal acts regulating nuclear safety, radiation safety in the area of nuclear energy, physical protection of nuclear installations, nuclear materials and nuclear fuel cycle materials, accounting for and control of the nuclear materials;

– supervises the implementation of requirements arising out of the international obligations for non-proliferation of nuclear weapons assumed by the Republic of Lithuania;

– analyses and assesses the documents submitted by applicants for obtaining a licence or a permit, also the documents submitted by licence holders or permit holders or other persons, adopt relevant decisions regarding such documents, review and evaluate the nuclear safety;

– supervises and inspects applicants, licence and permit holders or the persons rendering services, supplying goods or performing works for them or other persons engaged in activities pertaining to nuclear materials and nuclear fuel cycle materials;

– in the cases specified in the laws applies enforcement measures, suspends licences and permits, revokes suspension of licences and permits, or cancels licences and permits, establishes or changes their terms, supervises compliance with such terms, requires for implementation of corrective measures and elimination of infringements, and shall monitors the implementation of such requirements;

– in the event of a nuclear and/or radiological accident provides the interested state and municipal authorities with the time-critical information about the radiation situation in the nuclear

installation, estimated threats of the nuclear and/or radiological accident and other related information.

Exercising the entrusted functions of state regulation and control of nuclear safety, VATESI has the right:

– to receive all information requisite for the review and evaluation of nuclear safety from persons, applicants and licence holders implementing the nuclear installation design, as well as from their service and goods providers, contractors or persons carrying out other activities related to nuclear and/or nuclear fuel cycle materials;

– in a manner prescribed by the laws and other legal acts receive all information and documents necessary for regulation and monitoring over the nuclear safety compliance with the requirements arising out of the obligations for non-proliferation of nuclear weapons and other international obligations assumed by the Republic of Lithuania from all the persons that possess such information;

– to coordinate actions with other state regulatory and/or municipal institutions, if it is required for the performance of the functions of the nuclear safety regulation;

– to obtain the services provided by experts and consultants, scientific-technical support organisations, other independent suppliers that are not related to the applicants, licence holders or persons involved in other activities related to nuclear and/or nuclear fuel cycle materials.

8.4. Organizational structure of the regulatory body

The structure and competence of VATESI and its resources corresponds with the nature and scope of the activities in the field of nuclear energy, activities involving nuclear materials and other activities in the field of nuclear energy involving sources of ionising radiation undertaken and planned to be undertaken in the Republic of Lithuania.

VATESI's staff comprises of state officials, public servants and employees, working under employment contracts. VATESI is headed by its Head, who has two Deputy Heads. The Head is appointed by the President on the proposal of the Prime Minister for a term of six years. The Deputy Heads are appointed by the Prime Minister on the proposal of the Head of VATESI for a term of six years.

VATESI structure consists of 5 divisions and Administration department directly subordinate to the Head of VATESI, 3 divisions subordinate to Deputy head for Radiation Safety and 4 divisions subordinate to Deputy head for Nuclear Safety. Divisions are headed by heads of divisions. Work of a particular division is organized in accordance with the statue of the division and job descriptions of VATESI public servants and employees. Heads of divisions are personally responsible for the tasks and functions assigned to their units, and organization of labour discipline inside the division as well as they are responsible for implementing delegated tasks by the Head, Deputy Heads or Director of the Department, taking into account the subordination. Since January 1st, 2014, VATESI has an Internal Audit Division, responsible for carrying out internal financial and activities' audits. Current organizational structure is provided in Figure 8.1.

8.5. Development and maintenance of human resources of the regulatory body over the past three years

From the middle of the year 2013 until the middle of 2016 there was a natural turnover of staff: of the permanent staff 2 civil servants retired and 4 civil servants left VATESI for different reasons and 5 new public servants were hired to take their place.

In June 2016 the number of VATESI full-time staff positions was 75, and 68 of these 75 positions were filled (57 public servants, 8 employees under employment contracts and 3 state officials).

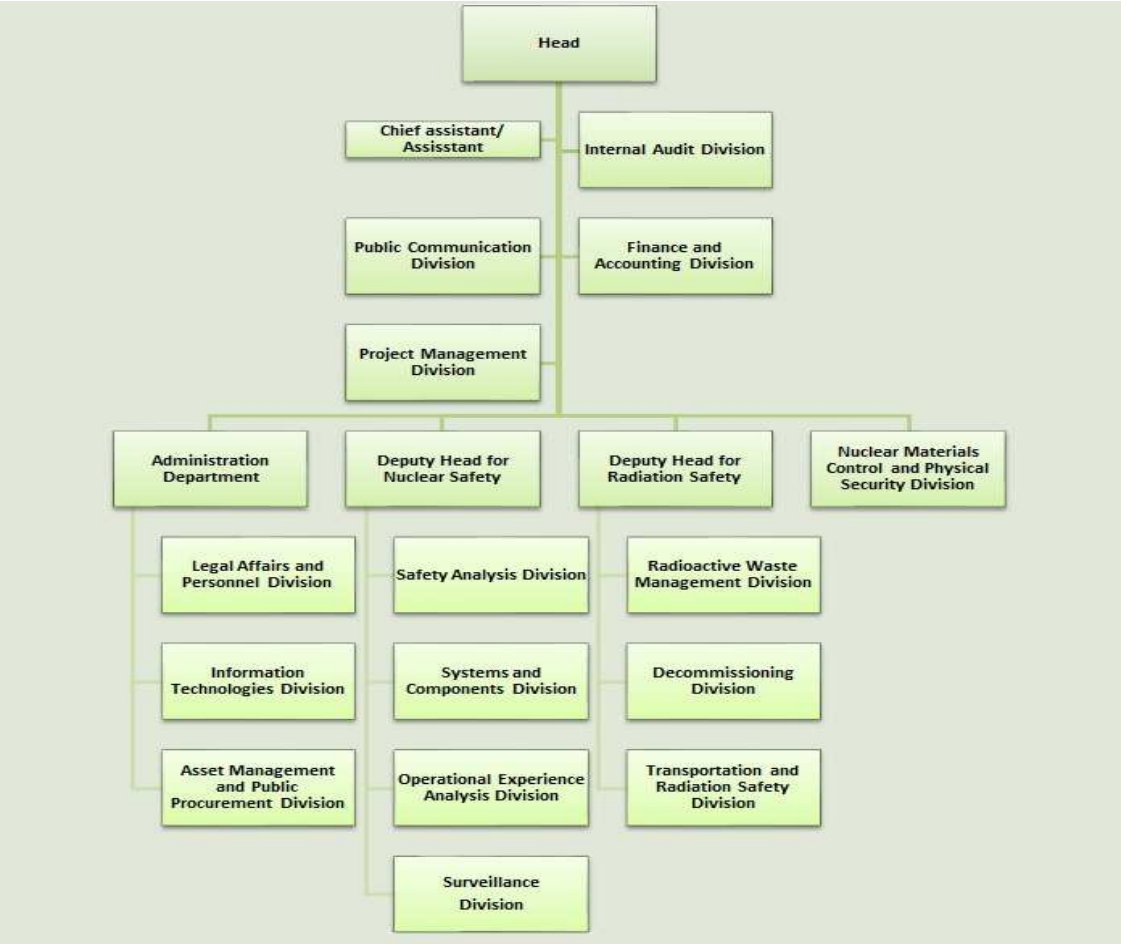


Figure 8.1 Current VATESI administrative structure.

8.6. Measures to develop and maintain competence

One of the most important goals of VATESI in order to complete regulatory functions in a timely and appropriate manner is to maintain highly qualified and equipped with special knowledge personnel.

Over reported period different methods of training – formal training (courses, workshops), introductory training of public servants, initial internal training, lecturing by VATESI employees, independent study, work with more experienced specialists – were used in order to maintain the qualification of more experienced employees and to train new employees. Dividing by topic, training included training of basic administrative skills and abilities, needed for public servants, and training of special professional knowledge (e.g. specific nuclear technologies).

In III–IV quarters of 2013 31 VATESI employees improved their skills at different training events in Lithuania, in 2014 – 49, in 2015 – 57 and in I–II quarters of 2016 – 25. Over reported period VATESI specialists also actively participated in the qualification improvement events arranged by the IAEA. In all, 47 VATESI specialists took part in 124 training events.

8.7. Developments with respect to financial resources of the regulatory body over the past three years

VATESI is a state-financed institution financed from the national budget. VATESI budget is approved every year in the framework of the State Budget allocated to all state administrations. VATESI drafts its budget proposal and presents it to the Ministry of Finance and the Government for consideration. The final State Budget is approved by the Parliament of Republic of Lithuania.

8.8. Statement of adequacy of resources

Over the reported period, during which VATESI was financed from State Budget, VATESI financial resources were adequate to its needs. Over reported period human resources were adequate to VATESI needs, taking into consideration the state of the nuclear energy programme in Lithuania.

8.9. Management system of the regulatory body

VATESI has established and implemented integrated management system (IMS), aligned with the safety goals and corresponding to the requirements of standards ISO 9001:2008 and IAEA's Safety Requirements the Management System for Facilities and Activities No. GS-R-3. The scope of IMS includes all VATESI activities and functions. The VATESI management system is applied in the area of regulation and supervising of nuclear safety, physical protection of nuclear power facilities, physical protection of nuclear materials and nuclear fuel cycle materials, radiation safety of activities with ionising radiation sources in the nuclear power area, international obligations of the Republic of Lithuania with regard non-proliferation of nuclear weapons. IMS application relates to VATESI activities in the following areas: nuclear power safety, quality, environmental protection, information safety, and occupational safety and health.

VATESI, with a help of external experts, has analysed existing management system, all regulatory responsibilities and functions, delegated to VATESI, all applicable national statutory and regulatory requirements, all requirements for the management system, determined in ISO 9001 and GS-R-3 standards, and using process approach identified 30 processes (see Figure 8.2). VATESI IMS processes are grouped into core, management and supporting processes for the implementation of delegated functions.

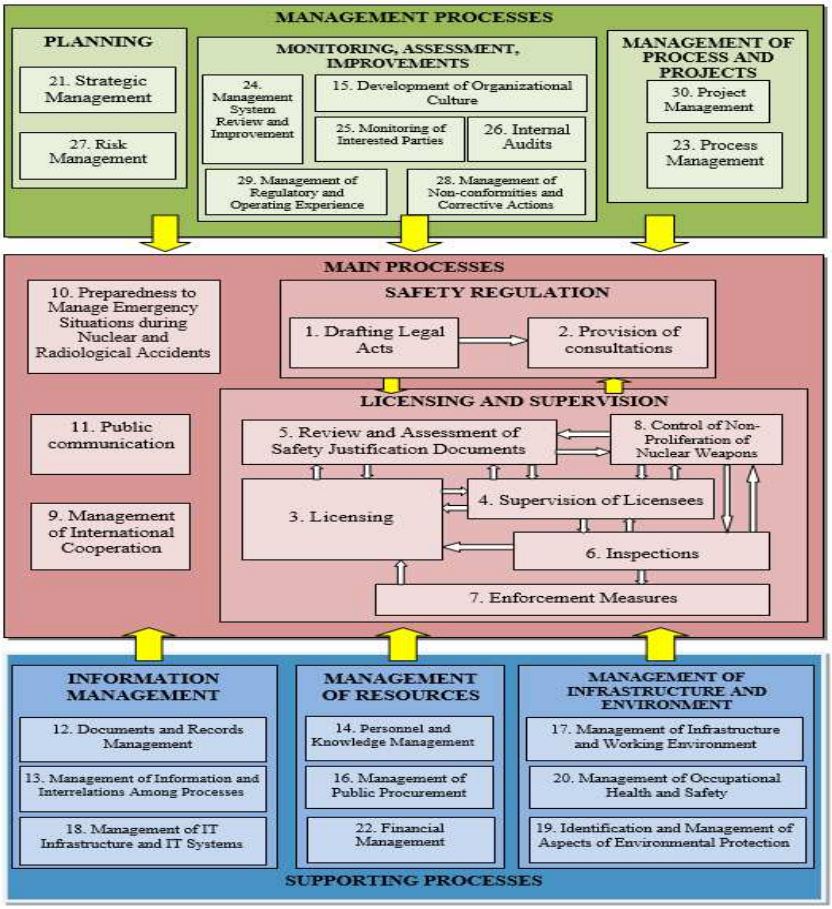


Figure 8.2. Process interaction chart of VATESI IMS

8.10. Openness and transparency of regulatory activities, including actions taken to improve transparency and communication with the public

VATESI and the licence holders must inform both the state and municipal institutions and the general public as well as other persons whose business activities are directly related to the licensed activities of a relevant licence holder about the conditions of nuclear safety in the manner required under the Law on Provision of Information to the Public and other legal acts. The organisations operating nuclear installations also must inform general public about the measures that are foreseen in the emergency preparedness plans which may have an impact on regular living conditions. VATESI has to deliver public announcements on the results of supervision the implementation of nuclear safety requirements. While implementing its regulatory functions VATESI provides confirmed written and/or public consultations to the legal entities that submitted written requests and/or questions or provides public consultations on its own initiative.

The main means of ensuring the transparency of the decisions:

– draft legal documents are public in order to inform and get a response (suggestions, remarks, comments) from interested parties;

– consultations and meetings are organized on different issues with interested parties;

– regular public announcements on the information about the condition of nuclear safety in the Republic of Lithuania are announced;

– information on issues licences, permits, other authorizations is published on VATESI's website;

– all legal acts are public.

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

– reports on implementation of conventions and EU law;

– VATESI annual reports (Nuclear Power Safety in Lithuania) and annual reports to The President and the Government in terms of activities and finances;

– VATESI website, press releases and other publications;

– possibility for students from universities to visit VATESI.

To improve transparency and ensure feedback, VATESI organizes surveys of stakeholders, including public.

The Annual Report of VATESI "Nuclear Power Safety in Lithuania" is also used as a measure of public communication. VATESI informs interested parties and public by publishing it online and sending it by mail to our interested parties, including local governments of Visaginas city and districts of Ignalina, Zarasai and Širvintos. It is also received by email by subscribers of our website.

8.11. External technical support

VATESI cooperates with the TSOs of Lithuania as well as of foreign countries, which provide VATESI with expertise and necessary technical-scientific support during safety reviews, verification of safety justifications, drafting of legal acts. Some TSOs are involved in international projects implemented through international and bilateral cooperation, coordinated by VATESI. Legal acts do not establish an advisory body for VATESI.

Pursuant to Article 45 of the Law on Nuclear Safety, in selecting specific contractors, the principle of impartiality of the contractors shall be applied. The TSOs or experts and consultants which have already participated in preparing the documents on a nuclear installation design or the documents required for the evaluation of nuclear safety that were submitted when obtaining a licence or participated in the preparation of such documents under request of the licence holder, shall not participate in performing the review and assessment of the same documents. The TSOs and the

experts and consultants shall declare compliance with this requirement and their impartiality in the course of their selection carried out in the manner set out by the legal acts.

During the reporting period the main VATESI cooperation directions with the Lithuanian TSOs are following:

– the evaluation work of decommissioning, equipment decontamination and dismantling of nuclear facilities at the INPP;

– expert services for VATESI in terms of the technical documents and the justifications of the INPP.

Although services to support VATESI's regulatory functions and the corresponding budget for that are planned in advance, VATESI can purchase these services as soon as the need is determined.

Expert support and advice is being secured in the frame of VATESI support projects in the area of decommissioning and waste management. Support to VATESI in the area of decommissioning has been an ongoing action since 2001 and is continued under the Ignalina Programme. Currently VATESI implements the sixth project. It is used for reviews of decommissioning-related submittals by technical support organisations. Technical support organisations are engaged to review decommissioning-related submittals, assisting VATESI in identification of requirements, documentation analysis, providing recommendations for improvements and conclusions, and performing test calculations, if needed. The consultants prepare a review of the relevant submittal (Dismantling and Decontamination Project, Technical Design Documentation, Safety Analysis Report, etc.) reports and as part of the review support work, representatives from the consultant also participate in meetings between the VATESI and INPP, the producers of the documents reviewed. The main technical support organizations of Western Europe and Lithuania that participate in the project and are engaged to review safety justifications of the interim storage facility for spent nuclear fuel assemblies and solid radioactive waste retrieval facility from the existing storage facilities and new treatment and storage facilities for INPP are following: Riskaudit (as managers of the project), IRSN (France), GRS (Germany), Kaunas University of Technology (Lithuania), former Institute of Physics (Lithuania).

It is also worthwhile mentioning, that while implementing its duties to establish requirements and rules in the field of nuclear safety VATESI prepares drafts of legal acts and submits them for remarks and proposals to the state institutions, licence holders, TSOs and the public.

Article 8(2) – Status of the regulatory body

8.12. Place of the regulatory body in the governmental structure

VATESI is an independent state institution exercising the state regulation and supervision of nuclear safety, activities involving nuclear materials and other activities in the area of nuclear energy involving sources of ionising radiation which acts in accordance with the Law on Nuclear Safety, other laws and the Statute of VATESI. 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 authorization is granted by VATESI. Over reported period VATESI's position in Governmental structure remained as shown in Figure 8.3.

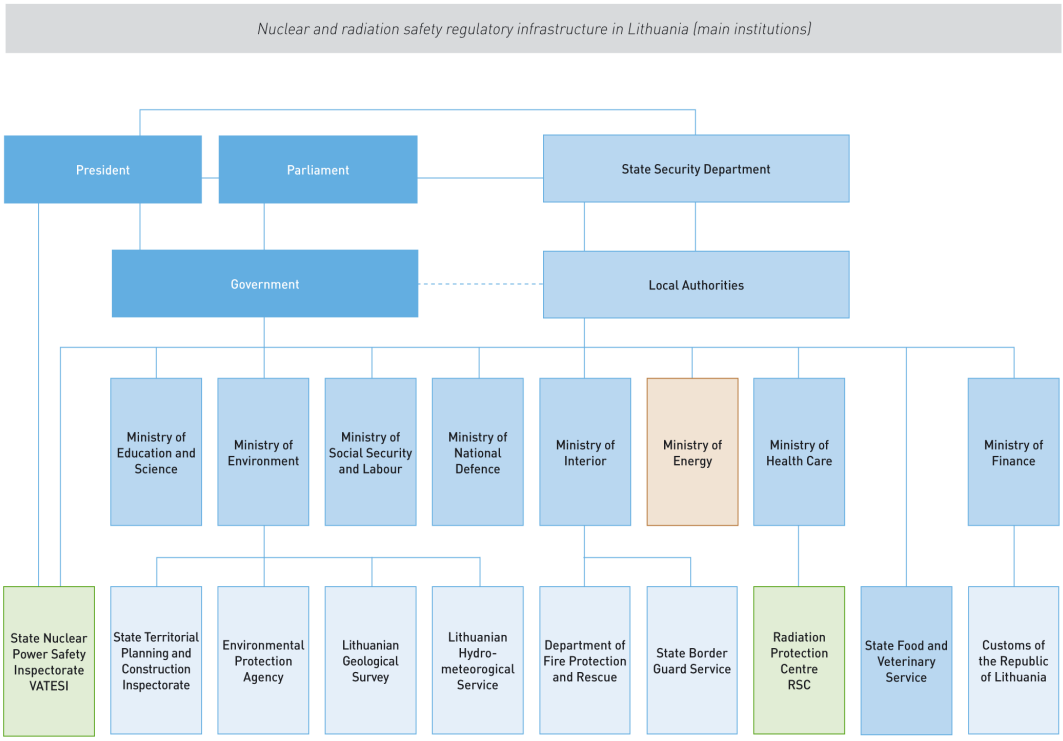


Figure 8.3 VATESI position in Governmental structure

8.13. Regulatory body reporting obligations

The Head of VATESI is responsible for activities of VATESI and accountable to the President and the Government. VATESI informs other national and international bodies about its activities according to the national and international legal acts and treaties. In accordance with national legislation, VATESI coordinates its activities with other state bodies and institutions responsible for radiation safety and health care, emergency preparedness, civil protection, environmental protection, industrial safety and supervision of potentially dangerous industrial facilities.

By 1st May each year VATESI has to submit an annual report on activities of VATESI and a set of financial statements to the President and to the Government of the Republic of Lithuania and have to make them public in the manner laid down in the legal acts. The President and the Government may invite the Head of VATESI to present the annual results of VATESI in terms of its activities and finances.

In 2014 VATESI submitted the first report to the European Commission on the implementation of Council Directive 2009/71/EURATOM of 25 June 2009 Establishing a Community Framework for the Nuclear Safety of Nuclear Installations and will have to submit the second report no later than by 22nd of July, 2020 as required by Council Directive 2014/87/Euratom of 8 July 2014, amending Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations.

8.14. Means by which effective separation of the regulatory body from the agencies responsible for promotion of nuclear energy is assured

National legislation provides clear division between the responsibilities and functions of VATESI and those organizations or bodies engaged in development/promotion of the nuclear energy or use of nuclear energy, including production of electricity. The independence of VATESI as a regulatory body is deeply engraved in the national legislative system, as it is both established as a

principle in the laws and implemented through other legislative provisions and in practice. All of the following aspects of independence of regulatory body are present in Lithuanian legislation:

– All of the functions of VATESI and other state authorities that take part in regulating the activities in the area of nuclear energy are clearly defined in the laws and specified in secondary legislation, hence there are no duplications or omissions;

– The Head of VATESI, therefore VATESI itself, is accountable to the President of Republic of Lithuania and the Government of Republic of Lithuania. Moreover, the Law on Nuclear Energy sets a clear finite list of objective reasons for dismissal of the Head and Deputy Heads of VATESI, which allows to ensure that the state officials making the most important regulatory decisions shall not be dismissed on undue grounds;

– Pursuant to the Law on Nuclear Energy, VATESI is financed from state budget. Financial resources are allocated pursuant to VATESI's Strategic Action Plan, which is approved by the Head of VATESI. As a separate owner of allocations, VATESI shall have a right to dispose the allocated funds in a discretionary manner;

– VATESI is free to define and establish the structure of VATESI within the maximum allowable number of positions;

– Regarding decision-making, the Law on Nuclear Energy establishes the principle, that the Head and Deputy Heads of VATESI in their official capacity shall act independently from the persons engaged in activities in the field of the nuclear energy sector, also from other agencies, institutions or organisations engaged in development of nuclear energy sector, including generation of electricity. Independent activities imply a prohibition to be a member of a body of a legal entity, to accept other remunerated or public positions, to provide services or consultations, except the ones provided acting in the official capacity at VATESI, or to be engaged in other activities due to which a certain person, other agency, institution or organisation acting in the nuclear energy sector would or might gain unjustified competitive advantage over the persons engaged in relevant activities. A breach of this requirement shall be qualified as a serious misconduct. Moreover, the legal acts regulating civil and public service provide for legal means to require the employees of VATESI to be impartial, unselfish, objective and avoid the conflict of public and private interests, including the obligation to opt out from any actions that can cause a conflict of interests;

– Other institutions do not agree on, review or evaluate VATESI's regulatory decisions. In some cases, decisions have to be made or other activities have to be carried out by other institutions before VATESI makes a decision, for example, a permit shall be issued or conclusions received from another authority, but such decisions are made within their area of competence, therefore there is no duplication with VATESI's area of competence;

– Liability for the nuclear safety is clearly allocated. Pursuant to Article 16 of the Law on Nuclear Safety, full liability for the nuclear safety of a nuclear installation and for nuclear safety in carrying out other activities with nuclear and/or nuclear fuel cycle materials shall solely fall on persons that are engaged in such activities and hold relevant licences and/or permits. Several Nuclear Safety Requirements also have a provision, declaring, that supervision activities by the regulatory body do not relieve the licensee from responsibility for safety.

Article 9 Responsibility of the Licence Holder

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

9.1. Formulation in the legislation assigning the prime responsibility for safety to the licence holder

Article 3 of the Law on Nuclear Safety of the Republic of Lithuania establishes basic principles for ensuring nuclear safety where the first one is the principle of liability for ensuring nuclear safety.

Article 3 of the Law on Nuclear Energy of the Republic of Lithuania identifies the legal principles of activities involving nuclear materials and other activities in the field of nuclear energy involving sources of ionising radiation. The first paragraph of the article states, that activities involving nuclear materials and other activities in the field of nuclear energy involving sources of ionising radiation in the Republic of Lithuania shall be permitted only subject to a licence or a permit issued by an authorised state institution. If such activities are conducted without a licence or a permit, they shall be held illegal and shall incur legal responsibility as provided by the laws of the Republic of Lithuania. The second paragraph states, that a licence holder or a permit holder shall be liable for compliance of the activities pursued thereby with the requirements of this Law, the Law on Nuclear Safety, the Law on Radiation Protection, the Law on Management of Radioactive Waste, other laws and legal acts. The final paragraph of the article defines, that an applicant having filed an application for a licence or a permit, and a licence or a permit holder shall notify state and/or municipal authorities, international organisations and the general public of the intended or pursued activities in the manner prescribed by the Government or its authorised institution.

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

The Law on Nuclear Energy of the Republic of Lithuania identifies the following responsibilities of a licence holder:

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

– A nuclear installation shall be used only for the intended purpose as stipulated in its design. The purpose of nuclear installations may be changed in accordance with the procedure provided in the legal acts.

The licence holder shall:

– include into accounting the nuclear materials belonging to the nuclear installation or used in the operation and exercise their control in such a manner as to ensure performance of the obligations of the Republic of Lithuania regarding the guarantees of the IAEA and the European Atomic Energy Community (the EURATOM);

– investigate nuclear and/or radiological accidents and nuclear incidents in the manner prescribed by the laws and other legal acts;

– notify VATESI and other interested institutions in the manner prescribed by the laws and other legal acts about all the violations of conditions and requirements for nuclear safety and all the malfunctions of the structures, systems and components ensuring safety of a nuclear installation, also shall notify promptly about a nuclear accident and/or radiological emergency, and shall inform of

level of the accident estimated according to the International Nuclear and Radiological Event Scale (INES) and recommended actions for protection of the population;

– analyse and evaluate the risk of nuclear and/or radiological accidents in the nuclear installation to the population, their property and environment and shall prepare an emergency management plan as well as ensure preparedness to mitigate the consequences of a nuclear accident and/or radiological emergency in the nuclear installation;

– perform other duties established on the grounds of Law on Nuclear Energy and other laws.

In addition, Organisations operating nuclear installations and other holders of licences and/or permits, according to the national legal requirements shall:

– have the material, financial and human resources that are sufficient for involvement in the licensed activity or operations regulated by permits in compliance with the legal acts and technical standard documents of nuclear safety;

– ensure high level of safety culture and competence of the organisation and its workers;

– on a regular basis analyse the state of nuclear safety and improve it;

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

– maintain an effective integrated management system with due priority on nuclear safety;

– develop an organisational structure which would ensure the fulfilment of nuclear safety policy formation, implementation and control functions;

– ensure radiation protection of staff and population during normal operation, and for design basis and beyond design basis accidents not to exceed the allowed levels of exposure for staff and population;

– implicitly follow the conditions of the licence;

– ensure quality of the licensed activity, proper management of documentation, its storage during all life-time of a nuclear installation, renewal in time and approval by licensing authority when it is necessary;

– be responsible for the safety of a nuclear installation even if the validity of the licence is suspended or it is revoked;

– monitor emissions of radionuclides into the environment in a systematic manner;

– monitor and investigate the contamination of a nuclear installation/site and environment in a systematic manner and present to the regulatory institutions with the data about emission of radionuclides, contamination of a nuclear installation/site and the environment;

– apply principles of “defence-in-depth” and the ALARA.

A licence holder is liable for the nuclear damage resulting from the activity subject to the licence or related to that activity to the natural and legal persons, their property or to the natural environment. The organization shall insure a nuclear installation or procure in some other way the funds necessary to compensate for the damage after a nuclear accident as assumed by the Republic of Lithuania according to the Vienna Convention on Civil Liability for Nuclear Damage.

9.2. Description of the main means by which the licence holder discharges the prime responsibility for safety

Since the final shutdown of both INPP units, the INPP mission changed from that of an electricity producer to that of a decommissioning organization while still a regulated nuclear facility. Therefore, the INPP goals are to safely and in an adequate manner carry out activities related to the INPP reactors final shutdown and implement the INPP decommissioning activities, nuclear and radioactive material and waste management by effectively and consistently implementing the required measures, as well as reasonably and efficiently using the funds allocated for implementation of the INPP decommissioning and related measures.

The integrated management system based on processes (see Article 13 of this report) implemented at the INPP encompasses all organizational components (including its structure, resources, processes and safety culture) in order to set the goals and tasks for the enterprise and to enable to reach these goals and tasks which among others include: safety, quality, environment protection, worker safety and health, fire, radiation, physical protection, economic aspects and social responsibility. The main objective of the INPP management system is to ensure and improve safety during the decommissioning process in such a manner as other requirements laid down for the enterprise and (or) its needs would not be evaluated separately from the requirements for safety, as well as in order to avoid potential negative impact to safety.

9.3. Description of the mechanism by which the regulatory body ensures that the licence holder discharges its prime responsibility for safety

VATESI is obliged to ensure the state regulation and supervision of nuclear safety and radiation protection at nuclear installations and other related organizations. According to the Law on Nuclear Safety of the Republic of Lithuania the main target of VATESI in the area of nuclear safety is to exercise the state regulation of, and supervise over the nuclear installations and the activities related to nuclear and nuclear fuel cycle materials, in order to protect the society and the environment against the harmful impact of exposure to ionising radiation. The main tasks of VATESI in the area of nuclear safety is development and regular improvement of the nuclear safety regulatory system, evaluation of safety of nuclear installations and the activities related to nuclear and nuclear fuel cycle materials, issuance of licences and permits, monitoring of the compliance with legal acts by conducting inspections, and if required – application of enforcement measures in the manner set forth by the legal acts of the Republic of Lithuania. Also see Chapter 8.3 of this report.

9.4. Description of the mechanisms whereby the licence holder maintains open and transparent communication with the public

The INPP, according to legislations of the Republic of Lithuania, as well as to inner documents of the enterprise, maintains transparent communication with authorities, public, press and local society about the enterprise's financial status, provides information related to nuclear safety. The enterprise prepares and distributes information about unusual events to state institutions, local authorities, public, as well as by placing information on the INPP website www.iae.lt.

Pursuant to the provisions of the Law on Environmental Impact Assessment of the Planned Economic Activity of the Republic of Lithuania and the Procedure for Notification and Participation of the General Public in the Environmental Impact Assessment Process of the Planned Economic Activity, the developed Environmental Impact Assessment Reports are placed on the INPP external website for the notification and familiarization of the general public. Hard copies of the reports are available at the INPP Communication Division and the local Municipality for those wishing to read the reports. The affirmative decisions regarding the possibility to carry out the planned economic activity under consideration issued by the responsible institution are published on the INPP external website.

Based on the Nuclear safety requirements BSR-1.4.1-2016 „Management system", INPP has developed the procedure for information concerning interested parties who raised reasonable claims or expressed their opinion about INPP activities, provision, administration and responsibility for usage of that information.

Pursuant to the established procedure, INPP Communication Division informs the society periodically and maintains open communication with the public on the issues related to the enterprise; relevant decisions taken, implementation or completion of the decommissioning projects, structure of the enterprise, environmental safety, technical visits and other INPP activities related information.

The Management Procedure “External and Internal information” was reviewed and approved in July 2015. 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 condition, 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 the Communications Department personnel placing the constantly updated information at INPP 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.

9.5. Description of the mechanism ensuring that the licence holder of the nuclear installation has appropriate resources (technical, human, financial) and powers for the effective on-site management of an accident and mitigation of its consequences

Ministry of Energy of Republic of Lithuania executes control over financing of the INPP, assigns an independent auditor to review financial documentation of the INPP, and approves financial results of the INPP. During the process for confirming the adequacy of applicant’s financial resources VATESI verifies the applicant's financial capacity in the Register of Legal Entities. According to the requirements of VATESI licensee shall prepare and approve list of safety related staff, specifying the job, competence requirements and the required minimum number of employees, also licensee shall have a long-term plan of obtaining employees. If the licensee intends to change the organizational structure or the number of employees, this change shall be implemented as a modification with the relevant safety justification and shall be approved by VATESI (also see Articles 11, 12 and 14 of this report).

The Law on Nuclear Safety establish the general requirements for the prevention of nuclear and radiological accidents and nuclear incidents and emergency preparedness. Pursuant to Article 35 of the Law on Nuclear Safety in order to prevent nuclear and/or radiological accidents, nuclear incidents and other unusual events as well as to avoid their reoccurrence and to secure and further improve safety in the area of nuclear energy, at all stages of a lifecycle of a nuclear installation the licence holder shall be required to regularly analyse its own or other persons that are engaged in the nuclear energy sector experience as well as to exchange such experience and take necessary preventive and/or corrective measures that would ensure proper performance of nuclear safety requirements in the manner prescribed by the VATESI (also see Articles 15, 16 and 19 of this report).

Article 10 Priority to Safety

Each Contracting Party shall take the 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. Overview of arrangements and regulatory requirements regarding policies and programmes to be used by the licence holder to prioritize safety in activities for design, construction and operation of nuclear installations

Safety as the highest priority is emphasised within the Law on Nuclear Energy of the Republic of Lithuania and within the national system of regulation of nuclear safety. The first article of the Law identifies the main goal of state regulation in the field of nuclear energy – to ensure nuclear safety and preclude impermissible use and proliferation of nuclear materials and technologies.

According to the Law, the safety requirements and other legal documents the INPP established its policies, necessary structures, activities and integrated management system based upon the priority on safety. The VATESI performs the regulatory activities to ensure constant adherence of the licence holders to the safety requirements and proper prioritization of safety.

Pursuant Lithuania's legislation, the licence holder bears full responsibility to ensure the safety. The Law on Nuclear Safety of the Republic of Lithuania determines the basic principles based on IAEA Safety Fundamentals for ensuring nuclear safety.

10.2. Measures taken by licence holders to implement arrangements for the priority of safety

INPP Policy Statement

The INPP, being the Operating Organization, is responsible for nuclear installation safety assurance in accordance with the international practice and pursuant to provisions of Article 3 of the Law of Nuclear Safety of the Republic of Lithuania undertakes full responsibility for the plant safety and establishes policy that gives the top priority to the plant safety.

INPP Safety culture development

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. During reporting period Safety culture management procedure and procedures for evaluation of safety culture were reviewed at INPP within the frame of integrated management system of organization. For safety culture evaluation INPP uses questionnaires (every three years), safety culture indicators (quarterly) and self-assessment of activities (once per year). Safety culture evaluation reports are submitted to the VATESI and managers of INPP departments.

At INPP monthly meetings are held. 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.

The Director General of the INPP 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. Mainly those measures are the results of self-assessment of activities and evaluation of safety culture indicators.

The main objective of the programme is to orient behavior of the plant personnel and contractors, also plant management methods to the achievement of the highest priority – SAFETY.

The safety culture development programme, results of safety culture evaluation and principles of strong safety culture are presented on internal website of INPP. This information is constantly updated.

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, 2004, 2008 and 2013. 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 by using questionnaires is planned for the end of 2016.

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 works were performed concerning the conduction of the Safety Culture training course for plant employees and contractor personnel. During this training course the personnel were familiarized with principles of strong safety culture also with

safety culture evaluation methods and with results of safety culture evaluation for the past period. Updated version of the safety culture training manual was issued in 2015.

INPP also once per year organizes a Seminar for plant staff in order to maintain their qualification. One of the topics of seminar is the review of reports on events at INPP related to the disadvantages of safety culture.

Independent reviews, inspections and audits

At the INPP is established the Department of Audit, Safety and Quality Management. The main responsibilities of that Department are performance of independent reviews, safety inspections and internal audits of processes of organization integrated management system.

Audit of the implementation process for management procedure MS-001-4 “Safety Culture Management Procedure” was performed in June 2015. The purpose of the audit was to assess the implementation of management procedure MS-001-4, which was reviewed and issued on 2014. During the audit recommendations were presented for the Safety Culture training manual and for the INPP personnel training inspection. All recommendations are planned to be implement until October 2016.

Self-assessment

Each division of organizational structure of INPP performs self-assessment once per year. Scope of self-assessment consists of:

- evaluation of goals and plans implementation of past year;
- evaluation of corrective actions implementation related to results of internal and external independent assessments;
- evaluation of personnel preparation and qualification;
- evaluation of inspections results of workplaces, instrumentation, equipment and etc. which were performed during last year;
- evaluation of preparedness of procedures related to operation and technical maintenance of safety systems and components of the plant;
- evaluation of proposals of employees;
- preparing suggestions to safety culture development programme for the next year.

Visaginas Nuclear Power Plant

Regardless the VNPP project preparatory works implementing company is not a license holder and not even an applicant for obtaining a license for activities in the field of nuclear power yet, this organization recognizes the safety as a top priority for both on-going and planned future activities the company. For that purpose a safety policy in the company has been developed.

The Management of the Visaginas NPP project preparatory works implementing company considers safety to be the most important part of the activities of the company and undertakes to ensure adequate execution of safety functions. The general goals of safety are as follows:

- understanding of the main aspects of the safety culture in the activities of the company, its contractors, and sub-contractors;
- timely provision of employees with resources and means necessary for safe and successful work;
- systematic and consistent development and assessment of the safety culture;
- environmental protection and preservation.

The Management of the Visaginas NPP project preparatory works implementing company understands safety as a system of the specific features of the organisation and its employees, knowledge about possible consequences of the activities and provisions (including values) of importance for safety as well as relevant practice, which preconditions proper and comprehensive attention of all employees to safety including but not limited to the following: observance of the effective safety rules, work with certified tools and equipment, fostering of safe work culture, and

escalation of safety issues to the Management of the Visaginas NPP project preparatory works implementing company.

The Management of the the Visaginas NPP project preparatory works implementing company undertakes the following obligations:

- to perform activities in a safe manner and to follow the established requirements;
- to give preference to safety over other priorities or goals;
- constantly improve safety and develop the safety culture;
- establish measures which allow proper execution of safety supervision.

10.3. Regulatory processes for monitoring and oversight of arrangements used by the licence holders to prioritize safety

The requirement for operating organization to implement, maintain and develop management system giving due priority to nuclear safety is set in the Article 17 of the Law on Nuclear Safety and Nuclear Safety Requirements BSR-1.4.1-2016 “Management System”. The management systems of licence holder is the subject for regulatory review and assessment and regulatory inspections as well (also see Articles 7(2)(iii), 13 and 14 of this report)

The VATESI continuously monitors safety culture of the INPP by the following activities:

- inspections and other activities to assess licensees’ compliance with requirements of the granted licence and other requirements;
- reviewing quarterly safety culture related reports on INPP safety culture indicators and organizational issues related to safety culture;
- review of results of the surveys for assessing safety culture at the INPP;
- performing review and assessment of the INPP submittals (e.g. on safety important changes to the INPP organizational structure);
- quarterly and other meetings with INPP management.

10.4. Means used by the regulatory body to prioritize safety in its own activities

Safety as the highest priority is emphasised within VATESI Mission, MS documents, strategic and annual plans of the VATESI activities and nuclear safety requirements. The main goal of the VATESI strategy is to assure high level of nuclear safety. The VATESI has established and continuously improves system of nuclear safety requirements.

Safety oversight is performed on the basis of specific and clearly defined requirements. Every VATESI employee must perform his duties with responsibility, using his professional knowledge and experience, enhancing his qualification and sharing the knowledge with the colleagues.

The VATESI management system is integrated into the everyday work and ensures that the employees receive the necessary information, assistance and tools to perform their tasks properly. Heads of the divisions are responsible for the quality of work performed and services provided by their divisions. Each employee is responsible for the quality of work performed by him. Activities of the VATESI are based upon principals of honesty, openness and clarity. The VATESI provides reliable and correct information on nuclear safety in Lithuania to the public in timely and proactive manner. Corporative VATESI activities and those of individual employees are subject of continuous improvement which is based on the self-assessment.

Article 11 Financial and Human Resources

1. 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.

2. 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.

Article 11(1) – Financial resources

11.1 Mechanism for the provision of financial resources to the license holder or applicant in order to ensure the safety of the nuclear installation throughout its lifetime

After the final shutdown of the INPP Unit 2 in December 2009 up to present, the following parties take part in financing the activities related to the INPP safe maintenance and performance of decommissioning activities:

- European Community under the Ignalina Programme (IP);
- INPP Decommissioning Fund (DF);
- INPP own means (INPP);
- Ignalina International Decommissioning Support Fund (IIDSF);
- Lithuanian Republic budget (LR).

Breakdown of planned and actual INPP expenses by the source of financing are shown in Tables 11.1 and 11.2. It was planned that about 85% of the total annual decommissioning expenses would be covered by the European funds, the rest – by the national funds. Actual proportions are shown in Table 11.3.

Table 11.1 Breakdown of planned and actual INPP expenses by the source of financing *(KEur)*

Source	2013		2014		2015		2016
	Plan	Fact	Plan	Fact	Plan	Fact	Plan
IP	63 523	52 404	53 147	46 565	46 399	44 114	46 236
NDF	8 859	7 705	7 351	6 044	4 246	2 478	3 569
INPP	4 795	1 364	1 306	254	1 872	1 541	4 923*
IIDSF	85 123	40 380	84 430	70 518	34 050	36 105	15 631
SBF	8 246	6 862	7 832	7 140	8 148	7 842	6 759
Total	**170 546**	**108 715**	**154 066**	**130 521**	**94 715**	**92 080**	**77 118**

*sum of 157 000 Eur is included as technical support from Sandia National Laboratory

Table 11.2 Breakdown of planned and actual INPP expenses by the source of financing for different expense items (KEur)

Expense item	2013		2014		2015		2016
	Plan	Fact	Plan	Fact	Plan	Fact	Plan
Payments for personnel	37 155	36 051	38 811	37 245	38 478	37 996	38 341
Utilities	21 066	17 247	18 201	13 585	14 048	11 604	11 667
Works & Services, Equipment & Supplies	24 322	12 895	16 496	12 848	9 906	7 884	12 496
Taxes	1 085	214	373	139	673	584	386
Decommissioning projects	86 918	42 308	80 185	66 704	31 610	34 012	14 228
Total	**170 546**	**108 715**	**154 066**	**130 521**	**94 715**	**92 080**	**77 118**

Table 11.3 Actual proportions of funds distribution

Source	2013		2014		2015		2016
	Plan (%)	Fact (%)	Plan (%)	Fact (%)	Plan (%)	Fact (%)	Plan (%)
European funds	87	85	89	90	87	87	80
Lithuanian funds	13	15	11	10	13	13	20

As of January 1st, 2016 there was EUR 4.95 million EUR accumulated in the INPP National Decommissioning Fund. The average amount to be allocated from the Fund to the INPP decommissioning activities is approx. EUR 4.5 million per year. The order of the Minister of Finance of the Republic of Lithuania No. 1-14 dated 30 January, 2014, states that proceeds from disposition of assets of the SE INPP shall be transferred to the account of the INPP National Decommissioning Fund. However, the risk of funding gap in the nearest future still remains and the issue related to the replenishment of the NDF itself is still ongoing. Financing of the activity by IP funds is performed in accordance with the annual activity programs developed on the basis of annual tasks under the INPP decommissioning schedule (Megaproject).

Council Regulation (Euratom) No 1369/2013 of 13 December 2013 on Union support for the nuclear decommissioning assistance programme in Lithuania, and repealing Regulation (EC) No 1990/2006 establishing that the financial envelope for the implementation of the Ignalina Programme for the period from 2014 to 2020 shall be EUR 450 818 000.

In 2014, in order to optimize the activity of the State Enterprise INPP Decommissioning Fund by providing for a single administrator of the Fund as well as to include a provision establishing the proceeds obtained from the sale of the property of INPP during the closure as resources of the Fund, the Law on the State Enterprise INPP Decommissioning Fund was amended.

New version of INPP Final Decommissioning Plan was finally agreed and adopted 25th August, 2014 by the order No.1-230 of Minister of Energy. INPP decommissioning works are planned until year 2038, and calculated INPP decommissioning costs (excluding inflation and risks) amounts to 2,6 billion euros.

To improve the legal regulation of the administration of the funds of the Programme for the Administration of the Ignalina Programme in Lithuania as well as to effectively implement the 2014–2020 Ignalina Programme in Lithuania, the Ministry of Energy prepared the Rules for the Implementation of the 2014–2020 Ignalina Programme in Lithuania which were agreed with the Ministry of Finance and Public Institution Central Project Management Agency and adopted on 3 September 2015 (Order No. 1-205/1K-282 of the Minister of Energy of the Republic of Lithuania and the Minister of Finance of the Republic of Lithuania).

New INPP decommissioning interinstitutional plan was adopted 9th of February, 2015 by Decree of Government. This plan was created in order to assure visibility and effectivity of planning and use of European Union and national financial resources in activities related to INPP decommissioning performed by different Lithuanian institutions. Demand of European Union and National financial resources, values of assigned measures are planned for 3 years period and updated every year.

Financing Model for new Visaginas NPP

The VAE SPB is not a licence holder but this organization is responsible for project preparatory works that are necessary in order to have proper arrangements, after the establishment of project implementing company, to develop new VNPP construction project. The VAE SPB is a special purpose vehicle company for the implementation of the VNPP project establishes and 100% owned by “Lietuvos energija”, UAB which is a state-owned company and the Ministry of Finance holds 100% shares of it.

Project Company (PCO), once established, will coordinate, supervise and inspect the carrying out of the Project and construction of the VNPP. Once the VNPP will be commissioned the PCO will operate the installation.

The VNPP project participants are: Lithuania, regional partners – Latvia and Estonia, and the Strategic Investor – the Japanese company Hitachi together with Hitachi-GE Nuclear Energy as technology provider. According to the Lithuanian legal requirements, Lithuania will have no less than 34% of the VNPP shares. The VAE SPB will be national "Lithuanian Investor" to the new NPP construction project and will take presumably 38% of PCO shares. The remaining shares will be distributed among other participants of the project. The VNPP project is being developed based on the Mancala model. According to the model, the investors in the VNPP will get electricity at cost price in proportion to the amount of shares they have.

It is envisaged that the investment costs would be funded by shareholder equity or through third party debt, secured by the shareholders. In the case of Lithuania a small proportion of the total investment cost is already identified as funded via the contribution in kind of the site and already completed development activities. The financing plan is based on conservative assumptions on scope of debt financing. Each of the shareholders would commit to fund the full investment requirement under their shareholding obligations even at a zero debt basis. The proportions of funding to be provided from different sources are yet to be finalized (i.e. whether funded at corporate level or using the shareholder secured financing). The VNPP construction project will be financed by export credit agencies: JBIC, US ExIm and NEXI backed commercial bank loans. It is also planned that the investors will formally apply to obtain debt funding both from the European Commission under EURATOM and from the EIB. Several debt financing options are being considered, including lending enabling prospective shareholders to receive ECA financing at the shareholder level then passed on further to PCO to finance the Project. Based on the letters of interest from the export credit agencies and other financing sources, a maximum leverage level of up to 70% of the overall required investment in the project would be possible.

Securing Finances for VNPP Decommissioning

Lithuanian Law on Nuclear Energy requires that operator of the nuclear installation shall ensure accumulation of the resources in the fund for decommissioning of the nuclear installation (the Decommissioning fund) required for safe decommissioning of the nuclear installation and management of radioactive waste. The operator of the nuclear installation shall be entitled to secure its obligations related to financing of the safe decommissioning and management of radioactive waste by furnishing to the Government or its authorised institution a guarantee in the prescribed amount. The procedure for establishing the guarantee and the terms for its delivery, the time limits of the guarantee, the amount of the guarantee and other mandatory requirements shall be regulated by the law on the decommissioning fund or the legal acts implementing the law on the decommissioning fund.

The principal objective of the decommissioning fund shall be accumulation of resources required for safe decommissioning of a nuclear installation and safe management of radioactive waste, including spent nuclear fuel. The decommissioning fund (or funds) shall be established by a law. The law on the decommissioning fund shall inter alia set forth:

- sources for accumulation of the fund resources;
- tasks for which the resources are accumulated;
- principles of management and control applied to accumulation and use of the resources;
- principles for using the resources before beginning the decommissioning of the nuclear installation without prejudice to the principal objective of the decommissioning fund;
- measures for continuity of accumulation of resources in the event the nuclear installation is decommissioned due to unforeseen circumstances.

The resources of the decommissioning fund may be used only for implementation of the measures and the tasks for which the resources were accumulated based on their intended purpose.

The law on the decommissioning fund and corresponding legal acts are yet to be adopted; provisions of these draft acts shall be based on Comparison among Different Decommissioning Funds

Methodologies for Nuclear Installations, study made by Wuppertal Institute on behalf of the European Commission Directorate-General Energy and Transport, and is compliant with the Commission Recommendation on the management of financial resources for the decommissioning of nuclear installations, spent fuel and radioactive waste (2006/851/EURATOM).

Lithuanian legislation requires Preliminary Decommissioning Plan together with application for nuclear facility construction license to be prepared and submitted to the VATESI. The purposes of the plan are accumulation of sufficient funds for safe decommissioning of the nuclear facility, early as possible planning of the measures facilitating the decommissioning and gather all information important for the decommissioning.

11.2. Statement with Regard to Adequacy of Financial Provisions

Lithuania ensures the sufficient financial provisions to ensure safety and activities of the INPP and the VNPP.

11.3. Processes to Assess Financial Provisions

The Ministry of Energy executes control over financing of the INPP, assigns an independent auditor to review financial documentation of the INPP and approves the financial results of the INPP.

Director General of the INPP is responsible for INPP safety and undertaken activities and implements decisions regarding the INPP activities and its decommissioning taken by the Parliament (Seimas), the Government, Ministry of Energy and Management Board, formed by the Ministry of Energy.

11.4. Description of arrangements for ensuring that the necessary financial resources are available in the event of a radiological emergency

Organisations operating nuclear installations or other persons engaged in the activities referred to in paragraphs 1 and 2 of Article 22 of the Law on Nuclear Safety must hold a licence and/or permit issued by the VATESI and must have material, financial and human resources that are sufficient for involvement in the licensed activity or operations regulated by permits in compliance with the legal acts and technical standard documents of nuclear safety.

Nuclear safety requirements BSR-1.4.1-2016 Requirements for the Management System provides requirements on integrated management system, which ensures that health, environmental, security, quality and economic requirements are not considered separately from safety requirements, and gives due priority to nuclear safety in all stages in the lifetime of installation. The licence holder must ensure necessary financial, material, human and technical resources are in place as well as administration rules and technical requirements, scientific support and effective management system during all stages of lifetime of a nuclear installation.

Article 11(2) – Human resources

11.5. Overview of the arrangements and regulatory requirements concerning staffing, qualification, training and retraining of staff for nuclear installations

The enterprise employs a number of highly experienced staff members with unique expertise. The knowledge and experience of each employee is applied as much as possible in the activity of the enterprise.

Since 1 January 2010 the main activity of INPP is decommissioning. Today many employees employed in the enterprise have a huge experience, unique knowledge that shall be maintained and

applied. While implementing the decommissioning projects the knowledge and experience of these employees are applied at most. The procedures, manuals and guidelines in the field of personnel management are developed in accordance with the IAEA standards.

As of 1 January 2016 the INPP personnel is well educated and properly trained (total – 2106):

– 43% of personnel have higher education (905 employees);

– 21% – specialized secondary education (422 employee);

– 36% – vocational schools (464 employees); general secondary education (300 employees) and unfinished general secondary education (15 employees).

Due to the intention of the INPP management to implement as many projects as possible using internal manpower of the enterprise, and taking into account qualification of the INPP personnel and the performed works on equipment dismantling and decontamination, it was decided to refuse the services of external organizations and to perform as many works as possible by the INPP own resources. Due to this fact at the beginning of 2011 the amount of employees working at INPP started to rise. The need for INPP personnel is determined in accordance with the personnel needs calculation methodologies by types of activities, depending on the scope of work projected in the long-term INPP decommissioning Megaproject schedule and annual work plans. As of 1 January 2016 the amount of employees was 2106. In order to realize some short-term projects, employees are hired under the fixed-term employment contracts.

11.6. Methods used for the analysis of competence requirements and training needs for all safety related activities in nuclear installations

Human Resources Management covers all the INPP internal processes by improving operational efficiency; making more transparent and optimized the key activity processes; optimizing servicing functions; creating new organizational structure; providing for staff training, developing necessary competence, upgrading employees' qualification and preparing replacement of significant for the enterprise positions; creating a unified value-based organizational culture.

By means of the enterprise structure optimization and improvement of relationship between structural divisions, on 1 November 2012 INPP passed on the new organisational structure. It was the first stage of large-scale reorganization of the INPP organisational structure. On 2 February, 2015 the second restructuring stage was implemented when activity planning and project management functions were centralized and activity planning and performance functions were separated. In 2015 the dismantling processes analysis was performed and dismantling process restructuring was initiated, the implementation thereof is planned for 2016. In addition, in 2016 next organizational restructuring is coming up by centralizing maintenance functions, as well as restructuring related to commissioning of the new Spent Nuclear Fuel Storage Facility and Solid Radioactive Waste Management and Storage Facilities.

In 2013 the INPP realized public procurement of consulting services for the staff workplace/ position assessment and wage system creation. Based on the recommendations regarding the wage system, INPP began to develop and implement a new wage system since the autumn of 2013. Since 1 March, 2015 the new wage system is functioning based on workplace/position assessment. Also in 2013 the INPP realized public procurement of consulting services for general activity staff workload assessment. Based on the recommendations and general activity staff workload assessment methodology, the staff workload monitoring system is under development at the INPP since the autumn of 2013.

Since 2014, the INPP applies employees' annual performance assessment method that evaluates general and functional competencies, as well as mission performance/results.

11.7. Arrangements for initial training and retraining of operations staff

The purpose of the initial training is to prepare employee for a position at INPP, including the training for promotion. After the initial training is completed the employee on the basis of the qualification committee conclusion is allowed to work under supervision of the experienced employee (for operation personnel) and/or independent work. Training of the personnel consists of the theoretical training and on-site 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 TS instructors or the relevant experts of the INPP departments.

Training using technical means (training computer programmes, equipment mock-ups, actual components and samples, etc.) is provided when required by a training programme and is conducted by the TS instructor.

On-site training (probation) is to acquire practical skills and attitudes in situ and is conducted by the on-site training instructor. During probation period employees study and apply in their work areas the actual rules, required standards, job descriptions and operation manuals to the extent required in the job description to obtain experience for proper, safe and effective work. At the end of the on-site training (probation) and before the qualification by the appropriate qualification committee the employee's practical skills are checked.

11.8. Capabilities of plant simulators used for training with regard to fidelity to the plant and scope of simulation

Pursuant to Decision No. Spr-222 (3.263) on Decommissioning of the Main Control Room (hereinafter the MCR) Full Scope Simulator of 4 October 2013, the simulator is no longer operated. This decision was adjusted by VATESI.

11.9. Arrangements for training of maintenance and technical support staff

Maintenance and technical personnel at the INPP is trained by using initial training and continuous training. To provide proper qualification and competence of the personnel a systematic way of training is used on different stages of education. The activities related to the management of personnel at the INPP is regulated in accordance with the Personnel Management Procedure Description MS-2-014-1.

11.10. Improvements to training programmes as a result of new insights from safety analyses, operational experience, development of training methods and practices

Continuous training of INPP personnel is performed according requirements for a particular position (e.g. periodic training to re-approve compliance to the qualification requirements of a safety important position), need to prepare for new activities or tasks of a division, other needs identified by a manager and discussed with an employee during annual individual appraisal meetings. TS are supporting managers of departments as an internal provider of training and, when needed, help to find and organise external training according the established needs. TS continuously is assessing effectiveness of training content and process, develops new programmes and training tools to support implementation of plans of INPP (e.g. to prepare new mock-ups for training on dismantling of contaminated equipment). TS work with line managers to establish training needs, assess training

results after a trainee has worked for some time after the training. TS also performs analysis of OEF lessons, organises training for TS specialists and makes practical observations of the related tasks to improve training content and methods.

In line with the commitment under the laws of the Republic of Lithuania to comply with nuclear and radiation safety requirements, the enterprise dedicates special focus to the qualification and psychological preparation of its employees – prerequisites for ensuring that the safety of the INPP is a top priority and an underlying objective that fosters one's sense of responsibility and self-control in the performance of all safety-related tasks.

The enterprise employs a number of highly experienced staff members with unique expertise; therefore retaining them is vital. The organization encourages employee responsibility, initiative and innovation, develops and implements employee training programmes, creates conditions for employees to constantly improve their qualifications and keeps them up-to-date on the enterprise's goals, current projects, changes and achievements. In the case of application to the vacant position within the structure of the INPP the redundant personnel of INPP has the priority to be selected for employment that other applicants.

On 30 of August 2013 contracts on supply of training services entered into force according to the INPP Personnel Continuing Training and Retraining Programme. According to the mentioned programme INPP organizes: Management skills improvement trainings (for example Strategic Management and Planning, Conflict Management, Projects Management, Effective teamwork, Change Management, Negotiation skills and etc.), IT training courses, Business English language courses, Lithuanian language courses.

11.11. Methods used to assess the sufficiency of staff at nuclear installations

VATESI document BSR-1.4.1-2016 requires from a licensee to assess, plan and ensure sufficiency of staff performing safety important activities and affecting safety related professes of a licensed organization. It's necessary to assess and establish the number of staff needed for safe operation, and their competence in a systematic and documented way. The document will also require establishing and annually updating a long-term staffing plan for activities that are important to safety. Additionally, it's licensee is required to monitor sufficiency of staff for safe operation, their competence, and suitability and to document results of such assessments and always to have in house sufficient number of competent staff understanding the safety basis of a plant (e.g. Safety Analysis Report or Safety Case and other documents), as well as to understand the actual design and operation of the plant in all plant states. For instance, assessment of the staffing level at INPP was annually indicated within the annual INPP safety report.

Since 2014, INPP has been making a comparative market analysis of its controlled operating costs, using "Make or buy" approach. In 2015 the INPP, in attempt to manage fluctuations of sudden work scope increase/decrease, also to estimate and use labour resources accurately to perform short-term works or works of necessity, started procurement of temporary employment services.

VATESI during regulatory inspections and other activities verifies suitability of personnel qualifications, quality of safety important training and sufficiency of competent INPP personnel to ensure safety of INPP.

11.12. Policy or principles governing the use of contracted personnel to support or supplement the licensee's own staff

Personnel of contracting organizations prior to commencement of works in the controlled area of the INPP is trained in the INPP TS under the Training program for contracting organizations personnel, performing works within the controlled area of INPP (MC-1410-23), whereupon personnel

acquires respective knowledge and competencies in the area of radiation safety, fire safety, physical protection, emergency preparedness, safety culture and in other areas important to safety.

Operations managers of contracting organizations are certified in the certifying commission No. 2 of the INPP. Moreover, all the personnel of contracting organizations undergoes induction and initial briefings at the working place on fire safety, health and safety of workers and, if necessary, on radiation safety.

11.13. Methods used to assess the qualification and training of contractor's personnel

BSR-1.4.1-2016 requires from a licensee to establish personnel qualification requirements for safety important contractors within procurement documents, to monitor adherence to those and to this end to have enough specialists competent to perform this oversight and assess performance of a contractor.

INPP has established management system procedure “Procurement” QA-2-017 that requires careful assessment of qualification of a potential INPP contractor. The assessment includes checking of competence of the key personnel of contractor and applied management system before a contract is approved. After a contract for safety important activities is approved, INPP assigns the competent personnel to perform monitoring and inspections of implementation of a contract. INPP requires from contractors for safety important tasks to be performed at INPP to undergo a special training programme on INPP requirements for safety, application of quality requirements and principles of safety culture.

11.14. Description of the national supply of, and demand for, experts in nuclear science and technology

Ministry of Education and Science of Lithuanian Republic is responsible for implementation of “The National Plan of Preparation of Highly Qualified Specialists in Nuclear Energy for 2008–2015”. The Plan is intended to provide the Lithuanian nuclear energy infrastructure with highly skilled nuclear professionals. The aims of the Plan are to ensure the effective preparation of highly qualified nuclear energy specialists for VNPP and the entire nuclear industry and further develop nuclear knowledge, experience and practical, educational and scientific excellence. In order to achieve this objectives two study programs were started:

– The Studies of Nuclear Energy Physics at Vilnius University (since 2011 these studies were renamed to Energy Physics);

– Graduate and Postgraduate Studies of Nuclear Energy at Kaunas University of Technology.

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

The main purpose of Graduate and Postgraduate Studies of Nuclear Energy – to provide students of general technical and special nuclear energy education, to enable absorption of the essential knowledge of fundamental physics, theories and principles, to help develop nuclear power engineering design and manufacturing bases, introduce with operational technologies and to enable acquire the initial application skills, to provide the necessary social and human sciences knowledge.

The dynamics of number of graduated students at Vilnius University and Kaunas University of Technology from 2006 until 2015 is presented in Table 11.4.

Table 11.4. Number of graduated students at Vilnius University (VU) and Kaunas University of Technology (KTU) from 2010 to 2015

Enrolment year	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*
Graduation year	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
Number of graduated students (VU, BSc)	-	-	22	29	19	13
Number of graduated students (KTU, BSc +MSc)	6	8	11	10	12	13
Total	6	8	33	39	31	26

After selection of strategic investor (Hitachi and Hitachi GE Nuclear Energy) to the new nuclear power plant and planning to further develop the human resource capabilities and deepen the knowledge in nuclear energy field, several initiatives have been taken in this regard with the Government of Japan (through the Ministry of Economy, Trade and Industry, METI and in cooperation with Japan Atomic Industry Forum International Cooperation Centre) and intensive cooperation in nuclear energy and human resource development launched since 2013. The cooperation includes organization of training programmes in Japan and seminars/workshops and intensive nuclear engineering courses, students exchange visits, scholarships in Lithuanian and Japanese universities and other activities. For example, during 2013-2016 more than 1000 participants attended the intensive nuclear engineering courses at Kaunas University of Technology, held in cooperation with Tokyo Institute of Technology and Hitachi. Above mentioned events significantly contribute to strengthening and enhancement knowledge in nuclear energy sector and its development, nuclear safety, information exchange, sharing the experience and lessons learned in development and management of nuclear power projects.

11.15. Regulatory review and control activities

Specialists of VATESI are continuously concentrating their efforts on the supervision of qualification of the employees of the nuclear energy sector. In supervising the training and qualification improvement system at the INPP, the VATESI follows the Requirements VD-E-11-2001, the IAEA safety standards, recommendations and the best practice of other countries. Even after the final shut-down of both Units of the INPP, VATESI has not altered the commonly recognized approach that a nuclear facility has to be operated by a sufficient number of highly qualified employees. VATESI specialists coordinate the training programs, exam questionnaires, take part in the exams to evaluate the competencies of the INPP specialists responsible for safety.

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 throughout the life of a nuclear installation.

12.1. Overview of arrangements and regulatory requirements to take human factors and organizational issues into account for the safety of nuclear installations

Human factors and organizational issues have significant importance for safety of nuclear installations. Lithuanian legislation covers human factors and organizational issues in several regulations: VD-E-11-2001 “General Requirements for Personnel Management in the Organizations Operating Nuclear Facilities and Enterprises Rendering Services to Them”, BSR-1.4.1-2016 “Management Systems Requirements”, VD-T-001-0-97 “Nuclear Safety Regulations for the Reactor’s of Nuclear Power Plants”. The extensive regulatory requirements on human factor are set in BSR-2.1.2-2010 “Basic Safety Requirements for Nuclear Power Plants with RBMK-1500

Reactors". VD-E-11-2001 defines more specific requirements for organizational structure and distribution of functions, staff recruitment, training and qualification and staff certification.

Human factors and organizational issues during modification process are addressed in BSR-1.8.2-2015 "Categories of Modifications of Nuclear Installations and Procedure of Performing the Modifications". INPP adheres to the requirements and VATESI performs the regulatory oversight of INPP compliance to them.

12.2. Consideration of human factors in the design of nuclear installations and subsequent modifications

Human factor management at INPP is based on the consideration of organizational, labour (professional), environmental factors, as well as individual abilities and other characteristics of human behaviour at work to preclude safety problems. Human factors are taken into account in the design of new nuclear facilities for INPP decommissioning and modifications. Work spaces for operational, maintenance and dismantling personnel are arranged on the base of ergonomic principles and norms. Design solutions of the main control room provide operability and habitability for the staff under nuclear and radiation accident conditions, including a case of blackout. Working places of all personnel meet current ergonomics requirements.

INPP personnel management process includes recruitment, primary and continuous training, certification and permission of personnel to work on their own at INPP, is regulated by the documents indicated in Article 11 of this report.

12.3. Methods and programmes of the licence holder for analysing, preventing, detecting and correcting human errors in the operation and maintenance of nuclear installations

Human factor affects many aspects of safe decommissioning of a nuclear facility and first of all in such activity fields as nuclear, radiation and fire safety assurance, physical protection, safety and health of employees. The man-machine interface provides sufficient data about the on-going operating processes, status of process systems as well as systems of control and personnel attention in case of deviations from normal operation. Prior to the beginning of work the medical control of operating personnel is mandatory. The activities related to the "Human Factor" management at INPP is carried out with consideration for the following:

– The personnel has everything necessary to carry out its duties (documentation, materials and equipment) and is duly trained and certified;

– The operating conditions at the enterprise meet current standards and do not allow that hazardous influence of physical, chemical, biological and other harmful factors exceed the specified limits;

– INPP personnel safety and health system is aimed at ensuring the safety and health of the personnel, reduction of occurrence of accidents and rate of personnel occupational diseases.

The personnel activities are being monitored. There is a system that ensures recording of incidents caused by human error at the INPP, investigation of the causes and development of corrective measures; performs probabilistic safety assessment considering human factor and monitor psychophysical capabilities of personnel providing safe operation of the nuclear facility.

Considering the Human Factor Management Programme existing at INPP, activities on human factors management at the enterprise is performed in the following areas:

– Personnel recruitment, training and motivation;
– Personnel reliability and qualification;
– Provision of information and use of operational experience;
– Workplace organization;

– Documentation control;
– Modifications and decommissioning organization.

Personnel actions, not defined in the instructions, and errors are subjected to reviewing to identify direct and root causes of the event, to eliminate causes and prevent further recurrence, the corrective measures are developed and taken. In order to ensure the safety of INPP activities the system of medical alcohol tests is integrated in enterprise.

Different aspects of motivating in respect of incentives for the personnel are highlighted in "Policy" of the plant. In addition, the motivation issues are considered during training and workshops on safety culture, which are conducted for the plant personnel on a regular basis.

Human factors related unusual events at INPP are carefully investigated by commissions appointed in accordance with the norms and technical requirements in force. INPP is responsible for ensuring that the investigations are performed satisfactorily and in full, for reporting the results to VATESI and other interested organizations. Also the licensee is responsible for measures to perform needed corrections and to eliminate the root causes of an unusual event to preclude repetitions of similar events.

Human factor Management Methods and Programmes at the VNPP

Taking into account the nature of the activities of VNPP and that their results will form a basis for the future NPP construction, human factor related risks are managed by implementation of effective procedures, quality management system and by providing the adequate training.

The activities of the company are project based. In line with the company's procedures the experience gained during the implementation of the preparatory works projects is being taken into account throughout all the stages of the implementation of other projects of VNPP.

Experience is being reported by the projects managers to the Project Management Committee which ensures the distribution of the received information to all VNPP project managers thus providing the input to apply the lessons learned across VNPP projects.

12.4. Self-assessment of managerial and organizational issues by the operator

The procedure for self-checking and self-assessment is regularly revised; the self-assessment of activity at the level of INPP divisions is carried out on a yearly basis. While preparing and performing the works that have an impact on safety, the personnel uses the self-control methodology STARK. Self-assessment activities of INPP are described within Article 10 of this report.

12.5. Arrangements for feedback of experience in relation to human factors and organizational issues

The blame free work culture, when errors are seen as an opportunity for improvement, is supported by managers of INPP. The importance of the human factor as a significant matter in safety is taken into account in the methodology of the evaluation of operational events. Event analysis methodology applied at INPP is based on ASSET method and is directed towards identification of direct and root causes of the event. Direct and root causes of the individual events are classified as equipment failures, documentation deficiency or humane error. In case human factor impact is identified during the determination of causes, detailed investigation of human factor impact analysis for the respective event is performed. The analysis results are the integral part of the overall analysis of the respective operational event. To ensure the analysis is performed systematically, INPP applies the special "Procedure for additional analysis of events caused by the incorrect personnel actions during unusual events". Such analysis identifies measures for prevention of events and their recurrence in the future as well as sharing the experience gained.

Audit, Safety and Quality Management Division carries out analysis of human factor impact on INPP safety. The division is responsible for carrying out special investigation of unusual events due to personnel error and (or) organizational factors. To perform the analysis INPP applies a special procedure "Method for Detail Analysis of Unusual Events Related to Incorrect Actions of Personnel". According the procedure, the division forms a team of competent specialists. The methodology combines Man-Technology-Organization and ASSET methodology. The analysis is performed by using a relevant method (or their combination) from the following list of methods:

- Task analysis;
- Changes analysis;
- Barrier analysis (for physical and administrative barriers that ensure safety);
- Event cause-effect analysis diagram;
- Fault tree analysis.

The team reviews the relevant documents, perform needed interviews, model and analyse causes of the event, its sequence and the related barriers, and develops the analysis report. Operating experience and feedback related information is presented within Article 19 (7) of this report.

12.6. Regulatory review and control activities

Through the regulatory review and assessment of safety documentation submitted by a licence holder, as well as inspection activities, VATESI ensures that the licence holder adequately addresses human factor issues through all lifetime of nuclear facilities.

VATESI has established the permanent commission for analysis of unusual events. This commission monthly meetings cover reviews of recent and other IAEA IRS reports as well as reports from INPP on unusual events, including those on the events due to human factors and (or) organizational issues. Commission provides recommendations to INPP to apply lessons learned, to review relevant IRS reports and (or) to present additional information on the events at INPP. The commission also provides recommendations to INPP for application of the lessons and performs follow-up of its recommendations to INPP.

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 a nuclear installation.

13.1. Overview of arrangements and regulatory requirements for management systems of the licence holders

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

BSR-2.1.2-2010 "Basic Safety Requirements for Nuclear Power Plants with RBMK-1500 Reactors" requires that safety of the NPP shall be ensured by implementing a system of technical and organizational measures, including a management system at the NPP. Those technical and

organizational measures shall be experience based and comply with the legal acts, norms and regulations. Such approach shall be applied during all life cycle of the NPP.

BSR-1.4.1-2016 “Management System” specify regulatory requirements for development, implementation and maintenance of an effective management system for the organizations operating nuclear facilities and require covering all activities related to the use of safety important systems and components by management system’s documentation and periodically assess effectiveness of the management system. To this end an operating organization must establish an independent department to oversee application of management system requirements and coordinate its improvement. The licensee and its safety-important contractors shall comply with all national legal requirements and regulations, including those in the area of nuclear safety. According to the BSR-1.4.1-2016 licensee by developing management system shall consider application of the IAEA recommendations published in the IAEA guides on management systems. The BSR-1.4.1-2016 establishes requirements for implementation and continuous improvement of the integrated management system based upon GS-R-3 process approach.

13.2. Status with regard to the implementation of integrated management systems at nuclear installations

The INPP integrated management system (hereinafter, IMS) integrates all organizational components (including its structure, resources, quality assurance, processes and safety culture) so as to establish the goals and objectives of the organization and enable the organization to achieve all of these goals and objectives. The INPP IMS provides a single framework for the arrangements and processes necessary to address all the goals and objectives of the organization. These goals and objectives include safety, quality, environmental, health, security and economic elements and other considerations such as social protection. The application of the IMS requirements is graded so as to deploy appropriate resources, on the basis of the consideration of the significance and complexity of each product or process, the hazards and the magnitude of the potential impact associated with the safety, health, environmental, security, quality and economic elements of each product or process and the possible consequences if a product fails or a process is carried out incorrectly.

The INPP Senior Management is ultimately responsible for the IMS and shall ensure that it is developed, implemented, assessed and continually improved in accordance with the established requirements and objectives. Within the INPP organization this function is assigned to Audit, Safety and Quality Management Department (AS&QMD). This is an organizational unit, which is independent from other functions and reports directly to Director General of the INPP. The AS&QMD Manager in the capacity of the Senior Management Representative has the specific authority and responsibility for coordinating the IMS development, implementation, assessment and continual improvement. The personnel of this department are appropriately trained and qualified to conduct the tasks.

13.3. Main elements of a management system covering all aspects of safety throughout the lifetime of the nuclear installation, including delivery of safety related work by contractors

The INPP Senior Management establishes goals, strategies, plans and objectives that are consistent with the policies of the organization and appropriate to the activities and facilities of the organization. Currently, there are 10 documented policies in the IMS, including the Quality Management Policy.

The INPP IMS is a process-based management system. It is described by a set of documents specifying the overall controls and measures to be developed and implemented by the organization to meet the established requirements and objectives. These controls and measures apply to every unit and individual within the organization.

IMS Manual, Policies, Strategies and Final Decommissioning Plan are Level 1 documents applicable to development, implementation, assessment and continual improvement of the IMS. Currently, 41 upper-tier processes are grouped in the IMS Manual. All these processes are described in Level 2 documents (hereinafter, IMS procedures). The IMS procedures are documented process descriptions; they provide specific detail on which activities shall be performed and which organizational units shall carry them out so as to meet the general requirements specified in the IMS Manual. Detailed working documents, such as procedures, instructions, plans and schedules are Level 3 documents. Developed in accordance with the requirements specified in the IMS procedures, they prescribe the specific details for the performance of sub-processes, projects and tasks by organizational units or individuals. Records stating objective evidence of activities performed or results achieved are Level 4 documents.

The relationship between the measurement, assessment and improvement processes in the IMS is shown in Fig. 13.1 below. These processes are described and detailed in Level 2 and Level 3 documents respectively.

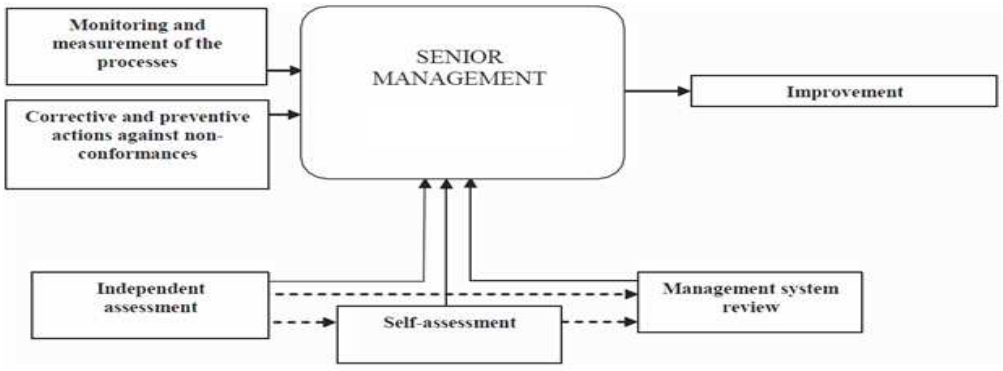


Fig. 13.1 Relationship between measurement, assessment and improvement processes

Monitoring and measurement

The effectiveness of the IMS is monitored and measured to confirm the ability of the processes to meet the established requirements and objectives, and identify opportunities for improvement.

Self-assessment

The Senior Management and management at all other levels in the organization carry out self-assessment to evaluate the performance of work and the improvement of the safety culture.

Independent assessment

The independent assessment process includes internal IMS audits, audits of management systems of suppliers of safety-related products, surveillance inspections, engineering surveys, review of safety-related operating documents, modifications, decommissioning projects, event reporting, corrective actions developed in response to VATESI inspections, and licensing-related documents. Requirements for the planning, conduct, reporting and follow-up of independent assessments are documented in respective IMS procedures. The owner of the independent assessment process is AS&QMD Manager.

Management system reviews are conducted by the Senior Management annually to ensure the suitability and effectiveness of the IMS, and its ability to enable the objectives set for the organization to be accomplished. Quality management issues are discussed at monthly meetings chaired by General Director.

The procurement process is managed within the IMS. General requirements for procurement are specified in the IMS Manual. Detailed requirements for procurement process (including those for selection, evaluation and control of suppliers) are set forth in the Procurement Procedure and respective working documents. The graded approach is applied, so special attention is paid to control of the suppliers of safety-related products. Procurement documents contain requirements for the

supplier organization, products to be supplied, supplier's capabilities, personnel qualifications and management system. The supplier's management system shall be equivalent at the least to the requirements of the standards LST EN ISO 9001. In some cases, such as procurement of construction works, other management system standards may apply too.

After signing the contract, the selected safety-related product supplier is included into the List of Approved Safety-related Product Suppliers, which is reviewed and updated regularly. This list is communicated to VATESI annually.

Control of suppliers and their sub-suppliers is in accordance with the Procedure for Assessment of Safety-related Product Suppliers and Sub-suppliers and Control of Their Activities at the INPP. Suppliers are allowed to start their on-site activities at the INPP after they develop a Quality Assurance Plan subject to approval and control by the interested INPP department(s) and AS&QMD. The Supplier's personnel shall pass special training and certification by the INPP Personnel Division, covering aspects of radiation safety, fire safety, security, health & safety, safety culture and emergency preparedness as appropriate. In case of serial production quality assurance plans are not required.

13.4. Audit programmes of the licence holders

The internal and supplier audits are conducted by the INPP personnel, who are in the list of qualified lead auditors/auditors. This list is updated annually. There is a procedure specifying requirements for lead auditor/auditor qualifications. The AS&QMD personnel are adequately trained and qualified to fulfil these tasks. Audit reports are distributed to the INPP Senior Management, managers of audited departments, senior managers of audited suppliers and to VATESI as appropriate.

Audits are conducted regularly on behalf of the Senior Management:

– to evaluate the effectiveness of the IMS processes and adherence to the established requirements and objectives;
– to determine the adequacy of work performance and leadership;
– to evaluate the organization's safety culture;
– to monitor product quality;
– to identify opportunities for improvement.

The processes and products that do not conform to the specified requirements are identified, segregated, controlled, recorded and reported to an appropriate level of the management within the organization. Corrective actions for eliminating non-conformances are determined and implemented. Preventive actions to eliminate the causes of potential non-conformances are determined and taken.

Opportunities for the improvements of the IMS are identified, and actions to improve the IMS processes are selected, planned, implemented and recorded. Annual reports on improvement of the INPP IMS are submitted to VATESI.

– Audits of suppliers of safety-related products belong to the independent assessment process. They are planned, conducted, reported and followed-up in compliance with the Procedure for Supplier Audits.

13.5. Regulatory review and control activities

The Law on Nuclear Safety states, that the licences and permits shall be issued to persons with sufficient capacities in terms of technological and financial resources, management system, human resources, emergency preparedness, physical protection, safe storage and shipment of nuclear materials, their accounting and control that comply with the provisions on implementation of the IAEA and the EURATOM guarantees, and allowing to properly fulfil the conditions required by the licence or permit and to secure nuclear safety.

The regulations for issuing licenses and permits for nuclear power facilities and activities require applicants to submit to the VATESI to review and assess such documents as:

– procedures for selection, training and certification of the employees and improvement of their qualifications;

– description of means for safety culture development;

– documentation of 1st and 2nd level of management system;

– description of organizational structure;

– procedures related to selection, approval and control of suppliers and quality assurance of safety-important products, services and works;

– description of measures for employment of operational experience.

The VATESI periodically performs review of the INPP's management system's documents, reports of audits, including those performed at contracted organizations, reports on safety issues, reports on safety culture monitoring, assessment and carried out surveys, the documentation of modifications' to the nuclear installations including organisational changes whether they comply with legal acts and potential risks on safety are evaluated and properly managed.

During other regulatory oversight activities, e.g. inspections, VATESI specialists analyse and inspect management system's documents related to the particular activity or safety issue. When needed, inspectors of the VATESI require to improve activities or to make necessary corrections in the INPP management system's documents and (or) practice. The VATESI performs the inspections of the activities of the INPP related to conducting the audits at the contractors' organizations involved into the INPP's decommissioning projects. The goal of such inspection is to ascertain how the INPP is performing the assessments (audits) of the management systems of the suppliers that are relevant to safety and of the capability of these suppliers to meet the requirements of the procurement documents.

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.

Article 14(i) – Assessment of safety

14.1. Overview of arrangements and regulatory requirements to perform comprehensive and systematic safety assessments

The Law on Nuclear Safety, among other provisions, establishes the main principles for safety assessment. Pursuant to Article 30 of the Law on Nuclear Safety the assessment of nuclear safety shall be a systematic process intended for verifying whether the siting, design, construction, operation and decommissioning of a nuclear installation are safe – i.e. meet safety requirements established by the legal acts, technical codes and standards documents and other documents. The assessment of nuclear safety shall be conducted in the prescribed manner at all the stages of a lifecycle of a nuclear installation. The assessment of nuclear safety shall get sufficient attention and shall be assigned sufficient resources. The amount of resources shall be adequate to a possible issue's impact on nuclear safety.

The applicant or the licence holder carries out the analysis and justification of nuclear safety in the area of nuclear energy activities as well as other activities involving nuclear and nuclear fuel cycle materials. The persons implementing a nuclear installation project carry out the analysis and justification of nuclear safety during the evaluation of the construction site of a nuclear power plant. The results of the analysis and justification of nuclear safety are executed in the documents evidencing nuclear safety, which are established in the manner prescribed in the Law on Nuclear Safety and other legal acts. The results of the analysis and justification of nuclear safety are independently verified in the manner set out by VATESI. The applicant or the licence holder is responsible for the performance of such independent verification, whereas in case of the construction site of a nuclear power plant evaluation – the responsibility for performance of an independent verification falls on persons implementing the nuclear installation project design.

In addition to the main safety document evidencing nuclear safety, i.e. safety analysis report, the applicant or the licence holder shall provide to VATESI design documentation of a nuclear installation, which are necessary for the assessment of the safety analysis report. The nuclear installation design documentation shall establish and classify all the structures, systems and components of a nuclear installation according to their functions and importance to safety, and shall contain a comprehensive description of all the structures, systems, components, and operation processes that are important to safety.

The review and assessment of nuclear safety shall be conducted by VATESI and results of such review and assessment shall be documented. The main goal of regulatory review and assessment process is to verify if the safety justification document complies with normative technical documents of nuclear safety and complies with factual circumstances. The decision on the safety justification document shall be made taking into account results of the review and assessment. The review and assessment of safety justification documents are performed in accordance with PR-5 “Procedure document for review and assessment of safety justification documents”, which is procedure document of VATESI management system. This procedure document defines formal procedure for regulatory review and assessment of safety justification documents. The outcomes, e.g. safety evaluation report of the VATESI review and assessment are documented in accordance with the provisions foreseen in procedure document PR-5.

In additional, VATESI could require additional documents or conduct inspections, if it finds out that after review and assessment of the submitted documents the information is not sufficient to assess the documents according to the legal acts and 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.

14.2. Safety assessments within the licensing process and safety analysis reports for different stages in the lifetime of nuclear installations

Siting

According to the Paragraph 1 of Article 32 of the Law on Nuclear Safety, the safety analysis and justification of a construction site of a NPP shall be performed prior to starting preparing the design of a NPP. The persons implementing a NPP project shall carry out the analysis and justification of nuclear safety during the evaluation of the construction site of NPP. The results of such analysis and justification shall be reflected in a report on evaluation of the construction site, which shall be approved by VATESI. VATESI can approve the report on evaluation of the construction site only after verifying that the results of the analysis and justification of the construction site are in line with requirements of the legal acts and after having received positive decisions form other institutions, which are involved in the process of reviewing a report. The detailed procedures for reviewing the

site evaluation report are defined in the Governmental Resolution of the Republic of Lithuania No. 83 the "Description of procedure on review of the construction site evaluation report of nuclear power plant" and Nuclear Safety Requirements BSR-2.1.3-2010 "General requirements on site evaluation for nuclear power plants".

VNPP site evaluation process had started in 2008. Evaluation included both deterministic and probabilistic assessments of various site related phenomena. The main conclusions of this activity were determined after considering the following aspects:

– The effects of external events occurring in the region of the Visaginas sites;

– The characteristics of the Visaginas sites and their environment that could influence the transfer to persons and the environment of radioactive material that has been released;

– The population density and population distribution and other characteristics of the external zone in so far as they may affect the possibility of implementing emergency measures and the need to evaluate the risks to individuals and the population.

It was concluded that there are no exclusion criteria and no deficiencies that cannot be compensated for by means of design features, measures for site protection or administrative procedures. Therefore, both investigated sites are suitable for construction of the VNPP.

Site Evaluation Report was reviewed by Independent IAEA Site Safety Review Mission (SSRM) which took place on 8–12th of November, 2010. IAEA experts stated that "Sites evaluation is conducted in line with IAEA requirements and guides, the volume of investigation is sufficient, and sites are suitable for construction of Visaginas NPP". The experts of the mission have submitted several recommendations, which may be implemented only after selecting of nuclear technologies and layout of nuclear facilities providing opportunities for additional investigations related with design works.

Design

According to the Article 25 Paragraphs 1 and 2 of the Law on Nuclear Energy, construction of a NPP or an individual NPP energy unit shall be carried out in accordance with the Law on Construction of a new nuclear power plant or an individual nuclear power plant energy unit. NPP or an individual NPP energy unit may be designed only subject to a decision on the start of construction of a new NPP or an individual NPP energy unit adopted by the Government and only after the builder (customer) drafts and approves with VATESI a technical specification of NPP (the "technical specification" shall be understood as specification for procurement of a nuclear facility – document which sets requirements for design). The technical specification shall include a site characteristics, a set of safety requirements (as well as established by utility, for example – the technical codes and standards) and other safety criteria for design of NPP.

According to the Article 26 Paragraph 1 of the Law on Nuclear Energy, the design of a building structure of a nuclear installation shall be prepared in accordance with the procedure and terms of the Law on Construction and the secondary legislation. The design documentation shall be approved with VATESI and other authorities involved in the manner established by the Government Resolution of the Republic of Lithuania No. 1873 "Rules of Procedure of Authorization of Nuclear Facility building Plan".

Construction and operation

The stages of authorization process are linked to licenses and permits which utility shall acquire for construction and operation of NPP. The necessary licenses and permits are listed in the Article 22 of the Nuclear Safety Law, and the main safety assessment issues, linked to the stages, are stated in the Article 32 of the Nuclear Safety Law. The necessary safety documents to be submitted when applying for each license or permit for regulatory review and assessment are listed in Regulations on the Issue of Licenses and Permits Necessary to Engage in Nuclear Energy Activities.

Commissioning

The Article 32 Paragraphs 3 and 4 together with the Article 2 Paragraph 3 of the Law on Nuclear Safety set a requirement for preparation of Commissioning programme that have to be approved with VATESI. A person can start commissioning if he is a licence holder of a licence defined in the Article 22 Paragraph 1 or 3 of the Law on Nuclear Safety. All requirements for commissioning are established in Nuclear Safety Requirements BSR-2.1.5-2015 "Commissioning of Nuclear Power Plants". The results of implementation of commissioning program are subject for further authorisations.

Approval of safety analysis report (SAR)

Pursuant to Paragraph 2 and 8 of Article 32 of the Law on Nuclear Safety the evaluation of nuclear safety shall be conducted in the prescribed manner at all the stages of a lifecycle of a NPP. Along with other documents, which shall be submitted for VATESI for the issue of an appropriate licence or permit, the applicant shall submit preliminary safety analysis report, safety analysis report and final safety analysis report.

Regulatory requirements related to the preparation, content and format of safety analysis reports that have to be submitted at the different stages of the licensing process for a nuclear power plant are described in Requirements BSR-2.1.4-2011 "Preparation and Use of Safety Analysis Report of Nuclear Power Plant".

Re-evaluation of hazards assumptions

The re-evaluation of hazards assumptions using deterministic and probabilistic methods of analysis is performed according to requirement for periodic safety assessment of nuclear installations that is established in the Law on Nuclear Safety.

In response to the event at Japan's Fukushima Daiichi Nuclear Power Plant, the European "stress tests" were conducted in 2011 – 2012 at INPP according to specification agreed by ENSREG. In accordance with the scope of "stress tests", the re-evaluation of extreme natural events (earthquake, flooding and extreme weather conditions) challenging the plant safety functions and leading to a severe accident was performed. More details on INPP "stress tests" results and safety improvements measures associated with post-Fukushima lessons learned are presented in Section A2 of this report.

Overview of periodic safety assessments of nuclear installation

The requirement for periodic safety assessment of nuclear installations using deterministic and probabilistic methods of analysis is established in the Law on Nuclear Safety. Pursuant to Part 7 of Article 32 of the Law on Nuclear Safety, a licensee shall perform a periodical safety analysis and justification and prepare a periodical safety review report at least every 10 years after the issuance of a permit for the commercial operation of a nuclear installation. Periodical safety review report shall be submitted to the VATESI for review and assessment. Thereafter, the VATESI shall adopt a decision regarding the coordination of such report.

Taking into account the analysis and justification of nuclear safety, performed in the frame of decommissioning of INPP, for Unit 1 in 2007 and for Unit 2 in 2010, the next periodic safety assessment shall be carried out for INPP units accordingly in 2017 and in 2020. This obligation is included into licence conditions for operation of corresponding units. Therefore, the INPP is in the process of Unit 1 periodic safety review performance. Pursuant to the recommendations of the IAEA Specific Safety Guide No. SSG-25 „Periodic Safety Review for Nuclear Power Plants" and the national regulatory requirements the scope of the periodic safety assessment is described in Section A1 of this report.

Overview of safety assessments performed

In response to the events at Japan's Fukushima Daiichi Nuclear Power Plant, the "stress tests" were performed at INPP according to ENSREG "stress tests" specification and assessment for

reasonable improvements, taking into account as well as results of assessment performed in 2012 in-line WANO recommendations, was done by the INPP. The results of the "stress tests" revealed that the INPP has implemented the relevant technical and organizational measures which would be adequate to control the emerging situation to maximally protect the people and the environment from the hazardous effects of ionizing radiation even in the most adverse conditions, such as the earthquake, flood, long-lasting interruption of power supply, long-lasting failure of the spent nuclear fuel cooling systems. More details on the post-Fukushima lessons learned related to implementation of the INPP safety improvement measures are presented in Section A2 of this report.

14.3. Regulatory review and control activities

Regardless of the fact that INPP Unit 1 and Unit 2 were finally shut down, INPP has been further performing the safety improvement works in accordance with the INPP's Safety Improvement Programme SIP-3. The purpose of INPP Safety Improvement Programme is to improve and ensure the highest possible level of nuclear safety at the power plant, by improving maintenance and operating procedures of structures, systems and components important to safety, and by taking into account operational experience of INPP and operators of other countries. The INPP Safety Improvement Programme SIP-3 is annually reviewed, updated and approved by VATESI. To assure the adequate supervision of the safety improvement measures linked to the post-Fukushima lessons learned and "stress test" (the Plan of Strengthening Nuclear Safety in Lithuania (National Action Plan), see Section A2), INPP included the measures of the National Action Plan into the INPP Safety Improvement Programme SIP-3.

The INPP activity for safety improvement is based on priorities to meet the current requirements of national and international safety standards, on results of the analysis, carried out in SAR of Unit 1, SAR of Unit 2 (SAR-2) and Periodic Safety Review scope. In additional, INPP Safety Improvement Programme SIP-3 includes additional calculations and measures related to implementation of INPP modifications and recent VATESI requirements. Besides safety improvement measures linked to the post-Fukushima lessons learned and "stress test", INPP Safety Improvement Programme SIP-3 includes the following major measures dedicated for:

– reduction of the frequency of an individual exposure (the ALARA principle and radiation monitoring);

– managing the ageing of the safety related systems;

– maintaining the qualified condition of the safety-related structures, systems and components;

– conservation of the fully loaded compartments of the Solid Radioactive Waste Storage Facility (building 157/1);

– reconstruction of spent fuel storage pools sections by installing armour-plated sheets;

– construction of Solid Waste Management and Storage Facility;

– performance of Unit 2 safety related systems equipment and pipes metal inspection and control, including welding seams;

– defining of the methodology and measuring devices for activity determination of difficult-to-measure nuclides.

With respect to the implementation results of INPP's Safety Improvement Programme SIP-3, and the results of inspections and review and assessment of safety justifying documents, VATESI specialists noted that the safety level of INPP during the period of 2013-2016 was acceptable. Irrespective of the fact that INPP Units 1 and 2 are permanently shutdown, safety improvement measures will further be planned and implemented.

Article 14(ii) – Verification of safety

14.4. Overview of arrangements and regulatory requirements for the verification of safety

VATESI performs the supervision of maintenance, in-service inspections of SSC important to safety and ageing management processes at INPP in accordance with Nuclear Safety Requirements BSR-2.1.2-2010 “Basic Safety Requirements for Nuclear Power Plants with RBMK-1500 Reactors”, ”Basic maintenance requirements for Nuclear power plants, VD-E-01-98” and “Ageing Management Requirements of Systems and Elements important to safety of Nuclear Power Facilities, VD-E-05-99”.

14.5. Main elements of programmes for continued verification of safety (in-service inspection, surveillance, functional testing of systems, etc.)

At present the INPP is not operating, but prior to its decommissioning the operational maintenance and in-service inspection have to be carried out.

In compliance with the Quality Management Programme and Documentation control system acting at the INPP all works related to maintenance, in-service inspection of SSC important to safety and ageing management are performed only on the basis and in accordance with documents, which are agreed with VATESI.

Regardless of facts that INPP Units 1 and 2 were finally shut down and configuration of its systems and components has been significantly altered, INPP has been further performing non-destructive testing of fuel channels, piping metal condition and equipment of systems important to safety in accordance with the INPP Regulations (“Regulation Control of the Piping Metal Condition and Equipment of Systems Important to Safety in Unit-2 of the INPP with the RBMK-1500 Reactor” and “Regulation Control of Fuel Channels in Unit-2 of the INPP with the RBMK-1500 Reactor in Pursuance Decommissioning Project”), agreed with VATESI. These regulations have been developed in accordance with the requirements for in-service inspection (PNAE G-7-008-89 and PNAE G-7-010-89), experience of in-service inspection in other nuclear power plants, and IAEA Safety Guide “Maintenance, Surveillance and In-Service Inspection of Nuclear Power Plants”, NS-G-2.6. Regulations determine requirements of in-service inspection (methods, frequency, volume and regions (places)) and assessment of results of performed in-service inspection for systems important to safety.

Every year the INPP prepares in-service inspection Programme of piping metal condition, equipment of systems important to safety and every two years the INPP prepares in-service inspection Programme of fuel channels on the basis of above mentioned Regulations. These Programmes have to be agreed with VATESI.

During operation phase of the INPP in-service inspections were performed by the INPP staff (Metal and Technical Control division), but due to final shutdown both of the INPP Units was performed modification of the INPP organization structure and this division was liquidated. Now in-service inspections at the INPP are carried out by accredited Contractor organisation.

Staff of the INPP together with representatives of the Contractor performs technical verification of pressurized components (equipment and piping) important to safety. VATESI’s Surveillance Division performs appropriate regulatory oversight (technical inspections) of these activities. The technical verification comprises external and/or internal inspection of equipment and piping, checking of parameters that prove the compliance of pressurized components with safety requirements, testing of the components and other actions aimed at assessing their adequacy in terms of safety.

Operational staff of INPP performs maintenance during walk down with control condition of equipment and rooms. Also INPP staff carries out the diagnostic activities of system and components, vibration and failures analysis of equipment, which are important to safety. The results of maintenance are the basis to prepare the plans for repair or replace the components, to carry out modifications.

14.6. Elements of ageing management programme(s)

The INPP has established and developed ageing management system and prepared ageing management programme according to "Ageing Management Requirements of Systems and Elements important to safety of Nuclear Power Facilities, VD-E-05-99". In accordance with VD-E-05-99, the INPP has prepared:

- procedure and programme for the SSC ageing management;
- methodology for evaluation of the technical conditions and remaining life time of the SSC;
- procedure for screening of SSC for the purpose of ageing management;
- list of the INPP safety related SSC;
- schedule of evaluation of the technical conditions and remaining life time of SSC, which are included in ageing management programme.

The main task of the ageing management programme is to ensure reliable operation of systems and elements important to safety of nuclear power facilities. The INPP prepared ageing management programme ensures performance of following functions:

- general assessment of ageing process according design documentation requirements;
- timely assessment of systems and elements condition to ensure reliable operation of nuclear power facilities during design lifetime;
- timely detection of systems and elements degradation phenomena, including determination of unanticipated causes, their elimination and mitigation of consequences;
- performance of necessary modifications and change of operation conditions in order to mitigate degradation phenomena; assessment of residual service life of system and elements and planning of necessary measures.

This programme will be implemented as long as particular systems, structures and components of the INPP are required to remain operating and the decommissioning process has not been completed, also for the existing and new constructed spent fuel and radioactive waste storages.

14.7. Arrangements for internal review by the licence holder of safety cases to be submitted to the regulatory body

Law on Nuclear Safety of the Republic of Lithuania states that the analysis and substantiation of nuclear safety in the area of nuclear energy activities as well as other activities involving nuclear and/or nuclear fuel cycle materials shall be carried out by the applicant or the licence holder; whereas the analysis and substantiation of nuclear safety during the evaluation of the construction site of a nuclear power plant shall be carried out by the persons implementing a nuclear installation project. The results of the analysis and substantiation of nuclear safety shall be independently verified in the manner set out by the Head of the VATESI. The applicant or the licence holder shall be responsible for the performance of such independent verification, whereas in case of the construction site of a nuclear power plant evaluation – the responsibility for performance of an independent verification falls on persons implementing the nuclear installation project design.

Nuclear Safety Requirements BSR-1.4.1-2016 "Management System" states that licence holder shall establish requirements for implementation of the independent verifications, including audits.

License holder is responsible for the performance of independent verification of the documentation of substantiation of modification safety according Nuclear Safety Requirements BSR-

1.8.2-2015 “Categories of Modifications at Nuclear Facilities and Procedure for Implementation of these Modifications”.

14.8. Regulatory review and control activities

Law on Nuclear Energy of the Republic of Lithuania states that VATESI shall analyse and assess the documents submitted by applicants for obtaining a licence or a permit, also the documents submitted by licence holders or permit holders or other persons, shall adopt relevant decisions regarding such documents, shall review and evaluate the nuclear safety.

Regulatory review and control activities of the performance of licensed or permitted activities and evaluation of nuclear installations safety as well as safety of operations with nuclear and/or nuclear fuel cycle materials are comprised of: review, evaluation and agreement of nuclear safety documents submitted by the licence or permit holders and inspection activities.

The Head of VATESI has appointed permanent authorised employees who in the manner set out by the Head of VATESI, shall regularly supervise all stages of a nuclear installation lifecycle at its construction site. VATESI inspections are conducted at all stages of the lifetime of a nuclear facility: during the evaluation of a construction site for nuclear facility, its design, construction, commissioning, operation or decommissioning stages, as well as in supervising the closed radioactive waste repository, procuring, storing or transporting nuclear and / or nuclear fuel cycle materials and / or dual use nuclear commodities. VATESI inspects applicants for obtaining licensees and permits, licenses and permits holders, suppliers of goods or nuclear fuel cycle materials. Every year VATESI develops a plan of inspections in accordance with the established criteria and with regard to the available human and financial resources. VATESI annual inspection plan involves four general types of inspections, namely Special Inspections, Regular Inspections, Technical Inspections and Control Room operation inspections. In addition to planned inspections as well as unplanned inspections which may be announced or unannounced are performed. Each year the following safety – related areas are inspected: training of the INPP personnel, safety systems and safety-related systems (emergency core cooling system, emergency power systems, fire protection systems, spent fuel pools and their cooling system, service water system and others), management of beyond-design-basis accidents, quality management, management of radioactive waste, safety culture, ageing management, emergency preparedness, assessment of operational experience and others.

Surveillance Division of VATESI Nuclear Safety Department performs periodical checks on technical condition of systems important to safety. The objective of technical checks is to ascertain that the technical condition of individual systems, installations and equipment of nuclear facilities complies with the requirements set in special operation, testing and repair regulations.

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. Overview of arrangements and regulatory requirements concerning radiation protection at nuclear installations

The basic standards and safety requirements for occupational and public exposure (including dose limits) are established in Hygiene Standard HN 73:2001 Basic Safety Standards of Radiation Protection (national BSS).

The basic regulation, which sets out requirements for radiation protection of workers working at the nuclear facilities, is BSR-1.9.3-2011.

Radiation protection requirements for outside workers are set in the Hygiene Standard HN 83:2004. The principal requirement is that the radiation protection of outside workers shall be at the same scale as of permanent workers of the NPP. The employers, whose workers are performing their activities within the controlled area of the nuclear power plant, shall establish the co-operation agreements with license holders, where the order and procedure of registration and estimation of workers exposure, measures of exposure reduction and other significant means from the radiation protection point of view shall be described.

The limits for discharges from INPP, the order of permitting of discharges, requirements for radiological monitoring are set in the BSR-1.9.1-2011.

Requirements for radiological environmental monitoring are laid down in the Order of the Minister of Environment "On approval of regulation of environmental monitoring of economic entities".

15.2. Regulatory expectations for the licence holder's processes to optimize radiation doses and to implement the ALARA principle

Lithuanian regulation (the Law on Radiation Protection, Lithuanian Hygiene Standards HN 73:2001 and nuclear safety requirements BSR-1.9.3-2011) clearly refer to the ALARA principle. There is a regulatory requirement that the optimisation of radiation protection is to be applied, together with the principle of justification of practices and the principle of limitation of individual exposures. According to the requirements of BSR-1.9.3-2011, one of the items of the radiation protection programme must be the application of optimisation principle (ALARA) and measures on exposure reduction. For this purpose the optimization programme shall be carried out at nuclear facility.

In order to optimize radiation protection of nuclear facilities workers, when they are performing routine, planned, maintenance, revision and other works at nuclear facility, the measures and procedures for exposure reduction of workers and reduction of amount of generated radioactive materials (reduction of exposure level in workplaces, decrease of surface and airborne radioactive contamination, determination of optimum number of workers, taking into account type of work, use of protective shielding, decontamination, iodine prophylaxis etc.) shall be included in the ALARA programme.

An ALARA programme dedicated to the dismantling of a nuclear power plant shall comprise the traditional phases of prediction, performance follow-up and feedback analysis and also it must allow defining at least:

– Objectives and dose targets for the short, medium and long terms. The rationality behind the choice of such objectives and targets must be clearly stated;

– A radiation dose plan and a dose reduction plan (sources, dose rates and exposure times to be considered), for the different stages of the decommissioning, demonstrating that the doses have been optimised;

– Ways to monitor, follow up and analyse the experience;

– Plans and strategies for extended education and training of the work force as well as organisational aspects of the ALARA programme requirements.

15.3. Implementation of radiation protection programmes by the license holders

To ensure adequate radiation protection of workers during decommissioning of the INPP the radiation protection program is established in accordance with the requirements of BSR-1.9.3-2011. Following items are included in the programme:

– classification of working areas and access control;

– local rules, measures of supervision of safety at work and work organisation order;

– 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.

Observation of dose limits, main results for doses to exposed workers

According to the Hygiene Standard HN 73:2001, the dose limit for the exposure of a worker is 50 mSv a year. In addition it is stated, that the radiation exposure of a person engaged in radiation work is limited so that the added dose does not exceed 100 mSv for the period of 5 years. Limits of exposure of critical organs determined by Hygiene Standard HN 73:2001 are presented in Table 15.1.

Table 15.1. Limits of exposure of critical organs determined by HN 73:2001

Equivalent dose per year	Dose limit	
	Workers	Public
for the lens of the eye	20 mSv	15 mSv
for the skin	500 mSv	50 mSv
for the extremities (hands and feet)	500 mSv	-

Individual monitoring of personnel exposure at the INPP aims at assessing and ensuring radiation protection of workers in the INPP controlled 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 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 and others (for operative control);
– 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 external exposure of INPP personnel and outside workers is set for a period of one month. If according to the results of operative control total individual dose of worker exceeds 2.0 mSv reading of the TLD dosimeter is performed without delay. The results of individual monitoring of INPP personnel and outside workers for 2013 – 2015 are given in the table 15.2. In the Figure 15.1 the collective doses of INPP and outside workers from 2005 to 2015 are presented in graphic form.

Table 15.2. Exposure and collective dose dynamics of the INPP personnel and outside workers 2013–2015

Year	Collective dose, Man·Sv		Highest individual exposure dose, mSv		Average dose, mSv	
	INPP	Outside workers	INPP	Outside workers	INPP	Outside workers
2013	0.607	0.047	12.20	10.25	0.38	0.06
2014	0.613	0.025	11.66	4.22	0.36	0.03
2015	0.620	0.064	9.37	7.13	0.36	0.06

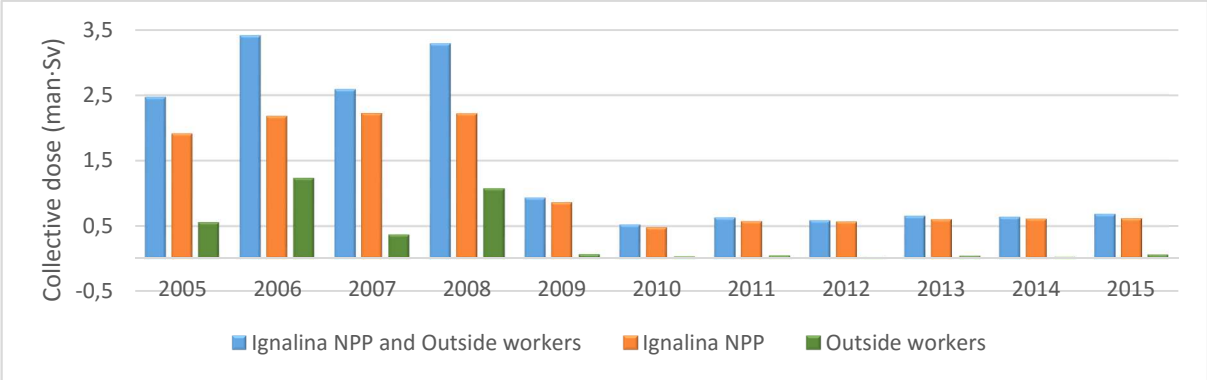


Figure 15.1 Collective doses of the INPP and outside workers from 2005 to 2015.

The annual individual exposure doses at the INPP did not exceed established dose limits. 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 body and prevention of fixed annual exposure dose exceeding. Personnel internal exposure control is realized in accordance with the "Time Schedule for Radiation Safety Monitoring at INPP". The values of an effective dose of the personnel internal exposure from 2013 till 2015 are given in Table15.3.

Table15.3. Monitoring results for nuclide content of workers 2013 – 2015

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	0.4-0.5 mSv	0.5-0.6 mSv	0.6-0.7 mSv	
2013	1483	142	12	1	–	–	–	–	1638
2014	1539	118	6	1	–	–	–	–	1664
2015	1574	124	5	2	1	–	1	1	1708

The highest internal exposure value of the INPP worker was registered in 2014, which amounted to 0.26 mSv. The highest measured activity of Co-60 radionuclide equals 544 Bq, Cs-137 equals 578 Bq. The highest internal exposure value of outside workers was registered in 2015, which amounted to 0.64 mSv. The highest measured activity of Co-60 radionuclide equals 1894 Bq, Cs-137 radionuclide equals 1232 Bq.

According to the "Program of Monitoring of the Workers and Workplaces Exposure", carrying out of the following kinds of the personnel internal exposure monitoring is foreseen: confirmative, target, regular monitoring prior to the beginning of works, monitoring after the completion of works.

The confirmative monitoring of personnel internal exposure is carried out once a year for all personnel in order to prove that the radiation protection of personnel is ensured and is sufficient. The target monitoring of internal exposure is carried out during and after radiation hazardous works for the INPP personnel and outside workers depending on radiation conditions at working places and results of external exposure individual dose measurement. Regular monitoring of the personnel internal exposure is carried out at least once every 3 months for the workers, whose expected effective annual dose of internal exposure is higher than 0,1 mSv/year according to the results of confirmative monitoring. Monitoring prior to the beginning of works is carried out with the purpose of internal irradiation individual background levels establishment for the personnel who have got a job in the controlled area. Monitoring after the completion of works is carried out with the purpose of estimation of internal exposure dose for the workers upon completion of work in the INPP controlled area at dismissal or transfer of the worker from the controlled area.

Conditions for the release of radioactive material to the environment, operational control measures and main results

In optimization of radiation protection the source related individual dose is bounded by a dose constraint. The dose constraint for each source is intended to ensure that the sum of doses to critical group members from all controlled sources remains within the dose limit. According to requirements of the Nuclear Safety Requirements BSR-1.9.1-2011 the exposure of population shall be limited by application of dose constraint during design, operation (both normal operation conditions and anticipated operational occurrences) and decommissioning of nuclear facilities but it is not applicable for accidents. If more than one nuclear facility contributes to the exposure of the population, the total sum of annual effective doses to members of the public from all contributing nuclear facilities shall not exceed the dose constraint. The established dose constraint for members of the public is 0.2 mSv per year.

According to Nuclear Safety Requirements BSR-1.9.1-2011, if radionuclides are dispersed into the environment by several pathways (e.g. by atmospheric and water paths) and the members of the same or different critical groups of population are impacted, the particular pathway resulting dose shall be limited in such a way that the total sum of doses from all pathways shall not exceed the dose constraint. The impact due to direct external ionizing irradiation shall be taken into account and the total dose (due to radioactive emissions and due to direct irradiation) to the critical group member of population shall not exceed the dose constraint.

Operational control of radioactive releases into the atmosphere at the INPP is ensured in accordance with the “Schedule of Monitoring for Ensuring Radiation Safety at the INPP”. The control of radioactive substance releases into the environment is implemented by the following technical means:

- Automated Radiation Safety Monitoring System SAMRB;
- Laboratory equipment for taking, preparation and specific activity measurement of samples.

Automated Radiation Safety Monitoring System SAMRB measurements are made by means of determination of the activity of each controlled environment component in the samples constantly taken into the facility detection units. Limits of authorized discharges from INPP to atmosphere are presented in Table 15.4.

Table15.4. Authorized discharges limits from the INPP to atmosphere

Airborne discharges	Bq/year
Noble radioactive gases	$2{,}22 \cdot 10^{15}$
Particulate Pollutant	$1{,}72 \cdot 10^{12}$

Laboratory control is based on the stationary and portable sampling equipment, as well as on the stationary radiometric and spectrometric equipment. Discharge rates of noble radioactive gases and radioactive aerosols from the INPP during period 2013-2015 are presented in Table 15.5. No exceeding of limits in discharges was recorded.

Table 15.5. Discharges of noble radioactive gases, radioactive aerosols and I-131 from INPP

Year	Noble radioactive gases, 10^{12} Bq		Radioactive aerosols, 10^{7} Bq	
	Sum	% from DL*	Sum	% from DL
2013	0.00	0.00	2,85	0.003
2014	0.00	0.00	2,466	0.0026
2015	0.00	0.00	4,968	0.0029

*DL – Discharge limit.

Radiological monitoring of the environmental contaminants, removed by the waterway, at the INPP is carried out in accordance with the “Environmental Monitoring Programme”. The periodicity

of taking samples from the intake and discharge channels – everyday, from the industrial and storm water sewage system – 3 times a month.

Before August 2015 the permissible maximum water discharges constitute $8.86 \cdot 10^{14}$ Bq/year and after August 2015 the permissible maximum water discharges constitute $1.72 \cdot 10^{14}$ Bq/year. No exceeding of limits in discharges was fixed. Discharge rates of gamma nuclides into environmental water from the INPP during period 2013-2015 are presented in Table 15.6.

Table 15.6 Discharges of radionuclides into environmental water from the INPP

Year	Discharges, 10^7 Bq
2013	1,52
2014	0,17
2015	2,45

Considering the Sr-90 and H-3 radionuclides are widely spread in the ecosystem and in the lake Drūkšiai, it is impossible to identify their ingress with the process water, as their concentration in the water of both the intake and discharge channels is practically the same and is equal to the detection limit of the measurement equipment (0.007 Bq/l for Sr-90 and 3 Bq/l for H-3).

Using the INPP monitoring data regarding airborne discharges and discharges into the lake Drūkšiai doses for critical group of public during normal operation of the INPP were evaluated. Annual dose for critical group of public during normal operation of INPP did not exceed dose constraint value (0,2 mSv):

– in 2013 – $1{,}73 \cdot 10^{-5}$ mSv and $3{,}09 \cdot 10^{-5}$ mSv due to the airborne and liquid discharges respectively, in total $4{,}82 \cdot 10^{-5}$ mSv per year;

– in 2014 – $9{,}24 \cdot 10^{-6}$ mSv and $4{,}12 \cdot 10^{-6}$ mSv due to the airborne and liquid discharges respectively, in total $13{,}36 \cdot 10^{-6}$ mSv per year;

– in 2015 – $2{,}33 \cdot 10^{-5}$ mSv and $5{,}79 \cdot 10^{-5}$ mSv due to the airborne and liquid discharges respectively, in total $8{,}12 \cdot 10^{-5}$ mSv per year.

Processes implemented and steps taken to ensure that radiation exposures are kept as low as reasonably achievable for all operational and maintenance activities

Implementation of the ALARA Programme at the INPP was started in 1996. The aim of the ALARA Programme at INPP for 2013–2015 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 ALARA Programme has the following basic directions at the INPP:

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

Responsibility for radiation protection is sharply defined at the INPP in accordance with a Control Procedure of the second level “Radiation Safety” MS-2-005-1. Director General is responsible for policy making in the field of radiation protection at INPP, distribution of authority and allocation of responsibility, implementation ALARA foundations at INPP as well as financing of radiation protection activity. Heads of Departments and Services are responsible for organisation of activities on INPP radiation protection according to ALARA rules, standards and principles. Heads of divisions are responsible for organisation of activities on radiation protection in their divisions 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 Service is responsible for work of the Service workers, their qualification, supply of resources, control of implementation of radiation protection standards and instructions, control of implementation of correction measures in case of inconsistencies. Head of the Radiation Protection Division is responsible for preparation and review of procedures for establishment of types and levels of impact on radiation protection, implementation of radiation monitoring, control of implementation of radiation protection standards. Head of the Maintenance and Quality Management Division is responsible for organisation and conducting of audits on radiation protection activity as well as coordination and corrective actions in this document. Every worker is responsible for fulfilment of radiation protection requirements. The staff that works in radiation exposure conditions is trained according to the programs on radiation protection preparation.

According to the Nuclear safety regulations BSR-1.9.3-2011 the INPP territory and its premises are divided into the controlled area and the supervised area. The premises in the INPP controlled area are subdivided into three categories according to their radiation conditions, see Table 15.7.

Table 15.7. Classification of INPP controlled areas

Room category	Colour of the area	Frequency of service	Dose rate μSv/h	Surface alpha contamination $Bq \cdot cm^{-2}$	Surface beta contamination $Bq \cdot cm^{-2}$	Total aerosol activity $Bq \cdot cm^{-3}$
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. The access to the room is authorised under the orders, written orders or special programmes approved in accordance with the established procedure with the permission of the Shift Supervisor or Radiation Safety Control dosimetrist. The second category premises are those, the entrance into which is only permitted for periodic maintenance of the equipment located in them (Central Hall, a Spent Fuel Storage Pools Hall, a sample cutting room). The access to the specified rooms is authorised according to INPP valid procedures. The third category premises are those of personnel permanent residence (for example, operator rooms, control panels, workshops, laboratories, corridors, etc.). The access to the premises, which under any radiation factor are related to categories I or II, is strictly regulated. The works in these premises are carried out in the following order:

– people responsible for radiation protection 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. The activities with increased exposure are usually carried out with the following radiation protection means: lead screens, distance safety equipment, video-monitoring systems. All activities threatened by ionising exposure are carried out in accordance with “Direction on Radiation Accident Prevention during Work Performance in Controlled Area” requirements.

Environmental monitoring and main results

In accordance with requirements for radiological environmental monitoring that are laid down in the Order of the Minister of Environment “On approval of regulation of environmental monitoring of economic entities”, the operator of nuclear energy object has to work out the monitoring programme and implement it. Measurements shall be made by the laboratory owned by the subject

or any other hired laboratory (or laboratories) possessing the required equipment and qualified personnel to ensure data quality. The laboratory that performs these analysis and measurements should be accredited by accreditation body, which belongs to European co-operation for Accreditation, or possess special permission to perform analysis and measurements of radionuclides in discharges and environmental samples.

The monitoring programme shall cover all important routes of radionuclide dispersion and population exposure to enable the proper evaluation of annual airborne and water discharges, likewise their short term and consequently doses for critical group members, changes.

To evaluate INPP impact to environment and population permanent radiation monitoring is carried out on the INPP site and within a radius of 30 km. Activities of radionuclides in foodstuffs, drinking water and soil have been measured since the INPP had been put into operation. The investigation data show that the activities of Cs-137 and Sr-90 in foodstuffs and drinking water do not considerably differ from the activity level in other regions of Lithuania and do not exceed levels laid out in the Lithuanian normative documents, see Table 15.8.

Table 15.8. Concentration of Cs-137 in the fish and soil in INPP Region in 2013-2015

Name of sample	Average values in INPP region (Bq/kg)		
	2013	2014	2015
Fish	1,12	2,43	0,71
Soil	4,84	2,98	3,03

All release pathways are monitored at the INPP. Activities of noble gases, particles, iodine and aerosol are measured in the ventilation stacks of NPP continuously. The discharge water is checked every time before s discharging into the lake and the water from intake and outlet channel is measured in laboratory every day.

On the site and in the vicinity TL dosimeters are set out for measurements of accumulated dose, which is evaluated at least twice per year. Also, on-line monitors for in-situ dose rate measurement are set around the INPP. The monitor readings permanently are available to the authority.

In order to control the impact of the INPP to environment sampling of aerosols and atmospheric precipitation (continuously), water, bottom sediments, grass and other environmental samples is 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 INPP. System operates in the territory of the INPP and in the monitoring area of potential radioactive contamination.

15.4. Regulatory review and control activities

There are two radiation protection regulatory authorities in Lithuania: VATESI and RSC.

VATESI is responsible for supervision of occupational radiation protection in nuclear energy area. For the regulatory purposes, VATESI drafts and approves legal acts related to occupational radiation protection in nuclear energy area, which shall be coordinated with the Ministry of Health. VATESI also sets the requirements for different life stages of nuclear facilities taking into account radiation protection aspects, sets the requirements for clearance of radioactive materials and establishes the procedure and limits for the release of radionuclides from nuclear facilities.

To evaluate how the radiation protection requirements are fulfilled by the license holder VATESI conducts inspections. During the inspections at nuclear facilities VATESI checks how the license holder performs the individual and workplace monitoring, manages the controlled area, implements the principle of optimization, applies personal protective equipment, ensures the radiation protection training of workers and implement other radiation protection measures during the decommissioning of INPP. During the annual inspections on implementation of environmental

monitoring programme, procedures of operational control of liquid and gaseous discharges from INPP are inspected as well.

Also VATESI performs review of safety related documents, including reports on occupational exposure and release of radionuclides, which shall be submitted to VATESI on regular basis. By the end of the year VATESI is provided with the report on the impact of nuclear facilities on the environment.

The radiation protection issues during decontamination and dismantling of the INPP buildings and equipment and the radioactive waste management, control of occupational and public exposure during the decommissioning of the INPP will remain one of the underlying areas of regulatory activities.

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 RSC. The RSC exercises the state regulation and supervision of the practices involving sources of ionizing radiation, except of state regulation and supervision of the practices in the area of nuclear energy involving sources of ionizing radiation.

Among other responsibilities the RSC is responsible for the radiation protection of the general public from negative impact which may cause the ionizing radiation, including ionizing radiation, arising from nuclear facilities in operation and decommissioning.

RSC as regulatory body takes part in evaluation of Environment Impact Assessment Reports of INPP decommissioning projects and also is regularly assessing exposure for public due to discharges to the atmosphere and water from the INPP. Within State Environmental Radiological Monitoring the measurements of radioactivity in the foodstuffs (milk, meat, vegetables, grains, and fish), raw food, drinking water, and mushrooms are performed at schedule approved by Minister of Health Care. Milk and drinking water is analyzed on quarterly basis, fish, meat – twice per year, vegetables, grains, mushrooms – during summer time. Approximately 100 samples of food, 160 samples of drinking water and 150 samples of mushrooms were measured in every year from 2013 up to 2015. Results showed that the levels of man made radioactivity in the samples analyzed are very low, and radioactivity in the samples in INPP area is the same as in the other territory of Lithuania. External gamma dose equivalent measurements by thermo luminescent dosimetry in the surroundings of the NPP proved that. Dose due to man made radionuclides (Sr-90 and Cs-137) for the public estimated on the results of measurements was lower 2 μSv/year. During the last 5 years dose estimation for the public was performed analyzing results of monthly and annual reports of radioactivity discharged to the environment delivered by the INPP.

The Ministry of Environment approves requirements on measurements of environmental radiation while EPA controls the implementation of these requirements. EPA provides environmental radiological control within the sanitary protection zone of the nuclear facility. There are six automatic gamma dose rate measurement stations in vicinity of INPP. There is a non-automatic station of aerosol sampling in 60 km distance from INPP and automatic aerosol station in Vilnius. Additionally monitoring of radionuclides in aerosols is done close to INPP (in the distance of 3.5 km) by the Center for Physical Sciences and Technologies, which reports the annual data to EPA. Environment samples are periodically taken within the zone of INPP: water, biota and bottom sediments of the Lake Drūkšiai. Control of INPP laboratory is provided for ensuring of reliability of results.

Article 16 Emergency Preparedness

Each Contracting 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 Contracting Party shall take the appropriate steps to ensure that, insofar as they are likely to be affected by a radiological emergency, its own population and the competent authorities of the States in the vicinity of the nuclear installation arc 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 affected 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.

Article 16(1) – Emergency plans and programmes

16.1. Overview of arrangements and regulatory requirements for on-site and off-site emergency preparedness

The main laws that set and describe the general criteria for ensuring on-site and off-site emergency preparedness and response in case of nuclear and radiological emergencies are:

– The Civil Protection Law establishes the legal and organisational framework for the organisation and functioning of the civil protection system, the competence of state and municipal institutions and agencies, the rights and duties of other agencies, economic entities and residents in the sphere of civil protection.

– The Law on Nuclear Energy sets the general obligations and assigns responsibilities for licence holders and state institutions for preparedness and response to nuclear and radiological emergencies at nuclear facilities. This law sets the order of preparation and approval of the state plan for protection of population in case of a nuclear accident.

– The Law on Nuclear Safety sets responsibilities for license holders to ensure the preparedness for possible nuclear and radiological accidents, their prevention at nuclear installations. This law sets the obligation for license holders to prepare and test an on-site emergency preparedness plan.

The arrangements for ensuring the off-site preparedness and response to nuclear and radiological emergencies are:

National Plan for Protection of Population in Case of Nuclear Emergency (hereinafter - Plan) at the State level defines civil protection actions in case of a nuclear emergency in Lithuania and (or) outside of its borders. The general objectives of emergency planning are to prevent serious deterministic health effects and to reduce the likely stochastic health effects of ionizing radiation. The Plan assigns the responsibilities of state institutions taking part in emergency preparedness, provides means of protecting the population. The Plan sets arrangements for co-ordination of actions taken over by ministries, other state administration institutions, municipal authorities, describes the early notification of neighbouring countries, EC, IAEA, etc. The Plan is prepared in accordance with IAEA Requirements No. GS-R-2 “Preparedness and Response for a Nuclear or Radiological emergency” and IAEA Safety Guide GS-G-2.1 “Arrangements for Preparedness for a Nuclear or Radiological Emergency”.

Hygiene Standard HN 99:2011 “Protective Actions of Public in Case of Radiological or Nuclear Emergency” approved by the Order of the Minister of Health on December 7, 2011, implements IAEA General Safety Guide No. GSG-2 “Criteria for Use in Preparedness and Response for a Nuclear

or Radiological Emergency". Hygiene Standard HN 99:2011 establishes generic criteria for acute doses to avoid or to minimize severe deterministic effects, generic criteria for protective actions to reduce the risk of stochastic effects, operation intervention levels (OIL) for environmental measurements, skin contamination, food, milk, drinking water, procedures on administration of stable iodine, clean-up procedures and dosimetric control of contaminated population, etc. This Hygiene Standard is a basis for application of public protective actions.

The main arrangements for ensuring the on-site preparedness and response to nuclear and radiological emergencies at nuclear facilities are:

Nuclear Safety Requirements BSR-2.1.2-2010 "General requirements on assurance of safety of nuclear power plants with RBMK-1500 type reactors" set the objectives, guidelines, principles and the main safety criteria for nuclear facilities operating RBMK-1500 type reactors. This document puts the obligation for operator of nuclear facility to make analysis and prepare the list of possible beyond design accidents, which may lead to severe reactor core damage or melting. The BSR-2.1.2-2010 sets the requirement for operator to prepare the emergency preparedness plan taking in account the analysis of possible severe beyond design accidents.

Emergency Preparedness and Response Requirements for the Operators of Nuclear Facilities set the main requirements for emergency preparedness at the nuclear facilities. The Requirements oblige the operator of nuclear facility to assure prevention of accidents and incidents and, in the event of an accident, to perform the emergency preparedness tasks immediately. This document requires the operator of nuclear facility to develop the Emergency Preparedness Plan complying with these Requirements. This document is based on IAEA requirements GS-R-2, GS-R-2.1 and Method for Developing Arrangements for Response to a Nuclear or Radiological Emergency (TECDOC-953 update).

16.2. Overview and implementation of main elements of national plan for emergency preparedness

The civil protection and rescue system is comprised off the Government of Lithuania, the Government Emergency Commission, the Ministry of Interior, the PAGD, the State Emergency Operation Centre, 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 two levels: state (governmental) and municipal. The state level comprises the Government of the Republic of Lithuania, the Government Emergency Commission, the State Emergency Operation Centre, the Emergency Operation Centres of the Ministry of Interior and other ministries, Emergency Operation Centres of the PAGD and other governmental institutions, including VATESI. The municipality level comprises the Municipal Administration, the Municipal Emergency Commissions, the Municipal Emergency Operations Centre, the Fire Protection Services, as well as other institutions, economic entities and theirs Emergency Operation Centres. Preparations for likely emergencies are carried out by means of planning related activities on each level of the civil protection system.

The PAGD is competent authority that regulates and coordinates the state civil protection system in the country, controls the way the civil protection system is functioning, organizes operation of State Emergency Operations Centre during emergency situations, organizes and conducts civil protection exercises at national level, organizes fire fighting operations, rescue of people and property, organizes notification and provides information to public.

Administrations of municipalities of Ignalina, Zarasai and Visaginas regions are responsible for development of plans for evacuation and temporary inhabitation for affected population.

Ministry of Energy and VATESI are responsible for management of emergency situation caused by nuclear accident in domestic or abroad NPP. Also VATESI is collecting information about situation at the nuclear facilities, analyzing and forecasting the development of the situation and

predicting possible emissions and pathways of radioactive materials, providing information and advice to the Government, PAGD, Ministry of Environment and RSC, providing information and consulting the Government Emergency Commission, providing information to the mass-media and public about the situation in the nuclear facilities, notifying European Commission, IAEA, neighbouring countries in accordance with the Convention on Early Notification and bilateral agreements.

In accordance with the Plan the RSC presents recommendations to the State or Municipal Emergency Commission, to the State or Municipal Operation Centre for the reduction of exposure doses and prevention of deterministic and stochastic effects of radiation on the public and emergency workers. RSC performs analysis of foodstuffs, drinking-water and other samples, contaminated by radionuclides, and presents suggest to the Ministry of Health to approve foodstuffs and their raw materials, drinking-water, feeding stuffs temporary maximum permissible levels of radioactive contamination for the emergency consequences liquidation period, organizes supervision and control of their compliance. RSC also presents proposals to the Ministry of Health about the necessity of applying iodine prophylaxis and provides information to the public, within the limits of its competence, about protection actions.

In the event of a nuclear accident at the INPP, PAGD is responsible for organization of warning, fire protection and rescue and public information and a real surveillance of contaminated territory. In the case of emergency actions of ministries and government authorities shall be coordinated by the Government Emergency Commission, which is comprised of ministerial and governmental officers entitled to decisions making. Operation body of the Government Emergency Commission is the State Emergency Operations Centre comprised of ministerial officers and the headquarters of the PAGD.

In the event of an emergency the State Emergency Operations Centre shall:

– 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 three Municipalities;

– 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 Government Emergency Commission.

In the event of an emergency the personnel of the INPP shall inform about emergency at the NPP and the existing situation in compliance with approved scheme for preliminary information on a radiation emergency at the INPP. 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 neighbouring countries: Daugavpils Region in Latvia and Braslav Region in Belarus.

PAGD shall pass information on the emergency to the ministries, municipalities of cities/towns. For this purpose it shall use automatic system for the national managing bodies and warning of the population, public means of communication (subscribers' telephone, fax for general purposes) and direct telephone and radio communication channels additionally arranged by PAGD. In addition, the PAGD also transmits information on the emergency to state civil protection management bodies in the neighbouring countries. International notification and information issues lay on VATESI.

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 radiation surveillance is carried out only if this is required. Radiation surveillance is

planned and coordinated by the RSC on the basis of information provided by administration of the INPP on characteristics of the accident, dose metric data, forecasts of LHMT, 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. If there is a need PAGD also has a capability to make additional reconnaissance of contaminated area.

Decisions concerning regular prophylactic application of iodine preparations in the event of an emergency in the INPP shall be made by municipal Emergency Operation Centres. Population in the zones of long-term protection measures (in radius of 50 km from the INPP) 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 at 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 municipal level by director of Municipal Administration or at highest level by a head official for civil protection operations assigned by the Prime Minister. Proposals concerning evacuation shall be given by municipal Emergency Operation Centres 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 three directions.

Taking into account lessons learned from Fukushima Daichi accident, Republic of Lithuania is ongoing the legitimation process of HERCA-WENRA approach to ensure arrangements for urgent protective actions and other recommendations in case of nuclear and radiological emergencies in neighbouring countries. The importance of Lithuanian’s preparedness to cross-border nuclear emergency is associated with Ostrovets NPP construction, which is just 50 km from Lithuania’s capital Vilnius. According to HERCA-WENRA recommendations and latest IAEA methodology, Lithuania has ensure arrangements for urgent protective actions in 100 km from Ostrovets NPP.

RSC in 2016 drew attention of the state institutions on the necessity to review the State Residents Protection Plan in Case of Nuclear Accident in line with HERCA-WENRA Approach for a Better Cross-border Coordination of Protective Actions during the Early Phase of a Nuclear Accident. The workshop was organized on 24th March 2016. The importance of Lithuanian’s preparedness to cross-border nuclear emergency is associated with Ostrovets NPP construction which is just 20 km from the Lithuania and Belarus state border. The review and updating of the State Residents Protection Plan in Case of Nuclear Accident and of the Lithuanian Hygiene Standard HN 99:2011 are planned in the near future, in accordance with requirements of GSR Part 7 and HERCA-WENRA recommendations.

16.3. Implementation of emergency preparedness measures by license holders

In order to protect the personnel of INPP and population of the Republic of Lithuania against potential consequences of nuclear and radiological emergencies, the INPP carries out emergency planning and emergency preparedness activities. Emergency planning process at the INPP includes:

– analysing of potential emergencies and assessing of their consequences to the personnel, people and environment taking into account the worst-case consequences;

– establishing of the Emergency Preparedness Organization (hereinafter - EPO) capable of eliminating potential emergencies and their consequences;

– permanent monitoring of the operability of the technical means ensuring accident prevention, their localization and elimination;

– accumulating of the material and technical resources required for the EPO functioning;

– maintaining of continuous preparedness of the Accident Management Centre (hereinafter - AMC) and training of the personnel of EPO headquarters, services and teams, and the personnel not involved in the EPO services;

– developing of the documents prescribed by VATESI and recommended by IAEA;

– timely updating of the INPP Emergency Preparedness Plan (hereinafter - EPP) with due consideration of the full-scale exercises results, changes in requirements as well as results of inspections conducted by VATESI, Visaginas PGV, and other state management and control institutions.

Director General of INPP is in charge of emergency preparedness and planning at the enterprise through the Manager of Fire Surveillance and Civil Protection Group of Audit, Safety and Quality Management Division (hereinafter - AS&QMD).

Classification of emergencies

The following emergencies classes are defined at INPP:

Alert is a violation of a nuclear facility state capable to develop into nuclear or radiation accident, at which:

– the acceptable concentrations of radionuclides in nuclear facility premises can be exceeded;

– the established limits of irradiation doses of the personnel can be exceeded;

– the failure of safety related systems (hereinafter - SRS) equipment occurred, which can lead to decrease in a level of protection of the core or the spent nuclear fuel.

Note: In case of such violations the appropriate nuclear facility EPP instructions come into force, members of the nuclear facility EPO headquarters are gathered in EPO AMC. EPO headquarters carry out an estimation and, if necessary, management of elimination of the arisen emergency. Investigation of radiation conditions within the limits of the nuclear facility site is conducted on a regular basis.

Local accident is a violation of a nuclear facility state, at which:

– the acceptable concentrations of radionuclides in nuclear facility premises are exceeded or the maximum permissible activity of radionuclides released into environment is exceeded;

– the established limits of irradiation doses of the personnel are exceeded;

– the failure of SRS equipment occurred, which led to decrease in a level of protection of the core or a safety level of the spent nuclear fuel.

Note: Consequences of the local accident do not go outside the limits of the controlled area. In case of such accidents EPP, the appropriate instructions on emergency preparedness and, if necessary, beyond design accident management manuals (hereinafter - RUZA) are put into action. Members of the EPO headquarters are gathered in AMC, the required EPO services and teams are gathered and brought to readiness. EPO headquarters carry out an estimation and management of elimination of the arisen emergency. Investigation of radiation conditions within the limits of the controlled area is conducted on a regular basis. In case of such accidents the protective actions for the population outside the controlled area, and for limitation of nuclear facility personnel irradiation doses, which should be specified taking into consideration the created circumstances, should be prepared in the EPO headquarters in advance.

Site area accident is a violation of a nuclear facility state, at which:

– a distribution of radioactive products within the limits of the controlled area occurred in the quantities exceeding the regulated values, which demand urgent performance of measures on protection of the personnel of the whole enterprise;

– the excess of the established limits of irradiation doses of the population is possible;

– the failure of SRS equipment occurred, which can lead to the core or the spent nuclear fuel damage.

Note: In case of such accidents EPP, the instructions on emergency preparedness and appropriate RUZA are put into action. Members of the EPO headquarters are gathered in AMC. All EPO services and teams are gathered and brought to readiness. EPO headquarters carry out an estimation and management of localization and elimination of the arisen emergency. Investigation of radiation conditions within the limits of the controlled area and outside it is conducted on a regular basis. In case of such accidents the protective actions for the population outside the controlled area, as well as the protective actions for limitation of nuclear facility personnel irradiation doses, which should be specified taking into consideration the created circumstances, should be prepared by the EPO headquarters in advance.

General emergency is a violation of a nuclear facility state, at which:

– emission of radionuclides into environment occurred that can cause environmental contamination and the population irradiation, wherefrom the protective actions should be applied established by the Hygienic Standard of Republic of Lithuania HN 99: 2011 “Protection of the Population in Case of Radiation or Nuclear Accident Occurrence”.

– damage of the core or the spent nuclear fuel;

– failure of SRS equipment occurred, which can lead to the core or the spent nuclear fuel melting.

Note: In case of such accidents EPP, the instructions on emergency preparedness and appropriate RUZA are put into action. Members of the EPO headquarters are gathered in AMC. All EPO services and teams are gathered and brought to readiness. EPO headquarters carry out an estimation and management of elimination of the arisen emergency. Investigation of radiation conditions within the limits of the controlled area and outside it is conducted on a regular basis. Urgent actions on protection of the nuclear facility personnel are carried out. In case of the accidents of such class the municipalities of the nearby cities should execute the urgent actions on protection of the population suggested by the EPO headquarters.

Accidents at INPP are classified in accordance with the Instruction for Classification of Accidents at INPP.

At the beginning the decision to apply protective actions is based on the class of emergency, and then the necessity of performance of protective actions is reviewed on the basis of environmental monitoring results. The decision to apply protective actions is based on the operation intervention levels (OIL). There are six OIL in the Republic of Lithuania that are regulated by the Lithuanian Hygiene Standard HN 99:2011 “Protective actions of general public in case of radiological or nuclear accident” and that correspond with the IAEA Requirements No. GS-R-2 “Preparedness and Response for a Nuclear or Radiological emergency” and IAEA Safety Guide GS-G-2.1 “Arrangements for Preparedness for a Nuclear or Radiological Emergency”.

Main elements of the on-site and off-site emergency plans

The INPP EPP is the main procedure to follow during organizational, technical, medical, evacuation and other activities in order to protect the personnel and the environment from the consequences of accidents, natural disasters and man-made impacts. The EPP requirements apply to the EPO managers and personnel, as well as to the personnel not involved in the EPO services and to the contractors’ personnel working at INPP. The EPP is developed in accordance with national legal acts and IAEA requirements.

The EPP consists of two parts:

– general part of the plan (descriptive) with appendices;

– operational part of the plan (instructive) containing 13 instructions on emergency preparedness and civil protection.

The EPP shall be agreed with VATESI and other institutions of state management and surveillance and shall be updated every three years or after important alterations in the NPP operation and activities. The Manager of Fire Surveillance and Civil Protection Group of AS&QMD of the INPP are responsible for updating EPP.

The INPP prepared a Final Stress Tests Report on the basis of which VATESI prepared National Report of Stress Tests and submitted it to the European Nuclear Safety Regulators Group (ENSREG). In the ENSREG report the INPP strategy for severe nuclear accidents management was accepted as adequate for the existing hazards. On the basis of the aforementioned reports the Plan of Corrective Actions on improvement of emergency preparedness and development of accident management was prepared and implemented, and its actions were included into EPP.

Facilities provided by the licence holder for emergency preparedness

INPP EPO AMC is created at the enterprise for beyond design basis accidents management (in Bld. 185 basement), which is maintained in constant (round-the-clock) preparedness, has special premises for EPO headquarters and EPO services working groups operation, equipped with necessary furniture, computers, communication equipment, personal protection equipment (hereinafter – PPE), and other life-support systems. For organization of EPO TSC experts work the following is foreseen:

– main TSC premises located at Unit D-1 in Room 300/56;

– spare TSC premises located at EPO AMC in Room 48.

The description of TSC premises, their equipment and communication means are presented in the TSC Instruction on Emergency Preparedness. The following premises are foreseen for accidents management by the operation personnel:

– MCR-2 – power unit 2 Main Control Room;

– RCR-2 – power unit 2 Reserved Control Room;

– CCR – Central Control Room for the enterprise electrical part;

– RPMCB – the enterprise Radiation Protection Main Control Board.

Working premises of EPO Services are indicated in the instructions on emergency preparedness of the specified EPO services. The INPP EPO applies monitoring systems, which includes automated radiation safety monitoring system (control of emissions, control of drains, control of radiation conditions on the site via stationary posts, as well as gamma background control in 30 km zone) and seismic warning and control system, which consists of an independent subsystem performing the function of the seismic alert system (SAS).

SAS system is intended for informing on the earthquake prior to arrival of its waves at the INPP. When a seismic wave arrives at one or several external seismic stations, the system sends alarms power unit 2 MCR, the information from SAS is also transmitted to the main TSC and reserved TSC. Time from the alarm start up to arrival of seismic waves at the INPP is defined approximately as 10 sec. The information received from the seismic sensors is kept in SAS archive.

The resources, equipment, tools, accessories and technical means required for EPO services for elimination of accidents are defined and specified in instructions on emergency preparedness of EPO services.

16.4. Training and exercises, evaluation activities and main results of performed exercises and lessons learned

INPP Director General (if he has not appointed the authorized person regarding the enterprise EP and CP) shall undergo initial training under the programme on EP and CP for the Senior Managers

of the state importance facilities in the PAGD Civil Protection Training Branch of the Fire Fighters Training School.

DD Director, as the authorized person appointed by the order of the INPP Director General regarding the enterprise EP and CP activities organization, is obliged to undergo initial training under the programme on EP and CP for the Senior Managers (or the authorized by them persons) of the state importance facilities in the PAGD Training Centre on Civil Protection.

The Head of TS, as the person who can act as the DD Director, is obliged to undergo initial training under the programme on EP and CP for the Senior Managers (or the authorized by them persons) of the state importance facilities in the PAGD Civil Protection Training Branch of the Fire Fighters Training School.

The Head of AS&QMD FI and CP Group, as the head of EPO headquarters, and the AS&QMD FI and CP Group civil protection engineer, as the assistant of the Head of EPO headquarters, should undergo initial training under the programme for the permanent EP and CP staff, in the PAGD Civil Protection Training Branch of the Fire Fighters Training School.

Managers of EPO services and teams with their subordinates (that are involved and those not involved in the EPO) in compliance with the approved training schedule conduct annual theoretical practice on emergency preparedness and civil protection in the class of Accident Management Centre for the members of all 15 training groups. As all the EPO services and teams personnel shall be trained to respond in the event of an emergency training of the EPO headquarters administrative board is also carried out according to the Schedule of studies, trainings and exercises on emergency preparedness and civil protection at the INPP. The duration of training is not less than 2 hours – theoretical training and not less than 2 hours – practical training in group exercises or full-scale exercises.

The INPP Director General not less than once per 3 years organizes emergency preparedness full-scale exercises, where all EPO personnel participate in the full-scale exercises, where the emergency preparedness level of all EPO services and teams headquarters personnel is checked, as well as their ability to work in complicated conditions at performance of the assigned tasks. During the full-scale exercises the actions of managers and personnel of EPO services are observed and assessed by appointed exercise controller and supervisors. When analysing the full-scale exercises, the supervisors report on merits and flaws in the actions of managers and personnel of EPO services as well as on the disadvantages and misjudgements made during the exercises.

After completion of full-scale exercises the controller of the exercises together with the Head of EPO headquarters (or its assistant) prepare a report on performance of full-scale exercises. The report is to be approved by the INPP Director General, registered and stored in Audit, Safety and Quality Management Division. Two copies of the report are to be sent to the Ministry of Energy of the Republic of Lithuania and VATESI.

On the basis of the reports of the supervisors, participated in the exercises, the workers of the Fire Surveillance and Civil Protection Group of Audit, Safety and Quality Management Division prepare the Plan of Corrective Actions for Emergency Preparedness in order to eliminate the detected disadvantages, and send the report to VATESI for control.

Training and exercises of Regulatory Authorities staff

Training for first responders and other competent authorities at the national level is organized every year. The purpose of this training is to strengthen the abilities of the competent authorities to respond and act in case of nuclear or radiological accident. VATESI and RSC has established its own emergency staff training and exercising programs.

According to paragraph 33 of VATESI procedure for Preparedness for Management of Emergency Situations in Case of Nuclear and Radiological Emergencies, administrator of ERC shall prepare a 3 year period training and exercise programme. This programme shall include a list of training courses and exercises for VATESI ERC staff. Training and exercise programme is prepared

according to Section VII of VATESI Emergency Management Plan in Case of Nuclear Emergency, which sets the requirements for training and exercising.

Besides VATESI training and exercise programme, the staff of VATESI ERC takes part in various IAEA's ConvEx and European Commission drills and exercises. Additionally VATESI ERC staff is trained on civil protection topics in the Branch of the Fire Fighters Training School of the PAGD.

Key authorities also participate in various international exercises, such as Convex, ECURIE, CBSS, etc., organized by the IAEA, EC, NATO and other international organizations.

On 30th of October 2013 RSC has organised state level exercise on Action Coordination of Subjects of Civil Protection System in Case of Dirty Bomb Explosion in Vilnius International Airport. 11 institutions together with RSC, Vilnius International Airport, PAGD, Police department, Lithuanian Police Antiterrorist Operations Team "ARAS", Vilnius Municipality, VATESI and other institutions were involved in this exercise. During the exercise preparedness to evacuate, decontaminate, provide temporary shelter for large number of residents, predict radionuclide transfer in the air, inform and warn the public about the situation, organize medical assistance to victims, manage radioactive waste and other matters were evaluated, the knowledges of participants on how to respond to such type of radiological accident were updated and consolidated.

In 2014 RSC, VATESI and other national institutions took part in the emergency preparedness exercise ConvEx-2d organised by the IAEA. According to the exercise scenario, a supposed nuclear accident occurred in Bulgarian Kozloduy NPP. VATESI and RSC specialists exchanged information with other Lithuanian institutions involved in the exercise and analysed the progress of the Kozloduy NPP accident.

In 2014 RSC participated in the table exercise Interaction between Lithuanian Authorities in Response to Nuclear or Radiological Incidents organised by Nuclear Security Center of Excellence established within State Border Guard Service under the Ministry of Interior Border Guard School. The purpose of this table exercise was to promote and improve performance effectiveness and interaction between Lithuanian institutions involved in ensuring nuclear and radiological security.

In 2015 institutions of Republic of Lithuania took part in ECUREX-2015 exercise organized by European Commission. The main objective of this exercise in Lithuania was to test information exchange and coordination of actions among national institutions in case of nuclear accident outside of Lithuanian territory. According to scenario nuclear emergency occurred in Cernavoda NPP, Romania.

In 2016 Visaginas municipality and INPP organized table top exercise to test information exchange and provision to public and coordination of actions in case of nuclear accident at INPP. The representatives of VATESI, RSC, PAGD and other local and neighbouring institutions and municipalities administrations took part in this exercise.

16.5. Regulatory review and control activities

VATESI is performing regular inspections at INPP to check that the emergency preparedness arrangements are implemented properly. This includes control of training and exercising of Emergency Response Organization staff and facility workers, review of emergency planning and response procedures and documents, inspection of equipment and functionality of Emergency Operation Centre, inspection of self-protection equipment and tools for emergency response organization workers. Additionally inspectors of VATESI participate in training and exercising activities as observers and give recommendations.

In 2013–2015 RSC focused on preparedness of its own staff and specialists of other institutions, which are involved in liquidation of the consequences of radiological or nuclear accidents, for safe performance of their functions without breaching radiation protection requirements. In total 617 radiological and nuclear accident responders from different institutions were trained on a number of radiation protection issues.

Every year health care hospitals are checked by RSC for its preparedness to take and render medical aid for injured people during radiological and nuclear accidents. Also workshops and training courses are organized for the specialists of public and personal health care. The training is provided on how in case of an accident to provide help to injured persons.

The IAEA on October 1–11th 2012 conducted Emergency Preparedness Review (EPREV) mission in Lithuania and evaluated Lithuania's radiation emergency preparedness and response arrangements. One of the mission recommendations was to RSC to prepare National Plan in Case of Radiological Emergency, also to clarify in Lithuania's regulations and its organization, which agency is the lead (INPP, VATESI, Environmental Protection Agency under the Ministry of the Environment (EPA), RSC) in the predictions of radiological consequences. It was recommended to test and examine the roles of these organizations in dose projection and formulating suggestions of public protective actions in a specially designed exercise. In responding to the IAEA's above mentioned recommendation and lessons learned from Daiichi Fukushima accident, RSC on October 8th 2015 has organized table top exercise „Cooperation of institutions in dose projection and formulating recommendations on protective actions of the public in case of nuclear emergency". In the exercise participated professionals from INPP, VATESI, EPA, RSC. In the conclusions of the exercise it was stressed the need to review the State Residents Protection Plan in Case of Nuclear Accident and some other legal acts which are regulated emergency preparedness and response to nuclear or radiological emergency.

16.6. International arrangements

Government of Republic of Lithuania has signed a number of international agreements with neighbouring countries and other States in the field of cooperation assistance in case of emergency situations:

– Agreement between Germany and Lithuania On Assistance in case of Natural Disasters and Severe Emergencies (signed in 1994);

– Agreement between Poland and Lithuania On Cooperation and Assistance in Case of Disasters, Elemental Events, and Other Emergencies (signed in 2000);

– Agreement between Hungary and Lithuania On Cooperation and Assistance in Case of Disasters and Severe Emergencies (signed in 2001);

– Agreement between Latvia and Lithuania On Assistance in Case of Natural Disasters and other Severe Emergencies (signed in 2001);

– Agreement between Ukraine and Lithuania On Cooperation and Assistance on Emergency Prevention and Liquidation of Emergency Consequences (signed in 2003);

– Agreement between Sweden and Lithuania On Cooperation in the Field of Emergency Prevention, Preparedness and Liquidation (signed in 2003);

– agreement between Belarus and Lithuania On Cooperation in the Field of Prevention and Liquidation of Natural Disasters and Severe Emergencies (signed in 2003);

– agreement between Pennsylvania Emergency Management Agency (US) and Lithuania On Cooperation and Assistance in the Field of Prevention and Liquidation of Emergencies (signed in 2009);

– Project of Agreement between Russia and Lithuania on Cooperation and assistance in the Field of Prevention and Liquidation of Emergencies is under development.

The final document of the Sixth Review Meeting of the Contracting Parties on 24 March-4 April 2014 highlighted the importance of siting and emergency preparedness, and consultation and provision of necessary information to Contracting Parties in the vicinity of a proposed nuclear installation. In response to the possible nuclear event at Ostrovets NPP, Lithuanian competent authorities shall come to an agreement with Belarus competent authorities for early notification in

accordance with Convention on Early Notification of a Nuclear Accident. Emergency preparedness zones and measures to be applied in case of an accident at the Ostrovets NPP shall be in line with the international recommendations set by the IAEA and recommendations of HERCA-WENRA (Goatomnadzor of Belarus has an observer status in WENRA). Due to the short distance from the Ostrovets NPP to the Lithuanian capital Vilnius, Lithuania shall be prepared to implement some protective actions defined in these recommendations. The exchange of information to be prepared for development of appropriate harmonized emergency preparedness and response measures is one of the issues, which currently remains unsolved, in regard to the site in close vicinity to the Lithuanian border selected for construction of nuclear power plant in Belarus. To ensure complete and transparent exchange of information the draft of the Agreement between Lithuanian and Belarus nuclear safety regulatory authorities on the Cooperation and Exchange of Information in the Field of Nuclear Safety and Radiation Protection and Early Notification of Nuclear Emergency, was prepared and is under negotiation process.

Lithuania is seriously concerned about Ostrovets NPP project and these key questions on nuclear safety raised by Lithuania are still unanswered:

The selected site is not acceptable taking into account residual risk of severe accident

Belarusian side has not provided evidence that during the process of site selection a proper evaluation of population density (especially on Lithuanian territory) as well as other aspects, important for implementation of measures for emergency preparedness and response, were evaluated. Also evidences were not provided that impact of ionizing radiation to population in the case of beyond design basis accident at Belarusian nuclear power plant is on acceptable low level. Hence, taking into account short distance to boarder of Lithuania and, especially, to capital Vilnius, in case of beyond design basis accident almost 1/3 of population of Lithuania will be impacted by ionizing radiation, such an extreme situation would be very difficult to manage, because state institutions would be pushed to work in the same impact conditions.

The selected site is not properly investigated

Belarusian side has not provided evidences that during investigation of site a liquefaction of soil, hydrological and seismic properties of site were properly evaluated. Additionally, it should be noted that Lithuania does not have evidence that site was evaluated against IAEA Safety Requirements NS-R-3 “Site evaluation for Nuclear Power Plants”.

Therefore, Lithuania seeks that Belarus would conduct a full scope Site and External Event Design (SEED) Mission of IAEA and that results of the mission would be presented to the international comunity.

Compliance of design with some modern safety standards is not justified

Evidences that during design of nuclear power plant impact of heavy plane crash was evaluated and technical and administrative measures are foreseen for resistance to such an event were not provided. Similar deficiency was observed by Finish regulatory authority STUK during their review of AES-2006 design for their decision in principal. STUK also raised questions regarding physical separation of safety systems and independent reduction of pressure in primary circuit during beyond design basis accidents.

“Stress tests” are not performed

Belarussian side have declared that they would perform “stress tests” in 2016-2017, nevertheless it is doubtful if Belarussian side would perform requested tests, including implementation of needed safety improvement measures, until commissioning of nuclear power plant’s first unit. It should be noted that results of stress tests should be reviewed and approved by the national regulatory authority as well as pass per-review process organized by European Commission.

Lack of information on capabilities of operating organization and regulatory authority

In view of several incidents during the construction of Ostrovets NPP there is a lack of information on capabilities of operating organization to perform their own responsibilities for safety

to control process of construction and ensure that Belarussian nuclear power plant is constructed in accordance with approved design documentation and standards. In addition, there is a lack of information on real activities of nuclear safety regulatory authority ensuring effective management system and leadership, safety management and high level of safety culture in all organizations participated in construction of nuclear power plant.

Radioactive waste and spent nuclear fuel management strategy

IAEA Safety Standards require that state embarking on nuclear power plant shall establish infrastructure and strategy for management of radioactive waste and spent nuclear fuel. The strategy shall include all necessary steps to be implemented, including disposal stage. Belarus is a Contracting Party to the Joint Convention. During the last Review Meeting Belarussian's team confessed that Republic of Belarus has no any document, talking on strategy of management of radioactive waste and spent nuclear fuel.

Article 16(2) – Information of the public and neighbouring states

16.7. Overview of arrangements for informing the public in the vicinity of the nuclear installations about emergency planning and emergency situations

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

In case of an emergency Sate and municipality's institutions, public offices and citizens is notified using existing notification public warning and informing system, which consists of 421 central and 406 local electric sirens and cell-broadcast facilities. After notifying signal, the information about situation, possible consequences and process of liquidation of emergency is vocally spread through companies and institutions emergency sound systems and using national and local broadcasters.

The citizens of municipalities are notified using technical and organizational means described in each municipality's emergency management plan. In places not covered by notification network system citizens are informed by using existing communication system, cell-broadcast facilities and specialized vehicles equipped with sound amplifying systems. Also courier or local police services could be used for spreading the information.

According to the order approved by Director of the FRD, the heads of national importance objects and those registered in the registry of dangerous objects are responsible for notification of public, national and municipal institutions and public offices which could be affected by emergency.

Ministries and other national institutions are responsible for notifying their own staff. The PAGD shall notify the population, using national television and radio channels, most of commercial broadcasting companies (which work in FM), as well as through the wire radio communication network.

16.8. Arrangements to inform competent authorities in neighbouring States

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 is responsible for implementation of Convention on Early Notification and PAGD is responsible for implementation of Convention on Assistance. According to IAEA's EPR-IEComm requirements, VATESI is National Warning Point, National Competent Authority for events abroad and PAGD – National Competent Authority for domestic events. VATESI is also a contact point and

competent authority in ECURIE arrangements. Mutual assistance policy between Lithuania and the neighbouring countries is based on bilateral agreements:

– The bilateral agreement between Lithuania and Denmark On Information Exchange and Cooperation 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 Cooperation 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 Cooperation in the Field of Nuclear Safety and Radiation Protection has been signed on 3 October 2003.

– The agreement on early notification of Nuclear and Radiological Emergencies between the VATESI and the Swedish Radiation Safety Authority of the Kingdom of Sweden has been signed on 1 January 2009.

– The Agreement between Lithuania and Belarus On Early Notification of Nuclear Accidents, Exchange of Information and Co-operation in the Field of Nuclear Safety and Radiation Protection is under negotiation process.

Article 17 Siting

Each Contracting Party shall take the appropriate steps to ensure that appropriate procedures are established and implemented:

(i) for evaluating all relevant site-related factors likely to affect the safety of a nuclear installation for its projected lifetime;

(ii) for evaluating the likely safety impact of a proposed nuclear installation on individuals, society and the environment;

(iii) for re-evaluating as necessary all relevant factors referred to in sub-paragraphs (i) and (ii) so as to ensure the continued safety acceptability of the nuclear installation;

(iv) 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 the 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.

Article 17(i) – Evaluation of site related factors

17.1. Overview of arrangements and regulatory requirements relating to the siting and evaluation of sites of nuclear installations

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.

Sites for the construction of the VNPP are selected in accordance with the IAEA recommendations and national requirements of nuclear safety. Compliance with the IAEA Safety Standards is mandatory in determining the appropriateness of construction sites as well as in evaluating the engineering geological conditions of the sites and in carrying out engineering geological (geotechnical) investigations.

In accordance with the Law on Nuclear Safety of the Republic of Lithuania, prior to starting the preparation of the NPP design adapted to a specific construction site, the safety analysis of the site and the justification of safety have to be performed. The results of such analysis and justification are presented in the Site Evaluation Report which has to be reviewed and approved by the VATESI. VATESI can approve the report on evaluation of the construction site only after verifying that the results of the analysis and justification of the construction site are in line with requirements of the legal acts and after having received positive decisions form other institutions, which are involved in the process of reviewing a report. The detailed procedures for reviewing the site evaluation report are defined in the Governmental Resolution of the Republic of Lithuania No. 83 the "Description of procedure on review of the construction site evaluation report of nuclear power plant" and Nuclear Safety Requirements BSR-2.1.3-2010 "General requirements on site evaluation for nuclear power plants".

Nuclear Safety Requirements BSR-2.1.3-2010 "General requirements on site evaluation for nuclear power plants" based on IAEA Safety Requirements No. NS-R-3 „Site Evaluation for Nuclear Installations" and best international practice. The regulation sets the main requirements for site evaluation, as well as proposals to use IAEA standards and guides for more detailed analysis:

- Site Evaluation for Nuclear Installations, NS-R-3;
- Seismic Hazards in Site Evaluation for Nuclear Installations, SSG-9;
- External Human Induced Events in Site Evaluation for Nuclear Power Plants, NS-G-3.1;
- Dispersion of Radioactive Material in Air and Water and Consideration of Population Distribution in Site Evaluation for Nuclear Power Plants, NS-G-3.2;
- Meteorological Events in Site Evaluation for Nuclear Power Plants, NS-G-3.4;
- Flood Hazard for Nuclear Power Plants on Coastal and River Sites, NS-G-3.5;
- Geotechnical Aspects of Site Evaluation and Foundations for Nuclear Power Plants, NS-G-3.6;
- Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5)

In the course of the safety analysis and its justification, all factors related to the site or its environment that could impact the NPP's safety, including physical protection and planning of emergency preparedness, have to be identified, and corrective measures for the identified deficiencies of the site, if any, have to be proposed.

According to Governmental Resolution, VATESI forward the site evaluation report for other institutions, which are involved in the process of reviewing the site evaluation, if site evaluation report are in line with execution requirements. The LHMT, the Ministry of Health, the Administration of Civil Aviation, the LGT and the PAGD are involved in the process of reviewing the site evaluation report, because the site evaluation, due to the abundance and the complexity of the possible impacts on the safety of the NPP, covers many areas – metrology, hydrology, geology, aviation, emergency preparedness and others.

Overview of assessments made and criteria applied for evaluating all site related factors affecting the safety of the nuclear installation

The VAE has undertaken a number of preparatory works that are necessary in order to be properly prepared for construction of the new NPP in Lithuania. The detailed description of the process and activities related to preparatory works were provided in the 6th National report.

Sites evaluation report for VNPP was developed in line with the above mentioned requirements and IAEA standards and guides for more detailed analysis. Moreover provisions of at that time IAEA Draft Safety Guide No. DS417 "Meteorological and Hydrological Hazards in Site Evaluation of Nuclear Installations" (issued as Safety Guide SSG-18 "Meteorological and hydrological hazards in site evaluation for nuclear installations" in 2011) were taken into account.

In general it must be mentioned that the scope of Site Evaluation process in Lithuania is wider in comparison to the scope required by IAEA in its Safety Requirements NS-R-3 due to the fact that Lithuanian requirements also require to include considerations related to the impact of environment conditions on potential emergency planning and physical protection measures in to the scope of site evaluation report.

Also it must be noted that provisions of IAEA Safety Guide NS-G-3.2 „Dispersion of Radioactive Material in Air and Water and Consideration of Population Distribution in Site Evaluation for Nuclear Power Plants“, according to Lithuanian legislation must already be covered at the earlier stage of NPP construction project development – Environmental Impact Assessment. Therefore this evaluation was already completed for VNPP in 2009 (please refer to 6th National Report). Nevertheless the information on dispersion of radioactive material in air and water and consideration of population distribution provided in EIA was reviewed once again and provided for regulatory consideration in the scope of Site Evaluation Report.

The ground water monitoring programme on both potential construction sites of new NPP started in 2011 complying with the IAEA recommendations (description of programme is provided in the 6th National Report).

Overview of design provisions used against human made external events and natural occurring external events and the impact of related sequential natural external events

The VNPP sites evaluation process was implemented by dividing into two major parts:

First part comprising of:

- Geotechnical evaluation;
- Seismic evaluation.

Second part comprising of:

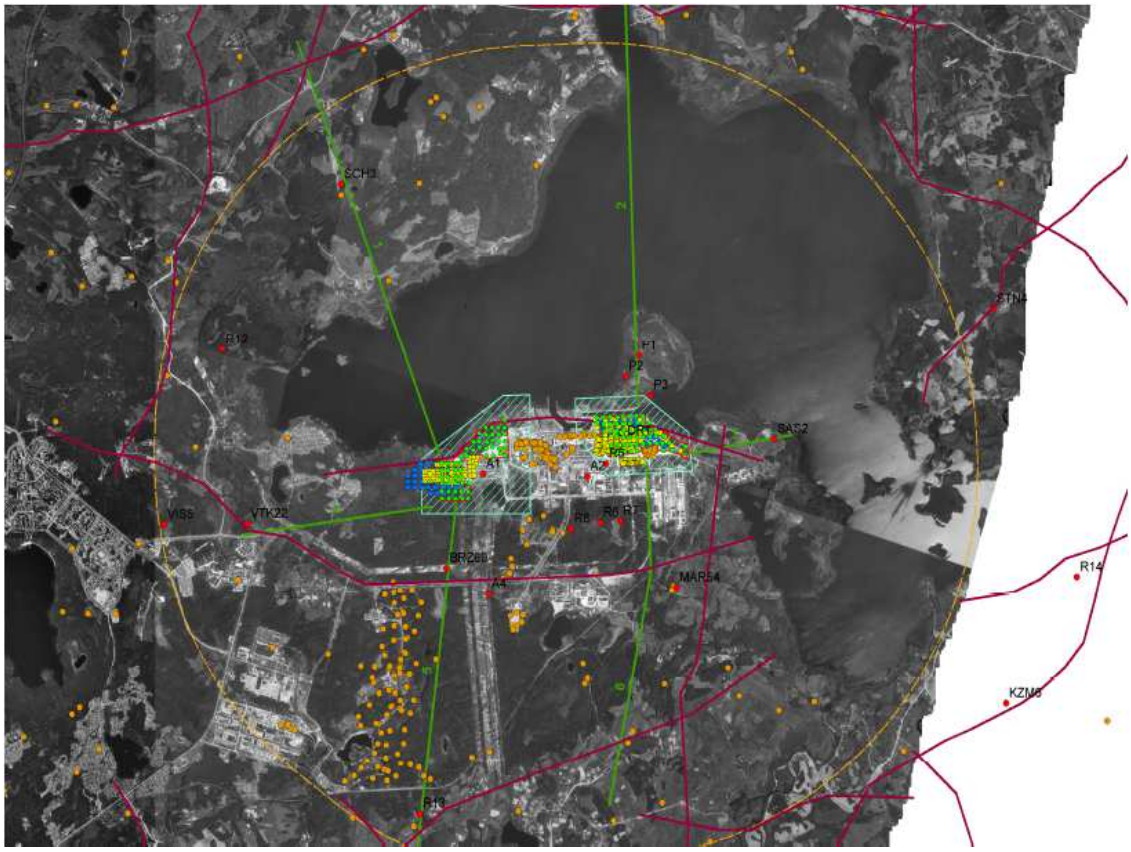
- Human induced events evaluation;
- Assessment of meteorological hazards;
- Evaluation of ultimate heat sink characteristics (including flooding hazards);
- Evaluation of potential dispersion of radioactive material and consideration of population distribution;
- Consideration of impact of environment on potential physical protection measures;
- Consideration of impact of environment on potential emergency planning measures;

The scope of the first evaluation part for geotechnical evaluation comprised a soil investigations analysis including the liquefaction coefficient, slopes stability hazards and existing buried structures. The following tasks have been implemented: determining the limits and depth of occurrence of weak soils in the sites; assessing the liquefaction potential of soils; and identifying the remnants of buried structures and objects and determining the depth of occurrence of such objects.

The scope of the first evaluation part for seismic hazards evaluates the risks of ground movements and surface deformation related to earthquakes and the other geological phenomena. The focus was on ascertaining the probability of tectonic faults in the NPP construction sites and on determining the degree of the seismic hazard for the sites on SL-1 and SL-2 levels and identifying the range of potential seismic impact.

It is important to note that there have been a number of previous geotechnical and seismic surveying investigation done for the purpose of INPP that already covered the sites of VNPP and before starting the detailed investigations for VNPP an in-depth analysis of an existing geotechnical and seismic data for the sites was performed.

In the scope of these evaluation the electrical tomography, geotechnical boring, satellite interferometry and 2D/3D seismic survey methods were used.



*Dots – wells; Lines – 2D seismic investigation lines; Striped polygons – 3D seismic investigations; Yellow dash line – 5 km radius.

Figure.17.1 VNPP sites geotechnical and seismic investigation scope.

More than 300 geotechnical investigation boreholes were drilled on the sites during previous investigations and 120 new geotechnical wells drilled in 2010. 112 ecogeological audit wells drilled on the Sites in 2009. More than 800 hydrogeological boreholes provide extensive data on the hydrogeological conditions in Near Region and Site Vicinity area. 8 new hydrogeological wells drilled on the Sites in 2010. Sites, Site Vicinity and Near Region areas are completely covered by gravimetric and magnetic survey at a scale of 1:50 000. 322 km of two dimensional (2D) seismic lines were shot in Near Region and Site Vicinity in 1988-1990. All this data reprocessed and reinterpreted in 2009. 27 km of high resolution 2D seismic lines carried out in Site Vicinity in 2010. 12 km of the electrical resistivity tomography carried out on the Sites in 2010. There are 29 deep boreholes in the Near region, 18 of them penetrated crystalline basement. “In total up till now 25 wells are drilled reaching the crystalline basement and/or Ordovician strata, and several shallower wells drilled within the study area. 2D seismic survey covers approximately 1000 square kilometers around the Ignalina Nuclear Power Plant (NPP). The survey comprises 321.6 km of seismic lines acquired in year 1988–1990. In year 2009 these seismic data were reprocessed and interpreted and to improve quality of seismic horizons at the Paleozoic levels and structural mapping for better understand faulting pattern of the site’s near region. In year 2010, new 3D and 2D high resolution seismic data have been acquired and interpreted in the potential Visaginas NPP sites’ vicinity area: 3D survey 10.3 square kilometers, 2D survey, 24 km“. Local seismic investigations were performed on the territory of the Eastern site in 1988. Sites are completely covered with high resolution three dimensional (3D) seismic survey in 2010.

With regard to the second part of evaluation each safety analysis methodology is started from a formation of initiated event analysis methods. In accordance IAEA an initiating event is such event, which in power plant creates a sequence of events, conditioning core damage. During safety analysis frequencies of such events occurrence must be estimated as well as their impact on nuclear safety.

Choosing methodologies of statistical data processing and probable event probabilistic calculations the following principles are being observed:

– Approbation. Only those methods are used which are given in IAEA documents, official probabilistic safety analysis reports or scientifically justified works;

– Conservatism. Due to lack of data or uncertainty of calculation results, more conservative assumptions are made and thus probabilities of external events are enhanced;

– Simplicity. Only well known, reliable statistical and probabilistic methods are used for the assessment of external events probabilities and analysis of statistical data.

All calculations are carried out by official software means and codes designed for nuclear safety.

The up-to-date statistical data and other information were used in analysis of external events. Since VNPP design operation period will be 60 years and more, thus estimating probable external events not only historical statistical data was taken into account, but also tendencies of related phenomena in the future (climate change, infrastructure development, etc.).

Initiating events

Before defining an initial list of initiating events, which may influence common NPP risk, all possible NPP hazardous events should be analyzed. General list of such events is recommended in IAEA.

Frequency and impact of initiating event depends on geographic position of nuclear power plant, geological and meteorological conditions of the region, and concentration of industrial and military objects in the region, different kind transport intensity and other human activities.

Evaluating mentioned conditions and preparing a list of initiating events, geographical and meteorological data of VNPP region as well as characteristics of industrial and military objects, transport network data and opinions of experts related to all that were to be provided.

Initiating events, which obviously do not influence NPP safety, were not included into the list. The list of initiating events was divided into two groups – natural forces induced events and external events related to the human activity.

Natural forces induced events:

– External events occurring in the atmosphere (strong winds, hurricanes, excess rainfalls, extreme temperature changes, droughts, lightning, fog, meteors, etc.);

– External events occurring on the earth or under it (earthquake, movement of earth layers, volcanic outbreak, soil deflation, bank erosion, etc.);

– External fires (fires of forests surrounding the VNPP territory, moor fires, etc.).

– External events related to the human activity:

– Explosion (gas, fuel, ammunition, chemical materials and similar explosion);

– Transport accidents (aircraft crash, accidents of cars or water transport, train accidents, etc.);

– Accidents related with transportation of hazardous materials (transport, transferring explosive, toxic, radioactive, easily igniting materials, etc.);

– Emergency events of industrial and military objects (explosion, collapse of technical constructions, emission of toxic extra poisonous materials into the environment, ammunition explosion, shots of non-authorized missiles, accidents related with gas or fuel oil pipe disposal, etc.);

– Terrorist acts and sabotages (out of the scope of this sites evaluation process).

Research of external events impact on safety of VNPP and other nuclear objects is carried out similarly as research of internal initiating events impact on safety. After determining frequency of external event, the biggest possible damage, induced by the event on power plant or systems, is defined. The impact of certain events on power plant safety level is analysed separately or it is included as an initiating event into corresponding deterministic or probabilistic models of NPP.

Sequence of analysis

Performing analysis of external events and its documentation the following steps were distinguished:

– Identification of external events, when a list of all possible events is concluded and their characteristic parameters are determined;

– Selection of events during which in accordance with selection criteria and event characteristic parameters and their value limits relevant (fundamental) events are distinguished for further analysis;

– Data analysis, which covers information analysis related with event occurrence and collection and research of statistical data;

– Probabilistic estimation during which probabilistic simulation and evaluation of separate cases of event occurrence is carried out;

– Outcome analysis during which it is estimated and described what after-effects and outcomes may be formed in case of event occurrence.

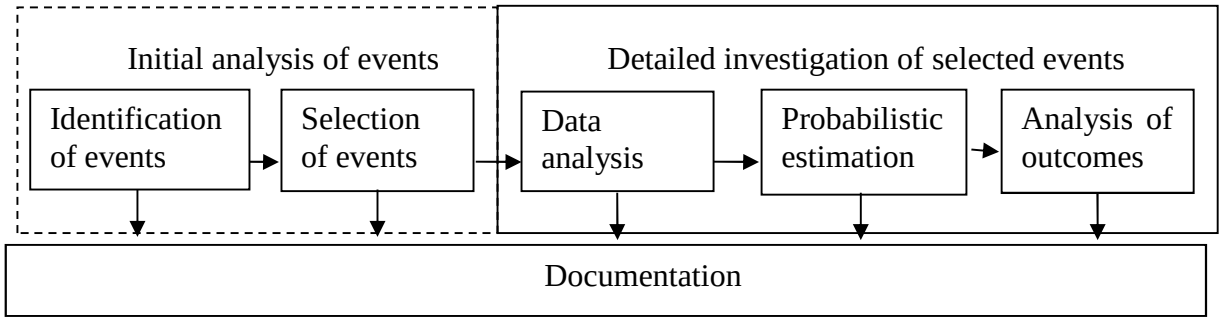


Figure 17.2 Scheme of external events analysis

Taking into account the sites evaluation report results detailed NPP design basis parameters shall be developed and later provided in VNPP design related documentation.

Nevertheless it can be mentioned that pursuant to the results of the site evaluation a detailed consideration of the following factors must be taken in the course of NPP design:

– Airplane crash;
– Forest fire (heat and smoke impact);
– Gas pipeline and steam boiler house explosion/fire;
– Extreme wind;
– Extreme precipitation;
– Extreme temperatures;
– Extreme snow cover;
– Snow storm;
– Tornado;
– Lake high and low water levels;
– Flood resulting from the melting snow;
– Seismological conditions (SL-1 and SL-2 based on PSHA and DSHA);
– Hydrogeological conditions (groundwater level and regime);
– Engineering geological and geotechnical conditions (site specific properties of soils).

Light and heavy aircraft crash probabilities for both investigated NPP sites were evaluated. Probability of aircraft crash on equal-sized objects in different sites does not differ substantially (the total probability of heavy aircraft crash in the site is estimated $1.6 \cdot 10^{-6}$ per year), because the sites are in the same region and only about 2 km away from each other. Regulations require that aircraft crash must be taken into account as postulated event during the design stage of nuclear power plant and

limited consequences shall be ensured in the case of such event. In the course of ultimate heat sink evaluation the reliability of Drūkšiai lake to serve a purpose of the ultimate heat sink for VNPP was evaluated. Various lake level scenarios were considered during evaluation and it has been demonstrated that even with low lake water level and the worst meteorological conditions it is possible to ensure necessary heat removal from the power plant to the lake.

In addition it must be noted that during the evaluation possible effects of climate change were taken into account. Also possible combinations of events were considered.

After the completing the VNPP sites evaluation it was concluded that there are no exclusion criteria and no deficiencies of the sites that cannot be compensated for by means of design features, measures for site protection or administrative procedures. Therefore, both investigated sites are suitable for construction of the VNPP.

17.2. Regulatory review and control activities

In accordance with the Law on Nuclear Safety of the Republic of Lithuania, prior to starting the preparation of the NPP design adapted to a specific construction site, the safety analysis of the site and the justification of safety have to be performed. The results of such analysis and justification are presented in the Site Evaluation Report which has to be reviewed and approved by the VATESI. Additionally, on request of VATESI, the site evaluation report was reviewed by IAEA Site Safety Review Mission (SSRM) in 2010. IAEA experts stated that "Sites evaluation is conducted in line with IAEA requirements and guides, the volume of investigation is sufficient, and sites are suitable for construction of VNPP". In 2014 VATESI approved the VNPP Site Evaluation Report. The main aspects, which let to adopt a positive decision, are as follows:

- Site evaluation are in line with Lithuanian legislation and IAEA safety standards regulating site evaluation;
- The assumptions and methodologies used for the site evaluation are proven, the environment parameters used in the site evaluation correspond to the current state of site;
- Positive decisions were received from other institutions, which are involved in the process of reviewing a Site evaluation report.

It should be noted that the concrete place for construction of NPP, NPP technology and layout of NPP have not been known during the site evaluation process. So additional analysis, which have to be performed, and recommendations, which have to be taken into account in other preparatory phases of new NPP project, are provided in the site evaluation report.

Article 17(ii) – Impact of the installation on individuals, society and environment

17.3. Criteria for evaluating the likely safety related impact of the nuclear installation on the surrounding population and the environment and implementation of these criteria in the licensing process

According to the Law on the Proposed Economic Activity the safety related impacts of nuclear installations on the population and environment shall be defined in EIA report. The report shall contain the following information: description of pollutants to be generated; description of waste generation and management; description of components of the environment potentially to be impacted by the proposed economic activity; description and evaluation of any potential direct and indirect impact of the proposed economic activity upon public health, flora and fauna, soil, surface and subsurface of the earth, air, water, climate, landscape and biodiversity, material values, immovable cultural heritage and interaction among the aforesaid components of the environment; description of measures provided for in order to avoid, reduce, compensate the negative impact upon

the environment or to liquidate consequences thereof; analysis of alternatives identified by the preparer of EIA documents, including reasons for selection taking account of best available manufacturing techniques and potential impact upon the environment; information about problems of technical or practical nature that the preparer has encountered in the course of preparation of the EIA documents; informational about potential emergencies as well as relevant prevention measures and emergency response measures; analysis of findings of environmental monitoring (if any), outline of any planned monitoring; and summary of all the information contained in the report. According to this Law, 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. For the present Environmental impact assessment is carried out in accordance with:

– The Law on Environmental Impact Assessment of the Proposed Economic Activity (1996, last amended in 2013);

– Governmental Resolution On Empowering the Ministry of Environment and the Subordinate Institutions (2000, last amended in 2014);

– The Order of the Minister of Environment on Approval of Regulations on Preparation of the Environmental Impact Assessment Program and Report (2005, last amended in 2010);

– The Order of the Minister of Environment on Informing the Public and Public Participation in the Process of Environmental Impact Assessment (2005, last amended in 2015);

– The Order of the Minister of Environment on Approval of Guidelines on the Quality Control of Environmental Impact Assessment of a proposed Economic Activity;

– The Order of the Minister of Environment on Investigating the Environmental Impact Assessment Document at the Ministry of Environment and Subordinate institutions (2006, last amended in 2015).

Participants of the environmental impact assessment shall be as follows:

– Competent authority – Environmental Protection Agency 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. Environmental Protection Agency 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 specific cases, participation of additional governmental institutions might be required (e. g. State Service for Protected Areas under the Ministry of Environment). As regards nuclear related activities VATESI and RSC 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 (including NGOs).

The preparer of EIA documentation obliged by the organizer (developer) shall carry out EIA procedures and prepare EIA documentation. EIA program (scoping document) 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 EIA;

– 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 covered sufficiently. Then the conclusions from all relevant parties of EIA and EIA program are submitted to the competent authority (Environmental Protection Agency), 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: radiological environmental monitoring (discharges and impact on environment), meteorological, hydrological and seismological 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 as well as NGO’s and community based

organizations are involved in EIA process and provides proposals and comments concerning the EIA of proposed activities and their potential environmental and health impacts. The preparer of EIA documentation evaluates the public opinions received and where necessary amends and supplements the report. The amended report together with the motivated evaluation of the publics comments is submitted to the relevant parties of EIA and EPA for consideration and decision making.

Decisions made during 2013-2015 on EIA of proposed nuclear activities:

– 15-06-2015 Environmental Protection Agency made a decision regarding the feasibility of INPP D-0, D-1 and D-2 Units Equipment Dismantling and Decontamination;

– Environmental Protection Agency the feasibility of decontamination and dismantling of INPP Unit 2 Turbine Hall equipment (decision regarding EIA)Environmental Protection Agency made a decision regarding INPP Building 117/2 Equipment Decontamination and Dismantling.

National requirements for radiological environmental monitoring (discharges and impact on environment) of economic entities are laid down in the Order of the Minister of Environment “On approval of regulation of environmental monitoring of economic entities”.

The purpose and content of the environmental radiological monitoring of the economic entities, procedure of agreement, requirements for the quality assurance and control of sampling, analysis and measurements, recording and reporting of results and related information are defined in Annexes 5 and 6 to the Order of the Minister of Environment “On approval of regulation of environmental monitoring of economic entities”. In accordance with requirements the monitoring programme shall cover all important routes of radionuclide dispersion and population exposure to enable the proper evaluation of annual airborne and water discharges, likewise their short term and consequently doses for critical group members, changes.

The meteorological and hydrological observations should be done as a part of monitoring. The performance of the meteorological and hydrological observations systems must be effective in different conditions and installed so that data can also be obtained during accidents.

The procedure of coordination of the Monitoring Programme is as follows:

1) not less than three months before the start or change of the planned economic activity, the operator shall submit the Monitoring Programme for agreement to the Environmental Protection Agency (hereinafter – EPA):

a) the EPA shall forward the Monitoring Programme for coordination to the LHMT. No later than within ten working days of the day of receipt of the Monitoring Programme from the EPA, the LHMT shall provide its written comments and proposals to the EPA or shall coordinate in writing the part of the meteorological and hydrological observations of the Monitoring Programme;

b) the EPA shall summarise its comments and proposals and the comments and proposals received from the LHMT and, no later than within ten days of the day of receipt of the comments, provide a summary of the comments and proposals to the operator who presented the Monitoring Programme for coordination, or shall coordinate it;

2) the operator, having received the comments and proposals from the EPA, shall update the Monitoring Programme and submit it for repeated coordination to the EPA. The Monitoring Programme submitted for repeated coordination shall be coordinated in accordance with the procedure mentioned above.

For the purpose of assessing the Monitoring Programme the qualified experts may be involved.

According to the Law on Nuclear Safety licence for operation of a nuclear installation shall be issued only after the VATESI verifies that the radiological monitoring programme has been coordinated with the Ministry of Environment or its authorised institution and with the Ministry of Health in the manner set out by the legal acts. The Ministry of Environment or its authorised institution and the Ministry of Health shall notify the VATESI of the decisions on the coordination of radiological monitoring programme and/or coordination of an update (amendment). The plan for

radioactive discharges into environment that is coordinated with the Ministry of Health also shall be submitted for the issue of licence for operation of a nuclear installation. A plan for radioactive discharges into environment shall be prepared and updated in accordance with the procedure established by the Head of the VATESI.

Article 17(iii) – Re-evaluation of site related factors

17.4. Activities for re-evaluation of the site related factors to ensure the continued acceptability of the safety of the nuclear installation

Pursuant to Part 7 of Article 32 of the Law on Nuclear Safety, a licensee shall perform a periodical safety analysis and justification and prepare a periodical safety review report at least every 10 years after the issuance of a permit for the commercial operation of a nuclear installation. Periodical safety review includes review of site characteristics which were took into account in the design of a nuclear installation. The site related factors that may impact the safety of nuclear installation shall be revised, and if necessary their reassessment based on new data and new methods shall be performed. If any nonconformities are identified, indispensable corrective measures ensuring the compliance of a nuclear installation with its design documentation shall be developed and implemented, as well as proper fulfilment of all requirements set in legal acts and normative technical documents shall be ensured.

In response to the event at Japan's Fukushima Daiichi Nuclear Power Plant, the European "stress tests" were conducted in 2011 – 2012 at INPP according to specification agreed by ENSREG. In accordance with the scope of "stress tests", the reassessment of extreme natural events (earthquake, flooding and extreme weather conditions) challenging the plant safety functions and leading to a severe accident was performed. More details on INPP "stress tests" results and safety improvements measures associated with post-Fukushima lessons learned are presented in Section A2 of this report.

The first review of the Monitoring Programme shall be carried out after one year of operation, and afterwards – every five years. The review shall take account of experience of the previous period, the most recent Monitoring methods and means, changes in the nuclear facility operation and environmental conditions. Irrespective of periodicity specified in this paragraph, the Monitoring Programme shall be revised in the following cases:

– where, in addition to the already operated NF, the operator envisages starting to operate a new NF (to which the same critical population group/groups may be exposed);

– where, upon change of the NF operations by the operator (e.g., expansion of operations, decommissioning of the NF), new discharged radionuclides, their pathways, media or points of discharge emerge and the plan of radionuclide discharges is changed in accordance with the procedure set out by the Republic of Lithuania Law on Nuclear Safety;

– where, during the Monitoring it is established that radionuclides discharged to the environment are not specified in the plan of radionuclide discharges to the environment drawn up and coordinated in accordance with the procedure set out by the Republic of Lithuania Law on Nuclear Safety (in the case of unplanned release);

– where the Monitoring data show that the critical group members' exposure dose exceeds or is likely to exceed the dose constraint in the future.

Amendments to the Monitoring Programme shall be coordinated in accordance with the procedure set out above.

17.5. Results of recent re-evaluation activities

Pursuant to the conditions set in licence for operation of INPP Unit 1 and Unit 2, periodical safety review of Unit 1 and Unit 2 at the stage of fuel removal from the Units shall be performed at the beginning of 2017 for Unit 1 and in the end of 2020 for Unit 2. Therefore, the INPP is in the

process of Unit 1 periodical safety review performance. The periodical safety review of INPP Unit 1 is going to be performed in accordance with VATESI requirements and recommendations set forth in the IAEA Specific Safety Guide No. SSG-25 „Periodic Safety Review for Nuclear Power Plants“. The scope and content of the periodical safety review of INNP Unit 1 was discussed with VATESI in 2016.

17.6. Regulatory review and control activities

According to the Order of the Minister of Environment “On approval of regulation of environmental monitoring of economic entities”, the performance of the meteorological and hydrological observations systems must be effective in different conditions and installed so that data can also be obtained during accidents.

For the purpose of assessing the activity of radionuclide discharges to the atmosphere, the systems of taking gas samples from the overall ventilation flow or direct measurements should be in place. The exhaust gas flows should be reliably measured under all conditions.

The radioisotope composition of radionuclide discharges to water and radionuclide activity (including H-3, but excluding C-14) shall be measured at least once a month. Stationary direct measurement and integral sampling systems (it is recommended that they should be automated) shall be installed on the main routes of continuous discharges and the overall radionuclide activity shall be measured at least once in 24 hours. In other cases, the sampling periodicity shall correspond to the discharge frequency. The discharged water flows shall be reliably measured along all routes and under all conditions.

“Emergency preparedness requirements for nuclear facility operating organisation” (P-2008-01) approved by the Head of VATESI states that describing Logistic Support, Emergency Supplies, Equipment, Communications and Facilities should be:

– Designated or located the emergency facilities so that they can operate under accident conditions, including radiological exposure conditions;

– Established or identified a laboratory facility (fixed or mobile) off-site, outside the UPZ, for the analysis of samples in case the on-site facility becomes unavailable or contaminated;

– Foreseen monitoring systems to detect potential emergency situations, to classify the accident and to choose appropriate protective actions.

The project of Seismological Monitoring of Lithuania, focusing on collection, processing and analysis of seismic data of Seismic Monitoring System (SMS) of INPP and broad band stations PBUR (Paburgė, Lithuania), PABE (Paberžė, Lithuania), SLIT (Slitere, Latvia), and VSU (Vassula, Estonia) was continued in 2014. There were some disturbances in operation of the seismic stations, thus, some seismological data got spoiled or lost. The INPP specialists responsible for SMS operation recovered the operations of the system every time when it was facing problems.

A few dozens of seismic events were identified and located every month during the data analysis of seismic stations of seismological monitoring system in Lithuania. The seismological monitoring of Lithuania is focusing on investigating the local events. There were identified and localized three local earthquakes in the Baltic Region and adjacent areas. An earthquake of magnitude M=4.6 and hypocentral depth h=2 km was recorded on the 5 th of July 2014. The epicentre of the event was located in the south-western part of Poland where intensive extraction of lignite is performed. The stress field of Earth crust is disturbed due to intensive mining process and this event presumably can be identified as an induced earthquake. An earthquake of magnitude M = 4.1 and hypocentral depth h = 10 km hit the central part of Sweden on the 9th of September 2014. The trembling produced by this event was felt near the epicentre and in more distant locations e.g. the western part of Finland. The third earthquake with magnitude M = 2.7 was recorded on the 18th of November 2014. It was localized in the southern part of Belarus, in the surroundings of town Soligorsk where intensive extraction of potassium salts is performed. Therefore this event can be

attributed to the induced earthquake. All other 71 local seismic events were identified as explosions in 2014.

There weren‘t events which could influence site related factors established during the VNPP siting. Requirements for re-evaluation of site related factors are given in paragraph 21 of VATESI Nuclear Safety Requirements BSR 2.1.3-2010 “General Requirements for Evaluation of Nuclear Power Plant Sites”. If new nuclear safety important factors occur during design, construction or operation of NPP, then shall be performed re-evaluation of site related factors.

Article 17(iv) – Consultation with other Contracting Parties likely to be affected by the installation

17.7 International arrangements

Environmental impact assessment in a transboundary context is regulated by the Law on Environmental Impact Assessment of the Proposed Economic Activity and by the United Nations Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention). The parties to the Convention are entitled to participate in an environmental impact assessment procedure of the proposed nuclear activity (nuclear power stations and other nuclear reactors, including decommissioning of nuclear power stations or reactors; production, processing, enrichment, storage and disposal of nuclear fuel) carried out in Lithuania if the detrimental environmental impacts of the project could potentially affect the country in question. For other projects the transboundary impacts are analyzed through screening procedure. If competent authority decides that project might have significant transboundary effects national and transboundary EIA procedure will be applied.

Since May 2010, the Ministry of Environment is only responsible for coordination of transboundary EIA procedure for the proposed nuclear related economic activities, the decisions regarding the feasibility of such activities are taken by Environmental Protection Agency. As regarding the new nuclear power plant the Ministry of Environment has informed the respective authorities of Latvia, Estonia, Poland, Belarus, Finland, Sweden and Russia about the commenced environmental assessment process of the new nuclear power plant in Lithuania and inquired about their intent to take part in the environmental assessment procedure. Countries, participating in the EIA process of the new NPP, were provided with the EIA report. Austria, Belarus, Estonia, Finland, Latvia, Poland and Sweden submitted their remarks and recommendations to the EIA report. It should be noted that out of the countries participating in the EIA process only Belarus, Latvia, Poland and Austria expressed the interest to hold further consultation meetings on the issues of the largest concern for them. Authorities of Belarus, Latvia, Poland and Austria responsible for the EIA process submitted comments and conclusions of their experts to the Ministry of Environment, and these comments and conclusions were discussed during series of interstate consultations, held in Vilnius from November 2008 to February 2009. In April 2009 the Ministry of Environment adopted a decision concerning the permissibility of construction of the new Nuclear Power Plant in terms of impact upon the environment.

In accordance with the Article 37 of EURATOM Treaty and Lithuanian Regulation on Providing of General Data Concerning Plans for the Disposal of Radioactive Waste, General Data relating to any plan for the disposal of radioactive waste it is submitted to the Commission of the European Communities.

Lithuania is participating in the transboundary EIA procedures not only as a country of origin, but also as an affected country. Lithuania is entitled to participate in an EIA procedure concerning a project of nuclear facilities located in the area of another country if the impacts of the project could potentially affect Lithuania, and, as of 2016, is participating in transboundary EIA procedures for nuclear facilities with Belarus, Poland, Russia and Sweden.

The development of the nuclear energy projects in Belarus and Kaliningrad (Russian Federation) raises concerns with regard to the compliance of these projects with international nuclear and environmental safety standards, as international procedures were not accomplished and comprehensive information regarding safety issues of the projects was not provided for Lithuania.

As of late 2009, Russian Federation and Belarus submitted the environmental impact assessment documents of the new nuclear power plants planned to be constructed in the proximity of the territory of Lithuania. The site chosen for the construction of the nuclear power plant in Belarus in Ostrovets (Grodno District) is only in 20 km from Lithuania, and in 40 km from the capital of Lithuania Vilnius (50 km to the city centre). The Neman site in the Kaliningrad Region is in 10–12 km to the South from Lithuanian – Russian border. The operation of both nuclear power plants can have a trans-boundary impact; therefore Lithuania involves in the environmental impact assessment of the new nuclear power plants which are planned to be constructed in the neighbouring countries.

After reviewing the documents and the replies to the questions of Lithuania submitted in 2009-2013 by Russia, questions regarding site selection criteria of the NPP in Kaliningrad, impact on environment and population, emergency preparedness and contingency planning, assessment of possible impact of large commercial airplane crash, assessment of the impact of possible transportation of radioactive waste have not been answered yet.

Having analysed documents and replies to the questions that Lithuania provided in 2009–2016 for Belarus, the following information was lacking: information related to site selection criteria of the NPP in Belarus, site evaluation according to the IAEA requirements, the possibility of implementation of the emergency measures in the vicinity of nuclear facility including the territory of Lithuania as well as assessment of possible impact of large commercial airplane crash, implementation all “stress tests” stages and strength of the national nuclear safety regulatory and future operating organization to have sufficient number of highly competent staff in all safety related areas. Taking into account possible impact to the NPPs by earthquakes, Lithuania proposed for Belarus to perform modern seismic safety assessment in all sites selected using the latest technological solutions. Additionally, according to the international practice, invitation of the IAEA mission to evaluate sites selected was proposed for Belarus.

The key questions of Lithuania regarding nuclear and environmental safety of the Ostrovets NPP remain unanswered, proper public hearings for Lithuanian public in Lithuania were not arranged, and the Ostrovets NPP case, initiated by Lithuania in 2011, is being further considered in the Implementation Committee of the Espoo Convention.

On 2–5 June, 2014, the 6th Meeting of Parties of the Espoo Convention endorsed Findings and Recommendations of the Implementation Committee of the Espoo Convention adopted on its 27th session on 12-14 March, 2013, and stated that Belarus had been developing the NPP project in Ostrovets in non-compliance with the provisions of the Espoo Convention; in particular, with Article 2(6) (public participation), Article 4(2) (EIA documentation), Article 5(a) (consultations) and Article 6(1) and (2) (final decision). The Meeting of Parties of the Espoo Convention endorsed that Belarus, among other violations, did not take into account Lithuania’s questions and comments that were directly related to environmental and nuclear safety of the NPP project, and disrespected the rights of Lithuanian public to get information and to participate in the transboundary environmental impact assessment of the NPP project. The Meeting of Parties provided recommendations for the elimination of the identified non-compliance.

The Implementation Committee on its 34th session on 8–10 December, 2015, acknowledged that disagreement between Lithuania and Belarus regarding the Ostrovets NPP project was of substantial manner (scientific, technological issues). The Committee recalled that, according to its structure and functions, its mandate was to provide advice and recommendations, inter alia, relating to technical matters; but since it did not in this specific case had the sufficient technical and scientific knowledge to assess compliance by Belarus with the Espoo Convention on that basis, it was necessary for it to seek the services of scientific experts and other technical advice or consult other relevant

sources, according to its structure and functions. The Committee proposed to Lithuania and Belarus to co-establish and finance an expert body modelled after the inquiry commission provided for under appendix IV to the Espoo Convention. Lithuania welcomed the initiative of the Implementation Committee to establish the expert body for an in-depth analysis of the Ostrovets NPP case under the Espoo Convention.

Lithuania has been raising questions regarding nuclear and environmental safety of Ostrovets NPP and its possible transboundary impacts since the very beginning of the transboundary EIA procedure bilaterally with Belarus and other partner countries, and on multinational level. Lithuanian authorities analyze thoroughly all the information provided by Belarus and present comprehensive comments and questions to Belarus. On 21-22 June, 2016, in Vilnius Lithuanian experts had a meeting with the counterparts from Belarus and considered the issues of transboundary EIA of the Ostrovets NPP, evaluation and selection of the site for the nuclear facility, the NPP design and its safety features, potential impact on Lithuanian environment and population in case of accident at Ostrovets NPP. A follow up experts' meeting on the Ostrovets NPP issues is scheduled for the autumn of 2016. As for now Lithuanian experts consider the key questions as unanswered and essential information regarding safety aspects of the Ostrovets NPP (site survey, including seismic and geological observations, site selection, external hazards, design provisions, radiological impact on Lithuanian population and environment, including possible contamination of transboundary waters and drinking water, management of spent nuclear fuel and radioactive waste, competences of nuclear safety regulator etc.) missing.

It is important to stress that the site for the construction of the Ostrovets NPP is situated around 40 km from the Lithuanian capital Vilnius, which is the most densely inhabited city in Lithuania with almost all the governmental institutions. Lithuanian authorities estimate that transboundary effects from the Ostrovets NPP could affect 1/3 of the Lithuanian population (within the range of 100 km from the Ostrovets NPP), and considering that the waters of the transboundary river Neris (Vilija) will be used for cooling purposes for the Ostrovets NPP, potable water and the Nemunas River basin, which covers 72 percent of Lithuanian territory, may be contaminated in case of an accident. During the meeting of 21-22 June, 2016, Belarus agreed that population density can be a prohibiting factor when considering location for an NPP, however, Belarus acknowledged that only the population density in the territory of Belarus was assessed, while the situation in the neighboring Lithuania was not taken into account. Lithuania requested Belarus to reassess a possible radiological impact on Lithuanian population taking into account population density and short distance from the Ostrovets NPP to the Lithuanian capital Vilnius. In line with the most recent recommendations of HERCA-WENRA due to the short distance from the Ostrovets NPP to the Lithuanian capital Vilnius, Lithuania shall be able to implement some protective actions defined in these recommendations (extension of sheltering and iodine thyroid blocking up to 100 km).

The Espoo Convention requires to assess locational alternatives in the EIA report and to choose the project site as an outcome of the EIA procedure. Belarus de facto selected the site for the construction of the NPP in the Ostrovets district in 2008, i.e. before the transboundary EIA was started in 2009. Site research and site selection criteria were not disclosed to Lithuania in spite of the official requests, and the EIA report did not contain evaluation of locational alternatives as it is required by the Espoo Convention. During the meeting of 21-22 June, 2016, Belarus experts provided new information regarding the geological, hydrological and seismotectonical researches of the site, that was not included in the EIA report of the Ostrovets NPP project and had not been disclosed to Lithuania earlier. Also, in some cases the data contradicted the information provided in the EIA report. Lithuania requested Belarus to provide this information in writing for an in-depth analysis. Likewise, Lithuania invited Belarus to include this information in the EIA report of the Ostrovets NPP; however, Belarus refused to do so, as it considers the transboundary EIA for the Ostrovets NPP finished. It is important to note that during the 35th session of the Implementation Committee of the Espoo Convention on 15 March, 2016, in Geneva, Belarus delegation admitted that information

regarding site research and site selection criteria was classified and could not be disclosed. Moreover, in the meeting of 21-22 June, 2016, Belarus experts confirmed that the Ostrovets site was the only one considered in the process of the transboundary EIA. Taking the above into account, Lithuania continues to raise questions regarding research of the Ostrovets site, including seismological and geological observations, site selection criteria and continues to request Belarus to engage international experts in the respective evaluations.

In April 2014, during the 6th Review Meeting of the CNS Belarus committed itself to invite the IAEA SEED mission. Furthermore, the 6th Meeting of Parties of the Espoo Convention in the declaration on the application of the Convention and the Protocol to nuclear energy issues stressed the importance of the SEED mission in the development of nuclear energy objects as well as recommended Belarus to invite the IAEA SEED mission for the evaluation of the Ostrovets NPP project: the site selection criteria and studies for the NPP, as well as its development and operation, to fully ensure its safety. Even though the IAEA encourages its Member States to request SEED review service at an early site survey stage and the first Unit of Ostrovets NPP is about to start operation in 2018, Belarus has not accomplished the SEED mission and has not provided plans or schedules when the mission could take place.

In response to the 2011 Fukushima nuclear accident, risk and safety assessments ("stress tests") have been carried out on all EU nuclear power plants and neighbouring countries were also encouraged to follow the lead. On 23 June, 2011, Belarus and Russia, together with Armenia, Croatia, Switzerland, Turkey and Ukraine, signed a declaration On comprehensive risk and safety assessments of nuclear plants ("stress tests") with the European Commission. As of May 2016, all the cosignatory countries have performed the stress-test exercise taking into account the specifications agreed by the European Commission and the European Nuclear Safety Regulators Group (ENSREG) on 24 May 2011, except for Russia and Belarus.

Lithuania has been constantly calling on Belarus to immediately accomplish the IAEA's Site and External Events Design Review Service (SEED), in its full scope, with a view to provide an independent review of the site evaluation and the design of the NPP. Lithuania has also been urging Belarus to fulfil its commitment of June 23, 2011, to undertake comprehensive risk and safety assessments (stress tests), taking into account the agreement with the European Commission. Lithuania requests Belarus to invite experts from the European Union, including Lithuania, to take part in the IAEA SEED mission and the stress-tests exercise, as only international expertise can guarantee impartial assessment.

Lithuania is seriously concerned about the safety culture at the Ostrovets NPP. In November 2014, integrated inspection mission in the Ostrovets NPP, performed by Belarus authorities, identified violations in the fields of hydro isolation, entry control installation, construction and armature works, load lifting installation, etc. Inspectors noted that violations were found during every inspection. Belarus media constantly reports thefts of concrete, armature and other construction materials from the NPP construction site. Belarus declares that the NPP in Ostrovets will be the cheapest NPP in the world and it will be built in the shortest period of time. Moreover, in May-June 2016, Lithuania received information about at least two incidents that occurred at the NPP. Although initially denied, later Belarus confirmed that on 8 April 2016, a supporting construction of a building in-between two nuclear reactors was damaged. In early June 2016, another incident occurred, yet Belarus does not admit that. The most serious incident occurred on 10 July 2016. The first information about a possible incident appeared on 25th July, only two weeks after the alleged incident. The Belarussian opposition press reported that the reactor pressure vessel was dropped. The Belarusian authorities admitted that there was an accident only after Lithuania's inquiries, following the reports of the media. Reactor's pressure vessel is one of the most important safety components of the NPP, therefore Lithuania called on Belarus to perform a detailed investigation of the abovementioned incident and its possible impact on the operation of the Ostrovets NPP and inform about the findings and conclusions of the investigation.

In 2015, Belarus joined the Western European Nuclear Regulators' Association (WENRA) as observer; however, Belarus does not implement its recommendations regarding heavy aircraft crash assessment. So far Belarus has performed assessment for a light airplane (~5 tones) only and refuses to assess consequences of a heavy aircraft crash due to low probability of the event. According to the WENRA position, established in 2013, in reaction to Fukushima accident of 2011, a crash of a heavy airplane should be considered in the design of all new reactors regardless of the estimated probability of the event and the air corridors above. Lithuania persistently requests Belarus to assess if Ostrovets NPP can resist a heavy airplane crash.

17.8. Bilateral arrangements with neighbouring States

Information about nuclear facilities and activities on territory of Lithuania shall be submitted to neighbouring countries according the bilateral agreements.

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. In December 2015 a bilateral meeting of experts took place in Vilnius for thorough discussion on the text of the draft Bilateral Agreement. The next meeting schould be held in Minsk in 2016.

On April, 2016 the draft Agreement between the VATESI and the Ministry of Emergency Situations of the Republic of Belarus on the Cooperation and Exchange of Information in the Field of Nuclear Safety and Radiation Protection and Early Notification of Nuclear Emergency was sent to Belarus.

Article 18 Design and Construction

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

(i) the design and construction of a nuclear installation provides for several reliable levels and methods of protection (defense 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;

(ii) the technologies incorporated in the design and construction of a nuclear installation are proven by experience or qualified by testing or analysis;

(iii) the design of a nuclear installation allows for reliable, stable and easily manageable operation, with specific consideration of human factors and the manmachine interface.

Article 18(i) – Implementation of the "defence-in-depth" concept

18.1. Overview of arrangements and regulatory requirements concerning the design and construction of nuclear installations

A necessity to implement the "defence-in-depth" concept at all stages of safety related activities (including design and construction) is going to be comprehensively explained in regulation "Nuclear Safety Requirements BSR-2.1. - .Nuclear Power Plant Design" which is in drafting stage. The corresponding provisions are going to be prepared according to IAEA safety standard SSR-2/1 "Safety of Nuclear Power Plants. Design" and other IAEA recommendations and best international practice. This regulation is going to be applied for new build. For existing INPP requirements concerning "defence-in-depth" stated in the "General Regulations for Nuclear Power Plants with RMBK-1500 type reactors Safety", item 10: "10. 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 principle of "defence-in-depth" should be applied in 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.

18.2. Status with regard to the application of the defence in depth concept

The INPP safety is provided by engineering devices and organizational activities, which ensure that the internal and external exposure of the staff and public, pollution of environment by radionuclides in case of normal operation and design basis accidents do not exceed the prescribed limits. After the final shut down of INPP Unit 1 and Unit 2 the extent of application of "defence-in-depth" principle was considerably reduced but remains in corresponding extent, for example, a number of inspections of pressure boundary is reduced, but still foreseen; the emergency shutdown system in Unit 2 is still in operation, although some equipment is decommissioned due to that the range of its operation was foreseen only for unit in operation; control room is still operated by operators, although the number of the staff per shift was reduced taking into account inoperability of turbine and a wide set of other systems. A number of operating normal operation systems important to safety and safety systems at Unit 2 is reduced from 64 to 47. All systems important to safety of spent fuel stored in SPH and Unit 2 reactor remains under the same safety requirements as during the INPP operation.

18.3. Extent of use of design principles for nuclear installations

The design principles of increment of reliability of safety related systems and assurance of safety functions such as fail safe function, automation, independence, physical and functional separation, single failure criterion, redundancy and diversity are required to be used in the designs of the particular systems. The requirements are set in regulations Nuclear Safety Requirements BSR-2.1.2-2010 "Basic Safety Requirements for Nuclear Power Plants with RBMK-1500 Reactors" and VD-T-001-0-97 "Nuclear Safety Regulations for the Reactor's of Nuclear Power Plants".

18.4. Implementation of design measures to prevent beyond design basis accidents or to mitigate their radiological consequences if they occur

A set of technical and organisational measures concerning management of beyond design basis accidents were implemented at the INPP (see Article 19(iv) and Section A2 of this report). The corresponding procedures for beyond design basis accidents management are developed at the INPP. Due to the final shut down of INPP the extent of measures is reduced. The management of severe accidents at the INPP was comprehensively reviewed during the European "stress test" and recommended additional measures were implemented. Regular drills and training exercises related to beyond design basis accidents management are performing for INPP staff.

18.5. Improvements implemented for designs for nuclear power plants as a result of deterministic and probabilistic safety assessments made since the previous National Report; and an overview of main improvements implemented since the commissioning of the nuclear installations

The detailed information about implemented improvements is presented in Section A1, A2 and Article 6 of this report.

18.6. Regulatory review and control activities

The implementation of the measures linked to “defence-in-depth” principle at the INPP is controlled by VATESI in the frame of control of implementation of Safety Improvement Program (SIP, see Article 6 of this report)) and other measures such as implementation separate modifications, and by regulatory inspections.

Article 18(ii) – Incorporation of proven technologies

18.7. Arrangements and regulatory requirements for the use of technologies

The draft Nuclear Safety Requirements “Design of nuclear power plant” states that the design of safety important (SI) structures, systems and components (SSC) of a NPP, technologies used by the NPP, other technical and organizational solutions that have impact to the NPP safety shall be based on proven engineering practice, documented in standards and other normative technical documents. The design of a NPP shall rationally seek to use SSC IS that have already been used in the nuclear power industry for a similar purpose, and use of which has been justified. Solutions of the NPP design whose relevance, reliability and other features have not been proven by the existing experience in the nuclear power industry shall be based on:

- experience of similar application of such decisions in other industries;
- experience in operation of prototypes of such equipment;
- if there is no experience of such solutions application in other industries – on relevant studies that demonstrate compliance of solutions with the set criteria.

Prior to application of solutions of the NPP design whose relevance, reliability and other features have not been proven by the existing experience in the nuclear power industry, they shall be verified and validated, and their acceptability shall be finally confirmed by observations during operation of the NPP.

Nuclear Safety Requirements BSR-2.1.4-2011 “Preparation and use of safety analysis report for nuclear power plants” defines the structure of Safety Analysis Report (SAR) and provides recommendations as well as references to the guidance on SAR preparation. Pursuant to above mentioned requirements demonstration of application of proven engineering practice shall be provided in Chapter 1 of SAR of NPP.

The justification of technologies used for decommissioning is required in clause 51.6 of Nuclear Safety Requirements BSR-1.8.2-2015 “Decommissioning of nuclear facility”.

18.8. Measures taken by the licence holders to implement proven technologies

Proven technologies are used by the INPP at present time in the main stages of the INPP decommissioning:

– At the stage of decommissioning preparation, commonly accepted proven practice was used. Contracting parties involved in decommissioning preparation activities were selected by open tenders taking into account the previous experience.

– At the stage of reactor defueling, the existing defueling procedures and facilities are used, which were used for reactor refuelling during operation. All defueling works are performed by skilled INPP staff. The refuelling/defueling procedures and facilities were tested many times during the INPP operation and INPP staff has a good practice to perform reactor defueling. So, undoubtedly proven technology is used at the stage of reactor defueling.

– The comprehensive safety analysis was carried out before the stages of reactor defueling and spent fuel storage pools defueling. Parties involved in safety analysis activities were selected by open tenders taking into account the previous experience in this area.

– At the stage of dismantling of the plant equipment, structures and buildings, commonly accepted technologies are used (first of all applied at Unit 1) and then the technological, organisational solutions, types of equipment, gained experience are transferred for application during dismantling activities at Unit 2. Special attention is focused on monitoring and control of the equipment and waste contamination levels since different waste decontamination, treatment technologies are applied for different waste classes in order to minimise waste volumes and satisfy free release criteria.

VNPP will be designed in accordance with nuclear energy legislation, regulatory guidelines and nuclear safety standards. VNPP as future licence holder and its vendors shall meet all the safety requirements and shall take all measures to use proven technologies. The latest safety requirements will be taken into account in VNPP design and construction.

18.9. Analysis, testing and experimental methods to qualify new technologies

The design management of instrumentation and control systems is an integral part of the licensed activities in nuclear power industry and shall be conducted in accordance to the Nuclear Safety Requirements BSR-1.4.1-2016. Monitoring and protection systems design, including subsequent design changes, modifications, or improvement of safety measures shall be implemented in accordance with relevant laws, regulations and nuclear safety normative technical documents.

18.10. Regulatory review and control activities

VATESI performs review and inspection of INPPs activities. VATESI activities cover all important aspects of plant specifying, designing, contracting, construction, equipment manufacturing, qualification, testing, installation, plant commissioning, operation, maintenance and decommissioning. An important part of these aspects is using of proven technologies at all stages of NPP life cycle. The special attention is focused on design analysis, compliance with safety standards, safety justification, reliability calculation, environmental qualification and functional testing of newly designed equipment, components and systems.

Article 18(iii) – Design for reliable, stable and easily manageable operation

18.12. Overview of arrangements and regulatory requirements for reliable, stable and easily manageable operation, with specific consideration of human factors and the human–machine interface

The “Nuclear Safety Regulations for the Reactor’s of Nuclear Power Plants” (VD-T-001-0-97) define in detail the requirements for NPP Safety. The regulations require that design of the NPP’s

(their systems, structures and components) shall be optimal for operator performance. It is required within this document 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.

The requirements BSR-2.1.2-2010 “General Regulations on Ensuring of Safety of Nuclear Power Plants with RBMK-1500 Type Reactors” require that design of a NPP shall be optimal for operator performance as well as provide means to eliminate single personnel errors or mitigate their consequences, including those during the maintenance. The NPP control room shall contain equipment which provides information about the plant operational state and any deviations from normal operation as well as which monitor the state of the plant safety system during operation and their functioning during operational transients and accidents. The information on regulatory requirements related to management of human factor and the corresponding INPP arrangements is presented within Article 12 of this report. For other design principles see Articles 18(i) and 18(ii) of this report.

18.13. Implementation measures taken by the licence holder

Since the final shutdown of both INPP Units the licence holder is in the process of the INPP equipment dismantling and decontamination. These activities are performed in the scope established in technological designs and safety justification documents and in compliance with the regulatory requirements and operational licences conditions. The INPP does not intend to restart operation of the units, as well as to change or modify them for reliable, stable and manageable operation. The INPP operating personnel ensures safety of the INPP and undergoes necessary training and examinations to remain competent for the assigned tasks.

18.14. Regulatory review and control activities

INPP preparation for decommissioning as well as the related organizational changes important to INPP safety are monitored and assessed by VATESI.

Article 19 Operation

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 programme demonstrating that the installation, as constructed, is consistent with design and safety requirements;

(ii) operational limits and conditions derived from the safety analysis, 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 licence to the regulatory body;

(vii) programmes to collect and analyse operating experience are established, the results obtained and the conclusions drawn are acted upon and that 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 any 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.

Article 19(i) – Initial authorization

19.1. Overview of arrangements and regulatory requirements for the commissioning of a nuclear installation

The Law on Nuclear Energy and the Law on Nuclear Safety together with the regulations made under other laws establish the licensing system for activities related to nuclear materials or nuclear cycle materials, as well as for nuclear facilities of the following life-stages: site evaluation, design, construction, commissioning, operation, and decommissioning. The Law on Nuclear Safety foresees an issuance of VATESI permissions for first carrying in of nuclear fuel into site of any nuclear reactor, for first loading of fuel into reactor core and for first start-up of a reactor.

The definition of "commissioning of nuclear facility (installation)" is set in the Law on Nuclear Safety: "Commissioning of a nuclear installation – demonstration that the installed structures, systems and components of a nuclear installation are in line with the design and safety requirements, and that the technical standard documentation, organisational structure, number and competences of staff of the licence holder are adequate for safe operation of a nuclear installation."

Commissioning of nuclear installation may be implemented only according to a commissioning programme which shall be approved by VATESI. Detailed requirements for commissioning of the NPPs are presented in Nuclear Safety Requirements BSR-2.1.5-2015 "Commissioning of Nuclear Power Plants". The further steps in the licensing process toward operation are going to be made taking into account interim or final results of implementation of commissioning program.

19.2. Conduct of appropriate safety analyses

Nuclear Safety Requirements BSR-2.1.5-2015 “Commissioning of Nuclear Power Plants” requires for compliance of tests performed within commissioning program with safety analysis report.

19.3. Commissioning programmes

The commissioning programme for INPP was developed prior to the INPP start-up. The Programme 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 organisation.

19.4. Programmes of verification that installations, as constructed, are consistent with the design and in compliance with safety requirements

Nuclear Safety Requirements BSR-2.1.5-2015 “Commissioning of Nuclear Power Plants” requires testing of individual SSC and reporting on the results.

19.5. Regulatory review and control activities

VATESI shall approve commissioning program and interim and final results of implementation of it are used in the licensing process in accordance with “Rules on the Issue of Licenses and Permits Necessary to Engage in Nuclear Energy Activities”. The implementation of commissioning program is going to be controlled through regulatory inspection’s activity.

Article 19(ii) – Operational limits and conditions

19.6. Overview of arrangements and regulatory requirements for the definition of safe boundaries of operation

It is stated in clause 147 of the General Regulations on Ensuring of Safety of Nuclear Power Plants with RBMK-1500 Type Reactors, BSR-2.1.2-2010, 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.

Units 1 and 2 Technical Specifications in accordance with the established procedure are revised once per three years, but in case of change of the status of equipment belonging to systems important to safety due to performance of works according to the Decommissioning Projects U1DP0, U2DP0, all appropriate changes to the Technical Specifications are made in a timely manner. Each revision of the Technical Specification shall be endorsed by VATESI.

19.7. Implementation of operational limits and conditions, their documentation, training in them, and their availability to plant personnel engaged in safety related work

For the INPP limits and conditions of safe operation was set and justified in the Technical Safety Justification prepared by the plant Main Designer NIKIET and Scientific Adviser “Kurchatov Institute” and the General Designer (St-Petersburg, Russia). In the frames of in-depth safety assessments for INPP Unit 1 and Unit 2 - SAR-1 and SAR-2 respectively the limits and conditions of safe operation were reviewed and their correctness was confirmed. As long as there is nuclear fuel in the reactor core or in the storage pools, INPP Units 1 and 2 are considered to be nuclear facilities. At

this stage all decommissioning activities are to be carried out in accordance with the design requirements as well as the limits and conditions of safe operation.

Taking into account INPP operational experience, safe operation limits on Cs-137 activity in water of spent fuel pools and safe operation limits on water temperature and level in the spent fuel pools were established, and all necessary changes were made in the INPP Unit 1 and Unit 2 Technical Specifications and appropriate operational and accident management procedures.

Issues regarding training are defined in Article 11.2 of this report.

19.8. Review and revision of operational limits and conditions

After final shutdown of the INPP units many changes were made in accordance with BSR-2.1.2-2010 and DSAR. All main documents associated with operation of safety-related systems (equipment operation and maintenance manuals, accident prevention instructions, setting tables, protection and blocking tables, lists of elements of safety-related systems) are reviewed as planned as well as at occurrence of changes to configuration of respective equipment, which are mainly related to INPP decommissioning projects. The documents requiring agreement with VATESI are independently reviewed by Audit, Safety and Quality Management Division of the INPP. The base for amendment of operational documents included the following:

– implementation of modification MOD-12-12-1233 “Temperature and Level Control in SPH” (see measures No. 13 of the Plan of Strengthening Nuclear Safety in Lithuania (National Action Plan));

– changes in operation of Du300 austenitic pipeline welds of Unit 2 MCC (Resolution No. SPr-155 (3.263) of 18 July 2014);

– changes in INPP personnel and Visaginas Fire and Rescue Board personnel cooperation procedure at actuation of fire alarm at INPP facilities;

– changes in procedure of INPP personnel notification in case of accidents occurred due to adoption of new normative documents of PAGD (Order No. VĮs-189).

19.9. Regulatory review and control activities

Technical Specifications of the INPP units are approved by VATESI as well as any changes in it. Current values of safety related parameters are supervised during VATESI inspections.

Article 19(iii) – Procedures for operation, maintenance, inspection and testing

19.10. Overview of arrangements and regulatory requirements on procedures for operation, maintenance, inspection and testing of a nuclear installation

All works relating to operation, maintenance, inspection and testing of all systems and equipment shall be performed only in accordance with the approved documents. More information is provided in Article 14 of this report.

19.11. Establishing of operational procedures, their implementation, periodic review, modification, approval and documentation

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 the INPP 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 programmes) 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 VATESI.

19.12. Availability of the procedures to the relevant staff

All documents and records are accounted in a special electronic system ARKI and registered in a special electronic system @vilys. On one hand the specified systems ensure retention of documents soft copies, and on the other hand access of all INPP users to all valid documents. Plant personnel use only the documents passed review, approval and registration. All key personnel have the possibility to use ARKI and @vilys systems to search for any required document. In accordance with the established requirements, each division of the INPP has its own list of documents that the personnel of specific division must follow and be guided in performing their own tasks.

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.

19.13. Involvement of relevant staff in the development of procedures

Preparation of documentation at INPP is carried out by competent personnel of enterprise subdivisions according to the Procedure of Documents and Data Records Management, MS-2-002-1, DVSta-0211-1 and other established procedures. Documents developers and managers of the relevant subdivisions of the enterprise ensure observance of obtainable accuracy, operational authenticity and acceptability of the document under development.

Confirmation of acceptability of the documents is carried out by the competent personnel of the power plant subdivisions, including operational, repair and operating personnel, prior to carrying the document into effect and includes revision, approval, coordination, independent review and validation of the document.

Confirmation of acceptability of documents is performed in accordance with graded approach principle and is based on critical analysis of sufficiency of measures which ensure safe and correct operation of equipment and systems. The results of the performed acceptability conformation are documented and stored together with original of the document. If endorsement of the document by the regulating authority is required, it shall be obtained prior to carrying the document into effect.

19.14. Incorporation of operational procedures into the management system of the nuclear installation

See Article 13 of this report.

19.15. Regulatory review and control activities

VATESI in accordance with the established responsibilities and national regulations for the verification of safety of nuclear facilities day-to-day carries out supervision/inspection activities and

systematic safety assessment to verify that the Authorized party and license holder is in compliance with the regulatory requirements and with the conditions specified in the authorization/license. VATESI supervises the activities of in-service inspection and testing at Nuclear Facilities:

– Review and approval of Standard in-service inspection and testing regulation and programmes of INPP;
– Review of annual in-service inspection and testing programmes of INPP;
– Review and assessment of annual in-service inspection and testing results of INPP;
– Review, development and approval of in-service inspection and testing regulations;
– Review and approval of in-service inspection and testing methodologies and procedures;
– Review of the results of material investigation of INPP components and pipelines;
– Review and consideration of safety justification in case of deviations from in-service inspection and testing acceptance.

Article 19(iv) – Procedures for responding to operational occurrences and accidents

19.16. Overview of arrangements and regulatory requirements on procedures for responding to anticipated operational occurrences and accidents

The main regulatory requirements on procedures for responding to anticipated operational occurrences and accidents are established in Nuclear Safety Requirements BSR-2.1.2-2010 “General safety requirements for nuclear power plants with RBMK-1500 reactors” and Nuclear Safety Rules VD-T-001-0-97 “Safety rules for reactor installations of nuclear power plants”.

The Nuclear Safety Requirements BSR-2.1.2-2010 establish safety goals, general safety criteria as well as the basic principles and the nature of the technical and organizational measures, which shall be applied to the nuclear power plants with RBMK-1500 type reactors. The BSR-2.1.2-2010 obligate the licensee to prepare a set of operating procedures, including procedures for responding to anticipated operational occurrences and accidents, including guidelines for management of beyond design basis accidents.

Nuclear Safety Rules VD-T-001-0-97 establish general requirements for design, characteristics and operational conditions of reactor installation systems and elements, as well as organizational requirements for nuclear safety assurance during the reactor installation design, construction and operation (decommissioning).

19.17. Event based and symptom based emergency operating procedures

The event-based accident procedure “Instruction on Elimination of Emergency Situations and Accidents at INPP” was developed for INPP Units 1 and 2 for the purpose to define INPP personnel actions for elimination of emergency situations and design accidents as well as the order of cooperation and responsibility distribution during performance of these actions. After the permanently shutdown of INPP Units, the accident response procedure “Instruction on Elimination of Emergency Situations and Accidents at INPP” was revised and applied to current state of INPP Units.

The Special Symptom Based Oriented Accident Instructions, Emergency Support Instructions, and Support Procedures were developed at INPP in addition to the existing event-based accident procedure and introduced at INPP in 2001. After the permanently shutdown of INPP Units, the abovementioned procedures were suspended in accordance to the procedure established at INPP, and

they were removed from the INPP personnel working places since they are not applicable for the current state of INPP.

19.18. Procedures and guidance to prevent severe accidents and mitigate their consequences if such accidents occur

Special guidelines for management of beyond the design basis accidents (SAMG/RUZA) were developed and introduced at INPP in 2008. After the permanently shutdown of INPP Units, the guidelines for management of beyond the design basis accidents were revised and applied to current state of INPP Units. In accordance with the INPP management system requirements for safety documentation, the guidelines for management of beyond the design basis accidents are included in the documentation package of INPP Emergency Preparedness Plan (EPP). The list of beyond design-basis accidents management guidelines contain five guidelines:

- Manual on use of beyond design-basis accidents management guidelines;
- RUZA-R1 "Heat removal from the reactor of Unit 2";
- RUZA-RB "Fission products release mitigation of Unit 1 and Unit 2";
- RUZA-B "Spent fuel storage pools conditions management of Unit 1 and Unit 2";
- Procedure "Heat removal from permanently shutdown reactor of INPP Unit 2 in the case of complete loss of auxiliary power supply".

The several safety improvement measures related to management of beyond design-basis accidents at INPP were implemented since it was presented in 6th National Report of Convention on Nuclear Safety. All implemented safety improvement measures were introduced in accordance with the Plan of Strengthening Nuclear Safety in Lithuania (National Action Plan). More details on the National Action Plan and INPP "stress tests" results and safety improvements measures associated with post-Fukushima lessons learned are presented in Section A2 of this report.

The assessment of the robustness and availability of the INPP Accident Management Centre (AMC) of INPP Organization of Emergency Preparedness (OEP) in case of earthquake was carried out in 2014. The seismic analysis of the robustness and availability of AMC was performed. The structural model of AMC was developed and computer code (SCAD) was used for calculation of seismic impact. The results of the calculations confirmed the robustness and availability of the AMC in case of earthquake with peak ground acceleration 0,13g. The report on the assessment of the robustness and availability of AMC was issued by INPP. VATESI performed review and approved this report. Taking into account the results of the assessment, the relevant procedures of INPP EPP were updated and reviewed by VATESI.

The modification of the INPP main computer information system was implemented in 2015. The special algorithm that is dedicated to display data of water temperature and level in the spent fuel storage pools measurements as well as radiation level measurements in the spent fuel storage pools halls in case of beyond design-basis accident was developed. The necessary hardware options have been installed as well, which allows the transmission of the data of water temperature and level in the spent fuel storage pools measurements as well as radiation level measurements in the spent fuel storage pools halls to the computer information system of INPP OEP. The implemented modification includes the transmission of data of water temperature in the accident management centre of VATESI as well. The relevant procedures of INPP EPP, including RUZA-B "Spent fuel storage pools conditions management of Unit 1 and Unit 2" were updated and introduced at INPP. VATESI has reviewed documentation of implemented modification and approved them.

19.19. Regulatory review and control activities

INPP has implemented technical and organizational measures to prevent accidents, including the low probability (beyond design-basis) ones, and to ensure management of potential accidents and mitigation of radiological consequences once they have occurred.

VATESI specialists reviewed and assessed safety justification documents related to accident prevention and management, submitted by INPP (see Section 19.18.). VATESI specialists analysed the updated guides on management of beyond design-basis accidents submitted by INPP and approved them. They also inspected INPP to analyse compliance with the set nuclear safety requirements related to potential accident prevention and management, and to organising emergency preparedness during decommissioning and other works.

During inspections of emergency preparedness measures at INPP, VATESI inspected training and drills of INPP staff and employees of the Technical Support Centre. It also inspected the storage, reviewing and updating of documents on accident prevention and management, and the implementation of safety improvement measures related to "stress test" results and conclusions.

Inspections of emergency preparedness measures were also focused on their implementation in the new and operated spent nuclear fuel storage facility and radioactive waste management and storage installations. Inspectors reviewed documents and instructions needed to liquidate emergency situations and looked into emergency preparedness trainings for employees. They also inspected if emergency liquidation means and personal protection measures were stored in line with VATESI requirements and INPP emergency management instructions.

The inspections results show that INPP duly complied with the set nuclear safety requirements related to emergency prevention and management, and ensured operations of the Emergency Preparedness Organisation. INPP pays particular attention to instructions (manuals on Normal Operation, Liquidation of Emergency Situations, Management of the Beyond Design-Basis Accidents, Emergency Preparedness Instructions) related to spent nuclear fuel management in fuel storage pools and operation of new nuclear facilities. The planned "stress test" measures were also duly implemented (see Section 19.18. and Section A2 of this report)).

Article 19(v) – Engineering and technical support

19.20. General availability of necessary engineering and technical support in all safety related fields for all nuclear installations, under construction, in operation and under decommissioning

Technical and scientific support is provided by INPP designers and by the designers of the reactor NIKIET (Russian abbreviation for Research and Development Institute of Power Engineering), VNIPIET (Russian abbreviation for All-Russia Research and Design Institute of Power Engineering Technology), and Research Manager – Russian Scientific Centre Kurchatov Institute, Moscow) and other institutes.

Equipment manufacturers/suppliers were actively involved during INPP construction and often provided support in services during INPP operation/outages: MZP (Moscow Polimetal Factory – design, production and supply of reactor control rods), GOZ (State Obukhov Factory in Sankt Peterburg, Russia – design, production and supply of control rod drives with the corresponding control system and the starting control and protection system used to achieve the first criticality), KhTZ (Kharkov Turbine Factory, Ukraine – design, production and supply of turbines and turbine systems) etc. A lot of companies from Western countries were involved in safety improvement activities, also local organizations such as Lithuanian Energy Institute, Kaunas University of technology, Vilnius Institute of Information Technologies have provided technical support in safety related fields during INPP decommissioning.

19.21. General availability of necessary technical support on the site and also at the licence holder or utility headquarters, and procedures for making central resources available for nuclear installations

Equipment manufacturers/suppliers and technical support organizations (see Section 19.20.) provided support in services and technical support in safety related fields after the final shutdown of the INPP as well as in INPP operation period.

The Nuclear Safety Department of the INPP is in charge of all issues related to nuclear safety, fuel and the core.

The Operational Management and Engineering Support Department of the INPP ensures support to the power plant subdivisions in solving engineering, ageing, HVAC etc. problems.

The Design Department of the INPP supports the plant departments in the area of equipment repair technologies development and design works.

The Documentation Management Department of the INPP provides support to the plant department in the area of technical documentation management.

To arrange technical support, management documents as well as level 3 work procedures are applied at INPP, including but not limited to the following:

- Procedure of Documents and Data Records Management, MS-2-002-1;
- Management Procedure of Operational Experience Application, MS-2-003-1;
- Nuclear Safety Management Procedure Description, MS-2-012-2;
- Procedure of Power Plant Modifications Management, MS-2-016-1;
- Designing Management Procedure, MS-2-018-1;
- Technical Questions, Modification Proposals, Technical Solutions Development Instruction;
- Modifications Control Instruction;
- Modifications Implementation Instruction.

19.22. General situation with regard to dependence on consultants and contractors for technical support to nuclear installations

At the INPP services on design, development, production, delivery of equipment and systems, materials and spare parts, contracted works of technical support organizations having permission to complete works and services at the INPP are procured in accordance with Procurement Management Procedure, MS-2-017-1, DVSta-1711-1. Independent examination of the most important modifications is carried out by technical support organizations according to Procedure of Power Plant Modifications Management, MS-2-016-1, DVSta-1611-1.

To solve the particular task that demands technical services and means both from internal and external organizations a special group on the project management is organized (for example, an implementation of a new system or procedure, fulfilment of the safety increase program, NPP decommissioning, etc.). The personnel of the INPP structural divisions as well as the personnel of external technical support organizations can be involved in such a group. The group manager is responsible for efficient implementation of the project according to given authority and existing management system. In development of technical support projects INPP cooperates with external technical support organizations listed in Section 19.20.

19.23. Regulatory review and control activities

VATESI performs the inspections of the INPP activities related to audits of the contractors' organizations involved in the INPP's decommissioning projects. The goal of such inspections is to ascertain how the INPP is performing the assessments (audits) of the management systems of the

suppliers that are relevant to safety and the capability of these suppliers to meet the requirements of the procurement documents.

Article 19(vi) – Reporting of incidents significant to safety

19.24. Overview of arrangements and regulatory requirements to report incidents significant to safety to the regulatory body

The Law on Nuclear Safety states the need for licence holders to notify promptly to VATESI about nuclear and radiological accidents, nuclear incidents and other unusual events occurred at nuclear installations.

Within VATESI Requirements on Operational Experience Feedback in the Field of Nuclear Energy (P-2009-04) it is required from a license holder to prepare procedures with detail reportable event criteria for reporting about the unusual events, including near-misses, accident precursors and abnormal occurrences at all stages in life-time of a nuclear installation.

Requirements BSR-1.8.1-2010 “Notification on unusual events at nuclear power plants” describes events reporting criteria, reporting processes to ensure that the information will be provided in timely manner, requirements for the analysis of event and content of event analysis report.

INPP has established event analysis procedures based upon ASSET methodology (IAEA). Human factor related events are additionally analyzed using the special procedure for analysis of events related to erroneous actions of personnel. The event analysis is used to detect all event causes, including root causes and to develop actions for preventing their recurrence.

In order to provide reportable events to INES databases, the INES national coordinator is nominated at VATESI. He is responsible to conduct the functions of INES national coordinator.

19.25. Overview of the established reporting criteria and reporting procedures for incidents significant to safety and other events such as near misses and accidents

The main criteria for reportable events and requirements for notification in timely manner are established within BSR-1.8.1-2010 “Notification on unusual events at nuclear power plants”. The reporting criteria include, but are not limited to the following ones:

- violation of limits and conditions for safe operation;
- failure of the barriers important to safety;
- obstacles for personnel to perform work safely;
- unplanned activation of a safety system;
- failure of a system to perform a safety important function;
- unplanned discharge of radioactive materials above the permissible levels;
- unplanned radiation dose above the permissible levels;
- any event posing a threat to physical protection of a NPP.

In accordance with BSR-1.8.1-2010 all safety significant events occurred at nuclear facility shall be reported to VATESI in a timely manner: within 24 h to notify about and event and 30 days to present an detailed event investigation report. VATESI shall be informed verbally about an event as soon as possible, but not later than within 1 or 2 hours after an event and written notifications must be sent not later than in eight hours on the first working day after an event.

INPP has developed reporting criteria’s specific o the type of the plant. Reporting criteria are established in the INPP procedure “Notification on unusual events at Ignalina Nuclear Power Plant instruction” DVSta-0312-8. Reporting criteria are consistent to VATESI requirements.

19.26. Statistics of reported events significant to safety for the past three years

From 2013 to 2015, 9 reportable events occurred at the INPP, which in accordance with the set information dissemination criteria had to be reported to VATESI. As a consequence of events the occupational exposure of the INPP employees and the contamination of the premises with radionuclides did not exceed the permissible limits, and the radionuclides were not released to the environment. On the International Nuclear Events Scale (INES) all 9 events were rated at Level 0 / below the scale.

Table 19.1 presents the total number of events occurred at the INPP within the period from 2013-2015. Some of events did not reach VATESI reporting criteria's, however all 28 events were registered and analyzed, event analysis reports were issued, root causes were identified, corrective measures were developed and implemented at the INPP in order to avoid event occurrences or reoccurrences.

Table 19.1 The Unusual Events occurred at INPP in 2013 – 2015

Events	Year			Total
	2013	2014	2015	
Total	13	8	7	28
Reportable events (out of total)	6	2	1	9

19.27. Documentation and publication of reported events and incidents by both the licence holders and the regulatory body

INPP maintains database of event to facilitate the analysis and to inform departments. The INPP database supports producing of investigation reports by providing of electronic templates compatible with the ASSET methodology. As soon as the first draft of a report is ready it can be easily retrieved from the system and reviewed by the members of an event investigation team. Necessary changes can be done to the report at this stage by the investigation team. The final version of such a report becomes accessible to all departments after receiving the "approved" status. The system provides no possibility to change the content of the report after its approval by the leader of the investigation team.

All event analysis reports from INPP are collected, handled and stored at VATESI database of unusual event so that it is possible to carry out a systematic search, selection and evaluation of events and their trends. National coordinator of Lithuania at VATESI is responsible for selection, preparation of national reports on safety related events and for setting to international databases: IAEA/NEA IRS or NEWS databases respectively.

19.28. Policy for use of the INES scale

In accordance with the Law on Nuclear Safety approved by Government of the Republic of Lithuania on 28 June 2011 VATESI is an institution authorised by the State to communicate and obtain information according to the 1986 Convention of Early Notification of a Nuclear Accident, according to 87/600/EURATOM Council Decision of 14 December 1987 on Community Arrangements for the Early Exchange of Information in the Event of a Radiological Emergency and according to the intergovernmental bilateral treaties. The licence holders must promptly notify the VATESI of the occurring nuclear and radiological accidents, nuclear incidents and other unusual events.

The unusual events in nuclear installations and in activities involving the use of nuclear and/or nuclear fuel cycle materials are classified by the licence holder in accordance with the INES. Independently from the licence holder the VATESI analyse the unusual events and based on the

conducted analysis finalise the approval of their classification. All reportable events for national and international communication are classified according to INES User's Manual edition 2008.

19.29. Regulatory review and control activities

The event reporting arrangements at INPP are regularly assessed by VATESI in the frames of supervision of the system of operational experience feedback. The effectiveness of the system is evaluated during annual inspection and review of corresponding submittals, including event reports, delivered pursuant to VATESI requirements P-2009-04. The regulatory activities include follow-up of the licensee's corrective actions identified as a result of event investigation.

Article 19(vii) – Operational experience feedback

19.30. Overview of arrangements and regulatory requirements on the licence holders to collect and analyse and share operating experience

In accordance with the Law on Nuclear Safety the licence holder shall analyse its own and external operation experience of the nuclear energy field as well as to exchange such operational experience with other interested parties and take necessary preventive and/or corrective measures that would ensure proper performance of nuclear safety requirements in the manner prescribed by the Head of VATESI.

With a purpose to strengthen and enhance the operational experience feedback processes VATESI has issued regulatory document "Requirements on Operational Experience Feedback in the Field of Nuclear Energy" (P-2009-04). Requirements (P-2009-04) are applied to licensee holder and describe the main requirements for:

- operational experience feedback system,
- identification, reporting, screening and analysis of information on operational experience,
- analysis of the trends of events,
- collection useful information on operational experience and dissemination of lessons learned,
- assessment of the effectiveness of the operational experience feedback system.

In accordance with the requirements (P-2009-04) operational experience shall be systematically exercised in all stages of the lifecycle of a nuclear installation.

19.31. Overview of programmes of licence holders for the feedback of information on operating experience from their own nuclear installation and from installations abroad

The INPP has developed operating experience system and special procedures, respectively VATESI Nuclear Safety Requirements BSR-1.8.1-2010 „Requirements of notification on unusual events in nuclear power plants" and "Requirements on Operational Experience Feedback in the Field of Nuclear Field" (P-2009-04).

The purpose of the use of operating experience is to increase the safety and reliability of the INPP. The activity on the use of internal and external operational experience at INPP is carried out according to the general management procedure "Use of operational experience management procedure" (MS-2-003).

The use of operational experience at the INPP is ensured by the following means:

- the competent personnel, whose authorities and responsibilities are defined in the power plant documentation,

– availability of the procedures describing and defining various actions: screening information on operational experience, evaluation of applicability, event analysis, planning and documenting of results, development of corrective actions, monitoring of the corrective actions

– allocation of the resources necessary for realization of activity on the use of own and operational experience.

– safety performance indicator system developed at the INPP is a part of the operating experience. Relevant to the decommissioning stage indicators have been renewed sins 2010 and is under applications at the INPP,

– the categorization (coding by WANO) system for the monitoring of the trends are developed and used at the INPP with aim to assess the effectiveness of the use operational experience. The monitoring comprise the faults of equipment, drawbacks in the employees' operations, descriptions of the procedures, organizational weaknesses as well as the data characterizing the conditions that were present during the events (near-miss events).

In order to assure operational experience use and feedback the INPP uses various information sources:

– Information of own operational experience: event analysis reports, low level events, the near misses events, the proposals of INPP employees, the business trips reports, the reports of the carrying out emergency and fire-fighting exercises;

– an operational experience of the NPPs with RBMK reactors;

– WANO and IAEA (IRS and FINAS) information;

– reports on external evaluations, including VATESI inspections, reports on carrying out of WANO peer review, reports on carrying out of international missions (ASSET, OSART, etc.)

Special attention is paid to safety issues and lessons learned related with decommissioning of other NPPs.

In order to strength the operational experience feedback the information at INPP is collected, handled and stored using a special database allowing to carry out systematic search, selection and evaluation.

19.32. Procedures to analyse domestic and international events

To prevent possible events at Lithuanian nuclear facilities and to avoid occurrences and reoccurrences of similar events happened in the worldwide VATESI analyses domestic and international operational experience including information on unusual events. VATESI performs review, screening and analysis of information on events available thought IAEA International Reporting System for Operating Experience (IRS), Fuel Incident Notification and Analysis System (FINAS), information on events gained through Clearinghouse web-page, NRC web-page and other available sources.

In accordance with VATESI regulation document "Requirements on Operational Experience Feedback in the Field of Nuclear Field" (P-2009-04), all safety significant events as well as the events that may impact long-term safe operation of the nuclear installation shall be thoroughly investigated, their direct causes and root causes shall be identified, the impact on safety and potential consequences shall be assessed, and the corrective actions shall be established. Based on the results of the investigation, the managers of the nuclear facility shall be provided with specific recommendations regarding the corrective actions that have to be taken immediately.

INPP has issued and uses a special procedure "Instruction for event analysis" DVSta-0312-5, which describes and procedures for event analysis occurred at INPP, procedures for root causes estimation, use of ASSET methodology for event investigation, development of corrective measures, event classification by INES, preparation of event analysis and other procedures related with event analysis and event analysis report preparation are included. "Instruction for event analysis" DVSta-0312-5 includes procedures of analysis of low level events and near-misses events in order to prevent them occurrence or reoccurrence.

In order to identify relevant to the INPP safety related issues and adopt the lessons learned at the INPP the special “Group of Operating Experience analysis and control” are constitute at INPP. This Group performs analysis if information on operating experience as well as domestic and international events.

19.33. Procedures to draw conclusions and to implement any necessary modification to the installation and to personnel training programmes

Application of operational experience at the INPP is evaluated in a systematic way in order to reveal eliminate any weaknesses and improve its effectiveness. To determine the effectiveness of the use of operational experience, self-assessments are periodically performed (internal inspections, audits, walk down, surveillances) and external assessments (VATESI inspections, ASSET and OSART missions, WANO peer reviews). On the basis of the analysis of the operational experience (investigation of the event, evaluation of the trend, analysis of the external operational experience feedback and other) the corrective actions are prepared with a final target to improve the safety of INPP.

The use of operational experience is a part of other INPP programmes, e.g. equipment maintenance programmes are developed with consideration of analysis of maintenance and operational experience, information submitted by designers and by manufacturers; programmes for optimization of radiation exposure are composed taking in to account the analysis of radiation exposure in the previous years, content and scope of work, VATESI requirements.

The operating experience is used in training for control room operators and other INPP personnel at INPP Training Subdivision. The data considered applicable to the plant are analysed and incorporated into training programmes.

19.34. Mechanisms to share important experience with other operating organizations

According VATESI requirements, INPP has contacts and cooperates with the legal entities which took part in designing the nuclear installation or in manufacturing the safety-important structures, systems or components which rendered services and carried out works related to safety in order to get consultations in the cases of equipment faults or events.

The mechanisms to share important experience with operating organizations are established in the INPP management procedure “Use of operational experience management procedure” (MS-2-003).

With a purpose to ascertain that all persons supplying goods, rendering services or performing works to INPP are efficiently using the operational experience in their activities the communication with contractors are maintained. INPP exchanges important operational experience with other operating organizations. The important experience is disseminate thought WANO.

19.35. Use of international information databases on operating experience

The licensee has defined the procedures for the assessment and usage of the information obtained from other nuclear installations, nuclear safety regulatory institutions and other sources, including IAEA/NEA IRS, FINAS databases and WANO.

19.36. Regulatory review and control activities for licence holder programmes and procedures

In order to assure proper operational experience usage VATESI plans and performs inspections at INPP every year. VATESI controls the licence holder's operational experience feedback arrangements and use of the lessons learned by performing regulatory inspections and reviewing the corresponding submittals delivered to the regulatory body according to regulations.

VATESI performs review of events analysis and notification the procedures, internal and external operational experience feedback procedures, safety performance indicators system and other procedures related with operational experience feedback.

19.37. Programmes of the regulatory body for feedback of operational experience and the use of existing mechanisms to share important experience with international organizations and with other regulatory bodies

In accordance with VATESI internal Quality Assurance procedure "The procedure on the regulatory and operational experience management" has established a permanent Commission of Unusual Events and Operational Experience, which systematically performs review, screening and analysis of information on operational experience. The event analysis reports are assessed and analyzed with a purpose to identify safety related issues, adopt the lessons learned in order to avoid the reoccurrences of events and for improve the regulatory requirements. Recommendations developed by Commission are provided to license holder. In accordance with VATESI "Requirements on Operational Experience Feedback in the Field of Nuclear Power" (P-2009-04) license holder provide VATESI reports on use operational experience and lessons learned, including information on implementation of recommendations of VATESI.

Identifying of relevant operating experience information includes the review of the international databases, such as:

- IAEA International Reporting System for Operating Experience (IRS);
- Fuel Incident Notification and Analysis System (FINAS);
- World Association of Nuclear Operators (WANO).

VATESI uses the different ways for information to share own experience. The information on lessons learned and important experience is disseminated trough international databases such as IAEA IRS and USIE. The important information for the public and international organization is published into VATESI own webpage www.vatesi.lt.

VATESI takes part in the Clearinghouse activity to improve the operating experience feedback and communication between participating countries.

Article 19(viii) – Management of spent fuel and radioactive waste on the site

19.38. Overview of arrangements and regulatory requirements for the on-site handling of spent fuel and radioactive waste

Radioactive waste management Programme in accordance to the EC directive 2011/70 EURATOM were prepared and approved by the Government of the Republic of Lithuania on 23 December 2015 superseding the Radioactive Waste Management Strategy approved in 2002. The strategic goal of the program is safe management of all radioactive waste and spent nuclear fuel available in Lithuania, protection of people and the environment from harmful effects of ionizing radiation and avoiding to impose undue burdens on future generations. The three basic tasks of the

programme remain the same as in the previous Radioactive Waste Management Strategy: to strive to reduce radioactive waste amount; to achieve a high level of nuclear and radiation safety and environmental protection by management of spent nuclear fuel and radioactive waste; to strive to ensure transparency of spent nuclear fuel and radioactive waste management and information of the public. The additional task is to ensure long-term safety of spent nuclear fuel and long-lived radioactive waste by constructing a deep geological repository within the Lithuanian territory.

INPP has developed action plans on implementation of the Pre-disposal Management of Radioactive Waste at Nuclear Facilities as well as the licence for construction and operation of Landfill facility for disposal of VLLW was issued by VATESI. INPP started tendering procedure for construction of VLLW facility, the start of operation is foreseen in 2017-2018. Currently INPP submitted the Near Surface Repository Technical Design (TD), Preliminary Safety Analysis and Environmental Monitoring reports to VATESI for analysis and assessment review. The Start of operation of NSR for LILW-SL is planned in 2021-2022.

The General Requirements for Dry Type Storage for Spent Nuclear Fuel issued by VATESI sets out general requirements for spent fuel storage. At INPP site the existing dry SF storage facility is in operation since 2000. The new interim SF storage facility is anticipated to start operation at the end of 2017 where SF still remaining at the INPP Units will be transferred to this new facility.

19.39. On-site storage of spent fuel

The storage capacity of the existing interim SNFSF (bld. 192) were prescribed in the license conditions - 20 CASTOR and 78 CONSTOR casks. For the period from 2008-04-01 to 2009-02-25 the storage capacity was increased for up to 22 additional CONSTOR RBMK casks. At present 20 CASTOR RBMK casks and 98 CONSTOR RBMK casks are stored in the storage facility. The total amount of stored casks is118 and the total quantity of spent nuclear fuel assemblies accommodated in the casks is 6018. Transportation of 2 remaining casks with spent nuclear fuel to the storage facility is not anticipated.

SNFSF is fenced in perimeter with the shielding reinforced concrete wall and supported by the triple fence equipped with an alarm system also site is equipped with a continuous radiation monitoring system the signals thereof being transferred into the Radiation Monitoring Control Room.

The process structures are located behind the shielding reinforced concrete wall, which ensures secure operation of the facility. The platform to store the casks of CASTOR RBMK and CONSTOR RBMK in the vertical position is located between the rails of the overhead crane.

With regard to necessity to handle and store the remaining approximately 15555 spent nuclear fuel assemblies from the shutdown INPP Units, in 2003 the Government of the Republic of Lithuania decided to construct a new dry type spent nuclear fuel storage facility (B1 Project) designed for handling and storage of the remaining spent nuclear fuel assemblies.

The new interim spent fuel storage facility (ISFSF) site is located at the distance of 0.6 km to the south from the INPP and covers 6 hectares of the area. The contractor of the B1 Project is the German consortium of German companies Nukem Technologies and GNS. The contractor enhanced the design of the new CONSTOR RBMK-1500/M2 casks each of which is 4,5 m high, 2,7 m in diameter and weighs 118 tons loaded with fuel. CONSTOR RBMK-1500/M2 cask consists of 2 baskets and can accommodate of 91 spent nuclear fuel assemblies. The new spent new fuel storage facility, according to the project, is designed to accommodate 200 CONSTOR RBMK-1500/M2 casks with spent nuclear fuel assemblies (about 17 000) and store it up to 50 years. The required spent nuclear fuel handling equipment is designed too.

19.40. Implementation of on-site treatment, conditioning and storage of radioactive waste

Pursuant to the Radioactive Waste Management Development Programme long lived radioactive waste retrieved from the existing INPP operational waste storage facilities shall be

segregated from short lived radioactive waste at the Solid Waste Management and Storage Facility, packed into containers unconditioned and transferred for 50 years storage to the Long Lived Radioactive Waste Storage Facility. Solid radioactive waste at INPP is segregated into three groups by the surface dose rate, according to standards that were applied in the former Soviet Union and were 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 processing of solid waste before it is dumped. All the waste from these facilities will be retrieved, characterized and conditioned according to the new regulatory requirements established by VATESI which follow the IAEA classification.

Liquid radioactive waste at the INPP 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 facility (build. 158). The building is also located on the INPP site.

The INPP performed preliminary study for bituminised radioactive waste storage facility in order to know if it could be converted into a repository. It was decided that more investigations are needed. If an outcome of final assessment is negative, build. 158 will remain as a storage facility and the INPP would develop actions plan of facility decommissioning including waste retrieval. If positive then this storage facility will be transferred to disposal facility. At present the B20 Project is initiated. The main purpose of B20 Project is to perform all necessary actions (investigation, researches, studies) in order to demonstrate the possibility of the bitumen compound storage facility transformation into the repository and prepare the basic design documents related to transformation or to conclude that the bitumen compound storage facility can not be transformed into the repository and other actions related to retrieval of bitumen compound, treatment etc. will be evaluated and prepared.

Considering the fact that the capacity of the constructed Long Lived Radioactive Waste Storage Facility will not be sufficient for storage of all long lived radioactive waste, for the purpose of temporary storage of the reactor waste (mainly graphite) it is planned to substantiate the safety of the interim storage of reactor dismantling waste in the existing Cemented Liquid Radioactive Waste Storage Facility (bld. 158/2). Currently the INPP initiated the modification within the scope of which it is foreseen to procure services for performance of the safety assessment and justification of temporary storage of the reactor waste in the existing Cemented Liquid Radioactive Waste Storage Facility where cemented waste of B and C classes (short lived low and intermediate level waste) in 200 litre drums are temporary stored in reinforced concrete containers. Graphite waste accumulated due to dismantling of process of fuel channels, Reactor Control and Protection System channels (fragments of graphite rings and sleeves) of the upper reactor installation part (reactor R1 area) will be temporarily stored in bld. 158/2 for subsequent their transportation for further storage to the Solid Radioactive Waste Storage Facility waiting for construction of deep geological repository. In case if the repository is not available after expiration of interim storage period, extended operation of the Solid Radioactive Waste Storage Facility will be considered.

Spent ion-exchange resins, perlite and sediments are stored in special tanks. In 2006 the cementation facility and storage facility for cemented waste started operation. The ion-exchange resins from the INPP 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 (200 litre drums) and put in storage container (FRAMATOME container for 8 drums) 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 the Near Surface Repository (NSR) (B25 Project). The start of containers containing cemented LRW disposal in the NSR is foreseen in 2021.

Modernization of the waste management includes retrieval from the existing storage facilities, characterization, treatment and conditioning of waste taking into account the separate disposal routes. Before the final disposal waste will be stored in new storage facilities. In new treatment facilities (B2 and B3/4 Projects) operational and decommissioning waste will be handled. It is foreseen that operation of the retrieval facility (B2 Project) for retrieval of the operational waste and new treatment and storage facility (B3/4 Project) will start in 2018. “Cold trials” of both facilities started in 2016.

After storage the waste will be disposed of in disposal facilities. It is envisaged to construct two disposal facilities – Landfill facility for very low level waste (B19-1 Project) and the NSR for low and intermediate level radioactive waste (B25 Project). According to the plans Landfill facility could start operation in 2017-2018 and the NSR for low and intermediate level radioactive waste in 2021-2022. In accordance with the national Radioactive Waste Management Program spent fuel and long lived waste will be disposed in deep geological repository constructed on the territory of Lithuania. The possibility to transfer abroad the spent nuclear fuel for treatment is not forbidden by national laws.

Before transporting for storage to the Landfill Facility the very low level waste is stored at the very low level waste Buffer Storage Facility with the capacity of 4000 m^3. This facility started operation in 2013.

19.41. Activities to keep the amount of waste generated to the minimum practicable for the process concerned, in terms of both activity and volume

According to new Regulation on Predisposal Management of Radioactive Waste, INPP 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. INPP optimized the processes related to waste generation which allowed reduce amount of waste.

For minimization purposes Free Release Facility for solid operational radioactive waste was constructed. It started operation in 2006 (bld. 159B). 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. In 2011 characterization of decommissioning waste was also started in this facility. Another Free Release Facility (B10 Project) is constructed for decommissioning waste, which started operation in 2010.

19.42. Established procedures for clearance of radioactive waste

Requirements BSR-1.9.2-2011 “Derivation and Use of Clearance Levels of Radionuclides for Materials and Waste Generated during Activities in the Area of Nuclear Energy” are established. According to these requirements the INPP performs measurements of the material which could be free released. This is done in the facilities mentioned in Section 19.41.

19.43. Regulatory review and control activities

Main steps of regulatory review are related to the steps of development of waste management facility design, construction or reconstruction, operation and decommissioning or closure. In order to receive a licence, operator shall provide safety documentation which shall reviewed by regulatory body. When licence is issued regulatory control is ensured by control of compliance with licence conditions and regular on-site inspections.