NATIONAL REPORT
OF THE REPUBLIC OF BELARUS

UNDER
CONVENTION ON NUCLEAR SAFETY

MINSK
2016

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ABBREVIATIONS

AMS – automatic measurement sites
ARSMS – automated radiation situation monitoring system
ARMS – automated radiation monitoring system
NPP – nuclear power plant
PSA – probability safety analysis
VVER – water-cooled power reactor
PSI "JIPNR-Sosny" – Public Scientific Institution "Joint Institute for Power and Nuclear Research – Sosny" of the National Academy of Sciences of Belarus
Gosatomnadzor – Department for Nuclear and Radiation Safety of the Ministry for Emergency Situations of the Republic of Belarus
PI RCRCEM – Public Institution "Republican Center for Radiation Control and Environmental Monitoring"
UNECE – United Nations Economic Commission for Europe
LRW – liquid radioactive wastes
VLLW – very low level radioactive waste
LLW – low level radioactive waste
ILW – intermediate level radioactive waste
HLW – high level radioactive waste
RW – radioactive waste
CJSC – closed joint-stock company
INIR – Integrated Nuclear Infrastructure Review IAEA mission
CNS – Convention on Nuclear Safety
LRC – local response centers
IAEA – International Atomic Energy Agency
ICRP – International Commission on Radiological Protection
MES – Ministry for Emergency Situations of the Republic of Belarus
SAR – safety assessment report
GPSE – general provisions of safety ensuring
EIA – environmental impact assessment
OSP-2002 – Sanitary Regulations and Standards 2.6.1.8-8-2002 "Main Sanitary Rules for Radiation Safety (OSP-2002)"
TSO – technical support organization
PC – pre-commissioning
PSAR – preliminary safety assessment report
RF – reactor facility
RRC – regional response centers
CIS – Commonwealth of Independent States
SPORO-2005 – Sanitary Rules for Radioactive Waste Management (SPORO-2005) 2.6.6.11-7-2005
TCCP – technical code of common practice
SRW – solid radioactive wastes
OO – operating organization (operator)
EPREV – Emergency Preparedness Review IAEA mission
NF – nuclear fuel
TCP – Technical Code of Practice

INTRODUCTION

The Seventh regular National Report of the Republic of Belarus under the Convention on Nuclear Safety prepared in accordance with Article 5 of the Convention demonstrates fulfillment of the country commitments undertaken within the framework of the Convention in 2013-2016, with consideration of the decision made at the state highest level to build the first NPP in Belarus, and the actions of all state agencies and organizations involved in this project implementation. It is the Belarusian nuclear power plant under construction that is the only facility corresponding to the definition provided in the Article 2 of the Convention on Nuclear Safety. Due to this reason, this National Report has its primary focus on the safety of this facility. There are also scientific nuclear facilities in Belarus, and the issues concerning their safety have also been included in the Report.

During the three-year period since the previous National Report was presented (August 2013), the Republic of Belarus continued to develop nuclear safety infrastructure and all its components: regulatory and legislative framework to manage infrastructure, including nuclear and radiation safety regulatory body, state system of emergency preparedness and response, etc. In November 2013, after the Decree of the President of the Republic of Belarus of November 2, 2013 No.499 [45] was signed, the operating organization received a license for erecting foundation of the buildings and strutures of the unit No.1 of the Belarusian NPP, and the construction of the Belarusian NPP was started. Later, in 2014, the full range of construction operations of the units No. 1 and No.2 was licensed. Licensing processes concerning the Belarusian NPP included compulsory review of the documents that prove its safety, as well as the assessment of the licensee's compliance with the licensing requirements and conditions. There is appropriate supervision of the NPP construction, as well as production and acceptance of the equipment for the Belarusian NPP, including continuous supervision on the construction site.

At the national level, the Republic of Belarus takes all necessary measures to ensure that the fundamental principles of nuclear safety are observed at all stages of the lifetime of the NPP under construction, including the IAEA mission recommendations on integrated nuclear infrastructure review in the Republic of Belarus (INIR mission) provided in 2012. In October 2016 Belarus will receive the IAEA mission on integrated regulatory infrastructure review (IRRS mission) so that they provide their results and recommendations on further improvement of the country nuclear and radiation safety regulatory system.

The Report article by article covers activities of the state on implementation of the Convention provisions. Special focus is put on the changes in the regulatory and legislative framework that concern nuclear and radiation safety in the course of nuclear energy use. The Report illustrates work and measures fulfilled to train staff, ensure safety priority, provide radiation safety, arrange emergency preparedness system, etc.

The articles 6, 7, 14, 17, 18 and 19 contain information on the implementation of principles of the Vienna Declaration on Nuclear Safety of 9 February 2015.

SUMMARY

The Convention on Nuclear Safety (hereinafter - CNS) was ratified by Belarus in 1999. Belarus has prepared and presented six National Reports under the CNS (1999, 2001, 2004, 2007, 2011, 2013), as well as one extraordinary report dedicated to lessons of the accident at the NPP "Fukushima-1" (Japan).

In the beginning of 2008 the decisions on implementation of the first nuclear power program in Belarus were taken on the state highest level [35]. The previous 6th National Report summarized measures taken in advance to the construction of the Belarusian NPP, while this 7th National Report provides information on various aspects of safety in the course of the NPP construction and measures to take in advance to the future plant operation.

The Belarusian nuclear power plant under construction is the only facility corresponding to the definition provided in the Article 2 of the Convention on Nuclear Safety. It is constructed by the Russian AES-2006 design. The general contractor for construction is "Atomstroyexport", JSC (ASE JSC), and the customer is the Republican Unitary Enterprise "Belarusian nuclear power plant" (RUE "Belarusian NPP", earlier referred to as Public Institution "Directorate for Nuclear Power Plant Construction") defined as the operating organization. In November 2013, after the Decree of the President of the Republic of Belarus of November 2, 2013 No.499 [45] was signed (which was preceded by the license of the Ministry for Emergency Situations of the Republic of Belarus for erecting foundation of buildings and structures of the unit No. 1 of the Belarusian NPP), the construction on the site of the unit No. 1 was started. In 2014 RUE "Belarusian NPP" received another three licenses concerning the NPP construction:

for erecting foundation of buildings and structures of the unit No. 2 of the Belarusian NPP (February 2014);

for full range of construction operations of the unit No. 1 (April 2014);

for full range of construction operations of the unit No. 2 (December 2014).

At the moment there are construction and mounting works for erecting the power units No. 1 and No. 2 of the Belarusian NPP in progress, as well as works at common plant facilities. Power unit No. 1 of the Belarusian NPP is scheduled for commissioning in 2018, while unit No. 2 is planned to be commissioned in 2020.

As the first nuclear power program is implemented, relevant measures are taken to develop nuclear safety infrastructure. These measures are based on the international recommendations, particularly, those of the IAEA mission on integrated review of the nuclear infrastructure of the Republic of Belarus held in 2012 (INIR mission), as well as the conclusions of the meetings of the CNS contracting parties. In the course of the review of the 6th National Report of the Republic of Belarus the following challenges have been highlighted:

finishing construction and commissioning of new reactors in 2018 and 2020 which is still a challenging task;

ensuring that the regulatory body adequately reviews the documents provided by the licensee, as well as ensuring monitoring of the NPP construction process, including monitoring of equipment production, quality of supplies, etc.

improving competences and extending opportunities for independent technical support for the implementation of future tasks;

providing review system on the NPP construction site;

recruiting staff and managing fast growing regulatory body, development and improvement of its competences;

establishing mechanisms of bilateral cooperation on nuclear safety with the Republic of Lithuania.

By the moment of this National Report compilation the construction of the Belarusian NPP continues to be in progress in accordance with the schedule, and the plans on commissioning of the power units No. 1 and No. 2 in 2018 and 2020 are still valid.

The republican state authority that regulates and manages nuclear and radiation safety (Ministry for Emergency Situations of the Republic of Belarus) adequately reviews documents in the framework of licensing procedures for the Belarusian NPP construction. Preparation for npp operation for licensing is underway. Regulatory and legislative framework for licensing of works involving nuclear power use (more details in Article 7 (2) (ii) of this National Report) is being improved.

Technical support by the regulatory body in nuclear and radiation safety field continues to be developed. Currently, technical support is provided by the Public Scientific Institution "Joint Institute for Power and Nuclear Research – Sosny" of the National Academy of Sciences of Belarus (PSI "JIPNR-Sosny"). When consulting is required, the Belarusian regulatory body involves competent bodies of the Russian Federation (Rostekhnadzor, FSUE VO "Safety") and receives methodological assistance from European experts in the framework of the European Union international technical cooperation projects for providing the Belarusian regulatory body with assistance in the field of nuclear and radiation safety. The system of technical support of the regulatory body is being continuously developed with a view of its current and future tasks. The strategy consists in moving from one technical support organization to the system of 20 ones, uniting scientific and expert resources of the Republic of Belarus.

Relevant supervision system has been established on the NPP construction site. It comprises continuous supervision mode implementation and operation of a relevant local subdivision of the Department on nuclear and radiation safety of the Ministry for Emergency Situations of the Republic of Belarus (Gosatomnadzor). Activities of the authorities participating in the supervision have been coordinated, and regulatory and legislative framework for nuclear and radiation safety supervision continues to be improved (ref. Article 7 (2) (iii) of this National Report).

Large-scale staff recruitment to Gosatomnadzor was held (45 new employees, including 22 graduates of profile higher education institutes). Their competences were improved and developed with the use of national and external recourses. Taking into account the regulatory practices, Gosatomnadzor structure has been revised and, starting from April 2016, the new structure has been introduced (ref. Article 8 (1) of this National Report).

There have been taken steps to institutionalize the bilateral cooperation on nuclear safety with the Republic of Lithuania. There is a draft agreement on nuclear safety between the regulatory bodies - the Ministry for the Emergency Situations of the Republic of Belarus (MES) and the Lithuanian State Inspectorate for the safe use of nuclear energy (VATESI) - that has been developed and is now being reviewed.

The nuclear infrastructure of the Republic of Belarus is being developed with the consideration of the world's modern tendencies and approaches, including the ones discussed and approved by the contracting parties to the CNS. Belarus implements principles provided in the Vienna Declaration on Nuclear Safety of 9 February 2015:

the design of the Belarusian NPP and its construction works correspond to principle 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"* (ref. information in Article 6, Article 17 (1) and Article 18 (3) of this National Report);

the national legislation complies with principle 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..."* (ref. information in Article 7 (2) (ii) and Article14 (1) of this National Report);

regulatory and legislative framework for nuclear and radiation safety in the Republic of Belarus is being improved on the basis of regular analysis made to identify new regulatory and legislative documents and (or) amendments to such current documents of any level necessary to be developed with the consideration of the IAEA recommendations (including the newly published

ones) and other documents to comply with principle 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"* (ref. Article 7 of this National Report).

To assess and further improve nuclear and radiation safety infrastructure, the Republic of Belarus has invited and is planning to invite a number of the IAEA review missions:

Integrated Regulatory Review Service (IRRS);

Site and External Events Design Review Service (SEED);

International State System for accountancy and control of nuclear material Advisory Service (ISSAS);

Emergency Preparedness Review (EPREV);

Integrated Nuclear Infrastructure Review (INIR), for the 3rd phase of the nuclear power program implementation;

International Nuclear Security Advisory Service (INSSERV);

Pre-Operational Safety Review Team (pre-OSART).

The nearest of them is the IRRS mission which will take place in the Republic of Belarus on 2 - 14 October 2016. Implementation of the recommendations provided by the review missions will contribute to further harmonization of nuclear and radiation safety norms of the Republic of Belarus and the international requirements necessary to reach high safety standards.

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.

Nuclear installations (hereinafter – installations) located in the Republic of Belarus according to Article 2 of the Convention on Nuclear Safety, Amendment to the Convention on the Physical Protection of Nuclear Material and Nuclear Facilities and the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, are listed in Table 1.

Table 1
Nuclear Facilities in the Republic of Belarus

Item No.	Facility	Current Status
1.	Belarusian NPP	Constructing
2.	Non-irritated nuclear material storage facility "Yavar"	Operating
3.	Spent fuel storage facility	Decommissioning (fuel transferred to the Russian Federation in 2010)
4.	Storage facilities for non-irradiated nuclear material	Constructing
5.	Subcritical assembly "Yalina"	Operating
6.	Critical assembly "Giatsint"	Operating
7.	Critical assembly "Kristal"	Operating

Of all the above mentioned installations power blocks of the Belarusian NPP are the only ones that correspond to the definition provided in the Article 2 of the CNS - Belarusian NPP, while the rest of them are scientific facilities located in the PSI "JIPNR-Sosny".

Construction of the nuclear power plant in the Republic of Belarus

In March 2011, in Minsk (Republic of Belarus), the Agreement was signed between the Government of the Russian Federation and the Government of the Republic of Belarus for cooperation in the NPP construction in the territory of the Republic of Belarus. The Agreement stipulates turnkey construction of the Belarusian NPP to be performed by the Russian party. The general contractor for construction is "Atomstroyexport", JSC (ASE JSC), and the customer is RUE "Belarusian NPP" (at the moment of the agreement signing referred to as Public Institution "Directorate for Nuclear Power Plant Construction") defined as the operating organization. Belarusian NPP will consist of two power units with total capacity of up to 2400 (2x1200) MW.

For construction of the first Belarusian NPP the AES-2006 design of Saint Petersburg Research and Design Institute "ATOMENERGOPROEKT" (hereinafter – SPbAEP, JSC) Joint-Stock Company, was selected for its enhanced safety characteristics and technical and economic parameters. Construction of an NPP according to this design features:

construction of a nuclear power plant of 3+ generation featuring a new reactor system with additional safety systems: passive heat removal system; passive filtration system of leakage to the intershell space; double protective enclosure vessel; trap for molten corium in case of a beyond design basis accident;

maximum implementation of the defense-in-depth principle: setting up barriers to prevent ionizing radiation and radioactive substances discharge into the atmosphere, and the system of

technical and organizational measures to protect the barriers, as well as preservation of their efficiency in the course of direct protection of the population.

System of NPP barriers provided in the AES-2006 design includes fuel matrix, fuel claddings, reactor coolant boundary; sealed enclosure of localization safety systems.

The designed barriers feature safety functions, such as reactivity control, afterheat discharge and localization of radioactive materials in operational states, during and after a design basis accident and, as far as it is reasonably practicable, in case of emergency conditions of beyond design basis accidents.

Basic technical characteristics of power units of the Belarusian NPP are listed in Table 2.

Table 2

Basic technical characteristics of power units of the Belarusian NPP with VVER-1200

Characteristic	Value
Number of units, pcs.	2
Lifetime, years reactor facility steam turbine plant	60 50
Capacity of a power unit, MW: electric (gross) thermal	up to 1200 3200
Heat extraction capacity of a power unit, MW	300
Installed capacity utilization factor, relative unit	0.9
Power consumption for auxiliaries (with regard to recycling water supply and site expenses), %	7.0
Number of fuel assemblies in core, pcs.	163
Number of fuel assemblies with operation control of reactor control and safety system, pcs.	121
Duration of fuel-element lifetime, years	4
Basic specifications of primary coolant: temperature at the core inlet, °C temperature at the core outlet, °C heating of the core coolant, °C coolant flow through the reactor, m3/h pressure at the core outlet, MPa steam pressure at the outlet of the steam generator, MPa evaporating capacity of the steam generator, t/h Feed water temperature, °C steam humidity at the outlet of a steam generator, maximum %	 298.2 328.9 30.7 86000 16.2 7.0 1602 225 0.2

AES-2006 design is also a basis for the Leningrad NPP-2 under construction in Leningrad oblast of the Russian Federation. The design development included comparison of basic specifications and parameters of an NPP power unit with VVER-1200 and the data from the reference NPP with VVER-1000 (V-428) and from foreign NPPs.

The design corresponds to the international norms and the IAEA recommendations, as well as to the principle 1 of the Vienna Declaration on Nuclear Safety of 9 February 2015 stating that "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".

According to the General Contract for construction of the Belarusian NPP between RUE "Belarusian NPP" (Republic of Belarus) and ASE JSC (Russian Federation), the general contractor shall perform all necessary works, including survey works, develop detailed design documentation, execute construction, installation and commissioning works, supply equipment, as well as carry out any other works provided by the contract for two-unit NPP construction and commissioning in the

territory of the Republic of Belarus at full responsibility of the General Contractor (turnkey construction) at the industrial site of the NPP.

In November 2013, the Decree of the President of the Republic of Belarus of November 2, 2013 No.499 [45] was signed, (which was preceded by the license for erecting foundation of buildings and structures of the unit No. 1 of the Belarusian NPP), and the construction on the site of the unit No. 1 was started.

In February 2014 the operating organization obtained a license the right to erect foundation of buildings and structures of the unit No. 2 of the Belarusian NPP. In June 2014 the construction on the site of the unit No. 2 was started.

In April 2014 the license for the construction (full range of operations) of the unit No. 1 was obtained, and in December 2014 the same license was obtained for unit No. 2.

At the moment power units No. 1 and No. 2 of the Belarusian NPP are being constructed and mounted, and common plant facilities are being under construction and mounting as well. Buildings and structures of the fire station were fully commissioned for permanent operation, and the study and training center (STC) was commissioned for temporary operation.

Power unit No. 1 of the Belarusian NPP is scheduled for commissioning in 2018, while unit No. 2 is planned to be commissioned in 2020.

In 2015 the Ministry of Energy together with the National Academy of Sciences of Belarus developed the Strategy for the Belarusian NPP radioactive waste management approved by the resolution of the Council of Ministers of the Republic of Belarus of June 2,2015 No.460 [71]. Its objective is to determine basic activities for safe and cost-efficient management of the radioactive waste of the Belarusian NPP. In terms of construction of the surface radioactive waste disposal facility, the Strategy includes measures on design and construction of the first stage of the radioactive waste disposal facility of the Belarusian NPP to be performed by 2028 (more details in Article 19 (8) of this National Report).

Scientific nuclear facilities

Scientific nuclear facilities include the following facilities of the PSI “JIPNR-Sosny”:
spent fuel storage facility;
storage facility for non-irradiated nuclear material “Yavar”;
subcritical assembly “Yalina”;
critical assembly “Giatsint”;
critical assembly “Kristal”.

In 2014-2015 status and purpose of the institution facilities did not changed, except for the spent fuel storage facility (now being decommissioned). The license for construction of a new storage facility of nuclear material was obtained.

Non-irradiated nuclear material storage facility Yavar is used for non-irradiated nuclear material storage. Nuclear material is provided to the Giatsint critical assembly and Yalina subcritical assembly for research programs.

Nuclear material storage facility under construction. There is a special permit (license) obtained for the construction of a new nuclear material storage facility of July 13, 2015. The new nuclear material storage facility is now under construction, and the documents for its commissioning are being developed.

Critical assembly Giatsint is operating. Critical assembly Giatsint is intended for research in physics neutron multiplying assemblies and provides experimental base for solving a wide range of fundamental and applied problems concerning nuclear technology development. The critical assembly can host experiments on more than 20 critical water-moderated, zirconium hydride-moderated or non-moderated assemblies. In 2014-2015 experimental study of critical assemblies was performed in the framework of the following programs: State scientific research program “Nuclear energy, nuclear and radiation technologies” and State Program “Scientific support for development of atomic energy in the Republic of Belarus for 2009-2010 and for the period to 2020” (from April 2016 – subprogram 6 “Scientific support for development of atomic energy in the

Republic of Belarus" of State Program "Knowledge-intensive technologies and equipment" for 2016-2020).

Kristal critical assembly is operating in an extended shutdown mode.

Yalina subcritical assembly (SCA) consists of two zero-power subcritical assemblies, YALINA-T and YALINA-Buster, and neutron generator NG-12-1. Basic life support, management, safety and security systems are common for both subcritical assemblies. Yalina subcritical assembly (assemblies YALINA-T and YALINA-BT) is intended for basic research in nuclear and neutron physics, physics of sub-critical systems managed by external neutron sources (accelerators of charged high-energy particles, neutron generators), studies of the transmutation of long-lived radioactive waste of nuclear power industry and solving a number of applied tasks – neutron-activation analysis of geological samples, research and testing of radiation resistance of materials and products of various purposes, development of integrated circuits production technologies. The research is carried out in the framework of the State scientific research program "Nuclear energy, nuclear and radiation technologies" for 2016-2020, subprogram 1.3 "Nuclear energy and nuclear physical technologies" and State Program "Scientific support for development of atomic energy in the Republic of Belarus for 2009-2010 and for the period to 2020" (from April 2016 – subprogram 6 "Scientific support for development of atomic energy in the Republic of Belarus" of State Program "Knowledge-intensive technologies and equipment" for 2016-2020). At the moment the works are being carried out in the core of uranium-plastic subcritical assembly, together with experimental study of neutron-physical specifications of the subcritical assembly. Fuel from buster subcritical assembly is unloaded and transferred to the Yavar fresh fuel storage.

Spent fuel storage facility Fuel was transported to the Russian Federation in 2010. To decommission spent fuel storage, the Council of Ministers of the Republic of Belarus adopted the relevant resolution and approved the decommissioning program. At the moment there are design works and decommissioning activities being carried out at the facility. Works are planned to be finished in 2018.

ARTICLE 7. LEGISLATIVE AND REGULATORY FRAMEWORK

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

2. The legislative and regulatory framework shall provide for:

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

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

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

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

Activities in the field of nuclear safety are carried out according to the standard world practice and the IAEA recommendations. The principles of safety defined in the IAEA publication No. SF-1 "Fundamental principles of safety" and general provisions of other IAEA safety standards are taken as the base for the Law of the Republic of Belarus "On Use of Atomic Energy" and regulations of republican state control bodies in the field of nuclear power use. The government declared adoption of the global nuclear safety regime, as well as its commitment to implement the nuclear power program in accordance with the international conventions and agreements [1, 2, 4, 5, 7-10, 12, 14-18] by adopting and ratifying them.

Article 7 (1) Establishing and maintaining a legislative and regulatory framework

Legal regulation of safety in the field of nuclear power use has hierarchical structure and stipulates that documents of lower legal force are subject to the relevant requirements of the documents of higher legal force. The regulation is carried out on the basis of the following:

laws of the Republic of Belarus;

decrees of the President of the Republic of Belarus;

resolutions of the Government of the Republic of Belarus;

regulations of the authorized republican state control bodies responsible for state regulation of safe nuclear energy use;

standards and rules in the field of nuclear and radiation safety, as well as other technical regulations.

After the decision in principle to embark on nuclear energy was taken in 2008 [35], regulatory framework for nuclear and radiation safety was considerably changed. On the whole, by 2016 the higher level legislation (decrees of the President of the Republic of Belarus, laws of the Republic of Belarus, resolutions of the Government of the Republic of Belarus) has been formed. It is based on:

Law of the Republic of Belarus of July, 30 2008 No.426-3 (as amended on December 22 2011) "On Use of Atomic Energy" [36];

Law of the Republic of Belarus of January 5, 1998 No.122-3 "On Radiation Safety of Population" (as amended on January, 4 2014 No. 106 -3) [27];

Decree of the President of the Republic of Belarus of September, 1 2010 No. 450 (as amended on November, 26 2015 No. 475) "On Licensing of Certain Types of Activities" [37];

Decree of the President of the Republic of Belarus of February 16, 2015 No.62 "On Provision of Safety during the Construction of the Belarusian Nuclear Power Plant" [46].

The Law of the Republic of Belarus "On Use of Atomic Energy" regulates relations concerning designing, allocation, construction, commissioning, operation, operation limitation, extending of operation period and decommissioning of a nuclear plant and (or) storage facility, as well as relations concerning nuclear materials management in the course of a nuclear plant and (or) storage facility operation, including spent nuclear materials and (or) operational radioactive waste, as well as other relations in the field of nuclear power use. Law of the Republic of Belarus "On Radiation Safety of Population" determines the basics of legal regulation in regard of population radiation safety; its purpose is to create conditions that ensure protection of people's life and health from harmful effects of ionizing radiation.

In 2015 two higher-level documents introduced substantial changes into the procedure of supervision of the Belarusian NPP construction (Decree of the President of the Republic of Belarus of February 16, 2015 No.62 [46]) and licensing of activities involving nuclear energy use (Decree of the President of the Republic of Belarus of 26.11.2015 No. 475 [47]). The essence of the amendments is provided in Article 7 (2) (ii) and Article 7 (2) (iii) of this National Report.

Legislative acts in the field of nuclear power use and nuclear and radiation safety are available (in Russian) on the website of the Gosatomnadzor www.gosatomnadzor.gov.by.

Republic of Belarus identified, joined, ratified and carries out measures in the framework of the following international agreements and conventions it is a party to:

Convention on Nuclear Safety (joined by the Decree of the President of the Republic of Belarus of September 2, 1998 No. 430);

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (ratified by the Law of the Republic of Belarus of July 17, 2002 No.130-3);

Convention on Early Notification of Nuclear Accident, and Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency (ratified by the Decree of the Presidium of the Supreme Council of the Republic of Belarus of December 18, 1986 No.1216-XI);

Vienna Convention on Civil Liability for Nuclear Damage (ratified by the Law of the Republic of Belarus of November 11, 1997 No.76-3);

Convention on Physical Protection of Nuclear Material (ratified by the Resolution of the Presidium of the Supreme Council of June 14, 1993 No. 2381-XP);

Treaty on Non-Proliferation of Nuclear Weapons (ratified by the Resolution of the Supreme Council of the Republic of Belarus of February 4, 1993 No. 2166-XI);

Agreement between the Republic of Belarus and the International Atomic Energy Agency on application of the guarantees in regard of the Treaty on Non-Proliferation of Nuclear Weapons of August 31, 1995;

Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention, joined by the Decree of the President of the Republic of Belarus of December 14, 1999 No. 726);

Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention, joined by the Decree of the President of the Republic of Belarus of October 20, 2005 No. 487), etc.

The Republic of Belarus is a party to multilateral and bilateral cooperation activities concerning nuclear safety. There are bilateral agreements with the Russian Federation (the country supplying nuclear technologies to the Republic of Belarus) concluded and implemented, as well as agreements with Armenia, Austria, Germany, People's Republic of China, Poland, France and Ukraine [6, 11, 13, 19-26). There are documents prepared for signing that enable institutionalization of the bilateral cooperation in nuclear and radiation safety regulation with the State Atomic Energy Agency of Hungary and regulatory bodies of the North Europe (Norway, Sweden and Finland).

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

To implement standards provided in the laws of the Republic of Belarus and the decrees of the President of the Republic of Belarus, starting from 2013 the resolutions of the Council of Ministers of the Republic of Belarus [68-74] have been prepared and adopted in regard of the following issues:

operation of state system of accounting for and control of nuclear material;

specifying a list of control (supervision) bodies and (or) control (supervision) areas;

arranging and implementing safety control (supervision) in the course of construction and commissioning of the Belarusian NPP;

operation of radioactive contamination control system;

approving the Strategy of the Belarusian NPP radioactive waste management;

issuing permits for activities in nuclear power use field;

training staff for nuclear power industry in foreign countries' organizations, etc.

At the moment major efforts are put into the development of regulatory legislative documents and technical regulatory legislative acts (TRLA): standards and rules in the field of nuclear and radiation safety, sanitary standards and rules, hygienic norms, etc. They are developed by MES/Gosatomnadzor together with PSI "JIPNR-Sosny" (in the framework of the State program "Scientific support for development of Atomic Energy in the Republic of Belarus for 2009-2010 and for the period to 2020", from April 2016 – subprogram 6 of State Program "Knowledge-intensive technologies and equipment" for 2016-2020), the Republican Center for Hydrometeorology, Radiation Control and Environmental Monitoring, State Institution of Higher Professional Education "Belarusian-Russian University" and, within their competences, the Ministry of Health, Ministry of Natural Resources and Environmental Protection of the Republic of Belarus and other organizations. In accordance with the legislation of the Republic of Belarus, TRLA are to be approved by the involved state control bodies and organizations.

Since the previous National Report was presented, in its resolutions MES of the Republic of Belarus approved and adopted 12 technical codes of practice (TCP) [92-104]. The Ministry of Health of the Republic of Belarus developed and approved relevant sanitary standards and rules [141, 143, 144].

Adoption and implementation of the above mentioned documents ensured further harmonization of legislative and regulatory framework of the Republic of Belarus and the international requirements necessary to achieve high safety standards.

Work to improve legislative and regulatory framework in nuclear and radiation safety regulation is performed on planned basis in the framework of the Plan of Gosatomnadzor for development/revision of legislative regulatory documents in nuclear and radiation safety field for

2015-2016 and the List of nuclear and radiation safety legislative regulatory documents to be developed/revised by outside organizations for 2015-2016.

Legislative and regulatory framework on nuclear and radiation safety in the Republic of Belarus is being improved on the basis of regular analysis to identify new regulatory and legal documents and (or) amendments to such current documents of any level necessary to be developed with the consideration of the IAEA recommendations (including the newly published ones) and other documents. This confirms that Belarus follows the principle 3 of the Vienna Declaration on Nuclear Safety of 9 February 2015: "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".

Article 7 (2) (ii) System of licensing

In the Republic of Belarus there is a licensing system for nuclear energy and ionizing radiation sources use and nuclear and radiation safety. The provisions on licensing of certain types of activities approved by the Decree of the President of the Republic of Belarus of 01.09.2010 No. 450 "On Licensing of Certain Types of Activities" determine basic regulatory requirements to the nuclear safety. Use of nuclear energy and ionizing radiation sources and nuclear and radiation safety are considered to be licensed types of activity. The licensing body is the Ministry for Emergency Situations of the Republic of Belarus.

Due to the fact that the Belarusian NPP is constructed under the Russian design, the licensing system for nuclear energy and ionizing radiation sources use and nuclear and radiation safety is arranged similarly to the Russian system.

Basic licensed types of activities are the following:

nuclear energy use;

ionizing radiation sources use;

radioactive waste management;

construction and production of equipment for nuclear energy using facilities, designing and production of radiation protection means;

review of nuclear energy and ionizing radiation sources use safety.

Nuclear energy use includes the following works and (or) activities:

designing, allocation, construction, operation, decommissioning of nuclear installations;

designing, allocation, construction, operation, decommissioning of nuclear materials storage facilities;

management of nuclear materials, nuclear fuel, spent nuclear materials, spent nuclear fuel, operational radioactive waste;

performing works and providing the operating organizations with safety-related services, including installation construction.

Performing the above mentioned activities without licenses is prohibited by the legislation.

The Ministry for Emergency Situations of the Republic of Belarus delegated functions of licensing activities concerning nuclear energy and ionizing radiation sources use to its structural subdivision, the Department of Nuclear and Radiation Safety.

Scheme of procedure for licensing the activities concerning nuclear energy use in the Republic of Belarus is provided in Figure 1:

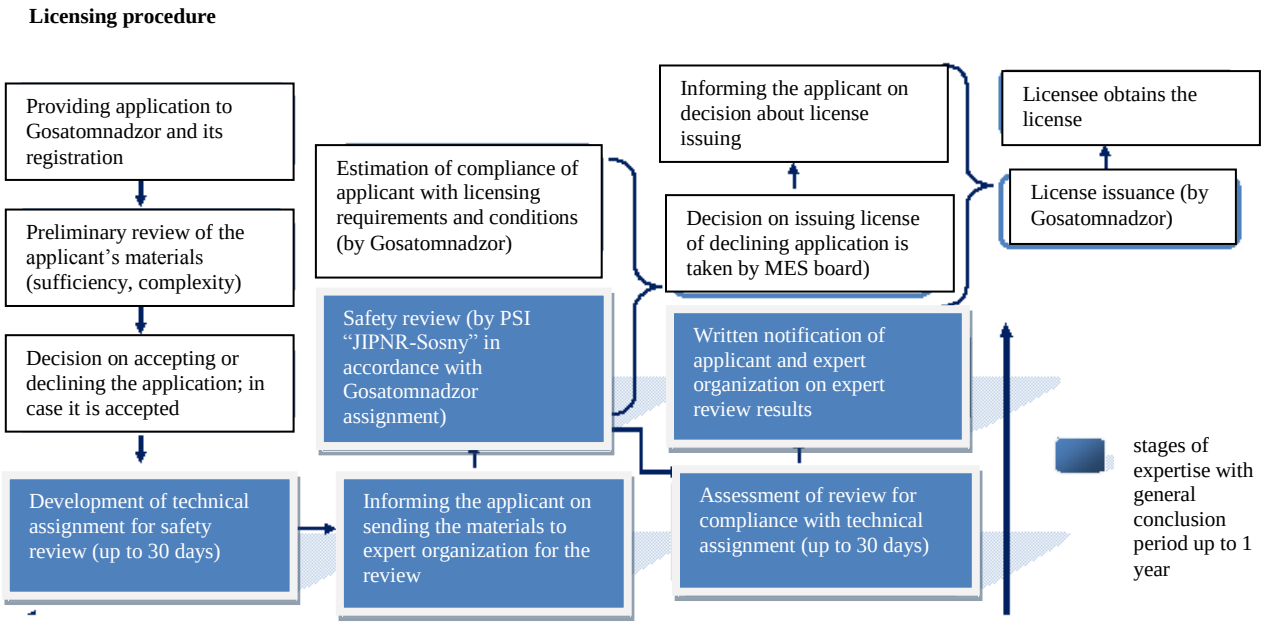

Figure 1 Scheme of procedure for licensing the activities concerning nuclear energy and ionizing radiation sources use in the Republic of Belarus

The Government of the Republic of Belarus approved the procedure for review of documents justifying nuclear and radiation safety in the course of nuclear energy and ionizing radiation sources use [63].

PSI "JIPNR-Sosny" is appointed to be an organization to provide scientific and technical support to the Ministry for Emergency Situations of the Republic of Belarus which, in accordance with the legislative documents, arranges and provides scientific and technical support of nuclear and radiation safety regulation, including analysis and justification of safety criteria and requirements, scientific and research works on improvement of state regulation efficiency in provision of nuclear and radiation safety of nuclear energy using facilities, as well as assessment of safety in nuclear energy and ionizing radiation sources using industry [65]. PSI "JIPNR-Sosny" is the only organization in the Republic of Belarus with special permit (license) for safety assessment in nuclear energy use field.

The license is issued only if the results of the review of nuclear installation safety are positive. At the stage of nuclear installations construction design solutions and measures to ensure their safety were estimated for licensing purposes.

Operation licenses will be issued after safety assessment based on the review of the documents provided by the operating organization.

Documents required for nuclear installation safety review are the ones that justify safety of a nuclear installation, as well as design, construction, process and operation documents for a nuclear installation provided by the license applicant to MES. Safety review commissioned by MES is performed to determine the nuclear installation safety level by comparing the design solutions taken and the way they are implemented with the requirements of legislative regulatory documents, including technical legislative regulatory acts concerning nuclear and radiation safety.

Assessment of nuclear installation safety is performed regularly by the operating organization and Gosatomnadzor over nuclear installation lifetime [80].

Public associations and other organizations are entitled to provide their representatives to participate in safety review at the stages of allocation, construction, operation, decommissioning or limitation of operation of a nuclear installation, as well as to hold independent reviews [36].

Since the previous National Report was presented, the legislative and regulatory framework concerning nuclear energy use was considerably changed by the Decree of the President of the Republic of Belarus No. 475 [47] intended to amend the Decree of the President of the Republic of

Belarus of 01.09.2010 No. 450. The document tightened the requirements and regulations applied to the economic entities acting in the nuclear energy use industry. Some of the changes are as follows:

the list of licensing requirements and conditions was significantly expanded;

the list of the requirements and conditions which, if violated, may cause license suspension, was introduced;

the list of works and services involving activities in nuclear energy use was amended; Safety-related works and services provided to the operating organizations, including construction of installations, are to be licensed.

License validity limitation was lifted. Earlier, licenses issued for activities in nuclear energy use field had 5-year validity period. After the new Decree provisions entered into force, the validity of licenses became unlimited. At the same time, the Decree formalized possibility of regular safety review and assessment of licensee capabilities against licensing requirements and conditions, *in accordance with the principle 2 of the Vienna Declaration on Nuclear Safety of February, 9 2015 stating that "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...".*

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

Regulation of activities concerning nuclear energy use and nuclear and radiation safety is performed by MES. Gosatomnadzor is authorized to perform state supervision and control of safety-related legislation (more details in Article 8). On January, 28 2016 the meeting of the Gosatomnadzor board adopted a concept document - the Regulating Strategy of Gosatomnadzor for 2015-2018 and for the period to 2020.

As the Belarusian NPP is the only facility of this kind in the country, there is a special procedure established on its construction site for safety provision and control in the course of the plant construction and commissioning (Decree of the President of the Republic of Belarus of February 16, 2015 No.62 "On Provision of Safety during the Construction of the Belarusian Nuclear Power Plant" [46]). This procedure provides all control bodies with the right to continuous control (supervision) in their fields of expertise, impose sanctions and perform other correction actions (earlier only Gosatomnadzor was entitled to do so). Procedure of arranging and performing such control measures is determined by a specific Provision approved by the resolution of the Council of Ministers of the Republic of Belarus of February, 25 2015 No. 133 [69]. Adoption of the above mentioned documents ensured further consistent steps on integration of the IAEA recommendations into the legislative framework necessary to achieve high safety standards. Supervision activities performed by control (supervision) bodies and their subdivisions are provided in Table 3.

Table 3

Control body	Including	Supervision functions
State Standardization Committee	Department of construction control and supervision (special review)	– Control of TLRA implementation during the construction – Control of compliance of the approved design with documents for the construction and mounting works performed – Compliance of materials, products and constructions used during the construction with the design solutions and requirements of TLRA concerning technical norms and standardization
	State meteorology control bodies	– State meteorological supervision
	State control bodies to control compliance with the requirements of technical regulations and standards	– Control of compliance with requirements of technical legislative acts concerning technical norms and standardization – Control (supervision) of compliance with assessment legislative requirements concerning compulsory compliance validation

Ministry of Health	State sanitary control bodies and organizations	–	State sanitary control of compliance with the legislation on sanitary and epidemiological population wellbeing
Ministry for Emergency Situations	Department for supervision of industrial safety	–	State control of industrial safety
	Department for nuclear and radiation safety	–	Control (supervision) of compliance with the legislation on nuclear and radiation safety
	State fire control bodies	–	State fire control, control of compliance with the legislation on fire safety
	Bodies and subdivisions of state supervision and control of measures aimed at protection of population and territories from emergencies	–	State supervision and control of civil defense and protection of population and territories from natural and man-made emergencies
Ministry of Natural Resources and Environmental Protection	Local bodies	–	Control of environmental protection and rational use of natural resources
Ministry of Labor and Social Protection	Directorate for State Labor Inspection	–	Control of compliance with the legislation on labor and social protection
Ministry of Energy	State energy and gas control bodies	–	State energy and gas supervision
Ministry of Internal Affairs	Central department of interior troops commander	–	Control of compliance with the design and estimation documents during construction and installation works to provide the Belarusian NPP with a set of engineering and technical physical protection means

Inspections is provided in 2 modes - complex inspections and regular control (supervision). Complex inspections are performed by control (supervision) bodies under the decision of the Working group for coordination of the Belarusian NPP construction control (more information about it in Article 8 (2) of this National Report) in accordance with their competences and on the basis of a inspection program. The specific feature of these inspections is that several control bodies can take part in them at the same time to get simultaneous and fullest understanding of safety situation at the Belarusian NPP. Regular control (supervision) inspections are performed by supervision bodies to have an updated assessment of safety situation, to prevent and stop violations and to assess their effects with regularity established by the supervision bodies. These inspections are performed within the competences of state bodies which individually establish requirements to inspection process. To receive updated assessment of safety situation at the Belarusian NPP and to perform regular control inspections, Gosatomnadzor set up the relevant local subdivision - nuclear and radiation safety control department on the NPP site (7 inspectors).

The basic lines of inspections performed by a control body in the course of construction and commissioning of the Belarusian NPP are the following:

compliance with licensing requirements and conditions, as well as with requirements of the issued permits;

compliance with the requirements of the prior instructions;

arrangement and functioning of quality assurance systems;

compliance with the requirements to nuclear and radiation safety at the Belarusian NPP construction site in the course of installation, commissioning and testing of systems, equipment and other elements, as well as acceptance control of safety-related equipment; preparation to commissioning and commissioning of the Belarusian NPP;

manufacturing equipment and other elements of 1st, 2nd and 3rd safety classes and of 4th safety class which are to be parts of 1st, 2nd and 3rd safety class systems and (or) which have special quality plans developed for them, at the factories-manufacturers for the Belarusian NPP;

provision of physical protection, accounting for and control of nuclear material;

radiation safety of staff and population located in the Belarusian NPP impact zone;

planning protection measures to ensure safety of the operating staff and population in case of nuclear or radiation accidents.

The Belarusian NPP construction general supervision is coordinated by the Ministry for Emergency Situations of the Republic of Belarus via the Working group on the Belarusian NPP construction supervision coordination. In 2015 the authorities of the Working group were expanded after the Decree of the President of the Republic of Belarus of February 16, 2015 No.62 "On Provision of Safety during the Construction of the Belarusian Nuclear Power Plant" and the resolution of the Council of Ministers of the Republic of Belarus of 25.02.2015 No.133 "On Approving Regulations on Organization and Implementation of Control (Supervision) over Safety Assurance during the Construction and Commissioning of the Belarusian Nuclear Power Plant" came into force. Particularly, the Working group is responsible for decision-making concerning the following issues:

complex review on the Belarusian NPP construction site;

forming a commission of control (supervision) bodies representatives for such review;

appointing head of the review.

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

In accordance with the Provision on the Department for nuclear and radiation safety of the Ministry for Emergency Situations of the Republic of Belarus (approved by the Decree of the President of the Republic of Belarus of 29.12.2006 No. 756 [33]), Gosatomnadzor is authorized to control compliance with the legislation on nuclear and radiation safety.

If control activities reveal violations of current legislation, results of the review are fixed in a review report. The revealed violations may be fixed in a report on administrative violation(s), and (or) there may be an order issued on the administrative violation case. The report serves as a basis for the decision or the claim to eliminate the violations revealed in the course of the review. Decision or claim based on the review report is mandatory.

According to the legislation, in cases when the violations are a threat to the national security and may inflict harm to environment and life and health of the population, there shall be a claim to stop any activity of the facility under control, shops (production sites), equipment, operation of transport, goods production and realization (works, services); the requirements shall be made on the day when the violation has been revealed. The claim shall indicate period of suspension and a deadline for informing the control body on the elimination of the violations. Facts suggesting elements of crime give the control body a right to transfer the review materials to the criminal justice bodies.

The entity under review is entitled to appeal against the decisions of control bodies made under the review report, as well as the requirements on violation elimination, actions and failures to act.

If the licensee (its employee or department) has violated the legislation on licensing, licensing requirements, the licensing or other control (supervision) body issues a claim (order) in accordance with the established procedure on elimination of the revealed violations and established period for such elimination. This period shall not exceed 6 months.

If the licensee has not eliminated the violations within the period established in the claim (order) on elimination of the revealed violations or has not provided written notification about elimination of such violations to the licensing or control (supervision) body, or if the licensing or control (supervision) body has revealed that the licensee (its employee or department) has violated special licensing requirements and conditions, the licensing body on its own initiative or at the instance of other control (supervision) body makes a decision on suspension of the license for 6 months.

If within the established period the licensee has not eliminated the violations that caused license suspension, or the licensing or other control (supervision) body has not been provided with a written notification on elimination of such violations, the licensing body that issued the license makes a decision on license revocation.

The license is revoked under the decision of the licensing body in the following cases:

the license has been given on the basis of false data provided by the license applicant necessary (important) for positive decision on license issuance;

the licensee has not requested the license in 6 months since it has been issued;

the license is issued on the basis of a review found to be invalid.

Failure to comply with the legislation on nuclear and radiation safety is considered to be an administrative offense in accordance with the Code of the Republic of Belarus on Administrative Offenses, or a criminal offense in accordance with the Criminal Code of the Republic of Belarus [29, 31]. The offense is considered to be criminal if facts revealed in the course of a review suggest crime elements as determined in the Criminal Code of the Republic of Belarus.

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 fulfill 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

Since the 6th National Report of the Republic of Belarus under Convention on Nuclear Safety was published (2013), there were no changes in the status of the regulatory body in nuclear and radiation safety.

According to the Article 6 of the Law of the Republic of Belarus "On Use of Atomic Energy" of June 30, 2008 [36], state regulation of nuclear energy use is performed by the Ministry of Energy, the Ministry for Emergency Situations of the Republic of Belarus, as well as other republican state control bodies and other state organizations authorized by the President of the Republic of Belarus. The body responsible for arranging and performing state control activities for nuclear and radiation safety provision is the Ministry for Emergency Situations of the Republic of Belarus (MES http://mchs.gov.by/ [34], including the Department for nuclear and radiation safety (Gosatomnadzor, www.gosatomnadzor.gov.by) which is a separate structural corporate division authorized to monitor and control compliance with the legislation in nuclear and radiation safety field. Alongside MES, state regulatory bodies for safety of nuclear energy use include the Ministry of Natural Resources and Environmental Protection, the Ministry of Health, the Ministry of Internal Affairs and the State Security Committee of the Republic of Belarus.

Status of MES being a regulatory body in nuclear and radiation safety, its objectives and functions are formalized in a range of legislative and regulatory documents:

Decree of the President of the Republic of Belarus of November 12, 2007 No. 565 (revised on 31.01.2013) "On Some Measures for the Nuclear Power Plant Construction" [34];

Law of the Republic of Belarus of 30.07.2008 No.426-3 (revised on 22.12.2011) "On Nuclear Energy Use" [36];

Provision on the Ministry for Emergency Situations of the republic of Belarus approved by the Decree of the President of the Republic of Belarus of December 29, 2006 No. 756 "On Some Issues of the Ministry for Emergency Situations" [33].

In accordance with the above mentioned Provision, MES is a republican state control body regulating and managing prevention and response to natural and man-made emergency situations and civil defense, provision of fire, industrial, nuclear and radiation safety, as well as response to the Chernobyl NPP accident effects [33]. Objectives and functions of Gosatomnadzor are formalized in the Provision on the Department for Nuclear and Radiation Safety of the Ministry for Emergency Situations of the Republic of Belarus approved by the Decree of the President of the

Republic of Belarus of 29.12.2006 No. 756. Basic objectives and functions of MES and Gosatomnadzor have not been changed since the previous National Report was published.

Structure of the Ministry departments involved in the nuclear and radiation safety provision has not changed either. At the same time, under the consideration of the regulatory practice, the structure of Gosatomnadzor was changed, and from April, 15 2016 a new structure has been implemented (ref. Figure 2).

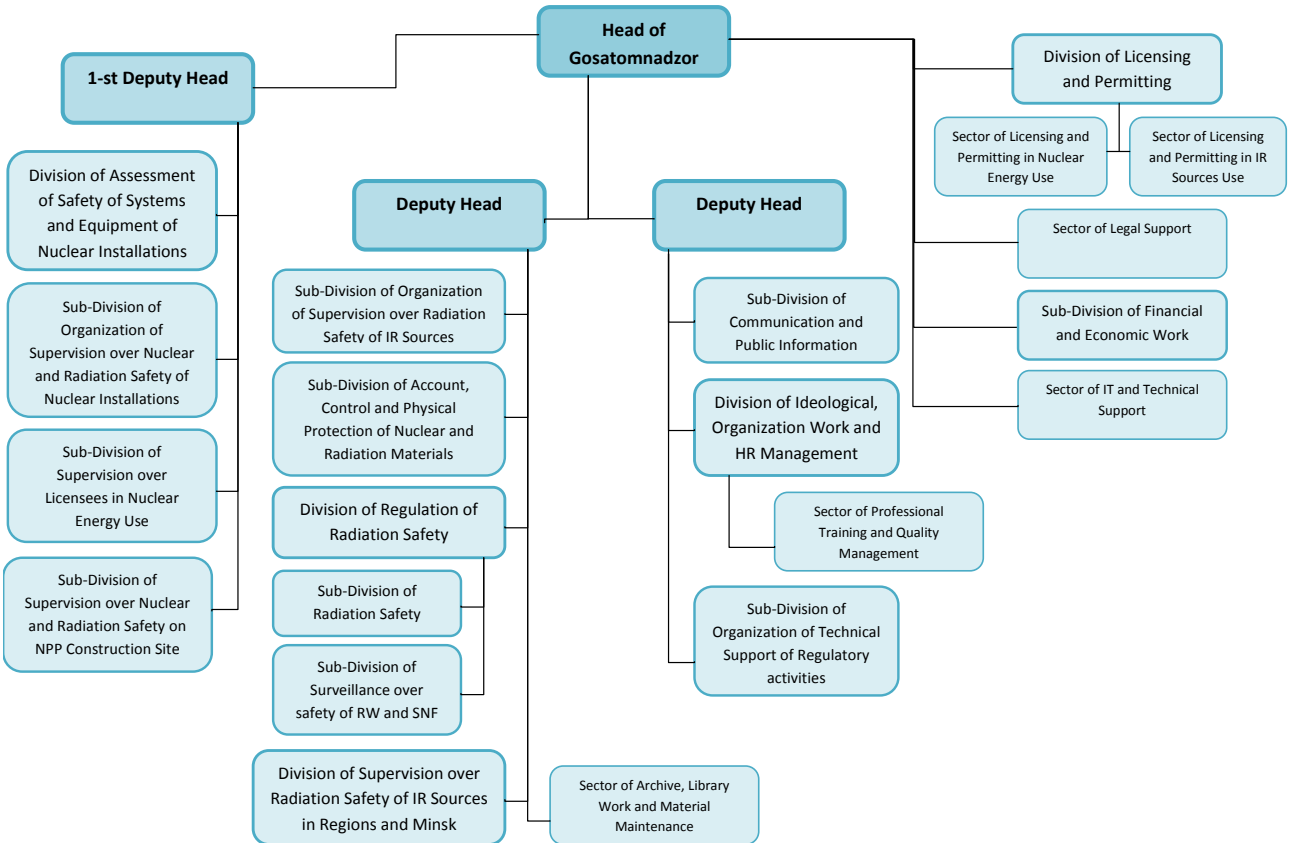

Figure 2 Structure of the Department for Nuclear and Radiation Safety of the Ministry for Emergency Situations of the Republic of Belarus (Gosatomnadzor) from April, 15 2016

Human resources and nuclear knowledge management

Human resources and nuclear knowledge management of Gosatomnadzor faced a considerable challenge in 2013 when its staff was more than doubled with increase from 39 to 82 employees, founding of local subdivision on the Belarusian NPP construction site and further intensive recruitment of 45 specialists (including 22 graduates of profile higher education institutions).

In 2011 Gosatomnadzor developed and now revises and updates a concept of formation and development of human resources and knowledge management system based on the IAEA requirements to the regulatory body specialists and including the following points:

training policy of Gosatomnadzor;

principles of knowledge management system arrangement in Gosatomnadzor;

system approach to training;

methods of employees' training.

As of May 2016, the department staff was almost fully recruited. Average age of the department employees is 43; 40% of employees of the department are energy, chemistry and wireless devices specialists; 24% are radioecology and radiation safety specialists; 23% are physics experts, and 13% are specialists in other fields. 4 candidates of sciences (1st doctoral degree) work in the department.

As the staff expands, the competences of the specialists are intensively developed. The process involves both internal and external resources:

State program of staff training for nuclear energy industry in the Republic of Belarus for 2008-2020 (from April 2016 – subprogram 6 "Scientific support for development of atomic energy in the Republic of Belarus" of State Program "Knowledge-intensive technologies and equipment" for 2016-2020);

projects of international technical cooperation of the European commission ("Development of technical cooperation on nuclear safety to support regulatory bodies" BY3.01/09, "Support and cooperation to expand capabilities of the Belarusian nuclear regulatory body MES/Gosatomnadzor in licensing and supervision of the Belarusian NPP construction", BY.01/13);

IAEA international technical cooperation project "Improving professional level of regulatory body for nuclear and radiation safety";

regional projects of the European Union ("Training and Tutoring" (T&T), MC.03/10).

From 2013 to 2015 in the framework of the IAEA and EU international technical cooperation projects 81 employees of Gosatomnadzor studied abroad: 22 in 2013, 34 in 2014 and 52 in 2015.

In terms of the Belarusian NPP construction and the equipment production Gosatomnadzor receives consulting support of the FSUE VO "Safety" (Russian Federation). Russian specialists take part in the arrangement and execution of supervision activities, as well as in the development of regulatory documents.

From April 2014 in the framework of the European Commission project BY.01/13 there is a permanent expert mission working in the Republic of Belarus that includes the representatives of France, Germany and Ukraine. The mission experts provide Gosatomnadzor with support in regulatory activities concerning nuclear and radiation safety by consulting it on strategy and operation issues (development of regulatory requirements, improvement of methods of safety assessment, arrangement of licensing process, safety review, planning reviews during construction and commissioning of the Belarusian NPP).

As for nuclear knowledge management (in the regulatory body and in its technical support organization PSI "JIPNR-Sosny"), it is of high importance for PSI "JIPNR-Sosny" to implement Measure 5 "Training of highly qualified specialists and researchers in atomic energy and nuclear technologies industry" of Subprogram 6 "Scientific support for development of atomic energy in the Republic of Belarus" of State Program "Knowledge-intensive technologies and equipment" for 2016-2020, as well as other training programs and measures (ref. Article 11 (2) of this National Report).

Financing and logistics support

Financing and logistics support of bodies, departments and organizations of MES is provided from the republican and local budgets, as well as from other sources considered legal by the legislation of the Republic of Belarus, including projects and programs of international technical assistance. In last 3 years no changes occurred in the procedure of financing of the regulatory body for nuclear and radiation safety. MES/Gosatomnadzor has enough resources to regulate nuclear and radiation safety provision.

Regulatory body management system

Gosatomnadzor's management system is developed in accordance with the objectives and functions of the department and specific requirements of the Republic of Belarus; it is regularly assessed and improved.

To organize and improve activity of Gosatomnadzor in accordance with the recommendations of the IAEA mission on integrated nuclear infrastructure review (INIR mission) held in the Republic of Belarus in 2012 for efficient integration of management processes, Gosatomnadzor prepared and now implements the Plan of activities on bringing its management system in line with the requirements GS-R-3 "Management system for facilities and activities (based on ISO 9001-2009). The Provision on Coordination board for introduction of the integrated management system (IMS) of Gosatomnadzor and the board members were approved;

representative of administration responsible for arrangement and coordination of bringing Gosatomnadzor's management system in line with the requirements GS-R-3 was appointed, as well as for IMS implementation, operation and development; the Provision on process leader was approved. Pattern processes are documented on the basis of the developed template.

The decision of the Gosatomnadzor Board of January, 28 2016 approved the Policy of the Department for Nuclear and Radiation Safety of the Ministry for Emergency Situations of the Republic of Belarus for 2015-2018 and for the period to 2020, the Regulating Strategy of Gosatomnadzor for 2015-2018 and the Strategy for Gosatomnadzor development.

The management and staff of Gosatomnadzor are being trained to develop and implement IMS into the activities of the regulatory body for nuclear and radiation safety.

Documents of Gosatomnadzor management system are developed (updated) with the support of the European experts of the permanent mission in the framework of the European Union international technical cooperation project BE/RA/08 "Support and help to expand capabilities of the Belarusian nuclear regulatory body MES/Gosatomnadzor in licensing and supervision of the Belarusian NPP construction" approved by the Resolution of the Council of Ministers of the Republic of Belarus of December, 18 2014 No. 1189 and registered in the Ministry of Economy of the Republic of Belarus of December 24 2014. STUK, GRS, IRSN and SNRIU experience are taken into consideration.

Openness and transparency of the regulatory body

In accordance with the Provision on Gosatomnadzor, its functions include informing the population on safety status of the radiation facilities, nuclear facilities and nuclear energy facilities. From July, 1 2013 the structure of Gosatomnadzor was expanded with the communication and public information department. Informing is a part of the Department activities aimed at high-quality solution of basic tasks, as it is an integral part of supervision, licensing, legislative and regulatory documents development, etc. To develop a strategy for that, the Information and Communication Strategy of Gosatomnadzor for 2016-2018 and for the period to 2020 was developed in 2013 and implemented in 2016. The document is approved by the decision of the Gosatomnadzor board of January 28 2016 and contains detailed description of target audiences, topics, forms and methods of communication, schemes of information flows, etc. In the framework of the Strategy implementation communication channels were established and are now supported (including Gosatomnadzor website), the communication with media was arranged, first of all with the leading state information agency BELTA; regular joint press activities are arranged, and a training project on improving basic knowledge of journalists on nuclear and radiation safety is in progress since 2015; there are reviews of nuclear and radiation safety status in the Republic of Belarus published annually, as well as other information products.

Technical support to the regulatory body

In the Republic of Belarus, PSI "JIPNR-Sosny" is determined as an organization providing technical support to the regulatory body in nuclear and radiation safety provision [65] by in the following fields:

expert assessment of nuclear and radiation safety of nuclear facilities and radiation technologies, assessment of use risks (safety report, PRA report, severe accidents analysis report);

individual independent deterministic safety analysis of accidents and review of preliminary safety analysis report chapters concerning deterministic safety analysis in the framework of licensing activities;

development of scientifically grounded recommendations on improvement of safety level of nuclear installations and ionizing radiation sources;

scientific and technical justification of principles, criteria and requirements for nuclear and radiation safety; development of designs of norms, rules and standards for nuclear and radiation safety;

scientific, analytical and expert support of the regulation of activities concerning nuclear energy and ionizing radiation sources use;

acquiring and implementing best practices of safety analysis and risk assessment for nuclear installations and radiation technologies use.

If required, the Belarusian regulatory body invites competent organizations from the Russian Federation for consulting (Rostekhnadzor, FSUE VO "Safety"). There is regular methodological and consulting support of Gosatomnadzor from European experts in the framework of the European Union international technical cooperation projects.

At the same time, there is a step-by-step work started on technical support of the regulatory body for nuclear and radiation safety. Its strategy stipulates transfer from one organization of technical cooperation (PSI "JIPNR-SOSNY") to the system of 20 uniting the scientific and expert resources of the Republic of Belarus.

Article 8 (2) Status of the regulatory body

Scheme of key bodies of state control and regulation for nuclear and radiation safety and nuclear energy use in the Republic of Belarus has not changed; it is provided in Figure 3.

In its activities MES reports to the Council of Ministers of the Republic of Belarus, has direct contact with state (governmental) bodies of higher level in case such contact may be necessary for efficient work of the regulatory body.

In terms of exercising their powers concerning state safety regulation, control and state supervision of activities involving nuclear energy use, state bodies for regulation of nuclear energy use safety are independent from the republican state control bodies and other state organizations of state control of nuclear energy use (Article 7 of the Law "On Use of Atomic Energy" [36]). The employees of the regulatory body do not have direct or indirect interest in the facilities and the activities or in the parties with official permit except for the interest necessary to achieve regulatory objectives. MES is entitled to:

review the compliance of state control bodies, other organizations and citizens with the legislation on nuclear and radiation safety, hear representatives of the organizations on issues concerning MES competences, and to make binding orders on elimination of revealed violations;

to request and receive from republican state control bodies and other organizations the information necessary to fulfill tasks of MES, under the established procedure.

Activities at the construction of the Belarusian NPP are coordinated by the following structures:

Interdepartmental Commission on coordination of a plan for basic arrangement activities on construction of the nuclear power plant in the Republic of Belarus and control of its implementation (ICC) headed by the Deputy Prime Minister of the Republic of Belarus. The ICC was formed in accordance with the resolution of the Government of November, 5 2012 No. 1010 [67]. It comprises leaders (deputy leaders) of state bodies and other organizations, the Administration of the President, including leaders of the regulatory bodies. Main objective of the ICC is coordination of basic organizational activities on construction of the nuclear power plant in the Republic of Belarus.

Working group for coordination of supervision of the Belarusian NPP construction headed by the first Deputy Minister for Emergency Situations. The working group was formed in accordance with the resolution of the Government of December, 30 2011 No.1791 [64]. Its main objectives are: consideration of problems arising in the course of arrangement and supervision, and developing solutions for them; preparing proposals on arrangement and supervision activities; solving other issues concerning arrangement and supervision. The working group comprises managers and (or) representatives of state authorities overseeing the Belarusian NPP construction. Results of supervision activities of all authorities are summarized and analyzed in Gosatomnadzor. They are the basis for full assessment of the current safety level at the Belarusian NPP construction, as well as for review planning and problem detection.

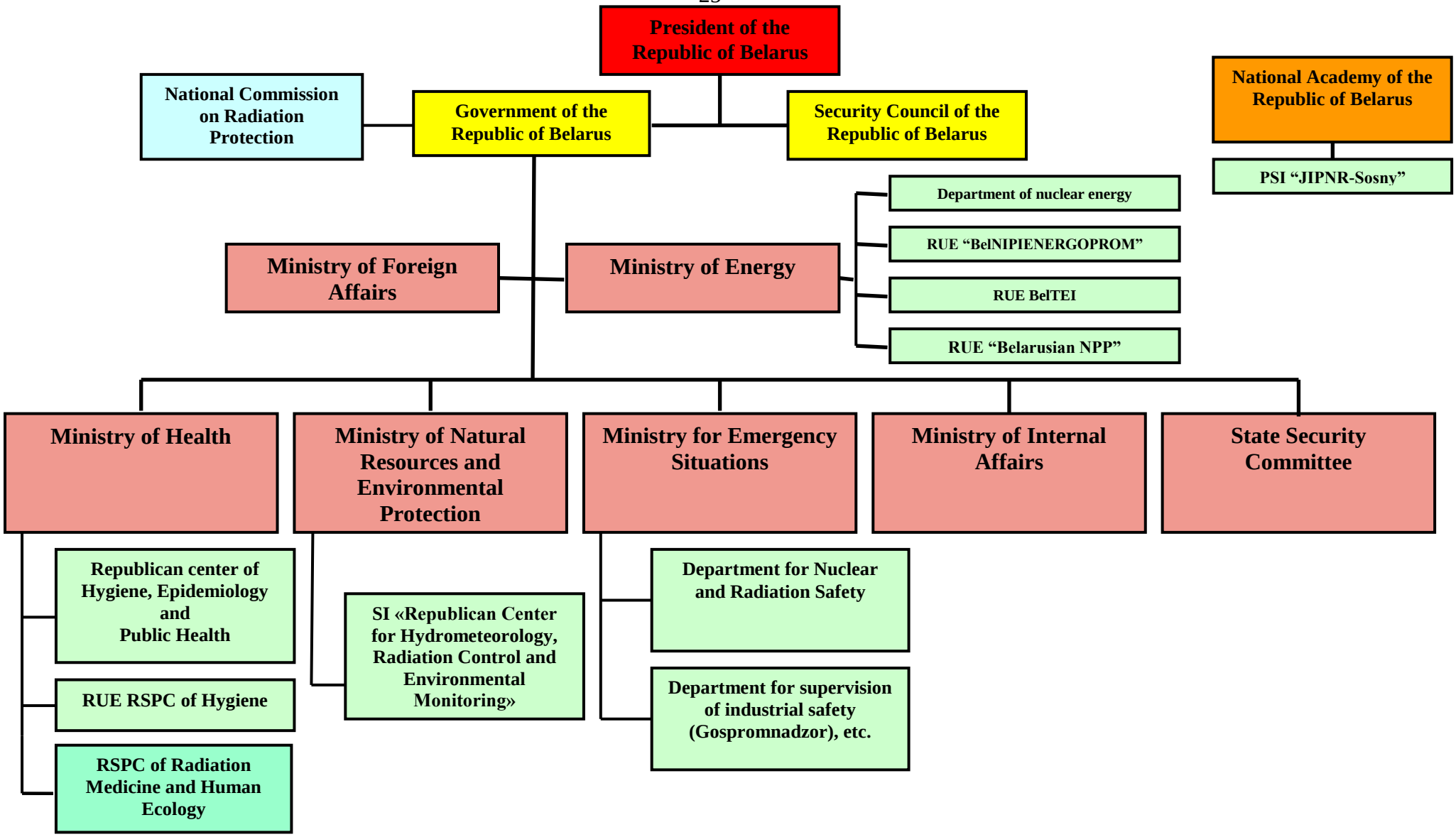

Figure 3 Scheme of key bodies of state control and regulation for nuclear and radiation safety and nuclear energy use

ARTICLE 9. RESPONSIBILITY OF THE LICENSE HOLDER

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

In the Republic of Belarus licensing of nuclear energy and ionizing radiation sources use is regulated by the Provision on licensing of certain types of activities approved by the Decree of the President of the Republic of Belarus of September, 1 2010 No.450. The licensing body is the Ministry for Emergency Situations of the Republic of Belarus. Specific features of the licensing process and basic licensed types of activities, works and (or) services are described in Article 7 (2) (ii) of this National Report.

In accordance with the Law of the Republic of Belarus "On Use of Atomic Energy", the operating organization develops and implements measures to support and improve safety of nuclear installation, founding relevant safety control services, if required, provides information on safety status of the facilities to state bodies for regulation of nuclear energy use safety in the periods of time they establish.

Operating organization ensures:

use of the nuclear installation for the intended purposes only;

arranging and executing works in the volume and quality corresponding to the requirements of the technical legislative and regulatory acts at all stages of allocation, design, construction, commissioning, operation, operation limitation, operation extension and decommissioning;

developing and implementing measures on prevention of a radiation accident during the nuclear energy-using activities and measures on response to its negative effects for staff (personnel), population and environment.

management of nuclear materials, spent nuclear materials and (or) operational radioactive waste safe for the employees (staff) and population;

forming and using the fund for decommissioning of the nuclear installation and the fund for finance assistance of works on support and improvement of the nuclear installation safety;

ensuring exercise of the rights of employees (staff) to social protection;

measuring individual exposure doses of employees (staff);

developing and implementing measures on protection of the employees (staff) and population in the control area in case a radiation accident happens during the nuclear installation operation;

accounting for and control of nuclear materials, spent nuclear materials, operational radioactive waste and other ionizing radiation sources;

physical protection of the facilities during nuclear energy use;

developing and implementing fire protection measures at the nuclear installation and (or) a storage facility;

radiation control and monitoring in the sanitary protection zone and control area;

recruiting, training and retraining staff, supporting relevant qualifications and number of the employees (personnel);

informing population in the control area on radiation situation;

discharging other duties established by the legislation.

In accordance with the legislation, the operating organization is responsible for the failure to comply with the requirements to safety of the nuclear installation and (or) storage facility.

If there is a decision taken under the procedure established by the legislation to suspend or revoke a special permit (license) to operate a nuclear installation, the republican state control body or other state organization supervising the above mentioned facilities takes measures to provide their safety. If it is impossible to renew such special permit (license), the republican state control

body or other state organization supervising the above mentioned facilities takes measures to form new operating organization.

In accordance with the legislation on licensing, the licensing body, other state bodies or other state organizations within their competences control compliance of the licensees with the legislation on licensing, licensing requirements and conditions [37]. For the regulatory body, state control of compliance with licensing requirements and condition concerning nuclear energy and ionizing radiation sources use by the licensees is performed by Gosatomnadzor within its competences in accordance with its objectives (Decree of the President of the Republic of Belarus of November 12, 2007 No. 565 [34]). To fulfill these objectives, Gosatomnadzor is entitled to involve qualified experts in the reviews of safety situation at nuclear facilities and nuclear industrial facilities in accordance with the procedure established by the legislation.

If false data provided by the license applicant necessary (important) for positive decision on license issuance was revealed in the application, the licensing body denies license to such applicant.

Features of law enforcement in case the licensing or other state body authorized to control licensed type of activity reveals violation of the licensing legislation or the requirements and conditions established for the licensed type of activity are described in the Article 7 (2) (iv) of this National Report.

A licensee supports open and transparent communication with the society providing information by various sources. Particularly, RUE "Belarusian NPP" informs the population via its own web-site http://www.belaes.by/, information centers in Ostrovets and Minsk, by communication with the media and participation in information and other events.

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.

Number of technical and administrative measures required to ensure safety of nuclear facilities is higher for more technically complex facilities; it is the highest for nuclear power reactors. The safety measures applied are adapted to the risks of specific nuclear facilities.

Priority of nuclear safety in the legislation of the Republic of Belarus

Principles of nuclear safety priority are formalized in the Law of the Republic of Belarus of 30.07.2008 "On Nuclear Energy Use" [36]. Section 3 of the Law established the following basic principle of activities concerning nuclear energy use: "*priority of protection of current and future generations' life and health, environmental protection over all other activity aspects in nuclear energy use; assurance of rising benefits for citizens and society from nuclear energy use over the harm that may be caused by the activities in nuclear energy use; ensuring nuclear and radiation safety*".

Safety at nuclear facilities in the course of construction, installation, individual tests and commissioning for such tests shall be ensured by the General Contractor and its subcontracting organizations. Management of these organizations is responsible for the staff of the organizations taking part in commissioning of a nuclear installation to comply with safety rules. The operating organization shall ensure safety of works from the moment the premises, construction and equipment in them is commissioned for operation (temporary operation).

Measures of the licensee (RUE "Belarusian NPP" to ensure nuclear safety priority

Legislative framework

According to the Decree of the President of the Republic of Belarus of March 29, 2011 No.124 "On Measures to Implement International Agreements in the Field of Civil Liability for Nuclear Damage" [41], RUE "Belarusian NPP" is the operator (operating organization) of the nuclear facilities - units No. 1 and No. 2 of the Belarusian NPP. Basic objectives of this enterprise as of operating organization are to perform on its own or involve other organization to perform

activities on allocation, construction and commissioning of the NPP, as well as other activities established by the Law of the Republic of Belarus of July, 30 2008 "On Use of Nuclear Energy" [36].

"General provision of General provisions of safety of nuclear power plants (GPS NPP) [80] state that the operating organization ensures control of the NPP, including measures on prevention of accidents and response to their effects, physical protection, accounting for and control of nuclear materials, radioactive substances and radioactive waste, radiation control of environment in sanitary protection zone and control area, as well as ensures the use of the NPP only for the purposes it was designed and constructed for. The operating organization is fully responsible for the NPP safety. The operating organization is not relieved from its responsibility due to individual activities and responsibility of the organization providing works or services for the NPP, as well as state safety control organizations.

Radiation safety

Radiation safety of the staff, population and environment at the NPP construction stage is determined by the requirements of technical legislative and regulatory acts, including technical legislative and regulatory acts of the Republic of Belarus and is specified for the Belarusian NPP in the "Program for radiation safety during the construction of the Belarusian NPP" No. 40/17.3 PR. This program is regularly reconsidered and after the commissioning of the unit No. 1 of the Belarusian NPP will be replaced by the "Guidelines for radiation safety of the State Enterprise "Belarusian NPP".

Activities on nuclear installation operation, management of nuclear fuel and other ionizing radiation sources is subject to licensing. Besides that, importing nuclear fuel to the territory of the Republic of Belarus requires special permit. Before nuclear fuel is delivered to the Belarusian NPP site, the established radiation safety requirements require the following:

arranging and ensuring radiation process and exposure control;

radiation control of premises and industrial site;

radiation control of radioactive contamination non-proliferation;

radiation control of environment;

preparedness of the Belarusian NPP to implement measures on protection of staff and population in case of a radiation accident.

The above mentioned requirements are binding for the operating organization to receive a license and a permit to operate a nuclear installation and manage nuclear fuel and other ionizing radiation sources.

During the Belarusian NPP construction responsibility for compliance with the requirements of the standards and rules of radiation safety rests with all the staff managing ionizing radiation sources. Responsibility for radiation safety rests with the staff of the operating organization. There are relevant criteria established and implemented for recruitment of this staff, its support and qualification improvement. Staff of the operating organization has regular training sessions and tests to check their knowledge of radiation safety standards and rules.

Nuclear safety

Nuclear safety is ensured by a range of organizational and technical requirements and measures to exclude possibility of nuclear accident. Their purpose is protection of population and environment from harmful effect of ionizing radiation of the nuclear installation and (or) storage facility, as well as proper management of nuclear materials and spent nuclear materials.

The Belarusian NPP is constructed by the design corresponding to today's level of nuclear industry development ensuring the required values of safety parameters. The design was developed in accordance with the requirements of the current regulatory documents of the Russian Federation in the field of nuclear energy use that are binding for design, construction and operation of the NPP. International experience of VVER-1000 reactors operation, recommendations and safety regulations of the IAEA, requirements of the European operating organizations to designs of new generation nuclear plants with LWR reactors and NRC materials have also been used. Design takes into

account stability of the Belarusian NPP in regard to the exposure similar to the one observed at Fukushima NPP.

The design of the Belarusian NPP includes safety systems, compulsory measures and engineering and technical solutions which would make a reactor facility controllable and stabilize its parameters in case of design basis and beyond design basis events. Special technical systems and means provided by the design ensure reserve of basic safety functions and proper level of nuclear safety at the Belarusian NPP. These systems include:

passive system of residual heat removal from containment;

passive system of residual heat removal via steam generators;

molten plutonium isolation system;

system of control and removal of hydrogen from containment;

The design includes double containment that, together with other isolation systems, ensures safe containment of radioactive products during regular operation, violations of regular operation conditions, design basis and beyond design basis events.

By now there are documents developed to justify safety of the Belarusian NPP: "Preliminary Safety Analysis Report" (PSAR) and "Probability safety analysis of level 1 for internal initial events" (PSA-1) prepared at the stage of applying for license for the Belarusian NPP construction. According to the results of beyond design basis modes review of the Belarusian NPP provided in the PSAR shows that beyond design basis accidents can be controlled, and, consequently, their effects can be efficiently limited. The design takes into account the following relevant external effects: explosions, floods, flight accidents, hurricanes, spouts, tornadoes, snow and ice and seismic load. In the course of safety analysis of the Belarusian NPP the considered basic list of possible initial events based on the requirements of regulatory documents was expanded with consideration of the following:

design features of the NPP under construction;

modes of safety systems in the design of the NPP under construction;

extensive experience of design and operation of operating NPP units with VVER reactors;

licensing of design of units with VVER reactors in the Russian Federation;

IAEA recommendations;

results of the PSA-1.

In accordance with the results of calculations made for PSA-1, summary core damage frequency (for power operation and in standstill modes) is 4.99×10^{-7} (1/year). This parameter corresponds to the reactors of the generation III+ (reactors with passive safety systems).

Belarus has commenced stress-tests for the Belarusian NPP and is planning to complete them by the end of 2016. Stress-tests will be performed in accordance with the Joint Declaration on comprehensive risk and safety assessments of nuclear plants endorsed in 2011 by the European Commission and EU neighboring countries, including Belarus.

Radiation and environmental monitoring in the Belarusian NPP impact area

Legislation of the Republic of Belarus established the requirements to the compulsory radiation and environmental monitoring of the area where the Belarusian NPP is located at all stages of the NPP lifetime, including the stage of power plant siting (prior to construction).

Before the construction of the Belarusian NPP engineering and radiation environmental surveys of the location region were made with their results provided in the Environmental Impact Assessment Report (EIA Report) of the Belarusian NPP.

Scope, term and procedure of radiation and environmental monitoring in the Belarusian NPP location region at the construction and commissioning stages are determined by the "Program of complex environmental monitoring of the Belarusian NPP" that includes the "Program of radiation environmental monitoring during construction" with requirements on radiation control. Purpose of works included in the "Program of complex environmental monitoring of the Belarusian NPP" is to set up monitoring networks and provide complex monitoring of environmental parameters, natural processes and phenomena in the region and on the site of the Belarusian NPP location. Results of the radiation monitoring of the NPP location region are registered in the radiation monitoring

database of the Belarusian NPP control area. In the course of operation this information will be used as zero background radiation point to assess the dynamics of content and environmental pathways of radionuclides in the ecosystem of the region, and the database will be used to support decision-making in terms of improvement of radiation safety system of the Belarusian NPP. The data acquired by the moment show that background radiation in the territory is natural and does not exceed values usual for the European territory. There are no radioactive contaminants found that could have appeared due to the Chernobyl NPP accident, and fallout deposition density complies with average global values.

Prior to physical commissioning of the unit No. 1 the automated radiation situation monitoring system (ARSMS) will be integrated for control of radionuclide content in the environment within the Belarusian NPP control area (12.9 km radius periphery around the NPP). Structure, number and location of control station in the field are determined by the NPP design and are approved in the PSAR of the Belarusian NPP. The above mentioned ARSMS will be integrated with Unified State Automated Radiation Situation Control System of the Republic of Belarus (EGASKRO).

In the framework of the Article 7 of the Espoo Convention the Republic of Belarus will implement the "Program of post-design analysis of the Belarusian NPP" approved in 2014. Post-design analysis is a mechanism of joint surveillance of the Belarusian NPP project implementation by the concerned Parties and includes:

monitoring compliance with the conditions as set out in the authorization or approval of the activity and the effectiveness of mitigation measures;

review of an impact for proper management and in order to cope with uncertainties;

verification of past predictions in order to transfer experience to future activities of the same type.

Control (supervision) of compliance with the legislation on nuclear and radiation safety provision

The Ministry for Emergency Situations of the Republic of Belarus regulating activities on safe nuclear energy use on the state level (ref. Article 8 of this National Report) within its competence monitors nuclear and radiation safety and physical protection of the nuclear energy using facilities; arranges and performes state supervision of management of spent nuclear materials and operational radioactive waste.

In 2015 the Decree of the President of the Republic of Belarus of February 16, 2015 No 62 "On Provision of Safety during the Construction of the Belarusian Nuclear Power Plant [46] introduced special procedure of safety control (supervision) during the construction and commissioning of the Belarusian NPP. Details on such control (supervision) are provided in the Article 7 (2) (iii) of this National Report.

The Republic of Belarus takes measures necessary to ensure relevant protection of staff, population and environment from radiation risks connected to the scientific research nuclear facilities operation and spent nuclear fuel storage. The only organization with similar nuclear facilities is PSI "JIPNR-Sosny" (ref. Article 6 of this National Report) where the following measures are in place:

annual commissioning reviews of nuclear safety situation at nuclear facilities;

weekly leak detection reviews of fuel assemblies and spent nuclear fuel packages and dust radiation monitoring in the premises;

operational and complex reviews of nuclear and radiation safety;

semi-annual commissioning reviews of nuclear and radiation safety;

semi-annual inventory of spent nuclear fuel.

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) (ii) Financial recourses

Financing of design and construction of the Belarusian NPP in the Republic of Belarus is provided from the national budget and the borrowings (including foreign ones).

Operating organization arranges and executes works in the scope and quality corresponding to the requirements of the technical legislative and regulatory acts at all stages of allocation, design, construction, commissioning, operation limitation, operation extension and decommissioning of a nuclear and (or) storage facility.

According to the requirements contained in TCP 170-2009 "General provisions of safety of nuclear power plants (GPS NPP)" [80], the operating organization established structural subdivisions to perform activities on construction and safe operation of the NPP directly on the NPP site providing them with appropriate rights, financial funds, material and human resources, and controls their activity.

Construction of housing facilities, housing, transport and production infrastructure of the nuclear plant are to be financed from the national budget in the framework of the State investment program approved by the Decree of the President of the Republic of Belarus annually in accordance with the applications received.

Construction of the nuclear plant is financed by means of export credit loan provided in accordance with the Agreement between the Government of the Republic of Belarus and the Government of the Russian Federation on granting export state credit to the Republic of Belarus for the construction of nuclear power plant in the territory of the Republic of Belarus of November 25, 2011. The credit covers 90% of the NPP construction contract value. To finance advance payments by the General Contract for the Belarusian NPP construction equal to 10 % of construction costs, the state corporation "Bank for Development and Foreign Economic Affairs (Vnesheconombank)" and Open Joint Stock Company "Belvnesheconombank" (settlement bank) provided an external national loan of May 15, 2014.

To finance scientific and research works, experimental development and other works to support and improve safety of nuclear facilities and storage facility, prior to commissioning of nuclear facilities the RUE "Belarusian NPP" shall set up a fund for financing works on support and improvement of safety of nuclear and (or) storage facility.

To finance works on decommissioning, premature decommissioning or operation limitation of its nuclear facilities, the RUE "Belarusian NPP" shall set up a nuclear installation decommissioning fund. Nuclear facilities decommissioning fund shall be used only to finance measures specified in the programs of decommissioning, premature decommissioning or operation limitation of the nuclear and (or) storage facility.

Thus, there are sufficient funds to implement the nuclear energy project at this stage of development of the national nuclear infrastructure.

Gosatomnadzor, Department on Nuclear Power Industry of the Ministry of the Energy of the Republic of Belarus, RUE "Belarusian NPP" and PSI "JIPNR-Sosny" are state institutions financed from the national budget.

Article 11 (2) (ii) Human recourses

The Republic of Belarus has a national system of staff training necessary to provide the nuclear energy industry with qualified experts and to further support current knowledge level for

safe, reliable and efficient NPP operation. Staff training system includes a range of organizational and technical measures of state control bodies, higher and specialized secondary education institutions, as well as other state organizations.

To arrange a complex staff training system for providing them with knowledge and skills necessary to construct and safely operate the NPP, as well as to provide nuclear and radiation safety of the NPP staff, population and environment, from 2016 Belarus implements measures indicated in the subprogram 10 “Training staff for nuclear energy industry” of the State program “Education and Youth Policy” for 2016-2020 approved by the resolution of the Council of Ministers of March 28, 2016 No. 250 (earlier, from 2008 to March 2016 – State Program for training staff for nuclear energy industry).

On the basis of demand and applications of state bodies (organization) state order for staff training was formed: scope of training, retraining, advanced training (support) is determined for specialists and qualified researchers by year in terms of qualifications and staff members; education institutions currently training possible staff members were determined; the relevant institutions prepared training plans by year. In the framework of the subprogram 10 “Training staff for nuclear energy industry”:

higher education institution of the country (educational institutions Belarusian National Technical University, Belarusian State University of Informatics and Radioelectronics, Belarusian State University, International Sakharov Environmental Institute of the Belarusian State University (earlier International Sakharov Environmental University) continue to train students on 8 new specializations in nuclear physics, including “Nuclear physics and technologies”, “Construction of heat and nuclear power plants”, “Steam generator facilities of nuclear power plants” (in 2017 this specialization will be replaced with “NPP Operation”), “Electronic systems of control and management at nuclear power plants”, etc.

there are internships abroad arranged for teachers and researchers of the higher education institutions, as well as internships for students in countries with developed nuclear energy industry;

there are advanced trainings, internships and training seminars for specialists of the regulatory body in nuclear and radiation safety, state bodies controlling (supervising) works at the Belarusian NPP during its whole lifetime, as well as subordinate organizations and local bodies.

Program of training specialists with higher education for the NPP operation includes basic (5-5.5 years) training in the higher education institutions of Belarus, including internships abroad, special (0.5-3 years) training of specialists with working experience obtained at the energy providers of the Republic of Belarus, in foreign higher education institutions, internship at the operation nuclear energy facilities abroad, training by individual programs in training center at the NPP.

From 2014 to 2016 in the framework of the State program of training staff for nuclear energy industry of the Republic of Belarus for 2008-2020 approved by the Council of Ministers of the Republic of Belarus of September 10, 2008 No. 1329, 16 specialists of the Belarusian NPP have been trained in the Ivanovo State Power Engineering University, and 16 specialists have been trained in the Obninsk Institute for Nuclear Power Engineering.

In terms of contract liabilities for construction of the Belarusian NPP (General Contract for the construction of the Belarusian NPP of July, 18 2012 No.77-598/1110700 between RUE “Belarusian NPP” and “Nizhegorodsk engineering company Atomenergoproyekt” JSC - managing company ASE JSC), training of Belarusian specialists is provided by the Rosatom state nuclear energy corporation. Training of operational staff of the Belarusian NPP is provided by the Russian party in the Republic of Belarus as well as at the operating NPPs and NPPs under construction in the Russian Federation.

This work includes several stages.

At the first stage, the detailed plan of the Belarusian NPP staff recruitment was developed on the basis of the construction schedule. Regulatory and legislative documents with requirements on recruitment of operational staff of the Belarusian NPP were developed. 76 specialists in 13 groups completed theory courses.

At the second stage, before first power unit commissioning, study and training center was commissioned where now training staff continues to be recruited, while staff also continues to be recruited to RUE “Belarusian NPP” in accordance with staff schedule for the first power unit of the Belarusian NPP. There are full-task and analytical simulators delivered, off-line and plant tests were commissioned. At the moment simulators are passing acceptance tests in accordance with a testing program.

At the third stage, before the second power unit commissioning, operational staff for the second power unit of the Belarusian NPP is to be trained, and human resources management strategy is to be developed with consideration of further nuclear energy industry development.

Considering high priority of training staff for the nuclear energy program, in addition to the above mentioned measures the Republic of Belarus intensively uses IAEA technical assistance (technical cooperation program) on the personnel training for the nuclear power programme. The program includes expert and consulting support in setting up a system of staff training for nuclear energy industry with consideration of international experience and the IAEA recommendations and includes seminars and training workshops, visits of the Belarusian researchers and teachers of the higher education institutions to the study and training centers of NPPs and scientific and research institutes abroad, visits of the Belarusian specialists to the operating NPPs and NPPs under construction, as well as development and delivery of training computer system for organizations participating in the construction of the Belarusian NPP.

In the framework of the IAEA technical cooperation project BYE/0/006 “Developing Human Resources and a Training System for the Nuclear Power Programme” the Republic of Belarus received applied training computer system and necessary software for training of Belarusian specialists involved in the nuclear power program. The system was tested and integrated at the RUE “Belarusian NPP” in March 2016.

In 2015 RUE “Belarusian NPP” became a member of the World Association of Nuclear Operators (WANO) and now is able to make use of the following opportunities:

support of preparation to various IAEA missions at different stages of construction and commissioning of the Belarusian NPP;

participation in programs for support of nuclear power plants arranged by WANO;

acquiring information on operation experience of all world nuclear plants;

participation in programs of technical visits to other NPPs;

participation in emergency response trainings in the Regional Emergency Response Center;

participation in training seminars arranged by WANO.

The Republic of Belarus closely cooperates with the IAEA and the European Union, as well as with other organizations and international associations to improve competences of the Belarusian regulatory body in the framework of technical cooperation projects and programs and by exchange of regulatory experience in terms of the Regulators Cooperation Forum (RCF) of the Western European Nuclear Regulators Association (WENRA) and Forum of the State Nuclear Safety Authorities of the Countries Operating WWER (VVER).

In accordance with the legislation of the Republic of Belarus, the operating organization provides recruitment, training, retraining and advanced training of the employees (staff) and the required numbers of employees at all stages of the NPP lifetime. Staff qualified in nuclear and radiation safety is a binding requirement for obtaining special permit (license) giving the right to activities in the field of use of nuclear energy and ionizing radiation sources.

Recruitment, training, solo qualification and support of operational staff competences is provided by the management of RUE “Belarusian NPP”. System of recruitment and training of the NPP operational staff is aimed to reach, control and support their qualifications necessary to ensure safe operation of the plant in any modes and to take measures to limit effects of accidents in case they happen.

Specialists of the license applicant (licensee) undergo training in nuclear and radiation safety maximum one month after their appointment to their positions and then regularly in accordance with the requirements of legislative and regulatory documents, though minimum once in five years.

Specialists are trained in education institutions (centers) that have a permit issued by the Gosatomnadzor giving them the right to qualified training, retraining and advance training of persons responsible for nuclear and radiation safety, as well as persons responsible for radiation control at the facilities and production sites subordinate to Gosatomnadzor. These permits are issued by Gosatomnadzor in terms of administrative procedures.

Number of industrial and production staff of the two power units of RUE "Belarusian NPP" shall be 2321 people. Positions on the management of RUE "Belarusian NPP" and operational shops are filled with qualified and experienced staff with higher and/or average special education in the relevant and related spheres, as well as work experience in the relevant field. Calculation of operational staff number was based on the following:

three-shift work where each worker is engaged eight hours per day during five working days;

flexible work schedule, days of rest, vacations and sick leaves;

if a worker visits controlled access area, regular vocation and weekends are expanded by extra leisure days, as their working week is formed on the basis of a 6-hours workday;

training in a study and training center.

Thus, for one operational workplace there are six or seven workers.

Structure of operational staff is based on hierarchy. RUE "Belarusian NPP" is based on a workshop principle. General director of the enterprise is the principal administrative manager bearing personal responsibility for nuclear safety and managing its provision, including general management of the NPP staff training. Administrative management is subordinate to the General Director. The NPP Chief engineer is a technical head of the NPP subordinate to the General Director. Deputy chief engineer for staff training arranges training and advance training of the staff, as well as studies to support qualifications required for safe and reliable NPP operation.

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.

Regulatory requirements

Requirements of the Article 12 of the Convention on assessment of possible human factor impact on safety of nuclear facilities operation during their lifetime are integrated into the legislation of the Republic of Belarus and are complied with. Article 11 of the Law of the Republic of Belarus "On Use of Atomic Energy" states that "*certain types of work are carried out by employees (staff) of operating organizations and organizations performing work and (or) services involving nuclear energy use, if the employees (staff) have permits to perform works involving nuclear energy use issued by a state body authorized in nuclear energy use safety regulation*" [36].

List of works requiring employees (staff) indicated in the Law "On Use of Atomic Energy" to obtain permits for works involving nuclear energy use, as well as the requirements to these employees (staff), including their education, and the procedure to obtain the above mentioned permits are determined by the resolution of the council of Ministers of the Republic of Belarus "On issuing permits to works involving nuclear energy use" of October, 12 2015 [72].

List of medical restrictions and list of works where these restrictions apply, as well as requirements to medical examinations and psychophysical examinations are determined by the legislation. Accounting for these requirements is binding in accordance with the Sanitary Regulations and Standards "Requirements to radiation safety of staff and population during nuclear energy and ionizing radiation sources use" and "Rules of nuclear safety of nuclear power plant installations" [141, 81].

Human factor in nuclear installation design

Design solution for the power unit include measures to prevent possible errors of staff violating normal operation mode and to reduce their effects. There are technical measures for prevention and reduction of effects of wrong actions of the staff that violate safety functions and may cause accidents: wrong positive reactivity insertion; violation of heat removal procedure from reactor core section; break of primary system seal.

To reduce effects of wrong deactivation of safety systems *during safety systems performability check, technical maintenance and repairs* the following measures shall be taken: technical measures to exclude non-authorized access to setting means; automatic activation of safety systems in case they are required; use of passive safety systems together with active systems; back-up of equipment; reducing technical maintenance during reactor facility power operation; automated registration of actions of the operating staff.

To exclude wrong action during accident management there are the following measures: technical means of accident management and liquidation; instructions (symptom and function-oriented).

To exclude wrongs action of the staff *during storage and fuel recharging* that may cause fuel criticality, the following construction solutions are implemented:

nuclear safety of storage of fresh fuel in transfer basket is provided by rigid distancing of the fuel assembly in 400 mm stainless steel hexagonal tubes;

nuclear safety of storage of spent fuel in pool storage rack is provided by rigid distancing of the fuel assembly in 300 mm boron steel hexagonal tubes;

in case of accidents due to adding water without boron to the fresh fuel storage nuclear safety is provided by the rack construction;

to exclude violation of safe operation limits in case of accidents because of dropped transfer basket or container with spent fuel there are shock absorbers installed in container lifting locations.

Measures of the licensee to account for human factor during operation and technical maintenance of nuclear installation

General requirements to staff

Staff is recruited and arranged in accordance with the requirements of industry regulatory, legislative and technical documents. Quality of works is provided by trained and independently working operational staff, as well as by the staff of organization participating in the NPP commissioning which have the required skills and qualifications. Safety culture of the staff is formed in the course of recruitment and training.

Medical requirements to staff

Persons involved in maintenance, commissioning, testing and repairs of the NPP equipment are subject to preliminary medical examination in accordance with the approved lists of industries and positions and shall in the future receive regular medical examination in the determined time periods.

Employees at positions at the NPP that require permits for the right to perform works involving nuclear energy use shall receive compulsory preliminary examination to detect medical restriction factor, including psychophysical ones.

Requirement to knowledge assessment

Management of organization involved in commissioning of the Belarusian NPP shall provide staff their organizations with training and knowledge assessment concerning safety rules during nuclear power use.

Results of knowledge assessment are registered in the relevant protocol. When working at the NPP, the staff shall have a certificate of knowledge assessment and present it to controlling persons at their request.

Generally, the following knowledge is to be assessed in accordance with the type of jobs performed: rules of NPP operation; industrial and job procedures; requirements to labor protection; standards and rules of fire safety; standards and rules of radiation safety; standards and rules of safety in nuclear energy industry; programs and methods of commissioning for specific equipment

or systems of the Belarusian NPP.

Administrative, management and organizational measures of the licensee to account for human factor

Responsibility of organizations for staff and its placement

Qualitative and quantitative composition of the staff and its placement are determined by the management of the organizations involved in commissioning of power units of the Belarusian NPP. Organizations participating in commissioning of power units are responsible for qualification and compliance of their staff with standards, rules and industry instructions.

Operational staff

Management of RUE "Belarusian NPP" works with the staff related to recruitment, training, support and improvement of qualifications. Staff involved in commissioning of the power unit is recruited in accordance with the requirements of the unified wage rate book.

Prior to each stage of power unit commissioning working places shall be fully filled with operational staff in accordance with the schedule plan of opening and closing vacancies for operational staff at the stages of the Belarusian NPP power unit commissioning. Management of RUE "Belarusian NPP" shall recruit, train and admit the staff to individual work in accordance with the established procedure proper to nuclear fuel delivery to the NPP.

Prior to being admitted to individual work, operational staff of the Belarusian NPP shall pass knowledge assessment tests in the scope necessary for each specific position.

Managers of all levels responsible for safe operation of the Belarusian NPP or providing institutional safety control, and operators shall receive medical and psycho physiological examination and have special permits to perform their activities.

Commissioning staff

Staff of commissioning organizations involved in the Belarusian NPP commissioning shall be recruited, trained and assessed with consideration of the schedule of works at the NPP. The staff is trained by job procedures, standards, instructions, schemes and other current legislative and technical documents corresponding to their job profile.

Regulatory supervision and control activities to account for human factor

Knowledge of safety standards and rules concerning nuclear energy use by the operational staff of the Belarusian NPP is assessed by commissions of the Ministry for Emergency Situations of the Republic of Belarus.

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.

Regulatory control and supervision

In accordance with the current legislation of the Republic of Belarus, quality assurance programs are approved by Gosatomnadzor [78].

According to the Decree of the President of the Republic of Belarus of 01.09.2010 No. 450 "On Licensing of Certain Types of Activities" [37], license issued by the MES is required for activities involving nuclear energy use. License is issued based on positive results of review of the documents justifying nuclear and radiation safety (procedure is established by the Provision on procedure of review of documents justifying nuclear and radiation safety within nuclear energy and ionizing radiation sources use [63]), as well as positive results of assessment of compliance of the license applicant to the licensing requirements and conditions, including:

assessment of the compliance of the license applicant to the licensing requirements and conditions (including established quality control and (or) management system);

assessment of compliance of the organizational solutions and results of their implementation to the requirements of legislative regulatory documents, including technical legislative regulatory acts in the area of nuclear and radiation safety;

determining completeness, sufficiency and relevancy of organizational and technical approaches aimed at preserving limits and conditions of safe operation, established basic dose and admissible radiation limits for staff and population and radioactive impact on environment.

Licensing and other state bodies or other state organizations within their competences control compliance of the licensees with the legislation on licensing, licensing requirements and conditions.

On November, 26 2015 the Decree of the President of the Republic of Belarus No. 475 "On Revisions and Amendments Introduced in the Decrees of the President of the Republic of Belarus" was signed, introducing special licensing requirements and conditions to activity in nuclear energy use that, if violated, may cause license suspension, including:

compliance with the requirements of documents of current quality management and (or) control system for licensing activity, and requirements established in quality assurance programs;

control of performance quality at the organizations providing the operating organization with works and (or) services involving nuclear power use, and control of their relevant licenses;

compliance with the requirements of documents of current quality management and (or) control system for licensing activity, and requirements established in quality assurance programs.

Ministry for Emergency Situations of the Republic of Belarus (Gosatomnadzor) provides state control (supervision) of nuclear and radiation safety during design, siting, construction, commissioning, operation and decommissioning of the NPP. In terms of its supervision activities MES (Gosatomnadzor) controls activity of RUE "Belarusian NPP" and organizations providing the operating organization with works and services.

Operating organization activities

Safety and reliable operation of nuclear power plant is only possible if quality is assured at all stages of the NPP lifetime. Highest priority of the RUE "Belarusian NPP" in terms of quality assurance is assurance of the NPP safety. It means that the NPP safety has the highest priority in any issues, at consideration of alternative design solutions and construction developments, choice of product and services suppliers, scheduling, production of electric power, etc.

RUE "Belarusian NPP", being the operating organization, individually or involving other organizations performs activities on design, construction, commissioning, operation, operation limitation, extending operation and decommissioning of the NPP nuclear facilities, as well as management of nuclear materials and radioactive waste management.

Administration of RUE "Belarusian NPP" shall:

provide high-quality and timely works on siting, allocation, design, construction, commissioning, operation and decommissioning of the Belarusian NPP;

provide cost-efficient and reliable operation of equipment, systems and constructions at the Belarusian NPP;

comply with environmental protection requirements;

provide sufficient financial, material and technical means and human resources for quality assurance at the Belarusian NPP;

aim to use process approach to management;

develop, implement and further improve quality assurance system at the Belarusian NPP;

provide clear understanding of when, how and who makes decisions in quality assurance system;

at RUE "Belarusian NPP" determine all relevant legislative and regulatory requirements applied to its products, processes and types of activities and integrate methods to comply with these requirements into the quality assurance system;

implement and support quality assurance programs at all stages of the NPP lifetime;

bear responsibility for planning, arrangement and control of quality assurance established by the Program of Quality Assurance for Safety in Nuclear Power Plants (POKAS), regularly reconsider and reissue new editions of POKAS for its continuous improvement;

once a year review POKAS implementation to use review results for further amendments;

regularly revise performance of quality assurance system of the General Contractor and the subcontractors involved in the Belarusian NPP construction;

give to each employee, regardless its position, the understanding that in case of emergencies that may influence quality of works or NPP safety they shall not conceal, but inform their direct managers on such emergencies;

provide efficient staff policy of the enterprise;

recruit staff of relevant qualifications, arrange continuous process of supporting and improving their qualifications and safety culture;

provide decent, safe and harmless working conditions in every structural subdivision, working area and at every working place;

provide moral and financial incentives to improve performance of its staff, solve their social issues.

Operating organization ensures development and implementation of quality assurance programs at all stages of the NPP lifetime. For this purpose it has developed general quality assurance program and controls activity of organizations providing works or services for the NPP. In terms of general quality assurance program organizations providing works or services for the operating organization of the NPP have developed private quality assurance programs for specific activities, including the NPP quality assurance program during construction and installation works (POKAS S).

The operating organization shall develop quality assurance programs for commissioning of the NPP POKAS (VE) and for its operation POKAS (E).

POKAS program includes a set of documents determining organizational, technical and other quality assurance measures aimed at implementation of safety principle established by the legislative documents and ensuring required parameters of operation quality.

Assessment of the results achieved is planned and performed at all levels of administrative quality management system.

To ensure the nuclear power plant quality assurance program functioning during the plant operation and to assess its efficiency RUE “Belarusian NPP” performs regular internal reviews, as well as external POKAS efficiency reviews. The results of reviews are used to develop corrective measures integrated in the operation practice and at all times controlled by the operating organization.

Department for Nuclear and Radiation Safety of the Ministry for Emergency Situations of the Republic of Belarus (Gosatomnadzor) pays due attention to assurance of quality at all stages of the NPP lifetime. In the Republic of Belarus there is a Technical Code of Common Practice TCP [78] that, among other, specifies standards for quality assurance at the NPP; types of quality assurance programs, requirements to development and support of quality assurance programs.

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 (1) Assessment of safety

The requirements to safety assessment and verification are regulated by a range of regulatory documents, including decrees of the President of the Republic of Belarus, resolutions of the Government, technical legislative and regulatory acts [37, 38, 46, 47, 63, 65, 76-77, 80, 84, 94-95]. Safety assessment is an integral part of licensing process for activities related to nuclear energy use (ref. Article 7 (2) (ii) of this National Report)**.** Activities concerning assessment of safety of nuclear energy and ionizing radiation sources use are subject to licensing.

There are specific rules of composition and requirement to the contents of a safety analysis report for a nuclear power plant (NPP SAR) with VVER reactor. Based on the information from the SAR, the regulatory body shall be able to assess sufficiency of justification for allocation, construction, commissioning, operation and decommissioning of the NPP power units on a specific site to avoid violation of the established staff and population exposure doses and norms for emissions and radioactive substances in the environment at normal operation and at design basis accidents, as well as limits for such exposure in case of beyond design basis accidents. SAR shall be prepared, composed, considered and reconsidered at all stages of the NPP lifetime [84].

The NPP SAR shall include deterministic and probability safety analysis. Safety analyses shall be made for all operational modes of the NPP and shall take into account all locations of nuclear materials, radioactive substances and radioactive waste at NPP site, where normal operation of the NPP may be violated. Deterministic analyses of the design basis accidents shall be made based on conservative approach. Probability analyses shall include estimation of great accident release probability. Safety reviews shall be provided with error and uncertainties estimation of the obtained results. Software used to justify safety shall be certificated.

PSI “JIPNR-Sosny” is an organization providing technical support to the regulatory body of the Republic of Belarus in the area of nuclear and radiation safety. The Institute has a license for the right to review safety in nuclear energy use area. One of the main purposes of the scientific and technical support organization is safety review, analysis of nuclear and radiation safety document performed by the organization individually or with specialists from other organizations involved.

In terms of scientific and technical support of the regulatory body the efforts are aimed at improvement of scientific and technical knowledge by:

studying, analyzing, adapting and implementing best methods of safety assessment;

developing, integrating and testing up-to-date computer programs and models to simulate processes inside and outside of the NPP (e.g. in reactor, primary and secondary systems, containment, emissions over safeguards);

studying and analyzing experience of the NPP components and systems production and of the NPP operation;

setting up analytical information reference systems and databases;

collecting, analyzing and checking initial data for reactor facility;

integrating probability safety analysis methods;

detecting issues of safety, analyzing their features and solution methods.

PSI “JIPNR-Sosny” continuously improves scientific and technical level of its support to the regulatory body with latest inventions and innovative approaches and methods developed for peaceful nuclear energy use to ensure high quality of the provided expert services.

Safety reviews and scientific and technical support of the regulatory body are provided with consideration of and on the basis of the current level of science and technologies development. Review and expert support accounts for experience of operation at Russian and other foreign nuclear facilities. All accessible information on events that happened at Russian and foreign nuclear and radiation hazardous facilities is used. The estimation of sufficiency of measures taken for nuclear and radiation safety during peaceful nuclear energy use is envisaged.

Organizational and legislative framework of expert assessment system in the Republic of Belarus continue to be improved. As it is specified in Article 8 (1) of this National Report, strategy of the regulatory body regarding technical support improvement stipulates transfer from one

organization of technical support to the system of 20, uniting scientific and expert resources of the Republic of Belarus.

Assessment and verification of safety of scientific nuclear facilities

The regulatory body reviewed and approved of "Justification of the nuclear safety of fissile materials allocation on the non-irradiated nuclear material storage "Yavar" in PSI "JIPNR-SOSNY" which is complying with safety requirements. At the moment "Yavar" storage facility is used for non-irradiated nuclear material storage. The regulatory body issued a license for the construction of a new nuclear material storage facility, and the documents for its commissioning are now under consideration and assessment.

Organizations involved in operation of storages, shipping equipment and nuclear fuel loading shall ensure necessary organizational and technical measures to comply with the requirements to nuclear safety, as well as control of its implementation [113, 114].

Regularly (minimum once per year) the commission of the operating organization shall review safety state of storage, shipping and loading of nuclear fuel. The commission certificate is approved by the head of the organization and is sent to the state supervision authorities.

Readiness of an assembly for commissioning is determined by [110,111]:

institutional commission on assembly commissioning acceptance for systems and premises;

nuclear safety commission of the operating organization.

On the basis of the assembly design and the report (act) on the results of physical commissioning the assembly certificate is issued. It contains information on critical and subcritical assemblies provided by the design, basic parameters of the assembly, its composition and safety systems features, as well as operational limits confirmed by experiment. The certificate is coordinated with the state authority of nuclear and radiation safety control (supervision).

Safety report is included in the list of basic documents of subcritical and critical assemblies concerning nuclear safety provision.

Assessment and verification of safety of non-scientific nuclear facilities

Safety assessments are performed and documented by the operating organization to check compliance with the safety requirements at all stages of the nuclear installation lifetime, as well as to determine measures necessary to provide safety of this nuclear installation. The results are transferred to the state regulatory body in the area of nuclear and radiation safety, within the process of licensing of activities related to nuclear energy use at all stages of the nuclear installation lifetime.

At every stage of the Belarusian NPP licensing (siting, construction) Gosatomnadzor arranged review of the documents justifying nuclear and radiation safety. Results of the review were provided in the Expert review of the assessment of the documents for nuclear and radiation safety of nuclear energy use in terms of siting and construction of nuclear facilities (units No.1 and No.2 of the Belarusian NPP) prepared by PSI "JIPNR-SOSNY".

Purpose of the review is to determine the level of nuclear and radiation safety at the Belarusian NPP by checking compliance of the design solutions and the results of their implementation with the requirements of legislative and regulatory documents, including TLRA, for nuclear and radiation safety.

One of the documents justifying provision of nuclear and radiation safety in the course of nuclear energy and ionizing radiation sources use subject to review is the NPP SAR [63]. SAR is developed by the operating organization in compliance with the design documents of the nuclear installation. SAR shall be prepared, composed and reconsidered at all stages of the NPP lifetime. There are requirements to the information provided in the SAR for the Belarusian NPP [80, 81].

With all that, a special commission of Gosatomnadzor specialists estimates compliance of the organizational and technical capabilities of the operating organization with the licensing requirements and conditions. The results of Gosatomnadzor assessment form a basis for requirements to operating organization that are to be complied with in accordance with the license.

Decision on issuing special permit at every stage of the Belarusian NPP licensing was made based on:

expert review of PSI "JIPNR-Sosny" made by the assessment of the documents justifying nuclear and radiation safety during nuclear energy use in terms of siting (construction) of nuclear installation (units No.1 and No.2 of the Belarusian NPP);

reviews of the Gosatomnadzor working group for the results of expert review made by PSI "JIPNR-SOSNY";

reviews of Gosatomnadzor for the assessment of licensee's compliance with licensing requirements and conditions.

Operating organization plans to provide the set of documents required to obtain license for operation of power unit No. 1 of the Belarusian NPP by the end of 2016. Decision regarding the operation license will be issued after:

safety assessment based on review and assessment of the provided documents justifying nuclear and radiation safety of the nuclear installation;

tests of preparedness to ensure safety during nuclear installation operation, verification of information validity, assessment of capabilities and conditions of the operating organization to be sufficient for the implied activities.

Also, in accordance with the legislation, license is required for manufacturing technological equipment for the Belarusian NPP.

Employees (staff) of the operating organizations or of organizations providing services for the NPP construction have to obtain the relevant permit of Gosatomnadzor.

To ensure nuclear and radiation safety during the implementation of the nuclear energy program in the framework of control (supervision), compliance with licensing requirements and condition at the current stage of the Belarusian NPP lifetime continues to be controlled (monitored).

As it is stated in the Article 7 (2) (ii) of this National Report, the legislative and regulatory framework was considerably changed by the Decree of the President of the Republic of Belarus No. 475 [47] of November, 26 2015. The Decree formalized possibility of regular safety review and assessment of licensee compliance with licensing requirements and conditions, *in accordance with the principle 2 of the Vienna Declaration on Nuclear Safety of February, 9 2015 stating that "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...".*

Article 14 (2) Verification of safety

To verify process (its compliance with the requirements) and quality of products and services at any stage of design, development and production of equipment, construction, installation, commissioning and operation of the Belarusian NPP, the operating organization shall control it by reviews [78].

The operating organization arranges regular (minimum once in two years) reviews of compliance with the nuclear safety requirements and establishes the review procedure for the Belarusian NPP nuclear safety status to be performed by internal commissions [81]. Results of reviews are provided to the regulatory body.

According to the General Contract for the Belarusian NPP construction between RUE "Belarusian NPP" and "Atomstroyexport":

operating organization shall provide technical (designer's) supervision (control of quality and scope of the works performed). For this operating organization set up technical supervision department with a purpose of reviewing activities of the general contractor and other subcontracting organizations;

general contractor shall review compliance of current construction and installation works with process documents and the requirements of regulatory documents, review the performance of quality assurance programs by subcontracting organizations, provide designer's supervision of

compliance with the requirements of design and process documents at all stages of the Belarusian NPP construction and commissioning.

Regulatory review and control (supervision)

Since the previous National Report was published, Gosatomnadzor has arranged and performed three safety reviews in the framework of the licensing of works at the Belarusian NPP construction for the right to:

erect foundations of buildings and structures of the unit No. 2;

fulfill a full range of construction cycle for the unit No. 1;

fulfill a full range of construction cycle for the unit No. 2.

Earlier, in 2013, safety review was arranged and performed in the framework of licensing of erection of foundations of buildings and structures of the unit No. 1 of the Belarusian NPP. At the moment operation of the unit No. 1 of the Belarusian NPP is being prepared for licensing, particularly, to a safety review.

To ensure safety of all activities related to nuclear energy use and their compliance with safety purposes, there is state control (supervision) provided at all stages of the Belarusian NPP lifetime by the authorized bodies of the Republic of Belarus. Details of its arrangement and coordination are provided in the Article 7 (2) (iii) of this National Report. Gosatomnadzor and other control bodies arrange and perform control (supervision) of the Belarusian NPP construction, compliance of the operating organization with the licensing requirements and conditions at the construction stage. In Ostrovets there is a permanently operating Gosatomnadzor sub-division of nuclear and radiation safety supervision on the NPP site (7 inspectors).

In a period 2014 – 2015, after licensing of the construction of units No. 1 and No. 2 of the Belarusian NPP Gosatomnadzor arranged and performed:

39 regular reviews;

4 complex reviews;

17 visits to plants manufacturing systems and equipment to control (supervise) appointed tests and inspections.

Visits and reviews showed that the operating organization continuously controls activities of the General contractor and subcontracting organizations.

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.

Regulatory requirements

Basic principles and requirements to radiation safety are formalized in the Laws of the Republic of Belarus “On Radiation Safety of Population” and “On Use of Atomic Energy” [27, 36].

Radiation safety requirements for planned, emergency and existing exposure to ensure human safety in any conditions of natural or man-made ionizing radiation exposure are established by the Sanitary standards and rules “Requirements to Radiation Safety” approved by the resolution of Ministry of Health of the Republic of Belarus of December 28, 2012 No.213 and Hygienic Standard “Criteria of Radiation Exposure Evaluation” approved by the same resolution of the Ministry of Health [140, 141]. The documents mentioned above are developed in accordance with the requirements determined in the IAEA document “Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards. General Safety Requirements Part 3”. There are three classes of standards: admissible exposure doses (for planned exposure), border doses (for planned exposure), reference levels (for emergency and existing exposure) and admissible many-factors impact levels. Radiation safety of personnel and population is considered to be provided if basic principles of radiation safety (limitation, justification, optimization) and requirements of the

legislation of the Republic of Belarus are complied with. This document contains the definition of a representative person (according to the ICRP Publication 101), determines use of border doses and reference levels, introduces quotas of exposure doses of the population from the NPP (100 μSv/year), determines levels of exemption and clearance from regulatory control, established general criteria of response to nuclear and radiation emergency situations and criteria for radiation protection of emergency staff, introduces new reference level of radionuclide contamination in drinking water, gross alpha and beta activity.

Sanitary standards, rules and hygienic norms "Hygienic requirements to the design and operation of nuclear power plants" approved by the resolution of the Ministry of Health of the Republic of Belarus of 31.03.2010 No. 39 [120] establish requirements to radiation safety of personnel, population and environment protection (radiation impact) during siting, design, construction, commissioning and operation of the NPP with VVER reactors. Radiation protection of the NPP is provided by a range of special activities:

establishing and implementing requirements to radiation safety at the NPP industrial site and the adjacent territories;

control of protective barriers of the NPP for protection against ionizing radiation and radioactive substances;

localizing ionizing radiation sources and protection of personnel and population in normal operation conditions and in case of emergency at the NPP.

Content and scope of special measures are provided in the design and the operational documents of the NPP.

Since the previous National Report was presented, regulatory requirements on radiation safety of nuclear facilities were continued to be developed and the following documents entered into force:

Sanitary norms and rules "Requirements to radiation safety assurance for public and personnel during the use of nuclear energy and ionizing radiation sources" approved by the resolution of the Ministry of Health of the Republic of Belarus of December 31 2013 No. 137 [141]. The document was adopted instead of earlier Basic sanitary rules for radiation protection (OSP-2002) [105] and accounts for requirements and approaches recommended in the IAEA editions of a safety rules series;

Safety regulations for NPP radioactive waste management approved by the resolution of the Ministry for Emergency Situations of April 25, 2015 No.19 [142]. The document established requirements to safety implemented in the design and operation of NPP radioactive waste management systems;

Technical Code of Common Practice "Safety of dry spent nuclear fuel storage facilities" [101] approved by the resolution of the Ministry for Emergency Situations of September 09, 2014 No.26. The document established requirements to safety implemented in the design, construction, operation and decommissioning of dry spent nuclear fuel storage facilities;

Sanitary norms and rules "Requirements to radiation safety assurance for public and personnel during radioactive waste management" approved by the resolution of the Ministry of Health of the Republic of Belarus of 31.12.2015 No. 142 [144]. The document was developed in accordance with the requirements of the IAEA safety editions No. GSG-1 and No.SSR-5 and was introduced instead of earlier Sanitary norms for radioactive waste management SPORO-2005. It established criteria for radioactive waste detection, as well as general classification of radioactive waste for their long-term safety after disposal;

Norms and rules on nuclear and radiation safety "Requirements to the operating organization on radiation monitoring in sanitary and protection zone and control area of the nuclear power plant" approved by the resolution of MES of June 30 2016 No. 29 [145].

ALARA principle implemented by licensees

Priority of the ALARA method is formalized in the Law of the Republic of Belarus "On Radiation Safety of Population" and in sanitary rules and norms [27, 137, 138, 120, 141]. Basic

regulatory requirements to comply with during normal operation of the ionizing radiation sources (IRS) and nuclear facilities are:

complying with admissible limits of individual doses of population exposure to all IRSs (limitation principle);

prohibition of IRS-using activities for which benefits for population and the society lower than potential harmful due to exposure exceeding natural background radiation (justification principle);

keeping individual exposure doses and number of exposed people at the lowest possible level under the consideration of economic and social factors when using any ionizing radiation source (optimization principle).

Sanitary norms and rules "Requirements to radiation safety assurance for public and personnel during the use of nuclear energy and ionizing radiation sources" approved by the resolution of the Ministry of Health of the Republic of Belarus of 31.12.2013 No. 137 [141] determine practical ways to use optimization principle for IRSs users. To comply with dose limits there is a system of controlled parameters which derive from border doses. IRS user (operating organization) shall develop controlled parameters of radiation effect at the radiation facility and in control area established for on-line radiation control to secure radiation safety level, provide further reduction of personnel and population exposure and radioactive contamination of the environment. When setting border doses, IRS user (operating organization) shall use the optimization principle taking into account:

radiation effect time nonuniformity factor;

practicability of preserving lower than admissible existing level of radiation effect at this facility;

efficiency of measures on radiation situation improvement.

Reasonably low level of operational parameters describing content of radionuclides in the NPP technological process systems and radioactive contamination of equipment and controlled access area premises, individual and collective personnel exposure doses, values of radioactive substances discharge into the atmosphere and volumes of radioactive waste formation is supported by a range of organizational and technical measures including:

implementation of defense-in-depth strategy (system of physical barriers limiting distribution of ionizing radiation and radioactive materials into the environment and systems of technical and organizational measures on protection of the barriers and preserving their effectiveness, as well as protection of personnel, population and environment);

compliance with safety culture principles (priority of safety over economic and production objectives, recruitment, training and support of qualification of staff, tight discipline and clear distribution of authorities and responsibilities, compliance with the requirements of operational and other regulatory documents, working within the documented procedures, building trust and approaches that would contribute to positive safety understanding, self-control);

integration and operation of radiation control system providing reliable control of protection barriers, technological environments and systems, discharge of radioactive substances into the atmosphere, content of radionuclides in environment and of personnel and population exposure doses.

planning, control of implementation, analysis of results and improvement of measures aimed at reduction of personnel and population exposure doses and minimizing discharge of radioactive substances into the environment;

taking organizational and technical measures to provide radiation safety during job planning and performing;

using operation experience and tested engineering and technical solutions;

analysis, self-assessment and regular independent estimation of the radiation safety level achieved (OSART mission, WANO partner reviews);

integrating and supporting quality assurance systems at high level.

Radiation protection programs implemented by licensees

As stated in the Article 6 of this National Report, at the moment nuclear facilities located in the Republic of Belarus are only operating in PSI "JIPNR-Sosny".

To control radiation safety *in PSI "JIPNR-Sosny"* there is a radiation safety department. Its basic objectives are:

control of radiation situation at work places, in the premises and the territory of the organization, control of discharge of radioactive substances in the sanitary protection zone, control of and accounting for individual exposure doses of employees (staff) to ensure radiation safety of personnel and population;

control of compliance with the legislation, rules, standards, requirements of the instructions for radiation safety in subdivisions of the institute during IRS and radioactive waste management.

control of compliance with the requirements of regulatory and technical documents for radiation control and radiation safety during design, construction and decommissioning of nuclear facilities and areas with radioactive materials.

Results of radiation safety review are annually registered in radiation technical certificate of ionizing radiation sources user.

Information on staff individual exposure doses is provided to the State radiation-monitoring register in the established form.

At the moment *on the Belarusian NPP construction site* personnel of the Contractor performs works involving IRS use for non-destructive control of the equipment being installed (technological systems pipelines). Exposure doses received of the Contractor's staff during the above mentioned works on the Belarusian NPP construction site are provided in Table 4.

Table 4

Exposure doses received of the Contractor's staff during the above mentioned works on the Belarusian NPP construction site

Year	Employees	Collective dose, man* mSv	Average individual dose, mSv	Maximum individual dose, mSv
2013	No works with IRS were performed			
2014	6	1.170	0.195	0.567
2015	8	5.741	0.718	1.320
2016 (as of July 1 2016)	6	0.996	0.166	0.389

Belarusian NPP radiation safety strategic planning was considerably influenced by the Strategy for the Belarusian NPP radioactive waste management developed by the Ministry of Energy together with the National Academy of Sciences of Belarus in 2015 and approved by the resolution of the Council of Ministers of the Republic of Belarus of June 2, 2015 No.460 (ref. Article 19 (8) of this National Report).

Radioactive substances discharge control by licensees

Design of the Belarusian NPP includes radiation control system to ensure measurement of values of the controlled parameters that describe radiation status in the premises and in the plant territory, within the sanitary and protection zone and control area in all mode of NPP operation, as well as in cases of design basis and beyond design basis accidents.

To prevent overdose of man-made population exposure, there is a NPP quota for population exposure established in the Sanitary norms and rules "Hygienic Requirements to the Design and Operation of Nuclear Power Plants" approved by the resolution of the Ministry of Health of the Republic of Belarus of March, 31 2010 No.39 [120] which is 100 μSv per year. This quota is established for gross population exposure from all sources of radioactive gas-aerosol discharge into the atmosphere and liquid discharge into open water for the NPP in general regardless of the number of power units on the industrial site. Value of the quota is considered to be the upper limit of possible population exposure from radioactive discharge of the NPP in terms of optimized radiation safety of the population for normal NPP operation mode. Values of the relevant

population exposure quotas are used to calculate maximum admissible discharge of radionuclides at the NPP into the atmosphere and maximum admissible discharge of radionuclides into open water. Maximum admissible discharge is upper limit for gas-aerosol discharge and liquid discharge of radionuclides into the atmosphere during normal NPP operation.

Lower limit of exposure dose in terms of optimized radiation safety of the population during normal NPP operation is minimum significant dose which is 10 μSv per year. Admissible discharge of radionuclides into open water is calculated so that compliance with them guaranteed compliance with this dose.

Limits of safe operation of every NPP unit in terms of discharge are established in process regulations on the level of maximum admissible discharge, while operational limits are established on the level of annual admissible discharge provided that values of safe operation limits and operational limits established for one power unit shall not be exceeded during the operation of all power units of the NPP.

Additional requirement for the operating organization is compliance with target discharge limit during normal operation and in case of deviations from normal operation with consideration of design factors of margin for estimated design discharge established on the level:

annual gas-aerosol discharge of inert gases into the atmosphere during normal operation and in case of deviations from normal operation shall not exceed 40 TBq for a power unit per year;

annual aerosol and iodine discharge (long-lived nuclides) into the atmosphere during normal operation and in case of deviations from normal operation shall not exceed 0.8 GBq for a power unit per year.

Reduction of annual radionuclides discharge into the atmosphere with discharge water from the Belarusian NPP during normal operation and in case of deviations from normal operation is limited by a target limit of 10 GBq for a power unit per year (except for tritium).

Environmental control by licensees

Legislation of the Republic of Belarus established the requirements to the obligatory radiation and environmental monitoring of the area where the Belarusian NPP is located at all stages of the NPP lifetime.

Scope, terms and procedure of radiation and environmental monitoring are determined by the “Program of complex environmental monitoring of the Belarusian NPP” that includes the “Program of radiation environmental monitoring during construction”. Results of the radiation monitoring of the NPP location region are registered in the radiation monitoring database of the Belarusian NPP control area of the Belarusian NPP that shall be used to support decision-making in terms of improvement of radiation safety system of the Belarusian NPP. More details are provided in the Article 10 of this National Report.

Regulatory review and control

State nuclear and radiation safety supervision is arranged and provided in accordance with the Provision on state nuclear and radiation safety control [55] approved by the resolution of the Council of Ministers of the Republic of Belarus of December, 31 2008 No. 2056.

ARTICLE 16. EMERGENCY PREPAREDNESS

1. 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 are provided with appropriate information for emergency planning and response.

3. Contracting Parties which do not have a nuclear installation on their territory, insofar as they are likely to be 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 programs

Regulatory requirements

In accordance with the Law of the Republic of Belarus "On Use of Atomic Energy" [36], emergency preparedness and response to accidents on nuclear facilities stipulates development of measures to provide emergency preparedness and response. Measures to ensure emergency preparedness and response are determined by internal and external emergency plans.

Resolution of the Council of Ministers of the Republic of Belarus of August 27, 2010 No.1242 "On approving Regulations on Conditions and Procedure of Emergency Plans of Actions Development" [61] determines conditions and procedure of internal and external emergency plans development that contain measures for emergency preparedness and response in case of radiation accident during nuclear power use, as well as requirements to their content, procedure for their approval and revision.

External emergency plan envisages zones of emergency response, actions of republican state authorities responsible for supervision, local administrative and public bodies, state and other organizations and population in case of radiation accident during nuclear power use, including the one in storage facilities located outside the territory of the Republic of Belarus in less than 100 kilometers from the State border of the Republic of Belarus. This document shall be revised and amended annually.

Internal emergency plan determines action of the operating organization in case of a radiation accident to ensure its liquidation and limit or reduce effects of the accident. This document is developed and approved by the operating organization after it is approved by the relevant state authorities no less than 6 months prior to start of planned commissioning. Internal emergency plan is to be amended as required, though minimum once in 3 years.

Basic provisions of state emergency preparedness plan

The Republic of Belarus has a system of response to nuclear and radiation emergencies integrated into the national system of response to emergency situations. There is operating State System of Prevention and Liquidation of Emergency Situations (SSES). Basic requirements to this system are determined by the Law of the Republic of Belarus of May 5, 1998 No.141-3 "On Public and Territorial Protection from Natural and Man-made Emergency Situations" [28].

Plan for population and territory protection of the Republic of Belarus from natural and man-made emergency situations including a Plan of protection from radiation accidents is developed, approved and regularly amended. Sections of territorial and industrial plans describing measures of the Republican Plan in detail are now developed based on Plan of protection from radiation accidents.

Measures on emergency preparedness improvement implementation

To improve readiness to respond radiation accident, the Concept of situation crisis centers system for nuclear energy industry was developed and approved by the Government (resolution of the Council of Ministers of the Republic of Belarus of June 21, 2016 No. 479, [74]).

The Ministry for Emergency Situations set up an interministerial working group for development of external emergency plan for the Belarusian NPP. The working group includes representatives of the Ministry of Internal Affairs, Ministry of Health, Ministry of Natural Resources and Environmental Protection, Ministry of Energy, Committee for State Security of the Republic of Belarus and local executive authorities. Development of external emergency plan and it submittion to the Government for approval is scheduled for 2017.

Hygienic Standard "Criteria of Radiation Exposure Evaluation" was approved by the resolution of Ministry of Health of the Republic of Belarus of December 28, 2012 No.213 [140]. The document established criteria of response to nuclear and radiation accidents.

The project of automated radiation situation monitoring system in the environment of the NPP control area with open architecture (ARSMS) in the Belarusian NPP location region is being implemented. At the moment basic ARSMS complex collects and stores data on exposure in the Belarusian NPP location region for their further use as background data. Basic ARSMS complex consists of 3 automated stations of gamma-radiation exposure and meteorological parameters (AMS) and 2 response centers. It will expand to 10 AMSs. ARSMS complex is being further equipped with new generation sensors measuring isotopic abundance of gamma-radiating radionuclides. Data on real meteorological conditions on the NPP location region provided by the closest meteorological station and data from speed and wind direction sensors and precipitation sensors installed at some AMSs will be used to forecast distribution of radioactive substances by air in case of radiation accident.

In the framework of the IAEA technical cooperation project BYE/9/019 "Modernizing and Expanding the Radiation Air Monitoring Network" air radiation monitoring network in the Belarusian NPP location regions was expanded and upgraded with modern devices for sampling radioactive aerosols from surface layer of the atmosphere.

To prepare elements of monitoring and forecast system to emergency situation annual territorial trainings of the monitoring network and laboratory control bodies are ongoing with practice the procedure and actions in case of emergency situations, including ones with radioactive substances discharge.

Article 16 (2) Information of the public and neighboring States

Procedure for informing population on threat of emergency situation, including transfer of data on forecast and existing emergency situations, their effects and radiation safety on the relevant territories is established by the resolution of the Council of Ministers of the Republic of Belarus of August 23, 2001 No.1280 "On Procedure of Collecting Information in the Field of Public and Territorial Protection from Natural and Man-made Emergency Situations, and Exchange with Such Information" [49].

Functioning of information and management system of the State system for prevention and liquidation of emergency situations and informing on population and territories protection from natural or man-made emergency situations is performed in accordance with the resolution of the Ministry for Emergency Situations of the Republic of Belarus of August 17, 2009 No. 42 "On Approving Regulation on Organizing the Functioning of Management Information System of the State System of Prevention and Liquidation of Emergency Situations" and the resolution of the Ministry for Emergency Situations of the Republic of Belarus of August 2, 2005 N 41 "On approving Instructions on submitting information in the field of public and territorial protection from natural and man-made emergency situations" [106, 119].

The resolution of the Government of the Republic of Belarus of November, 28 2014 No. 1118 approved the Provision on system for alert of population, state authorities and forces of the State system of civil defense and prevention and liquidation of emergency situations [68]. There are determined objectives, procedure of use and support of the system for alert of population, state authorities and forces of the State system of civil defense and prevention and liquidation of emergency situations. Joint resolution of the Ministry for Emergency Situations, Ministry of Communications and Informatization and the Ministry of Information of the Republic of Belarus of December, 07 2015 No. 42/27/9 establishes a list of alert system parties on the republican level. The resolution of MES of December 18 2015 No. 44 approved the instruction on procedure of set up and operation of local alert systems locations of hazardous industrial facilities.

Automated system of centralized alert of population, enterprises and state authorities is regularly tested (according to the approved schedules). Informing of population on case of radiation accident is practiced within these tests.

The Republic of Belarus has ratified a range of international conventions, including the Convention on Early Warning of Nuclear Accident. A range of other international and bilateral agreements has also been signed, including those with the Russian Federation - the supplier of nuclear technologies to the Republic of Belarus.

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.

Since the previous National Report was presented, no siting activities for new nuclear facilities corresponding to the definition of the Chapter 2 of the Convention on Nuclear Safety have been conducted. The legislative framework regulating siting of nuclear facilities has not changed. In this regard, Article 17 (1, 2, 4) contains abridged information discussed at the 6th Meeting of the Contracting Parties of the Convention.

Article 17 (1) Evaluation of site related factors

Article 4 of the Law of the Republic of Belarus “On Use of Atomic Energy” states that the decision on allocation of the NPP or its unit shall be made by the President of the Republic of Belarus.

The following requirements are determined in the Republic of Belarus [75-77]:

basic criteria and requirements regulating allocation of the NPP on the territory of the Republic of Belarus with consideration of natural and man-made processes, phenomena and factors and impact of the NPP on the population and environment;

basic requirements to content and scope of surveys and research for NPP siting on the territory of the Republic of Belarus;

requirements to development and content of the NPP environmental impact assessment (EIA) report.

In accordance with the Decree of the President of the Republic of Belarus of November 12, 2007 No. 565 (revised on 31.01.2013) “On Some Measures for the Nuclear Power Plant Construction”, functions of customer ordering a complex of preparatory, design and survey works for the NPP construction in the Republic of Belarus are performed by RUE “Belarusian NPP”.

Siting stage of the Belarusian NPP construction included monitoring of environment, agricultural and forest areas to obtain background data on radioactive and chemical contamination to be as basis for further assessment of operating NPP impact on population and environment.

The above mentioned basic criteria and requirements regulating allocation of the NPP in the territory of the Republic of Belarus with consideration of natural and man-made processes, phenomena and factors and impact of the NPP on the population and environment and their implementation on the course of the Belarusian NPP siting show compliance with the principle 1 of the Vienna Declaration on Nuclear Safety of 9 February 2015 stating that “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".

At the stage of the Belarusian NPP siting Gosatomnadzor was continuously supervising compliance of all organization of the Republic of Belarus involved in siting, with relevant requirements. In particular, their compliance with the requirements of technical legislative and normative acts was controlled. After inspections the organizations were given orders establishing periods to eliminate violations. All violations were eliminated.

On September, 15 2011 the Decree of the President of the Republic of Belarus [42] defined the Ostrovets site for the purposes of designing the Belarusian NPP (development of project documentation).

After the completion of the environmental impact assessment of the NPP project as well as consultations on the basis of the EIA Report with concerned public and States the Decree of the President of the Republic of Belarus of November, 2 2013 [45] approved the Ostrovets site for the Belarusian NPP construction. The Decree of 2013 was issued on the basis of the results of the environmental impact assessment, including the outcomes of transboundary consultations, and the approved project documentation as well as the statutory endorsements and conclusions by the authorities of the Republic of Belarus.

Article 17 (2) Impact of nuclear installation on individuals, society and environment

Outcomes of the environmental impact assessment of the NPP project and findings of the related surveys revealed the following:

NPP does not have significant impact on geological environment, while technical solutions, including foundations for reactor section and other 34 important buildings and structures, ensure their stability at any influence mentioned in regulatory requirements (seismic activity, shock wave, etc.).

Expenses for compensation of land lot purchase for NPP construction are fully included in the design.

Process water supply of the NPP is to be provided by water of the Viliya river. There is no forecast of water deficit in the Viliya river.

Under normal NPP operation:

basic radiation environmental impact of gas-aerosol discharge during NPP operation is conditioned by inert gases due to external exposure. During NPP operation the background radiation will not increase. Exposure in the NPP region at 1m height from the ground surface is within 0.19-0.17 μSv/hour.

chemical substances discharged by auxiliary constructions do not have any impact on population, as their maximum surface concentration, including background contamination, is lower than maximum admissible concentration even in the sanitary protection zone;

technological discharge of the NPP does not have an impact on ground, surface and ground water, plants and animals.

NPP operation does not influence ground water in 30-kilometer zone; quality of water (chemical, bacteriological parameters) from artesian water withdrawal points does not depend in the NPP operation.

Article 17 (3) Re-evaluation of site related factors

After the Decree of the President of the Republic of Belarus of September, 15 2011 No.418 "On Siting and Design of the Nuclear Power Plant in the Republic of Belarus" was issued, the following activities continues:

monitoring of radioactive and chemical environmental contamination during special field surveys in the Ostrovets district of Grodno region (performed by the Republican center of radiation environmental control and monitoring of the Ministry of Natural Resources and Environmental Protection) to specify features of land lot environment.

assessment of radiation and environmental state of 30 kilometer zone around the Belarusian NPP in the framework of measure 5 “assessment of the NPP impact on environment and of the environment on the NPP at all stages of NPP lifetime” of the State program “Scientific support for development of Atomic Energy in the Republic of Belarus for 2009-2010 and for the period to 2020” (from April 2016 – subprogram 6 of the State Program “Knowledge-intensive technologies and equipment” for 2016-2020).

On the site chosen for allocation and localization of NPP structures, a set of actions and engineering survey was implemented within development of the general layout and design documents: topographical survey, soil survey, engineering and meteorological survey. The results of the survey served as a basis for the development of design documentation of the Belarusian NPP and the conclusion of the state expertise of FAE “Glavgosekspertiza Rossii” No. 435-13/GGE-8551/02 of May, 27 2013 was obtained stating that “the results of engineering surveys comply with the established requirements. Design documentation of the Belarusian NPP complies with the results of the engineering surveys and the established requirements”.

To finalize justification of all design solutions and to provide designers with survey materials in the course of the Belarusian NPP construction, next stage of surveys is performed at the detailed design documentation development stage for every building and construction on the NPP allocation site and for out-of-site constructions and communications, including: topographical survey, soil survey, geotechnical survey and engineering and meteorological survey.

Article 17 (4) Consultation with other Contracting Parties likely to be affected by the installation

In 2009-2013 transboundary consultations were conducted within the framework of the Espoo Convention with Austria, Latvia, Lithuania, Poland and Ukraine.

Having started the construction of the NPP, Belarus invited these States to participate in the further post-project analysis and consulted them on the post-project analysis programme.

Information about environmental impact assessment of the Belarusian NPP is available on the websites of the Ministry of the Natural Resources and Environmental Protection of the Republic of Belarus http://www.minpriroda.by/ and RUE “Belarusian NPP” http://www.belaes.by/, and in particular the EIA of the Belarusian NPP is published in the section “NPP ecology” of the website of RUE “Belarusian NPP”.

MES/Gosatomnadzor and other state authorities of the Republic of Belarus within their competences continuously informs public and professional community on activities concerning nuclear and radiation safety in the framework of the first nuclear energy program implemented in the Republic of Belarus, including measures in terms of bilateral and multilateral cooperation, in particular those of the IAEA, Regulatory Cooperation Forum (RCF), Western European Nuclear Regulators Association (WENRA), Forum of the State Nuclear Safety Authorities of the Countries Operating WWER Type Reactors (WWER Forum).

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 man-machine interface.

During preparatory works for the NPP construction in the Republic of Belarus one of the most important objectives was to choose reliable, safe and cost-efficient NPP design and,

consequently, a company to implement this design and to supply equipment for the NPP. With consideration of comprehensive analysis and economic conditions the Russian design AES-2006 was chosen and is being implemented at the moment. Design of the Belarusian NPP was developed in accordance with the requirements of legislative regulatory documents, including technical legislative regulatory acts, of the Republic of Belarus, the Russian Federation and the IAEA recommendations. Basic features of the Belarusian NPP are provided in Article 6 of this National Report.

Design documentation of the Belarusian NPP was developed in 2013. On May, 27 2013 FAE "Glavgosekspertiza Rossii" issued positive expert conclusion No. 435-13/GGE-8551/02. In June 2013 RUE "Glavgosstroyekspertiza" of the Republic of Belarus issued its expert conclusion No. 293-17/13 for architectural design (cost estimate).

On November, 8 2013 in the wramework of the General Contract the construction of the Belarusian NPP was started and first concrete was placed on the underframe of the safety building of unit No. 1. As of 2016, works on all main buildings and structures of units No. 1 and 2, as well as auxiliary facilities of the Belarusian NPP, were fully started. Units No. 1 and No. 2 of the Belarusian NPP are constructed in accordance with the construction schedule provided in the General Contract. At the moment production facilities to ensure nuclear power plant construction are fully constructed. In 2015 the NPP study and training center and fire department commissioning was ensured, and installation of the turbine shop heating equipment, loading mechanisms of reactor section and electric equipment for electric capacity output was started.

Construction of the NPP by AES-2006 design stipulates:

construction of a nuclear power plant of the latest 3+ generation featuring a new reactor system with additional safety systems: passive heat removal system; passive filtration system of leakage to the intershell space;

double protective enclosure vessel; trap for molten corium in case of a beyond design basis accident;

maximum implementation of the defense-in-depth principle: creation of barriers to prevent ionizing radiation and radioactive substances spreading into the environment, and the system of technical and organizational measures to protect the barriers, as well as preservation of their efficiency at direct protection of the population;

compliance of the NPP with criteria of radiation safety provided in the national legislation and in international practice of NPP design (European utility requirements for LWR nuclear power plants. Revision C).

To ensure safety during the NPP design, principles providing higher reliability due to back-up, diversity and independence are implementing.

Article 18 (1) Implementation of defense in depth

To ensure efficient protection of the Belarusian NPP barriers there are several levels of its protection. Each level provides certain efficiency of barrier protection from effects specific for this level. For every level there are appropriate technical and/or organizational measures to prevent and/or reduce effects of impact due to limitation of normal operation up to NPP operational closure to prevent transfer of the NPP from higher protection level to the lower level or to reduce effects in case if such prevention gives no results, as well as to return the NPP to the higher protection level. Multi-level protection ensures compliance with the requirements to full account for any possible states of the NPP and reasonably sufficiency of safety measures.

Based on the recommended list of initial events (according to NP-006-98 of the Russian Federation), preliminary engineering on probability safety analysis of the NPP with VVER-1200, the list of design basis accidents (according to the terms of reference for technical design of a reactor facility), basic and auxiliary protection and safety functions were determined to be implemented to prevent accidents or to reduce their effects. These data make a basis for development of safety systems and special technical means to manage beyond design basis accidents.

Basic design principles of technical and special technical measures providing safety of the NPP with VVER comply with the requirements of current regulatory documents of the Republic of Belarus, the Russian Federation and the IAEA recommendations.

Concept of the NPP power unit safety provides measures to manage beyond design basis accidents, prevent their conversion into severe accidents and to reduce consequences of severe accidents.

Main purposes of accident management are:

to prevent core damage;

to prevent melting of the reactor vessel;

to prevent containment failure;

to reduce radioactive discharge into the atmosphere.

Accounting for personnel errors is a necessary element of deterministic and probability safety analyses. Safety analysis was made to confirm design bases of safety-related systems and safety systems and to prove that the unit design ensures compliance with the requirements for exposure dose and discharge limits established in the regulatory documents for design modes.

In addition to the provisions provided in the design concerning deterministic analyses of design conditions, beyond design basis accidents analysis is envisaged. This is made to indicate necessity and determine efficiency of technical and technologicals measures or accident management procedures for:

complex sequences including failures beyond those considered in deterministic design conditions, though not resulting in core melting;

accidents with core melting.

Deterministic safety analysis showed efficiency of safety systems and safety-related systems working in the framework of design basis they contain for safe functioning of the NPP in design conditions. It also showed that it is possible to manage beyond design basis accidents.

Probabilistic safety analysis of 1st level is developed for the following purposes:

assessment of the safety level provided by the design. Estimated average value of core damage frequency during power operation and in standstill modes, in accordance with technical assignment, shall not exceed 1E-6 for a reactor per year;

assessment of efficiency of design solutions taken to ensure the required NPP safety.

Article 18 (2) Incorporation of proven technologies

Using NPP operation experience is relevant for design and construction works at newly designed NPP units, in particular, for:

opportunity to store databases by NPP unit elements at all stages of its lifetime;

increase reliability of weak spots revealed during the operation of NPP units under operation;

forming relevant databases to use them in probabilistic safety analysis of the NPP designs, in particular, in the development of defense-in depth analysis methods, detection of weak spots and early detection of events preceding severe accidents.

Design and construction of the Belarusian NPP and its reactor units is based on rich experience of the design developers.

Design of the Belarusian NPP takes into consideration experience of commissioning and operation of foreign NPPs (Russian ones, at first), using it for systems and equipment upgrade. Design and construction solutions taken increase reliability and safety of the NPP. Commissioning of the unit No. 1 of the Belarusian NPP will take into consideration of power units commissioning experience of the Leningrad NPP-2 and the Novovoronezh NPP located in the Russian Federation.

Article 18 (3) Design for reliable, stable and manageable operation

AES-2006 design was chosen for the Belarusian NPP on the basis of preliminary comprehensive analysis made in the course of preparatory works to ensure reliability, safety, stability and manageable operation, taking into consideration modern technologies and paying special attention to human factor.

The design stipulates technical measures for prevention and reduction of effects of wrong actions of the personnel that violate safety functions. Accounting of human factor in nuclear installation design, during its operation and technical maintenance, as well as measures of the licensee (administrative, control, organizational, etc.) aimed to account for human factor are provided in the Article 12 of this National Report.

Regulatory activities in the course of the Belarusian NPP construction, principles and legislative framework of their implementation are described in Article 7 (2) (ii), Article 7 (2) (iii) and Article (2) (iv) of this National Report.

Design and construction of the Belarusian NPP correspond to the international norms and the IAEA recommendations, as well as to the principle 1 of the Vienna Declaration on Nuclear Safety of 9 February 2015 stating that "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".

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 (1) Initial authorization

Operator (operating organization) of the NPP under construction in the Republic of Belarus is RUE "Belarusian NPP" [41]. Operating organizations is engaged in commissioning, operation, limitation of operation, extension of operation, and decommissioning of the Belarusian NPP and bears responsibility in accordance with the legislation of the Republic of Belarus for a failure to comply with the requirements to plant safety.

Operating organization shall obtain a special permit (license) for activities on nuclear energy use at the Belarusian NPP [37] issued after all pre-commissioning works are finished in accordance with the established procedure and there is a final version of the Belarusian NPP SAR amended in

accordance with the results of physical and power commissioning and pilot operation of the power plant.

Process of nuclear installation commissioning is regulated by:

development of nuclear installation commissioning program by the operating organization, coordination of this program with state regulatory bodies on safety of nuclear power use;

acceptance of a nuclear facility for operation in accordance with the construction, architecture and town-planning legislation;

implementation of commissioning program controlled on accordance with the "Procedure for control (supervision) of commissioning of nuclear power plants with VVER reactors by Gosatomnadzor" approved by the order of the Chief of Gosatomnadzor No.14 of 25.04.2015.

Commissioning of the NPP unit star-up facilities includes two successive periods: preparatory pre-commissioning period and commissioning period. The latter includes the following basic stages:

Stage A - "Pre-commissioning start-up works" (about 344 days). Works of the stage are to be performed under the approved stage program "Pre-commissioning start-up works", agreed by the regulatory body.

Stage A includes the following substages:

substage A-1 - equipment testing;

substage A-2 - leak-tight enclosure system testing;

substage A-3 - cold and hot functional testing of reactor installation consisting of:

phase A-3-1 (cold phase) - hydraulic testing and circulation flushing of primary system;

phase A-3-2 (hot phase) - hot functional testing of reactor installation equipment;

substage A-4 - revision of basic equipment of reactor installation.

Unit tests not included in process regulations and operational instructions shall be performed by programs and methods containing safety measures for these tests. Data of program and methods shall contain measures for nuclear safety of the tests, be agreeed with the scientific coordinator of the commissioning, chief structural engineer of the reactor installation and General Contractor and approved by the operating organization. The tests are performed after the regulatory body review and under operating organization's approval, in accordance with the conditions of transfer from one stage of works to the next stage.

Stage B - "Physical commissioning" (about 39 days). Works of the stage are to be performed under the approved stage program "Physical commissioning", agreed by the regulatory body.

Before loading reactor with nuclear fuel and starting stage B, the operating organization shall obtain a license for unit operation in the regulatory body in accordance with the established procedure.

Stage B starts with shipping of fuel assemblies from storage locations to the NPP for their installation into the reactor in accordance to the program and methods for first basic core inventory.

Stage B includes the following substages:

substage B-1 - "Nuclear fuel loading and tests in subcritical reactor state";

substage B-2 - "Reaching critical reactor state and physical testing at minimum controlled capacity level".

Permit for stage B - "Physical reactor commissioning" is provided by the commissioning management group after actual readiness of the unit is reviewed on the basis of working commission certificate, decision of main acceptance committee on unit readiness for stage B works and after the readiness is checked by the regulatory body.

Before the reactor reaches its critical state, management of the NPP, civil defense service and local authorities shall arrange emergency response training for the NPP staff and population in the sanitary and protection zone to practice actions for beyond design basis accidents. Emergency response training shall be agreed by MES.

Stage C - "Power commissioning" (about 48 days). Works of the stage are to be performed under the approved stage program "Power commissioning", agreed by the regulatory body.

Stage C starts with increase of reactor capacity over capacity level of physical commissioning stage (stage B) (more than 1% of nominal capacity).

The operating organization shall publish a report by the results of physical and power commissioning containing these results, and amend (if required) the NPP SAR.

Decision on transfer to stage C "Power commissioning" is made by the commissioning management group after reactor readiness is checked by the regulatory body.

Decision on increase of unit capacity level during works performed at the previous capacity level is made in accordance with the conditions of operation license by the commissioning management group after it notifies the regulatory body under the established procedure and after the regulatory body checks documents.

Programs and methods of testing safety-related systems applied at stage C shall be coordinated with the regulatory body under the established procedures and in the established terms.

Before starting works the commission of the regulatory body shall check readiness of the unit for stage C and issue certificates on unit readiness for the works of stage C "Power commissioning".

Stage D - "Pilot operation" (about 147 days). Stage D includes the following substages:

substage D-1 - low power unit testing, including nominal capacity;

substage D-2 - complex unit testing.

Stage D starts after testing 50% of nominal reactor installation capacity. Stage D finishes after tests are finished for all reactor capacity levels tested at stage D, including nominal capacity, and complex tests of the unit are performed.

Decision on increase of unit capacity level during works performed at the previous capacity level is made in accordance with the conditions of operation license by the commissioning management group after the regulatory body reviews documents (including operating logs, protocols and other requested documents).

Readiness of the equipment (system) to a stage (substage) of the NPP commissioning shall be confirmed by certificates of working subcommission and commissioning management group

Technical manager of the power units commissioning is OJSC "Atomtekhenergo" (Russian Federation) which is a special engineering enterprise for commissioning and commissioning tests of news NPP power units that supports operating NPP units and trains operational staff for operating power units and power units under construction.

Decision on extension of nuclear installation operation period after expiration of a normative operation period established by the design is made by a body or a person that made decision on the construction of these facilities.

Five years prior to expiration of the normative operation period established by the design of the nuclear installation the program of nuclear installation decommissioning is developed, including measures on demounting of the mentioned facilities, management of nuclear materials, spent nuclear facilities and (or) operational radioactive waste, as well as measures for further control and state supervision of the mentioned facilities.

Article 19 (2) Operational limits and conditions

Limits of safe operation are values of process parameters that, if deviated, may cause an accident. There are safe operation limits by radiation parameters and safe operation limits by technological parameters. *Conditions* of safe operations are minimum conditions for quantity, characteristics, working state and technical maintenance characteristics of safety-related systems (elements) that ensure compliance with safe operation limits and (or) safety criteria.

The NPP design justifies safe operation limits and conditions and stipulates technical and organizational measures to prevent violations of safe operation limits and conditions.

The NPP final SAR should contain operational limits and conditions, safe operation limits and conditions for all operational modes of the NPP, including power operation of the reactor, standstill mode and fuel reloading.

Basic documents that determines safe operation of the NPP unit is process (technological) regulations of the NPP unit that contains rules and general operation methods, general procedure for safety-related operations, as well as safe operation limits and conditions. NPP unit operation is prohibited if the requirements of the process (technological) regulations for the NPP unit operation have been violated.

Before power units reaches minimum controlled level, all safety systems channels shall function under equipment characteristics established by the design. Valving, control and measurement devices, measurements means, automation devices, process protection and blocking devices, parameter signaling systems shall function to the full extend.

The NPP unit shall be stopped and transfer it into a safe state provided by the NPP design, if during reactor facility operation limit and (or) conditions established for its safe operation are violated.

During power operation of the reactor functioning of safety systems channels shall be regularly reviewed in accordance with safety systems technical maintenance and repairs regulations.

Violations of safe operation limits and conditions established for the Belarusian NPP shall be investigated. The operating organization shall develop and implement measures to prevent reoccur violations of safe operation limits and conditions due to the same reasons.

Accounting for and investigation of the violations occurring during the NPP operation and informing of the regulatory body about them is made in accordance with the requirements of legislative and regulatory documents.

Article 19 (3) Procedures for operation, maintenance, inspection and testing

First shipping of nuclear fuel to the site, physical and power commissioning of the NPP power units and pilot operation are permitted by the regulatory body under the following conditions:

compliance with conditions of transfer from one stage of works to the next established in the operation license;

review of the NPP readiness to the commissioning stage and approval of other state regulatory authorities;

personnel and population protection plans developed for emergency at the NPP.

To support functioning of safety systems and to prevent failure of safety-related systems they shall be subject to technical maintenance, repairs, testing and reviews.

The operating organization shall develop regulations on technical maintenance, repairs, testing and reviews together with the NPP and reactor installation designers in accordance with the NPP design and SAR.

When preparing safety systems for technical maintenance, repairs, testing and reviews, safe operation condition established in the process regulations of the NPP unit operation shall be complied with.

Under the requirement of the regulatory body during nuclear energy use the operating organization shall additionally review functioning of safety systems, special technical means for beyond design basis accidents management, as well as additionally control base metal and welding joints of NPP safety-related systems and elements.

The requirements to sequence and scope of pre-commissioning works, works at the physical and power commissioning stages and low capacity testing, as well as acceptance criteria for the NPP systems (elements) and unit during commissioning are established in compliance with:

design documentation;

engineering documentation from suppliers of systems and elements for the NPP;

programs of the NPP unit commissioning;

process (technological) regulations for safe NPP unit operation;

regulations for maintenance, reviews and testing of systems (elements) of the NPP unit;

programs for specific stages (substages) of the NPP unit commissioning;

programs for testing systems (elements) of the NPP unit.

To control (monitor) commissioning of the NPP unit, the operating organization shall within the period established in the licensing requirements and conditions, notify the regulatory body on:

transfer from one stage of works to the next stage during the NPP unit commissioning;

testing safety-related systems and equipment (elements) in accordance with programs and procedures for the commissioning of the NPP unit, equipment and pipelines to be registered in Gosatomnadzor;

testing safety-related systems and equipment (elements) not mentioned in the commissioning programs, process regulations and instructions;

readiness of systems and equipment for commissioning and organizational and mounting readiness of system or equipment for acceptance to commissioning;

reconstruction (upgrade) of safety-related systems and equipment (elements), as well as equipment and pipelines registered in Gosatomnadzor;

delivery and shipping of nuclear fuel to and around the NPP site;

other measures on the NPP unit commissioning concerning works on safety-related systems.

The NPP unit tests not included in process regulations and operational instructions shall be performed by programs and methods containing safety measures for these tests. These tests are conducted after elimination of violations (if any) commented on in the review report of the regulatory body.

Testing programs and other documents regulating actions of staff during testing shall contain instructions on actions of the staff in case the parameters of systems and elements have exceeded the established limits.

The operating organization ensures continuous control of all safety-related activity at the Belarusian NPP. Results of NPP operation safety control reviews and regular reports on plant safety status shall be provided by the operating organization to the regulatory body.

On the basis of process regulations for NPP unit operation and the NPP SAR the NPP management shall arrange development, publication and compliance with instructions and regulations that determine actions of the staff ensuring safety in case of normal operation violations, including instruction on liquidation of design basis accidents and regulations on the management of beyond design basis accident, including severe ones.

Before delivery of nuclear fuel the NPP shall recruit all the staff with the required qualifications and admitted for individual work in accordance with the established procedure.

During the NPP operation work places shall be occupied by the staff admitted for individual work for relevant positions. Minimum requirements to its number and compositions are established in the NPP design and are provided in the NPP SAR and the NPP unit operation process regulations.

Persons of the NPP staff may perform certain types of activities involving nuclear energy use provided they have permits issued by the regulatory body.

Organization of scientific support for the NPP construction is PSI “JIPNR-Sosny”. The purpose of scientific support is to develop proposals on optimization of processes that would improve radiation and environmental safety, physical protection and efficiency of power energy facilities.

Article 19 (4) Procedures for responding to operational occurrences and accidents

The requirements to responding to operational occurrences and accidents anticipated during commissioning and operation are regulated by the radiation safety legislation. The operating organization is fully responsible for full compliance with them.

In accordance with the requirements of technical legislative and regulatory acts [80, 81], on the basis of process regulations for safe power unit operation and the NPP SAR, as well as in full compliance with the design and engineering documentation, the operating organization develops

and publishes “Instruction on liquidation of normal operation deviations”, “Instruction on liquidation of design basis accidents” and “Guidelines on beyond design basis accidents management”.

By the start of any stage (substage) of the NPP commissioning the operation organization shall prepare all safety measures and means provided in the preliminary SAR, a program for the NPP commissioning, programs of stages (substages) of the NPP commissioning, programs of start-up and testing works for safety-related systems (elements).

Before delivery of nuclear fuel to the NPP plans of measures on personnel and population protection in case of accident at the NPP shall be developed and ready to be applied, with consideration of radiation effects of beyond design basis accidents.

By the moment of nuclear fuel delivery to the NPP there shall be external and internal emergency plans approved under the established procedure, in accordance with the Regulation on conditions and procedure for the development of emergency plans [61].

During the NPP commissioning the operating organization ensures and support emergency preparedness level for response to accidents and emergencies.

By the start of physical commissioning of the first NPP unit the operating organization shall commission crisis center, as well as basic and backup means of communication with MES, republican regulatory bodies for management of nuclear energy use and regulation of safety in nuclear energy use, local emergency situations management bodies and local executive and public bodies of settlements included in the NPP control area.

To practice actions of the staff in emergency conditions the operating organization develops methods and programs to prepare and perform emergency response trainings, arranges and regularly performs emergency response trainings in accordance with the established schedule.

During professional training of the NPP staff technical means shall be used for them to practice skills for NPP operation, including simulators of various types allowed for NPP staff training. It is necessary to pay special attention to practice of actions for possible deviations, including accidents, in the NPP operation and to account for the operation experience. At the moment study and training center of the Belarusian NPP has started operation with a full-scale simulator.

At the stage of final NPP SAR the regulatory body shall receive schedules of trainings and emergency response practice developed with indicated categories of administrative and operational staff involved in practicing relevant actions in emergency situations and in liquidations of accident effects, as well as with indicated technical means (including simulators) that are to be used for training.

Article 19 (5) Engineering and technical support

Engineering and technical support of the NPP commissioning will be provided by the Russian organizations that implements AES-2006 design in the Republic of Belarus by the following:

testing, start-up, commissioning and support within the warranty period of the NPP operation;

providing services on technical maintenance of the supplied equipment, including consulting, spare parts supply, providing equipment preservation and storage technology, support in maintenance and repairs;

development and coordination of quality assurance programs with the customer of the Belarusian NPP construction;

providing engineering and consulting services to the Belarusian organizations in development of programs and measures for physical NPP protection;

training of Belarusian specialists.

Belarusian regulatory body has signed agreements for consulting services with NIKIMT-Atomstroy JSC and FSUE VO “Safety” (Russian Federation) for cooperation that shall improve level of nuclear, radiation, process and environmental safety.

Article 19 (6) Reporting of incidents significant to safety

In 2013-2016 the Republic of Belarus has not operated nuclear installations that correspond to the definition of the Article 2 of the Convention on Nuclear Safety.

Article 19 (7) Operational experience feedback

In the course of the nuclear installation operation the operating organization shall collect, process, analyze, arrange and store information on failures of safety-related systems elements and wrong staff actions and to deliver this information to any parties involved.

The operating organization shall improve the NPP safety in accordance with plans made with consideration of operation experience and safety analyses to reach target safety parameters.

At the moment the regulatory body is developing regulatory documents on the account for operational experience with regard to the IAEA recommendations and other international standards.

As the Republic of Belarus does not has its own power unit operation experience, it took steps to study the operational experience of other countries and of the mechanisms of its account by the regulatory bodies and operating organizations. Exchange of relevant regulatory and operational experience is made:

on the multilateral basis - on the forums of the international associations of nuclear safety regulators (Belarus joined the RCF as aid recipient in 2012, the WENRA as observer in 2015 and the Forum of the State Nuclear Safety Authorities of the Countries Operating WWER as observer in 2015), Global Network on Nuclear Safety and Security (GNNSS) of the IAEA, World Association of Nuclear Operators (WANO – RUE "Belarusian NPP" joined in 2015);

on bilateral basis – in the framework of the cooperation agreements with Austria, Armenia, Germany, Poland, Russian, France and Ukraine.

Article 19 (8) Management of spent fuel and radioactive waste on the site

Spent nuclear fuel management

Spent nuclear fuel management in the Republic of Belarus is regulated by the Law of the Republic of Belarus "On Use of Atomic Energy", as well as by other regulatory documents [113, 114, 94, 96].

Range of measures to ensure spent nuclear fuel management safety at the Belarusian NPP is included in the design solutions.

After spent nuclear fuel (SNF) is unloaded from the reactor, it is sent into the SNF reactor storage system. The system is a storage pool with all necessary equipment and systems.

SNF reactor storage system is provided for cooling the SNF unloaded from the reactor to reduce activity and afterpower of spent fuel assemblies down to values admissible for their transportation.

SNF storage system provides storage and cooling of SNF in the reactor building for 10 years with consideration of scheduled fuel unloading and core unloading at any moment of the NPP operation.

After SNF is cooled in reactor storage system down to parameters admissible for its transportation, spent nuclear fuel is transported from the reactor building to the plant transfer unit in TK-13 container for further shipping from the NPP territory by special railway train.

In accordance with the agreement between the Russian Federation and the Republic of Belarus of March, 15 2011, SNF will be transferred to the Russian Federation for recycling.

To make balanced decisions on SNF management at state level the SNF management strategy is now being developed for the Belarusian NPP.

Radioactive waste management (RW)

The basic legislative document that establishes requirements to radiation safety for radioactive waste treatment is the Law of the Republic of Belarus "On Radiation Protection of Population" [27].

In the Republic of Belarus there is a range of legislative documents that regulate safety of RW management [120, 130, 136, 103, 144].

Resolution of the Council of Ministers of the Republic of Belarus of June 2, 2015 No.460 introduced the "Strategy of Belarusian NPP Radioactive Waste Management". The Strategy determines ways to develop RW management at the Belarusian NPP, describes how different types of RW will be managed by the Belarusian NPP at all stages of waste lifetime and established the period of disposal unit construction. The Strategy determines resources necessary to achieve the objectives set.

In accordance with the Belarusian NPP design, very low level radioactive waste (VLLW), low-level radioactive waste (LLW) and intermediate level waste (ILW) will be condensed and stored in the NPP storage facilities for 10 years and then transferred for disposal to the RW disposal facility. High-level waste (HLW) will be stored in the NPP storages during the whole NPP lifetime and will be transferred for final disposal during the NPP decommissioning.

In accordance with the Strategy for VLLW, LLW and ILW disposal, surface RW disposal facility is planned to be constructed, while for HLW disposal a geologic repository is planned to be constructed.

At the moment for construction of a surface disposal facility in the framework of state research programs principle construction, process and space-planning solutions are being developed, as well as facility location, its possible environmental impact assessment and forecast for planned technical and economic values to be reached.

Commissioning of the 1st stage of the disposal facility is planned for no later than 2028 to provide disposal of VLLW, LLW and ILW accumulated in the course of 10 years of the NPP operation.

System of radioactive waste management at the NPP is intended for collection, treatment, processing, conditioning, transporting and storing RW formed in the course of the nuclear power plant operation.

During the NPP operation gaseous, liquid and solid waste will be formed.

Solid waste is mainly of VLLW, LLW and ILW categories. Quantity of high-level operational RW will be about 1% of overall quantity of all waste.

Basic objectives of the NPP RW management:

for gaseous waste management - treatment to the state complying with sanitary norms before discharge to the atmosphere;

for liquid RW management - decontamination of liquid RW from radionuclides, concentrating radionuclides in minimum RW volume with further conditioning for conversion of concentrated RW into forms convenient for storage;

for solid RW management - minimization of volumes and safe reliable storage during the design period.

Very low, low and intermediate solid radioactive waste will be packed into metal 200 l containers. High-level solid RW formed due to replacement of in-core detectors and pilot joints cutting will be collected into special metal capsules, loaded into protection containers and transported to the solid RW storage section for storage during the whole nuclear power plant operation period. Liquid radioactive waste will be solidified and put into concrete non-return protection containers.

Estimated average volume of annual solid RW with consideration of their processing for one power unit of the power plant will be:

8 m^3 (40 drums) –for very low level waste (17.6%);

32 m^3 (160 drums) –for low level waste (70.4%);

5 m^3 (50 drums) –for intermediate level waste (11%);

0.5 m^3 – for high level waste (1%).

Estimated volume of treated (solidified) liquid RAE in concrete non-return protection containers for one power unit will be 33 m^3/year (22 containers).

Drums with solid RW and containers with solidified liquid RW are to be stored at the nuclear power plant in special surface capital constructions (one for each power unit).

Estimated volume of formation of solid RW subject to disposal during 60 years of two NPP power units operation is:

960 m^3 – for very low level waste;

3840 m^3 – for low level waste;

600 m^3 – for intermediate level waste;

60 m^3 – for high level waste.

Estimated volume of solidified liquid RAE in concrete non-return protection containers for the nuclear power plant operation period will be about 3960 m^3 (2640 containers).

Thus, during the operation of the nuclear power plant (60 years) formation of 9360 $м^3$ solid RW of various categories and 60 m^3 high-level RW,

System of RW treatment ensures reliable protection of employees (personnel) and population from radiation impact of RW exceeding limits established by legislative and regulatory documents, and prevention of radiation discharge into the atmosphere during RW management in the quantities exceeding maximum admissible values.

CONCLUSION

The system of nuclear and radiation safety establised in the Republic of Belarus continues to be improved with consideration of first nuclear energy program implementation, recommendations of the International Atomic Energy Agency and world's best practices and developments. The Government of the Republic of Belarus, nuclear and radiation safety regulatory body and other involved authorities plan and implement sequential actions, make effort provide financing and other assistance for its development.

In the next three-year period for preparing a national report under the Convention on Nuclear Safety the most important event for the Republic of Belarus will be preparation to commissioning and commissioning of the first power unit of the Belarusian NPP (scheduled for 2018) requiring all state authorities and organizations involved into the implementation of the first country nuclear energy program to be prepared, including:

licensing of operation of the power unit No. 1 of the Belarusian NPP, making safety review and the assessment of the licensee's compliance with the licensing requirements and conditions;

preparation to NPP operation supervision;

preparation to account for operational experience of the Belarusian NPP;

finalizing adjustment of the national emergency response system;

commissioning of the automated radiation situation monitoring system in the environment of the NPP observation area (ARSMS), etc.

The Republic of Belarus keeps its commitment to the developmental principle of safety provision which means continuous search of safety improvement, regardless of how high is the current level. The most important condition of its implementation is international experience exchange provided, among other ways, in the framework of the Convention on Nuclear Safety to support common commitment to the highest nuclear safety level in each country and on regional and international scale.

THE LIST OF BASIC LEGISLATIVE AND REGULATORY DOCUMENTS OF THE REPUBLIC OF BELARUS IN THE AREA OF NUCLEAR AND RADIATION SAFETY

International agreements and contracts concluded by the Republic of Belarus

1. Convention on Early Warning of Nuclear Accident (since 1987).
2. Convention on Assistance in the Case of Nuclear Accident or Radiological Emergency (since 1987).
3. Agreement on Basic Principles of Cooperation in Peaceful Uses of Nuclear Energy signed by countries of Commonwealth of Independent States (1992).
4. Treaty on Non-Proliferation of Nuclear Weapons (IAEA Safeguards) (since 1993).
5. Convention on Physical Protection of Nuclear Material (since 1993).
6. Agreement between the Government of the Republic of Belarus and the Government of the Republic of Poland on Early Warning on Nuclear Accident and Cooperation in the Field of Radiation Safety (1994).
7. Agreement between the Republic of Belarus and International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on Non-Proliferation of Nuclear Weapons (1995).
8. Vienna Convention on Civil Liability for Nuclear Damage (Vienna Convention) (since 1998).
9. Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention) (since 1999).
10. Convention on Nuclear Safety (since 1999).
11. Agreement between the Government of the Republic of Belarus and the Government of the Republic of Austria on the Exchange of Information in the field of Nuclear Safety and Protection from Ionizing Radiation of 09.06.2000
12. Comprehensive Nuclear Test Ban Treaty (since 2001).
13. Agreement between the Government of the Republic of Belarus and the Cabinet of Ministers of Ukraine on Early Notification of a Nuclear Accident and Cooperation in the field of Radiation Safety (2001).
14. Protocol of Amendment to Vienna Convention on Civil Liability for Nuclear Damage (since 2003).
15. Joint Convention on Safe Treatment of Spent Fuel and Safe Treatment of Radioactive Waste (since 2003).
16. Convention on Physical Protection of Nuclear Material (since 2005).
17. Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) (since 2005).
18. Protocol Additional to the Agreement between the Republic of Belarus and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on Non-Proliferation of Nuclear Weapons (signed in 2005, but not yet ratified).
19. Agreement between the Government of the Republic of Belarus and the Government of the People's Republic of China for Cooperation in the Peaceful Uses of Nuclear Energy (2008).
20. Agreement between the Government of the Republic of Belarus and the Government of the Russian Federation on Cooperation in Use of Nuclear Energy for Peaceful Purposes (2009).
21. Agreement between the Government of the Republic of Belarus and the Government of the Russian Federation on Cooperation in Construction of a Nuclear Power Plant on the territory of the Republic of Belarus (2011).
22. Agreement between the Government of the Republic of Belarus and the Government of the Russian Federation on Cooperation in the field of Nuclear Safety (2013).
23. Agreement between the Government of the Republic of Belarus and the Government of the Republic of Armenia on the Exchange of Information and Cooperation in the field of Nuclear Safety and Radiation Protection (2013).

24. Agreement between the Ministry for Emergency Situations of the Republic of Belarus and the State Inspectorate for Nuclear Regulation of Ukraine on cooperation in the field of nuclear and radiation safety (2013).

25. Agreement between the Government of the Republic of Belarus and the Government of the Russian Federation on Early Warning of Nuclear Accidents and Information Exchange in the Field of Nuclear and Radiation Safety (2013).

26. Agreement between the Ministry for Emergency Situations of the Republic of Belarus and the Federal Service for Environmental, Technological and Nuclear Supervision (Russian Federation) on cooperation in the field of nuclear and radiation safety at the use of nuclear energy for peaceful purposes (2013).

Laws of the Republic of Belarus, decrees of the President of the Republic of Belarus

27. Law of the Republic of Belarus of January 5, 1998 “On Radiation Safety of Population”.

28. Law of the Republic of Belarus of 5 May 1998 “On Protection of the Population and Territories from Natural and Man-made Emergency Situations”.

29. Criminal Code of the Republic of Belarus of 9 July 1999.

30. Law of the Republic of Belarus of 10 January 2000 “On Industrial Safety of the Hazardous Production Facilities”.

31. Criminal Code of the Republic of Belarus of 9 July 1999.

32. Decree of the President of the Republic of Belarus of 11 August 2003 No. 359 “On Measures for Improving the Law-making Activity”.

33. Decree of the President of the Republic of Belarus of 29 December 2006 No. 756 “On Certain Issues regarding the Ministry for Emergency Situations”.

34. Decree of the President of the Republic of Belarus of 12 November 2007 No.565 “On Certain Measures for Construction of a Nuclear Power Plant”.

35. Resolution of the Security Council of the Republic of Belarus of 31 January 2008 No. 1 “On Nuclear Power Development in the Republic of Belarus”.

36. Law of the Republic of Belarus of 30 July 2008 "On the Use of Atomic Energy".

37. Decree of the President of the Republic of Belarus of 1 September 2010 No. 450 “On Licensing of Certain Types of Activities”.

38. Decree of the President of the Republic of Belarus of 16 October 2009 No. 510 “On Improvement of Inspection (Supervision) Activities in the Republic of Belarus”.

39. Law of the Republic of Belarus of 9 November 2009 “On State Ecological Expertise”

40. Law of the Republic of Belarus of Law of the Republic of Belarus of 15 July 2010 “On Objects Owned only by the State and Types of Activities Carried out Exclusively by the State “.

41. Decree of the President of the Republic of Belarus of 29 March 2001 No. 124 “On Measures for Implementation of International Treaties in the field of Civil Liability for Nuclear Damage”.

42. Decree of the President of the Republic of Belarus of 15 September 2011 No.418 “On the Location and Design of a Nuclear Power Plant in the Republic of Belarus”.

43. Decree of the President of the Republic of Belarus of 28 February 2011 No.81 “On Adoption of an Amendment to the Convention on Environmental Impact Assessment in a Transboundary Context”.

44. Decree of the President of the Republic of Belarus of 26 July 2012 No. 332 “On Certain Measures for Improvement of Inspection (Supervision) Activities in the Republic of Belarus”.

45. Decree of the President of the Republic of Belarus of November 02, 2013 No.499 “On Construction of the Belarusian Nuclear Power Plant”.

46. Decree of the President of the Republic of Belarus of February, 16 2015 No.62 “On Provision of Safety during the Construction of the Belarusian Nuclear Power Plant”.

47. Decree of the President of the Republic of Belarus of November, 26 2011 No.475 “On Amendments and Additions to the Decrees of the President of the Republic of Belarus”.

Legislative regulatory documents of the Government of the Republic of Belarus

48. Resolution of the Council of Ministers of the Republic of Belarus of April 10, 2001 No.495 “On the State System of Emergency Situations Prevention and Liquidation”.

49. Resolution of the Council of Ministers of the Republic of Belarus of August 23, 2001 No.1280 “On Procedure of Collecting Information in the Field of Public and Territorial Protection from Natural and Technogenic Emergency Situations, and Exchange with Such Information”.

50. Resolution of the Government of the Republic of Belarus of 30.10.2002 No. 1504 "On Cooperation of between the Republic of Belarus and International Organizations”.

51. Resolution of the Government of the Republic of Belarus of 17 May 2004 No. 576 “On Approval of Provisions on the Procedure within the National System of Environmental Monitoring, Fauna Monitoring, Radiation Monitoring and the Use of Monitoring Data”.

52. Resolution of the Government of the Republic of Belarus of 24 June 2006 No. 767 “On Radiation-Hygienic Passport of a User of Ionizing Radiation Sources, on the Order of its Maintenance and Usage”.

53. Provisions on the Ministry of Foreign Affairs of the Republic of Belarus, approved by the resolution of the Government of the Republic of Belarus of 31.07.2006 No. 978.

54. Resolution of the Council of Ministers of the Republic of Belarus of November 19, 2004 No.1466 “On Approving the Regulations on Monitoring and Prediction System for Natural and Technogenic Emergency Situations”.

55. Resolution of the Council of Ministers of the Republic of Belarus of December 31, 2008, No.2056 “On Some Issues of Implementing State Supervision in the Field of Industrial Safety, Nuclear and Radiation Safety”.

56. Resolution of the Council of Ministers of the Republic of Belarus of 30.04.2009 No.561 “On National Commission of the Republic of Belarus for Radiation Protection of the Council of Ministers of the Republic of Belarus”.

57. Resolution of the Government of the Republic of Belarus of 4 May 2009 No. 574 “On Some Issues of Performing Works for Nuclear Energy Use”.

58. Resolution of the Government of the Republic of Belarus of 2 April 2009 г. No. 411 “On Approval of Provisions for the Procedure of Approving, Establishing and Marking of the Borders of Sanitary Protection Zone, Control Area of Nuclear Facility and (or) Storage Facility and Requirement for their Safety and Exploitation”.

59. Resolution of the Government of the Republic of Belarus of 21 January 2010 г. No. 54 “On Some Issues regarding Inviting Foreign Specialists for Teaching in Universities for Preparation of Specialists in the field of Nuclear Power”.

60. Resolution of the Council of Ministers of the Republic of Belarus of May, 19 2010 No. 755 “On Approving the Provision of Environmental Impact Assessment Procedure”.

61. Resolution of the Government of the Republic of Belarus of 27 August 2010 г. No. 1242 “On Approval of Provisions on Conditions and Procedure for Development of Disaster Recovery Plans”.

62. Resolution of the Government of the Republic of Belarus of 27 September 2010 г. No. 1385 “On Approval of Provisions on Physical Protection of Nuclear Power Facilities”.

63. Resolution of the Government of the Republic of Belarus of 7 December 2010 No. 1781 “On Approval of Provisions on Expertise of the Documents Regulating Nuclear and Radiation Safety within the Activities of Using Nuclear Power and Sources of Ionizing Radiation”.

64. Resolution of the Government of the Republic of Belarus of 30 December 2011 г. No. 1791 “On Formation of Working Group for Coordination of State Inspection (Supervision) over the Construction of the Nuclear Power Plant”.

65. Resolution of the Government of the Republic of Belarus of 11 January 2012 г. No. 33 “On Scientific and Technical Support of the Ministry for Emergency Situations and Additions and Amendments to the Resolution of the Council of Ministers of the Republic of Belarus of 28 August 2009 No. 1116”.

66. Unified List of Administrative Procedures, Carried out by the State Bodies and Other Organizations in regard to Legal Entities and Individual Entrepreneurs, approved by the resolution of the Government of the Republic of Belarus of 17 February 2012 г. No. 156.

67. Resolution of the Council of Ministers of the Republic of Belarus of November, 5 2012 "On planning basic organizational measures for construction of nuclear power plant in the Republic of Belarus" (together with the Provision on Interdepartmental commission for coordination of a plan for basic organizational measures for construction of nuclear power plant in the Republic of Belarus and control of its implementation).

68. Resolution of the Government of the Republic of Belarus of November, 28 2014 No. 1118 approved the Provision on system for alert of population, control bodies and forces of the State system of civil defense and prevention and liquidation of emergency situations".

69. Resolution of the Council of Ministers of the Republic of Belarus of 25.02.2015 No.133 "On Approving Regulations on Organization and Implementation of Control (Supervision) over Safety Assurance during the Construction and Commissioning of the Belarusian Nuclear Power Plant".

70. Resolution of the Council of Ministers of the Republic of Belarus of May, 4 2015 No.372 "On Approval of the Provision on Radioactive Contamination Control System".

71. Resolution of the Council of Ministers of the Republic of Belarus of June 2,2015 No.460 "On approving the Strategy of Belarusian NPP Radioactive Waste Management".

72. Resolution of the Government of the Republic of Belarus of 14 October 2010 No. 854 "On Issuing Permits for Performance of Works within the Activities of Using Nuclear Power and Sources of Ionizing Radiation".

73. Resolution of the Council of Ministers of the Republic of Belarus of November, 16 2015 No.956 "On Amendments and Additions to the Resolution of the Council of Ministers of the Republic of Belarus of April, 30 2009 No.562 and of February, 17 2012 No. 156".

74. Resolution of the Council of Ministers of the Republic of Belarus of June, 21 2016 No. 479 "On approving the concept for situation crisis centers system in the Republic of Belarus".

Technical regulatory legislative acts, including

technical regulatory and standardization systems

75. TCP (Technical Code of Practice) 097-2007 "Placement of Nuclear Power Plants. Main Criteria and Safety Requirements".

76. TCP (Technical Code of Practice) 098-2007 "Placement of Nuclear Power Plants. Main Requirements to the Structure and Scope of Study and Research for the Site Selection for Nuclear Power Plant".

77. TCP (Technical Code of Practice) 099-2007 "Placement of Nuclear Power Plants. Guidelines for Development and Content of the Justification for Environmental Safety of Nuclear Power Plants".

78. TCP (Technical Code of Practice) 101-2007 "Placement of Nuclear Power Plants. Guidelines for Development of General Quality Programme for a Nuclear Power Plant".

79. TCP (Technical Code of Practice) 102-2007 "Placement of Nuclear Power Plants. Guidelines for Development of Quality Programme for Nuclear Power Plant Site Selection".

80. TCP 170-2009 "General Provisions on Nuclear Power Plants Safety".

81. TCP 171-2009 "Rules on Nuclear Safety of Nuclear Power Reactors".

82. TCP 263-2010 "Account of Natural and Man-made Impacts on Nuclear Power Facilities".

83. TCP 264-2010 "Rules for Design and Operation of Localizing Safety Systems of Nuclear Power Plants".

84. TCP 294-2010 "Requirements to the Content of a Safety Report on a Nuclear Power Plant with Water-Water Power Reactors".

85. TCP 356-2011 “System of Physical Protection of Nuclear Materials and Facilities. Instruction on organization of design”.

86. TCP 357-2011 “Main Rules on Safety and Physical Protection for Nuclear Materials Transportation”.

87. TCP 358-2011 “System of Physical Protection of Nuclear Materials and Facilities. Design Requirements”.

88. TCP 359-2011 “Requirements to the Quality Programme for Systems of Physical Protection of Nuclear Facilities”.

89. TCP 360-2011 “Regulation on General Requirements to the Systems of Physical Protection of Nuclear Facilities”.

90. TCP 361-2011 “The Procedure for Determining the Level of Physical Protection of Nuclear Facilities”.

91. TCP 389-2012 “Rules on Physical Protection of Ionizing Radiation Sources”.

92. TCP 426-2012 “Rules on Physical Protection of Nuclear Facilities and Nuclear Materials in their Use and Storage”.

93. TCP 476-2013 “Requirements to the Quality Assurance Programme for Scientific and Research Nuclear Facilities. Rules of Structure Formation, Execution and Content”.

94. TCP 501-2013 (02300) “Rules and procedure for the developing report on Safety Case of nuclear materials storage facilities”.

95. TCP 502-2013 “Arrangement of Technical Support of the Regulatory Body. General Provisions”.

96. TCP 503-2013 “Regulations for Siting of Storage Facilities for Nuclear Materials and Radioactive Substances”.

97. TCP 505-2013 “Procedure for Cooperation in the System of Physical Protection of Nuclear Facilities”.

98. TCP 531-2014 “Procedure for Analysis of Nuclear Facilities and Vulnerabilities and Assessment of Physical Protection System Efficiency”.

99. TCP 533-2014 “Rules on Provision of Report Materials for Accounting of and Control of Nuclear Materials to State Competent Body”.

100. TCP 542-2014 “Rules of Design and Operation of Emergency Alert Systems for Self-Supporting Chain Reactions and Arrangement of Measures on Reduction of its Effects”.

101. TCP 545-2014 “Safety of Dry Spent Nuclear Fuel Storage Facilities”.

102. TCP 550-2014 “Safety of Decommissioning of Scientific Nuclear Facilities”.

103. TCP 565-2015 “Rules of Safety at Nuclear Power Plant Radioactive Waste Management”.

104. TCP 566-2015 “Assessment of Frequency of Severe Core Damage (for External Natural and Man-Made Initial Events)”.

acts of the republican control bodies

105. Sanitary Regulations and Standards 2.6.1.8-8-2002 “Basic Sanitary Rules for Radiation Safety (OSP-2002)” approved by the resolution of the Chief State Sanitary Doctor of the Republic of Belarus of 22 February 2002 No. 6.

106. Instructions on submitting information in the field of public and territorial protection from natural and man-made emergency situations approved by the resolution of the Ministry for Emergency Situations of the Republic of Belarus of August 8, 2005 No. 41.

107. Sanitary rules and norms 2.6.1.13-60-2005 “Hygienic Requirements to Radioactive Safety of Personnel and Population during Radioactive Materials (Substances) Transportation” approved by the resolution of the Chief State Sanitary Doctor of the Republic of Belarus of 30 December 2005 No. 284.

108. Instruction for Harmonizing List of IAEA Experts to Inspect Nuclear Facilities in the Republic of Belarus approved by the resolution of the Ministry for Emergency Situations of the

Republic of Belarus, Ministry of Foreign Affairs of the Republic of Belarus, State Security Committee of the Republic of Belarus of April 11, 2005 No.35/3/9.

109. Critical Dose Levels for Making Decisions on Protection Measures during Radiation Accidents approved by the resolution of the Ministry for Emergency Situations, Ministry of Health Protection of the Republic of Belarus of 31 August 2006 No. 41/67.

110. Nuclear Safety Rules for Critical Testing Facilities approved by the resolution of the Ministry for Emergency Situations of the Republic of Belarus of 30 December 2006 No. 72.

111. Nuclear Safety Rules for Subcritical Testing Facilities approved by the resolution of the Ministry for Emergency Situations of the Republic of Belarus of 30 December 2006 No. 72.

112. Safety Assurance Guidelines for Research Nuclear Units approved by the resolution of the Ministry for Emergency Situations of the Republic of Belarus of 30 December 2006 No. 72.

113. Safety Rules for Storage and Transportation of Nuclear Fuel in Spent Fuel Storage and Management Systems Facilities approved by the resolution of the Ministry for Emergency Situations of the Republic of Belarus of 30 December 2006 No. 72.

114. Safety Rules for Storage and Transportation of Nuclear Fuel in Nuclear Facilities approved by the resolution of the Ministry for Emergency Situations of the Republic of Belarus of 30 December 2006 No. 72.

115. Design and Safety Commissioning of Actuation Devices of Means Influencing Reactivity approved by the resolution of the Ministry for Emergency Situations of the Republic of Belarus of 30 December 2006 No. 72.

116. Instruction on Organization of Iodine Prophylaxis in Case of a Radiation Accident at Nuclear Facilities or its Threat approved by the resolution of the Ministry for Emergency Situations, Ministry of Health Protection of the Republic of Belarus of 14 January 2009 No. 3/6.

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